

## Assessment of Psychosocial Impact of Dental Aesthetics in Adult Patients visiting AFID

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### ABSTRACT

**Objective:** This study aims to evaluate the psychosocial impact of dental aesthetics by using the Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ) and self-rated Aesthetic Component (AC) of the Index of Orthodontic Treatment Need (IOTN).

**Materials and Methods:** A cross-sectional study was conducted at the Armed Forces Institute of Dentistry, Rawalpindi. A total of 120 patients were asked to fill in a questionnaire that evaluated psychosocial impacts based on five variables namely 'Dental Self-confidence', 'Psychological Impact', 'Social Impact', 'Aesthetic Concern' and 'Self-perceived treatment need'. The patients self-evaluated their dental aesthetics by using the IOTN Component.

**Results:** The comparison between genders was found to be insignificant. All the above-mentioned variables of PIDAQ showed a positive correlation with the self-rated IOTN Aesthetic Component, with  $p < 0.05$  except one variable i.e., 'Aesthetic concern'.

**Conclusions:** The results suggest a strong correlation between self-perceived dental aesthetics and its psychosocial impact on an individual. An increased want for orthodontic treatment may rise from the psychosocial impact.

**Keywords:** Dental Self-confidence, Facial Aesthetics, Index of Orthodontic Treatment Need, PIDAQ, Psychosocial Impact

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## INTRODUCTION

It is widely known that facial aesthetics play a vital role in determining self-confidence, there are many dimensions to aesthetics, an important one is dentofacial status.<sup>1</sup> Teeth, how they look and where they are placed play an integral role in shaping human social interaction as research has suggested that they can somewhat determine how visually appealing someone is, to some extent that is.<sup>2</sup> In recent studies, this has also been seen to affect people's psychological well-being.<sup>3-5</sup>

Traditional orthodontics treatment confines itself to improving oral function and is usually not concerned with the perceptions and mental state of the subject involved.<sup>6,7</sup> It is important to understand that research has suggested that the subject's perception and their idea of aesthetics is important in the determination of a treatment plan with a high chance of success.<sup>4,8</sup>

It is a known fact that self-image plays an important role in determining the patients' state of mind and it can sometimes determine whether the patient deems himself or herself in need of and kind of aesthetic treatment. To ease such a process of classification, scales are used. These include and aren't limited to the Index of Orthodontic Treatment Need (IOTN), Dental Aesthetic Index (DAI) and the Index of Complexity Outcome and Need (ICON). These can test whether there is a need for patient appeasement, largely dependent on the existence of aesthetic impairments.<sup>9,10</sup> Some of them may even be rated by the patients themselves (self-rated) with the more advanced or technical ones being looked at and rated by the concerned doctor (operator-rated), as the aesthetic component of the IOTN system.<sup>3,11</sup> The IOTN-AC may be rated by the dentist or even by the patients themselves.<sup>12,13</sup>

It is now time to delve deeper into the fact that it is fundamental to understand that the psychological impact of dental aesthetics is seen on multiple dimensions and is not always solely based on the need for orthodontic treatment as conventional doctors may assume.<sup>4,14</sup> One such tool to quantify all of the factors involved is called PIDAQ, The Psychosocial Impact of Dental Aesthetics Questionnaire. This multifactorial tool helps to rate the patients' needs, both from an orthodontist's point of view and a more generalized

need for a better aesthetic appearance kind of view.<sup>7</sup> It is a self-rating method and is widely the sole reason that patients seek orthodontic treatment in the first place.<sup>15,16</sup>

As orthodontic patients need to be recognized more as individuals rather than a set of maligned teeth, it is necessary to determine the psychosocial impact of a presenting malocclusion.<sup>8,17</sup> Therefore, the present study was undertaken to determine the psychological as well as the 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).

## MATERIALS AND METHODS

This was a cross-sectional, descriptive study carried out during November 2020, at the Armed Forces Institute of Dentistry, Rawalpindi. Ethical approval was taken from the institute's ethical review board before data collection. Written consent was also taken from study participants. The sample size was calculated by using the WHO calculator as 120.

The data was collected from patients visiting dental OPD at AFID using a non-probability convenient sampling technique. The study participants were 19 years or older as study participants included were adults only. Participants younger than 19 years or those who did not give consent were excluded from the study.

The data was collected by using a structured questionnaire used in previous research investigating dental aesthetics and assessment of its psychosocial impact. The psychosocial impact of the dental aesthetic questionnaire (PIDAQ) developed by KLAGES et al. was used for this study.<sup>16</sup> 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 05 variables including dental self-confidence, social impact, psychological impact, aesthetic concern, and self-perceived orthodontic treatment need were assessed by a series of relevant statements. To avoid increased awareness of the patient to the factorial relevance of each question, the names of the groups were not stated on the relevant items in the questionnaire. IOTN aesthetic component (AC) was used to assess the dental aesthetics. Ten black and white

photographs of anterior dentition from the IOTN scale were shown to the participants and they were requested to specify the photograph which most closely resembled their dentition. Participants were divided into different groups based on gender and IOTN-AC grading. An assessment of the psychosocial impact of dental aesthetics was done based on gender and self-rated IOTN-AC grades.<sup>11</sup>

All data were entered and analyzed using SPSS version 25.0. For data analysis, the IOTN-AC grades were divided into four categories. The first three grades were put into separate categories, while grades 4-10 were placed in the fourth category, owing to the small frequency of responses for each of the grades from 4 to 10. Frequencies and percentages were described for categorical variables such as gender, occupational status, and IOTN-AC grades. Mean and standard deviation was described for quantitative variables such as age and PIDAQ scores.

