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Assessment of Psychosocial Impact of Dental Aesthetics

Munizeh Khan and Mubassar Fida

ABSTRACT

Objective: To assess the psychosocial impact of dental aesthetics using the 'Psychosocial Impact of Dental Aesthetics Questionnaire' (PIDAQ) and self-rated Aesthetic Component (AC) of the Index of Orthodontic Treatment Need (IOTN).

Study Design: Cross-sectional study.

Place and Duration of Study: Dental Section, the Aga Khan University Hospital, Karachi, from August to September 2006.

Methodology: Adults with no prior orthodontic treatment were asked to complete a modified version of the 'Psychosocial Impact of Dental Aesthetics Questionnaire' (PIDAQ). A total of four variables including 'Dental Self-confidence', 'Social impact', 'Psychological impact' and 'Perceived orthodontic treatment need' were assessed by a series of statements, whereas dental aesthetics were assessed by the respondents using the IOTN Aesthetic Component (self-rated IOTN-AC). Kruskal-Wallis's test was applied to determine significance.

Results: The respondents were 120 adults (70 females and 50 males; mean age 25.8 years), all four of the above-mentioned variables measuring psychosocial impact showed positive and significant correlations with the perceived severity of malocclusion as depicted by the Aesthetic Component (AC) of Index of Orthodontic Treatment Need (IOTN), with p-value of less than 0.01 for all variables.

Conclusion: The results indicate the strong psychosocial impact of altered dental aesthetics on the emotional state of an individual. The association between self-rated IOTN-AC grading with psychosocial well-being stands established, indicating that the perceived aesthetics of malocclusion may be as significant a factor in determining treatment need as the degree of malocclusion.

Key words: *Psychosocial impact. Dental aesthetics. Index of orthodontic treatment need.*

INTRODUCTION

Personal aesthetic perceptions of the dentofacial complex and the associated psychosocial impact are of great consequence to orthodontic patients. The face is the most readily apparent feature and thus is said to be the most important physical characteristic in the development of self-image and self-esteem, as positive social interactions have been shown to result in better interpersonal relationships and more self-confidence.^{1, 2}

As malocclusion, particularly that present in the anterior region, is often conspicuous, it may elicit unpleasant social reactions and a poor self-concept.³⁻⁵ Maggregor stated that: "a disfiguring malocclusion is a physical handicap since it limits a person's social stereotype and opportunities".⁶ Being part of a social network, there is an inherent need for one to feel accepted. Any significant deviations from the norm may result in feelings of insecurity related to appearance, inhibition in social contacts, and comparison of self with others

considered to be 'superior', all of which may negatively affect the quality of life of the individual.⁷⁻⁹

Orthodontic treatment may be more often influenced by demand than by need.^{10,11} In the past, the need for orthodontic treatment was assessed from a strictly professional perspective, taking on a more paternalistic approach from the caregiver. However, several studies have stated that self-perceived dental appearance is also important in the decision to seek orthodontic attention.^{11,12} Different scales, such as the Index of Orthodontic Treatment Need (IOTN), the Dental Aesthetic Index (DAI), and the Index of Complexity Outcome and Need (ICON) were developed as a scoring system for malocclusion, and may be used to screen potential patients.^{10,13,14}

The IOTN is a scoring system that ranks malocclusion based on occlusal traits for oral health and aesthetic impairment.¹³ The Aesthetic Component (AC) of the IOTN has commonly been used to evaluate treatment need on aesthetic grounds assessed by dentists (operator-rated) or patients (self-rated).^{15,16} However, since it is an accepted fact that psychosocial consequences due to unacceptable dental aesthetics may be as serious, or even more serious, than the biologic problems, the indices currently in use have been criticized as lacking a psychosocial component.^{5,10,17}

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Philosophers studying the concept of self conclude that although self-esteem develops throughout life, it is our experiences during childhood that play a great role in the later years, as we build an image of self from experiences in different situations and with different people.² The 'psychosocial impact' of malocclusion is a phenomenon that may provoke an emotional reaction manifested as insecurities related to appearance, inhibition in social contacts, feelings of unhappiness and comparison of self with others.^{4,9} The correction of the appearance of teeth is a major motivating factor for most orthodontic patients; however, it is only recently that psychosocial factors such as those evaluating self-image have been incorporated into evaluations of malocclusion. As orthodontic patients need to be recognized more as individuals rather than a set of malaligned teeth, it is necessary to determine the psychosocial impact of a presenting malocclusion. The present study was undertaken with the objective to determine the psychological as well as social impact of dental aesthetics using the 'Psychosocial Impact of Dental Aesthetics Questionnaire' (PIDAQ) and self-rated Aesthetic Component (AC) of the Index of Orthodontic Treatment Need (IOTN).

