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Research Article

SMILE ATTRACTIVENESS: THE IMPACT OF THE ESTHETIC CRITERIA

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ABSTRACT

Objectives: The aim of this study was to assess the impact of four esthetic criteria on smile attractiveness: smile arc - median maxillary diastema- the longitudinal axis of both central incisors - Facial parameter.
Materials and Methods: Using a visual analog scale, Participants judged online the smile attractiveness of 14 smiles modified according to the parameters chosen.
Results: The results showed that there is a significant difference in the perception of smile between the professional and the non professional group.
Conclusion: On the basis of the results of this study, special attention should be taken to the patient's viewpoint in the treatment.

INTRODUCTION

Our smile plays an important role in physical attractiveness, it is one of the keys of social interaction; it influences personality and the initial impression in relationships. Aesthetic perception varies from person to person. For this reason, professional opinion may not coincide with the perceptions of patients; the difference in the appreciation of the smile by patients and dentists can cause misunderstandings, dissatisfaction of the patient and a failure of prosthetic treatment. In addition of that, there are a lot of esthetic criteria in the literature (such as smile arc, midline position…), but there is aforementioned controversies and lack of supporting scientific evidence of their validity (Dehghani, 2014; Dodds et al., 2014; Janson, 2011). We don't know if common aesthetic parameters between patients andtheir dentists exists to be able to incorporate it systematically in each treatment: Is this criteria considered unattractiveby thelayperson and the dentist in the same time? Is it recognized by all the participants in an aesthetic treatment (Prothodontics, orthodontics, patients...) ?

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As a result, dentists must help patients to make decisions based on treatment needs that is why the knowledge of the influence of some smile components on smile attractiveness is very important for the professional to identify the esthetic preferences of his patient and to judge whether treatment is successful or not. In addition of that, prosthesis usually work on plaster models, rarely with pictures of the whole face, it seemed interesting to assess if the esthetic perception of the smile depends on the face. The objectives of this study were to determine if smile arc, median maxillary diastema, the longitudinal axis of both central incisors and facial parameter have an impact on smile attractiveness by comparing the perception of dentists and laypeople.

We had three hypotheses:

- Laypeople are less discriminating than the professional jury in their perceptions of smile attractiveness.
- Orthodontists and prosthodontics have the same degree of perception.
- Facial attractiveness and smile attractiveness are strongly connected to each other.

Subjects and methods

Our study was based on a photograph of a smiling female with no obvious features. In addition, we used the facial views to test its influence. The original smile was modified using Adobe Photoshop® (AdobeSystems, SanJose, California, USA). Four aesthetic criteria werechosen to test our hypotheses, using these criteria the smile was modified in the following ways:

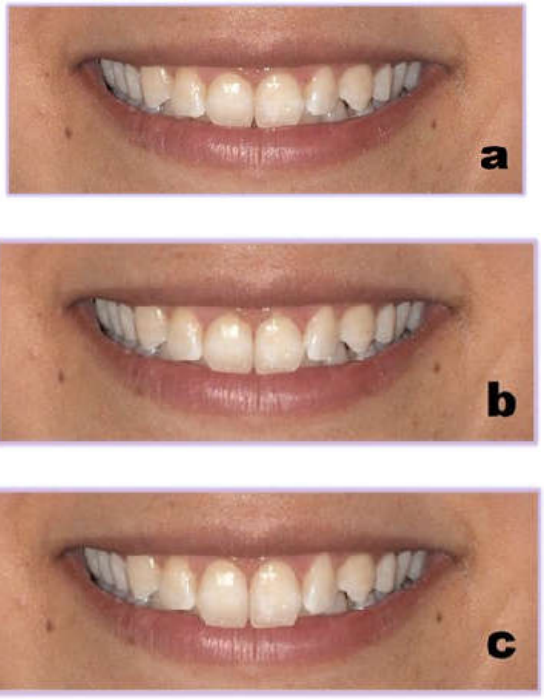

Fig. 1. Smile arc was altered uniformly (a: control; b: 5mm; c: 10mm)

