

Assessment of the most preferred facial profile amongst patients and Orthodontists

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Abstract

Introduction: A key aspect of orthodontic diagnosis and treatment planning is soft tissue evaluation, which includes the assessment of soft tissue-profile esthetics. Inherent facial features as well as extrinsic factors such as hair style, complexion, and makeup have a strong influence on aesthetics, biasing the judgment of profile esthetics. Therefore, investigators have used profile line drawings and profile silhouettes to eliminate the effects of other facial features while studying profile. The aim of the study was to determine the agreement regarding the most preferred facial profile among patients and orthodontists.

Material and Methods: This study was carried out at the outpatient department at Islamic International Dental Hospital from August 2011 to February 2012. A balanced facial profile with class I cephalometric norms was modified with the help of a computer software Viewbox™ 4.0 Software (DHAL Orthodontic Software, Athens, Greece) to generate 7 profiles with variation in maxilla and mandible. Silhouettes of these 7 profiles were ranked by patients and orthodontists (n=80each). A scale of 1-7 was used with 1 being least attractive and 7 being most attractive.

Results: The normal profile (Profile C) was ranked the most attractive and the profile with retrusive mandible the least attractive. Significant difference was found in the agreement of ranking of the most preferred facial profile by the patients and orthodontist (p-value0.001).

Conclusions: Normal (balanced) facial profile was ranked to be the most preferred facial profile by both patients and orthodontists.

Keywords: Soft tissue profile; Esthetics, Facial attractiveness

Introduction

Attention to physical appearance, particularly of the face, has become a very important issue in modern society.¹⁻³ In providing the highest standard of care for the patient, careful communication with the patient concerning esthetic expectations is essential.⁴ The study of the face and the

ability to alter its form has fascinated mankind for thousands of years. A key aspect of orthodontic diagnosis and treatment planning is soft tissue evaluation, which includes the assessment of soft tissue-profile esthetics.³ Studies have been developed in an attempt to define a beautiful face but the definition changes as society and its esthetic values change.⁵⁻⁸ Previous studies of the perception of the face have used various methods of stimulus presentation, such as drawings, caricatures, touched-up photos, and so on to represent faces.⁹ Responses to these stimuli may provide some information but these simulations may be too unrealistic to yield valid results. Furthermore, inherent facial features as well as extrinsic factors such as hair style, complexion, and makeup have a strong influence on aesthetics, biasing the judgment of profile esthetics.¹⁰⁻¹² Therefore, investigators have used profile line drawings and profile silhouettes to eliminate the effects of other facial features while studying profile

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esthetics. Clinicians can only infer from responses to these representations of the soft-tissue configurations and patients may differ significantly from the clinician's inference.

Orthodontists are involved in treatment that affects the facial profile and their perceptions of facial esthetics will influence the treatment plan. Patient's perception of his/her profile is an important indicator of treatment need and may complement conventional clinical measurements.¹³

Unfortunately, clinicians often overlook the fact that a person behaves in response to his/her own perception of facial esthetics. Since self-consciousness about dental and facial appearance is an important factor in the decision to seek orthodontic treatment, it would be of special interest to compare clinician's perceptions of attractiveness with those of the patients.

This information might assist orthodontists in appreciating the importance of individual perception in treatment planning, and actively involving patients in the clinical decision making. Therefore, the purpose of this study was to determine whether there are differences in perception of facial profile among orthodontists and orthodontic patients.

Material and Methods

After approval of the institute's ethical committee, informed written consent was taken from all the participants who took part in the study. Lateral cephalogram of a Pakistani woman with normal occlusion, balanced facial profile and normal cephalometric values were taken in the natural head position, unstrained lips and teeth in centric occlusion. The radiograph was scanned with HP Scanjet 2400 Scanner in JPEG format with 24 bit color, 150 dpi (dots per inch) and 1200 x 1600 pixels. The scanned image of the lateral cephalogram was imported and digitized using computer-assisted simulation system for orthognathic surgery Viewbox™ 4.0 Software (DHAL

Orthodontic Software, Athens, Greece).The original image (NP-1) for the female subject was used to generate 6 other manipulated images by altering the hard tissue cephalometric normative values by at least 2 standard deviations. The facial profile images were digitally manipulated in the anteroposterior plane with little or no changes to the vertical plane. This was carried out so that each generated profile has a normal vertical proportion. This set of 7 profiles accounted for the possible anteroposterior growth variations of the maxilla only and mandible only. Each image had only 1 skeletal or bimaxillary dental component manipulated. The computerized profile images were transferred into Microsoft Paint (Redmond, Washington) and converted to solid black silhouettes labeled with identification numbers only. The profile silhouettes (Figure 1, A-C) were extended from above soft tissue glabella to just below the throat point.