METHODOLOGY

This was a cross-sectional study conducted from August to September 2006 at the Dental Section, the Aga Khan University Hospital, Karachi. The study group consisted of post-graduate trainees, interns, medical students, nursing staff, patient attendants and orthodontic patients at the start of treatment, who met the inclusion criteria of being above 18 years of age and having no previous history of orthodontic treatment. The exclusion criteria included orthodontic patients already on treatment, and presence of craniofacial syndromes or anomalies.

The questionnaire used in this study consisted of an item pool based on previous research investigating dental aesthetics and oral health-related quality of life questionnaires.^{15,17} The 'Psychosocial Impact of Dental Aesthetics Questionnaire' (PIDAQ) developed by Klages *et al.* was slightly modified for this study.¹⁷ A segment was also incorporated to determine subjective orthodontic treatment need, as developed by Grzywacz.¹⁵ The reliability analyses of the four factorial analysis-derived scales were highly consistent as confirmed by Cronbach's α values ranging from 0.85-0.91.¹⁷

The questionnaire was self-administered by the subjects, with the Likert scale being used to rate the responses on a scale ranging from 0 (total disagreement) to 4 (total agreement). A total of four variables including 'Dental Self-confidence', 'Social impact', 'Psychological impact' and 'Self-perceived orthodontic treatment need' were assessed by a series of relevant statements (Annexure-I and Proforma).^{15,17}

Dental aesthetics were assessed using the IOTN Aesthetic Component (AC).¹³ The subjects were presented with 10 black and white photographs of anterior teeth displaying varying degrees of malocclusion (Annexure I), and were asked to indicate which grade of photograph (1 to 10) they thought most closely resembled their own dentition. There was no time limit given to the participants for the self-rating of AC. The IOTN-AC self-rating was then used in grouping the subjects; respondents denoting themselves as a particular IOTN-AC grade were categorized into respective groups.

The Kruskal-Wallis test was applied to determine differences between the mean scores for all the subject groups (1 to 4+) for each of the four variables under study. P-value equal to or less than 0.05 was taken as statistically significant. Statistical analyses were performed using SPSS for Windows (version 14.0). Owing to small cell counts, subjects rating themselves as IOTN-AC grade 4 and higher were pooled together (comprising Group 4+).

To assess the psychosocial impact of dental aesthetics on the emotional state of an individual, the mean values were compared amongst the four subject groups for each of the variables.

RESULTS

The sample consisted of 120 adults with a mean age of 25.8 years (SD \pm 3.4 years), and a predominantly female composition (58%). The study group consisted of post-graduate trainees (52%), nursing staff (24%), medical students (9%), interns (6%), patient attendants (6%) and orthodontic patients at the start of treatment (3%).

Of the total sample, 30.8% respondents rated their dental appearance as IOTN-AC grade 1 (constituting Group 1), 35% placed themselves as IOTN-AC grade 2 (Group 2), 20.8% rated themselves as IOTN-AC grade 3 (Group 3), whereas only 13.3% of the subjects rated their dental aesthetics as IOTN-AC grades 4 to 10.

'Dental Self-confidence' was found to be highest for subjects rating themselves as IOTN-AC grade 1 (mean score 12.9), and lowest for IOTN-AC grades 4 and above (mean score 4.2), with IOTN-AC grades 2 and 3 scoring in between (mean scores 9.7 and 8.0 respectively) as shown in Figure 1a, showing highly statistically significant differences between the groups ($p=0.000$).

'Social impact' was greatest for respondents scoring themselves as IOTN-AC grades 4 and above (mean score 8.7), and least for those evaluating their dental appearance as IOTN-AC grade 1 (mean score 2.2), with IOTN-AC grades 2 and 3 again scoring in between with mean scores of 3.8 and 5.0 respectively, as shown in Figure 1b ($p=0.002$).