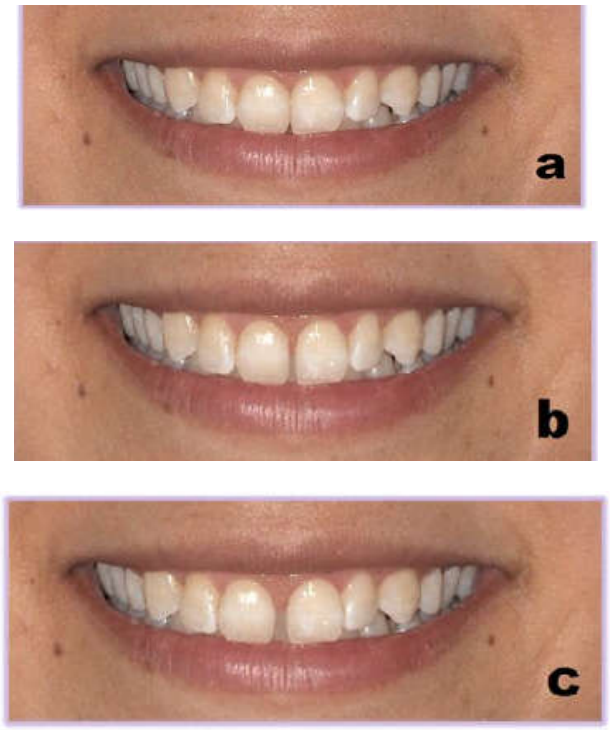

Fig. 2. Diastema between 21 and 11 (a: control; b: 1mm; c: 2mm)

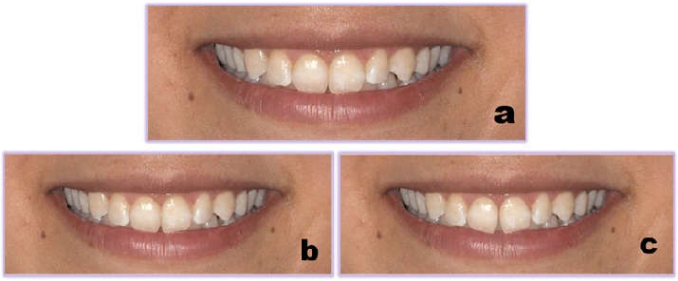

Fig. 3. Modification of the longitudinal axis of both central incisors (a: control; b: 5 degree of rotation; c: 10 degree of rotation)

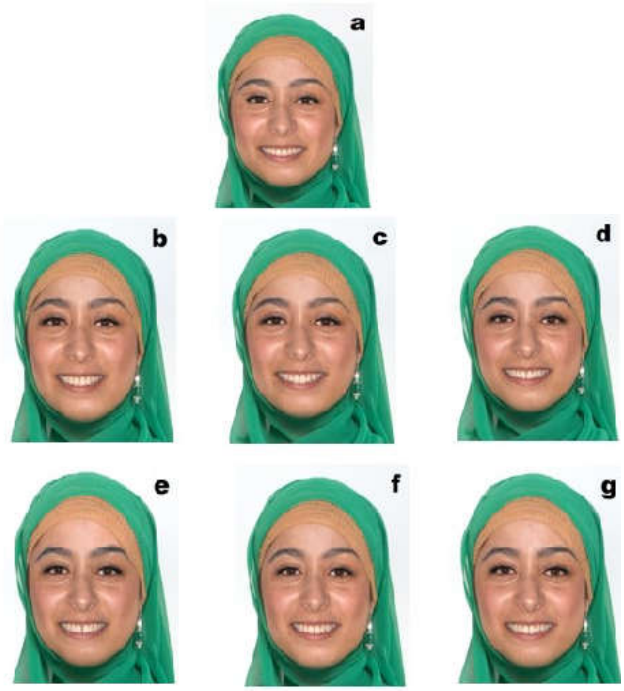

Fig. 4. All the changes were included in the face of the young woman

The modified smiles were compiled in a questionnaire that was administered to the participants for the evaluation of smile attractiveness. The questionnaire contained two parts: smiling photograph and facial photograph .It was sent by email to all participants. Two groups of raters were used in this study: Dentists and laypeople.

- **Professional group:** 40 prosthodontists and orthodontists specialists and graduates of the University of Dentistry. They were selected randomly from lists from the dental school.
- **Laypeople:** 40 student of the university Hassan II Casablanca without dental expertise.

All the participants were informed of the purpose of the study. The protocol passed the ethic committee of the Medical Faculty of Casablanca; the female smiling photograph understood well the objective of our study as well as her rights, she signed her consent. The images included in the. The images included in the questionnaire were coded randomaly by numbers 1 to 14.