A specially designed questionnaire with female profile silhouettes was given to patients and orthodontists (n=80). These silhouettes were arranged in a random order on the questionnaire so that chances of bias were minimal. The respondents were asked to rank the 7 profiles on a scale of 7 (very attractive) to 1 (least attractive) without any repeat of rank. The profile that scored the highest for both orthodontists and patients was recorded and then agreement between them was calculated using chi-square test SPSS Data package 21.



Fig 1A: lateral profile view

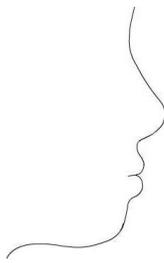


Fig 1 B: Outline of facial profile

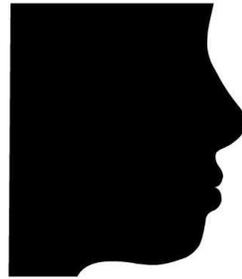


Fig 1 C: Silhouette of facial profile

| | | | |
|-----------|--------------|------|------|
| Profile D | patient | 2.45 | 1.45 |
| | orthodontist | 2.65 | 1.62 |
| Profile E | patient | 2.37 | 1.58 |
| | orthodontist | 2.62 | 1.87 |
| Profile F | patient | 4.88 | 1.59 |
| | orthodontist | 4.12 | 1.68 |
| Profile G | patient | 3.31 | 1.60 |
| | orthodontist | 3.10 | 1.39 |

Results

Of the 160 participants 43.8% were males and 56.3% were females. The 160 respondents were divided into two groups of orthodontists and patients. There were 25 % male patients and 75 % female patients and 62.5 % male orthodontists and 37.5% female orthodontists. The mean age of patients was 18.88 ± 5.11 years and orthodontists were 33.95 ± 6.81 years.

Table I: Mean ranks of facial profiles

| Profiles | Mean Rank | Mode | Std. Deviation |
|---------------------|-----------|------|----------------|
| profile A | 4.081 | 4.00 | 1.48 |
| profile B | 4.975 | 6.00 | 1.52 |
| profile C | 6.025 | 7.00 | 1.52 |
| profile D | 2.550 | 1.00 | 1.54 |
| profile E | 2.500 | 1.00 | 1.73 |
| profile F | 4.506 | 6.00 | 1.67 |
| profile G | 3.206 | 2.00 | 1.50 |
| Experience in years | 6.200 | 2.00 | 4.30 |

Table II: Mean scores of facial profiles according to type of respondent

| Profiles | Respondents | Mean Rank | Std. Deviation |
|-----------|--------------|-----------|----------------|
| Profile A | patient | 3.81 | 1.57 |
| | orthodontist | 4.35 | 1.34 |
| Profile B | patient | 5.25 | 1.64 |
| | orthodontist | 4.70 | 1.35 |
| Profile C | patient | 5.67 | 1.59 |
| | orthodontist | 6.37 | 1.36 |

Table III: comparison of agreement of preferred profile (score=7) between orthodontists and patients

| PROFILES | PATIENTS n=80 Agreement of scores | | ORTHODONTIST n=80 Agreement of scores | | P-value * |
|-----------|--------------------------------------|---------------|--|-----------------|-----------|
| | No (score < 7) | Yes (score=7) | No (score < 7) | Yes (score = 7) | |
| Profile A | 76(95%) | 4(5%) | 79(98.75%) | 1(1.25%) | 0.184 |
| Profile B | 60(75%) | 20(25%) | 76(95%) | 4(5%) | 0.0001 |
| Profile C | 42(52.5%) | 38(47.5%) | 23(28.75%) | 57(71.25%) | 0.001 |
| Profile D | 80(100%) | 0(0) | 79(98.75%) | 1(1.25%) | 0.500 |
| Profile E | 79(98.75%) | 1(1.25%) | 77(96.25%) | 3(3.75%) | 0.310 |
| Profile F | 67(83.75%) | 13(16.25%) | 76(95%) | 4(5%) | 0.01 |
| Profile G | 77(96.25%) | 3(3.75%) | 79(98.75%) | 1(1.25%) | 0.310 |