'Psychological impact' was found to be of highest in individuals who rated themselves as resembling IOTN-AC grades 4 and above (mean score 14.6), and lowest in those rating themselves as IOTN-AC grade 1 (mean score 5.7), followed by IOTN-AC grades 2 and 3 (mean scores 9.3 and 10.2 respectively) as shown in Figure 1c ($p=0.000$).

'Self-perceived orthodontic treatment need' was determined to be highest in IOTN-AC grades 4 and above (mean score 4.6), progressively decreasing along the IOTN-AC scale (mean score 3.6 for IOTN-AC grade 3 and 3.5 for grade 2), and being the least for IOTN-AC grade 1 (mean score 2.8), being significantly different amongst the groups ($p=0.004$) as shown in Figure 1d.

increasing grades of the AC (signifying poor dental aesthetics) with decreasing psychosocial well-being.

With respect to IOTN-AC grading as perceived by the subjects themselves (self-rated IOTN-AC), it was found that the majority of raters placed themselves as IOTN-AC grade 2 (35%), followed by IOTN-AC grade 1, IOTN-AC grade 3, and the least number of respondents placed themselves as IOTN-AC grades 4 or higher. Klages *et al.* found that although the greatest number of subjects evaluated themselves as IOTN-AC 1 (33.5%), only 8.8% of respondents placed themselves as IOTN-AC grades 4 or above.¹⁷ Kerosuo *et al.* also demonstrated skewed distributions in their study done on Arab high school students, with the least number of

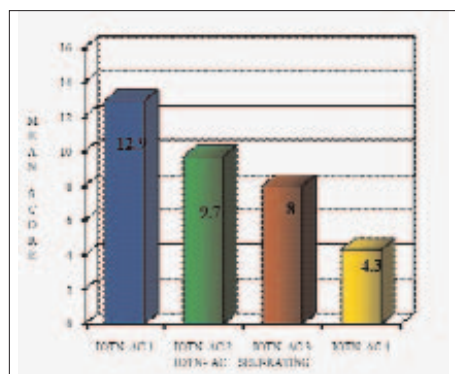


Figure 1a: Dental self-confidence.

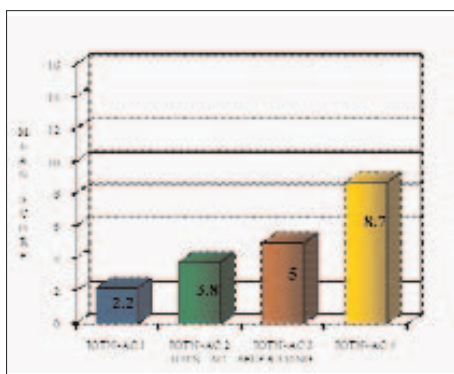


Figure 1b: Social impact.

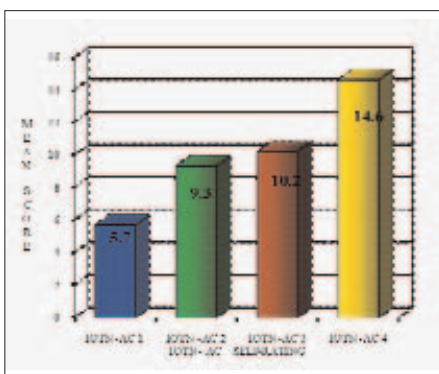


Figure 1c: Psychological impact.

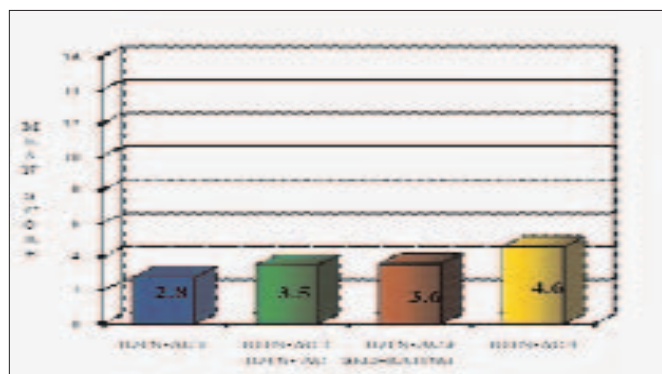


Figure 1d: Self-perceived ortho-dontic treatment need.