Table 1. Results for the smile are (professional/laypeople; SA: smile are)

	Professional group n = 40		Lay people n=40			
	Average	Standard deviation	Average	Standard deviation	P	Significance
SA 5°	5,675	1,32795389	6,825	1,75977126	0,04626582	S
SA 10°	4,3	1,55579974	4,8	2,04061328	0,22177803	NS

Table 2. Results for the smile are (orthodontics vs prosthodontics; AS: smileare)

Modification	Orthodontics		Prosthodontics			
	Average	Standard deviation	Average	Standard deviation	P	significance
SA 5°	5,25	1,332	6,1	1,209	0,04137858	S
SA 10°	4,2	1,507	4,4	1,635	0,68986189	NS

Table 3. Results for the modification of diastema (D: diastema)

	Orthodontics n = 20		Prosthodontics n = 20			
	Average	Standard deviation	Average	Standard deviation	P	significance
D 1mm	4,4	1,23117402	4,25	1,48235233	0,7297324	NS
D 2mm	2,4	1,39170475	2,45	1,57195822	0,9157503	NS

Table 4. Results for the modification of diastema (professional and public group; D: diastema)

	Professional group n = 40		Laypeople n = 40			
	Average	Standard deviation	Average	Standard deviation	P	significance
D 1mm	4,325	1,34712419	5,35	1,86120997	0,04532796	S
D2mm	2,425	1,46563192	3,05	2,36372153	0,16001287	NS

Table 5. Results for the longitudinal axis of both cental incisors (professional and laypeople; R: rotation)

	Professional group n = 40		Laypeople n = 40			
	Average	Standard deviation	Average	Standard deviation	P	significance
R 5°	4,95	1,21844794	4,65	1,84738207	0,39427446	NS
R 10°	3,4	1,46410032	4,9	1,72165692	0,03380092	S

Table 6. Results for the longitudinal axis of both central incisors (orthodontics vs prosthodontics; R: rotation)

	Orthodontics n = 20		Prostodontics n = 20			
	Average	Standard deviation	Average	Standard deviation	P	significance
R 5°	4,8	1,15165784	5,1	1,29370948	0,44343517	NS
R 10°	2,7	1,3803127	3,1	1,51830931	0,01891225	S

A gradual visual scale from 1 to 10 and situated below every picture in the questionnaire was used to estimate the "degree of aesthetics" smiles.Participants were asked to assign a number to each photograph according to their Perception "1: not at all attractive" or " 10: very attractive" . The rate of invalid answers was 8%.

Statistical analysis

The answers to the questionnairesin the server of Google Forms were transposed automatically in Microsoft Excel ® spreadsheet® 2014 (Microsoft Corp, Redmond, WA) without manual manipulation to minimize human transcription errors. Subsequently, these Data were transferred to the statistical analysis software Epi.info 6.04(CDC, Atlanta, Georgia, USA). Data were analyzed using the Student test. A threshold of statistical significance of p = .05 was adopted.

RESULTS AND DISCUSSION

In our study, we tried to compare the perception of public and professional jury. The results of our study showed that, globally, there is a difference of appreciation of aesthetics smile and facial between the two groups .The same result was found in other studies including that of Oshagh (4) in 2013.

Smile arc: we have noted a difference statistically significant when the modification is 5 ° (p = 0.04). We found the same results between orthodontists and prosthodontists; it wasn't significant at 10° (Table1,2). We concluded that the professional jury is harsher than laypeople intheir perceptions of smile arc. The Orthodontists might be expected to detect smaller differences than prosthodontics. These results agree with those found by Badran.S (5) in 2013.

The creation of the maxillary median diastema: With a modification of 1mm we found a statistically significant difference between the professional jury and the public jury (p = 0.04); smiles with 2mm become unattractive for both groups (Table3): Laypeople and dentists prefer smiles with small diastema (1mm). This agrees with the opinions of many other authors; Thomas in 2011(6) and Kokich (4) in 2006 evaluated the effect of the maxillary median diastema; They found that from 2mm of width, the smile was estimated as unsightly by the public jury, however for the professional group; the threshold of attractiveness was lower in 2mm what suits perfectly to our study. From our results we can conclude that the orthodontists and prosthodontists had the same appreciation (Table 4).