* Test of significance chi-square

Table IV: Comparison of preferred facial profile according to gender of respondent

| PROFILE | GENDER | PATIENTS | | ORTHODONTISTS | | P-VALUE |
|---------|--------|-----------|-----------|---------------|-----------|---------|
| | | SCORE < 7 | SCORE = 7 | SCORE < 7 | SCORE = 7 | |
| A | Male | 19 | 1 | 50 | 0 | 0.28** |
| | Female | 57 | 3 | 29 | 1 | 1.00** |
| B | Male | 15 | 5 | 46 | 4 | 0.10** |
| | Female | 45 | 15 | 30 | 0 | 0.005* |
| C | Male | 9 | 11 | 15 | 35 | 0.27* |
| | Female | 33 | 27 | 8 | 22 | 0.01* |
| D | Male | 20 | 0 | 49 | 1 | 1.00** |
| | Female | 60 | 0 | 30 | 0 | *** |
| E | Male | 20 | 0 | 47 | 3 | 0.55** |
| | Female | 59 | 1 | 30 | 0 | 1.00** |
| F | Male | 17 | 3 | 49 | 1 | 0.06* |
| | Female | 50 | 10 | 27 | 3 | 0.532** |
| G | Male | 20 | 0 | 50 | 0 | *** |
| | Female | 57 | 3 | 29 | 1 | 1.00** |

* Test of significance chi-square, ** Test of significance Fischer exact, *** not valid

Percentages were calculated for gender and the agreement for the most preferred facial profile as ranked by orthodontists and patients. Chi square test was used to determine the difference in most preferred profile in two groups. Statistical significance was set at $P < 0.05$.

Of the seven profiles, the normal profile (Profile C) was ranked the most attractive and the profile with retrusive mandible (Profile E) was ranked the least attractive (Figure 2, 3). Overall score was the highest for Profile C and was the most preferred facial profile as ranked by the patients and orthodontists as shown in (Table I & II).

Out of the seven profiles ranked the maximum score in both groups was given to Profile C. However Orthodontists ranked (Profile C) relatively more attractive than the patients.

Significant difference was found in the agreement of ranking of the most preferred facial profile by the patients and orthodontist. (Table III)

There was a significant difference in the agreement of ranks given by female respondents in both groups to Profile C. Female patients gave higher scores for Profile C. (Table IV)