DISCUSSION

Assessment of psychosocial factors of malocclusion has usually concentrated on children, and only recently have psychosocial evaluations been considered an important part of the orthodontic examination in adults.^{1,3,4,7, 9, 12,17-19} Although several indices have been developed to allow categorization of malocclusion according to the level of treatment need, they are usually used in countries where public programs provide orthodontic care or a system of third party co-payment exists, and lack of psychometric analysis.⁵ Many studies have used the IOTN-AC as a data collection tool, none have so far aimed to seek association between

subjects placing themselves in the 'borderline to great treatment need' groups based on self-rated IOTN-AC scores.¹⁸ All these studies have been done on small samples and hence cannot be used to predict the prevalence of malocclusion in a community, but the results could be perceived to indicate a comparatively lower ratio of individuals with higher degree of dental aesthetic impairment.

For each of the variables, namely, 'Dental Self-confidence', 'Social impact', 'Psychological impact' and 'Perceived orthodontic treatment need', the comparison between mean values amongst the four subject groups (self-rated IOTN-AC 1 to 4+) clearly indicate the strong psychosocial impact of altered dental aesthetics.

'Dental Self-confidence' indicates the level of satisfaction or dissatisfaction with the appearance of one's dentition, and aims to measure the influence of dental aesthetics on the self-image of an individual. The appearance of the mouth and smile plays an important role in assessment of facial attractiveness, which undoubtedly contributes to self-concept and self-esteem.¹⁻³ The results of the present study suggest a trend of decreasing dental self-confidence with increasing levels of altered aesthetics, as perceived by the respondents themselves using the IOTN-AC. Klages *et al.* showed similar results in their study, corroborating

that a set of well-aligned teeth (as depicted by lower scores on the IOTN-AC scale) may be associated with more favourable oral-health attitudes, and a higher degree of satisfaction regarding dental attractiveness resulting in better self-concept.^{17,19}

'Social impact' aims to assess the potential problems an individual may face in social situations due to a subjectively unfavourable dental appearance. Previous studies have observed that individuals perceived to be attractive are more likely to experience positive social interactions and evaluations by their peers.¹⁻³ Klages *et al.* have demonstrated a direct effect of dental aesthetics on all 'oral health-related quality of life scale values, with a greater social appearance concern in individuals with poor dental aesthetics.^{9,17} In the present study, an increasingly high social impact has been noted in respondents denoting themselves as IOTN-AC grades 4 and above, highlighting the negative influence of unpleasant aesthetics in social interactions. This may be explained by the phenomenon of 'social-comparison' whereby facial-appearance related self-concept may be affected to the extent of being a social handicap.³ According to Onyeaso *et al.* over 40% of respondents reported feeling less confident as a result of their malocclusions, with normal activities restricted in some of the subjects including laughing in public, meeting people and forming close relationships.²⁰

'Psychological impact' evaluates feelings of inferiority or unhappiness related to an individual's comparison of self with others. According to Tung and Kiyak, "researchers have consistently found that self-concept is related more to the individual's perceptions of others' evaluations than to objective evaluations by others".³ Onyeaso *et al.* have reported depression related to altered dental aesthetics in 27% of their subjects.²⁰ The highly statistically significant group differences in the study shows the relationship of diminishing psychological well-being with increasingly poor dental aesthetics. Klages *et al.* show results in parallel to ours, with IOTN-AC grades 1 to 4 and above demonstrating an increasing trend of psychological effect along the IOTN-AC spectrum.¹⁷

'Perceived orthodontic treatment need' assesses the subjective need for orthodontic attention, and as the results indicate, is found to be highest in individuals classifying themselves as IOTN-AC grade 4 and above. The association of a greater self-perceived treatment need with increasing severity of malocclusion has also been shown by Mandall *et al.* who concluded that children who are teased about their teeth are more likely to receive orthodontic treatment.²¹ Onyeaso *et al.* reported that 56.6% of all their subjects reported for orthodontic treatment for aesthetic purposes.²⁰

The 'Dental Self-confidence' and 'Psychological impact' scales demonstrated the strongest differences between the IOTN-AC groups under consideration; these results are parallel to those attained by Klages *et al.*,¹⁷ demonstrating that social and psychological effects of dental aesthetics are independent factors. The group differences in the 'Social Impact' and 'Perceived orthodontic treatment need' scales were smaller but still significant.