The rotation of the longitudinal axis of both central incisors: Our results concerning this criterionshowed a statistically significant difference between the professional jury and the public juryfor a rotation of 10 ° (p = 0, 03) (Table 5) The study of Zlowodzki and his team (8) in 2008 interested only in the axis of the central incisor (rotation of 5 °, 10 °, 15°) showed that the professionals perceive significantly the modification from a rotation of 15 °. On the other hand, the general population does not perceive significantly the modification brought to the smile. The difference wasn't significant between orthodontists and prosthodontists to a rotation of 5 ° but it was statistically significant when the rotation was 10 ° (p = 0.01; Table 6)

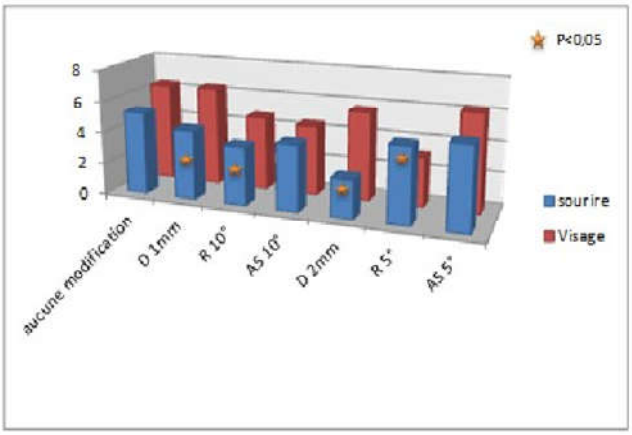

Figure 5a. Histogram of difference of the scores of aestheticism between the photos of smiles and facial photograph (orthodontics)

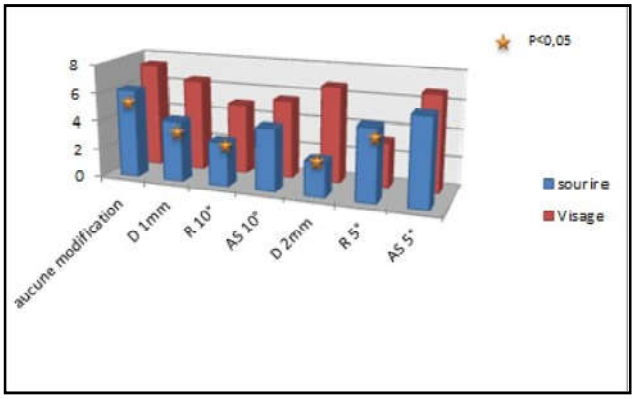

Figure 5b. Histogram of difference of aesthetic scores between the photos of smiles and facial photographs (Prosthodotics)

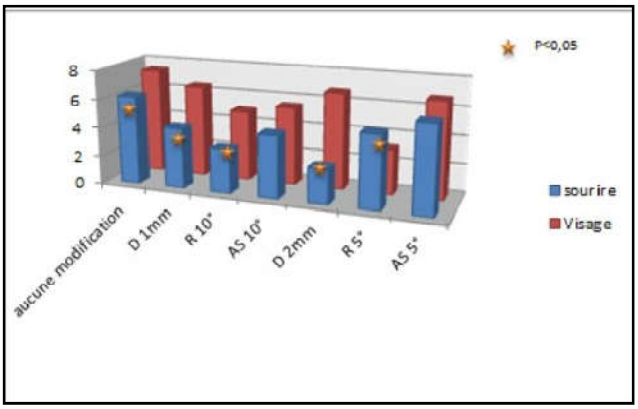

Figure 5c. Histogram of difference of aesthetic scores between the photos of smiles and facial photographs (Lay people)

Facial parameter: The results revealed a statistically significant difference in 71.4% of cases (p <0.05) between different jury (Figure 5a, 5b, 5c) the perception is influenced by all components of the face for all the groups, the judgment becomes less critical for small variations in the dental composition. Zlowodzki and his team in 2008 found the same results (8). It does not seem illogical to find such as conclusion. Our look being influenced by all the components of the face, teeth become only a detail and our judgment will be less critic for small variations of the dental composition. Finally, it is important to emphasize the limitations of this study .The group chosen to represent the public jury consisted of students of

university; they have a high cultural level compared to the others that constitute the Moroccan population. Social dimension can‘t be analyzed in this study.

Conclusion

We concluded that laypeople are less discriminating than professionals in their perceptions of the chosen esthetic criteria, orthodontists remain more demanding that prosthodontists. We were also able to confirm the positive influence of the face with its parameters on the perception of the smile. Thus, the presence of differences of opinion between different groups confirms the importance of the communication between the various participants (dentists and patients) for the success of our treatments.This analytical approach can be applied to other aesthetic criterion of pink and white score and other variables such as age, gender as well as ethnic differences.

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