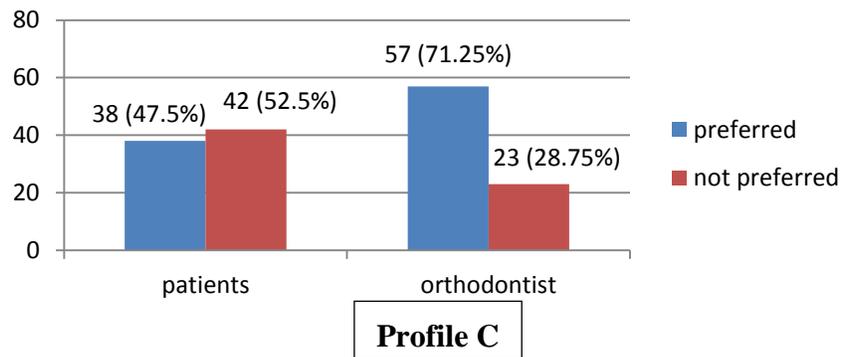


Figure 2: Most preferred facial profile according to type of respondent

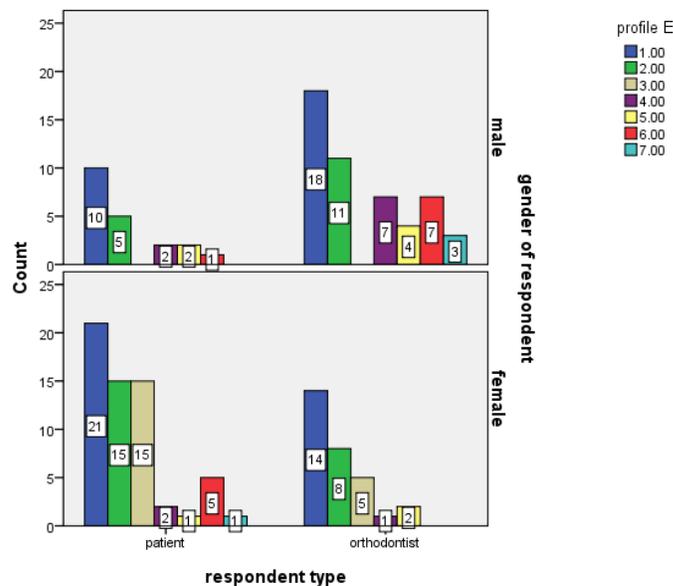


Figure 3: Scores given to the least preferred facial profile according to type and gender of respondent

Discussion

In contrast to the previous studies, improvements in research methodology were made in this study by using silhouettes of facial profiles of females in place of profile photographs. Furthermore, the modified profiles included images from manipulation of the maxilla, the mandible by two standard deviations to account for the different skeletal Class II and III patterns with an isolated single as well as a double jaw discrepancy.

As growth modification of maxillo-mandibular complex is planned for growing patients and more adults seeking orthodontic treatment are opting for orthognathic surgery, male and female respondents from all ages were included in the patient's group. The digital images were converted to silhouettes to eliminate any possible influence of skin, complexion facial features and hair color. The manipulated profile images were generated without extreme anteroposterior hard tissue movements to provide the more realistic soft tissue profiles encountered in clinical practice. The order of arrangement was kept random between profiles to prevent profile pattern recognition during the assessment.

Profile C was perceived to be the most attractive, whereas mandibular retrognathism was perceived to be the least attractive by both groups. The patient's perceptions coincided with those of Mantzikos and Lew et al regarding the extreme limits of facial attractiveness.^{14, 15} Normal profile was ranked the highest by both groups.

The mean ranks given to Profile C by orthodontists were found to be significantly higher when compared with patients. This showed a tendency for orthodontists to perceive Profile C (normal profile) to be more attractive than patients, although both groups generally ranked Profile C most attractive. A straight profile is normally associated with a Class I appearance and literature supports a straight profile to be a more desirable treatment outcome.¹⁶ The orthodontist's

ratings for the Class I profile were significantly higher than the patient's exemplifying the emphasis that professionals place on the profile and their bias for the Class I profile in particular. These findings for a general preference of a Class I profile agree with other studies.¹⁷

This study agrees with Philips et al who also proved Class I profile to be the most attractive as perceived by patients, orthodontists and oral surgeons.¹⁸

Similarly another study confers to the present finding.¹⁹ Previous studies investigating preference of facial profile in other races concluded that both whites and African Americans (orthodontists and lay people) prefer straighter profiles.²⁰

As the scores given to the most preferred facial profile were higher by orthodontists, there is a possibility that media exposure and overseas specialist training in Western countries has influenced their perceptions.²¹

Manipulation of a single jaw per image would help identify whether a maxillary or a mandibular discrepancy was more critical in influencing the perception of facial esthetics. It is obvious from this study that profiles with maxillary or mandibular retrusion were perceived to be less attractive than profiles with maxillary or mandibular protrusion. This finding is similar to the findings of a previous study suggesting that the retrusion of either jaw is more critical than the protrusion of jaws in evaluations by both orthodontists and patients.²²

The respondents in patients group were predominantly females. This shows that females seek orthodontic treatment for improvement of facial profile more than the males. In our study there was a significant difference in the ranking of female patients and female orthodontists for Profile C. They were more critical about the most preferred facial profile. Numerous studies have investigated the effects of facial appearance of females on marriage, persuasive ability,

politics, employment, advertising, criminality and academic performance.

Conclusions

Normal (balanced) facial profile was ranked to be the most preferred facial profile by both patients and orthodontists. The morphed profiles were obtained by using computer software that uses algorithmic changes based on data from previous studies. Even with this sophisticated technique, algorithmic changes using ratios can give a general appearance of the expected treatment outcome but cannot estimate for the individual variation that would be expected if each photograph represented a real patient with the specific skeletal deformity. Improvement in the study could include the development of a more comprehensive scale for measuring facial attractiveness, increasing the number and types of respondents and age groups would enable the results to be generalized to other populations.

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