Varela and Garcia-Camba reported no significant changes in self-concept and particularly in self-esteem after orthodontic treatment.²¹ Several studies have demonstrated the detrimental effects of altered dental aesthetics on the emotional state of an individual.^{3,9,17,18,22} The results from this study are also conclusive in denoting the psychological as well as social impacts of malocclusion, with an inverse association being perceived between the IOTN-AC grading with psychosocial well-being. Thus, the IOTN-AC may be considered an effective tool in assessing the psychosocial impact of dental aesthetics.

CONCLUSION

It seems prudent to endorse the benefits of orthodontic treatment based on the need as assessed normatively by the orthodontist and subjectively as perceived by the patient.

The association between self-rated IOTN-AC grading with psychosocial well-being stands established, indicating that the perceived aesthetics of the malocclusion may be as significant a factor in determining treatment need as the degree of malocclusion. Although, the AC is effective in determining the detrimental effects of altered dental aesthetics, the recommendations for an index incorporating a psychometric scale for assessment of orthodontic-specific aspects of quality of life still stand strong.

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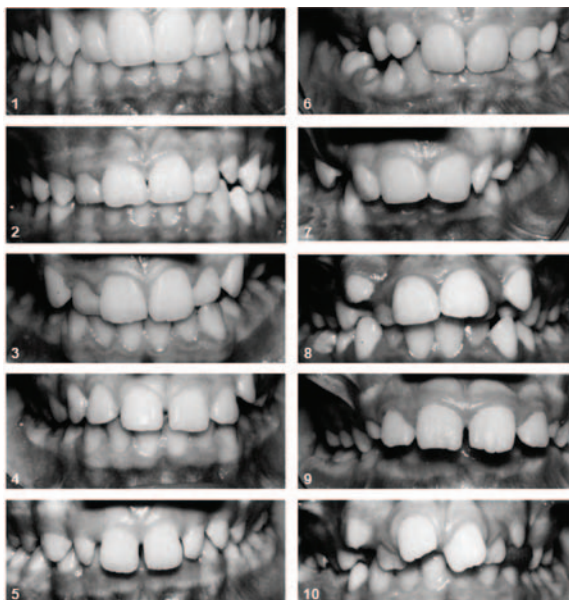
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ANNEXURE I

According to the 10 black and white photographs of anterior teeth shown to you, which photograph do you feel resembles your dentition most closely?

- | | | | | |
|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|------------------------------------|
| <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| <input type="checkbox"/> 6 | <input type="checkbox"/> 7 | <input type="checkbox"/> 8 | <input type="checkbox"/> 9 | <input type="checkbox"/> 10 |



PROFORMA

Psychosocial impact of Dental Aesthetics Questionnaire

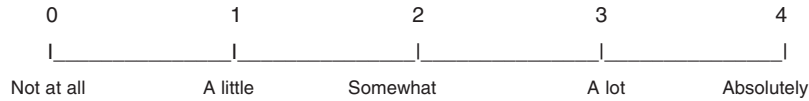
NAME :

AGE:

DESIGNATION:

GENDER:

Please rate the following statements according to the scale provided below:



- I am satisfied with the appearance of my teeth _____
- I am pleased when I see my teeth in the mirror _____
- I find my tooth position to be very pleasing _____
- I like to show my teeth when I smile _____
- Others often comment on how nice my teeth look _____
- I hold myself back when I smile so my teeth don't show so much _____
- I am sometimes concerned what people might think about my teeth _____
- I'm afraid other people could make offensive remarks about my teeth _____
- I am somewhat inhibited in social contacts because of my teeth _____
- I sometimes hold my hand in front of my mouth to hide my teeth _____
- Sometimes I think people are staring at my teeth _____
- Remarks about my teeth irritate me even when they are meant jokingly _____
- I sometimes worry about what members of the opposite gender think about my teeth _____
- Sometimes I am somewhat unhappy about the appearance of my teeth _____

- I envy the nice teeth of other people _____
- I think most people I know have nicer teeth than I do _____
- I wish my teeth looked better _____
- I wish my smile was more like the models in magazines/ on TV _____
- I don't like to see my teeth in the mirror _____
- I don't like to see my teeth in photographs _____
- Do you think healthy and well arranged teeth are important for your appearance?
 Yes No
- Is there anything you would like to change about your teeth?
 Yes No
If yes, what would you like to change:
 Colour Size Arrangement
 Others (specify) _____
- Has anyone ever suggested orthodontic treatment to you?
 Yes No
- Do you think you should have orthodontic treatment?
 Yes No