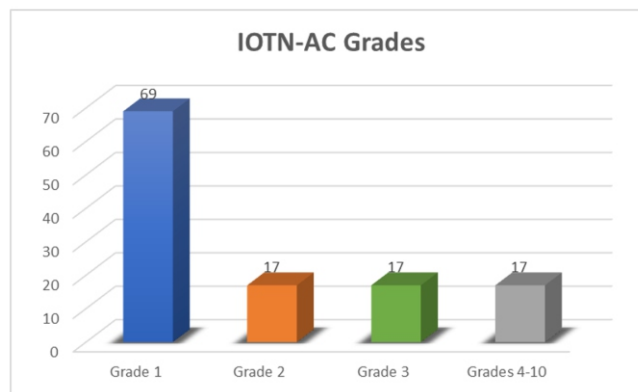
To compare the mean values of the five dimensions of PIDAQ with the four categories of IOTN-AC grades (1, 2, 3 and 4-10), a one-way ANOVA was applied. To compare the inter-group, mean differences, post-hoc Tukey analysis was conducted. To compare the mean values of the five dimensions of PIDAQ between male and female participants, an independent sample t-test

was applied. An arbitrary value of less than 0.05 was considered to be significant.

**RESULTS**

A total of 120 participants were included in this study. The sample included 41 (34.2%) males and 79 (65.8%) females. The mean age of the participants was 24.90±6.00 years. The IOTN-AC grades of the participants have been illustrated in Figure 1. While 69 (57.5%) participants reported having grade 1 aesthetics, 17 (14.2%) participants each reported having aesthetic grades 2, 3 and 4-10.

The mean values of the five dimensions of the PIDAQ for each of the IOTN-AC categories have been illustrated in Table 1.



**Figure 1: Frequency of IOTN-AC Grades**

**Table 1: Mean Values of the Five Dimensions of PIDAQ for the IOTN-AC Grades**

PIDAQ Dimension	IOTN 1	IOTN 2	IOTN 3	IOTN 4-10	Total
Dental Self-Confidence	13.51±4.10	11.35± 4.90	8.35±3.26	8.12±4.21	11.71±4.69
Social Impact	3.10±2.75	5.65±5.35	6.82±5.83	8.18±6.62	4.71±4.76
Psychosocial Impact	4.42±3.81	6.59±4.61	7.65±4.23	6.53±4.45	5.48±4.23
Aesthetic Concern	5.90±2.26	6.12±2.47	5.82±2.81	4.82±2.32	5.77±2.39
Self-Perceived Orthodontic Treatment Need	5.23±0.91	4.71±0.99	4.59±1.28	4.24±1.15	4.93±1.07

The intergroup mean differences comparison for the PIDAQ mean values for the IOTN-AC categories have been illustrated in Table 2. 'Dental self-confidence' scores reported to have significant differences when compared for participants with IOTN-AC grades 1 and 3 (mean difference =  $5.15 \pm 1.12$ ,  $p < 0.001$ ) and for IOTN-AC grades 1 and 4-10 (mean difference  $5.39 \pm 1.12$ ,  $p < 0.001$ ). Patients reported to have IOTN-AC grades had significantly lesser 'social impact' scores, when compared with grade 3 (mean difference =

$-3.72 \pm 1.18$ ,  $p = 0.011$ ) and grades 4-10 patients (mean difference =  $-5.08 \pm 1.18$ ,  $p < 0.001$ ). Participants with IOTN-AC grade 1 had significantly lesser 'psychosocial impact' scores, as compared to grade 3 patients (mean difference =  $-3.23 \pm 1.10$ ,  $p = 0.021$ ). Moreover, participants reported to have IOTN-AC grade 1 had significantly higher 'self-perceived orthodontic needs' score when compared to participants with grades 4-10 (mean difference =  $1.00 \pm 0.27$ ,  $p = 0.002$ ).

**Table 2: Inter Group Mean Differences between IOTN-AC Grades for the Five Dimensions of PIDAQ**

PIDAQ Dimension	IOTN-AC Grade	Comparison IOTN-AC Grade	Mean Difference	p-value	95% Confidence Intervals
Dental Self-Confidence	1	2	$2.15 \pm 1.12$	0.224	-7.63, 5.07
		3	$5.15 \pm 1.12$	<b>&lt; 0.001</b>	2.24, 8.07
		4-10	$5.39 \pm 1.12$	<b>&lt; 0.001</b>	2.47, 8.31
	2	3	$3.00 \pm 1.42$	0.154	-0.70, 6.70
		4-10	$3.24 \pm 1.42$	0.108	-0.46, 6.93
	3	4-10	$0.24 \pm 1.42$	0.998	-3.46, 3.93
Social Impact	1	2	$-2.55 \pm 1.18$	0.144	-5.63, 0.54
		3	$-3.72 \pm 1.18$	<b>0.011</b>	-6.81, -0.64
		4-10	$-5.08 \pm 1.18$	<b>&lt; 0.001</b>	-8.16, -1.99
	2	3	$-1.18 \pm 1.50$	0.861	-5.09, 2.73
		4-10	$-2.53 \pm 1.50$	0.335	-6.44, 1.38
	3	4-10	$-1.35 \pm 1.50$	0.804	-5.26, 2.56
Psychosocial Impact	1	2	$-2.17 \pm 1.10$	0.208	-5.05, 0.71
		3	$-3.23 \pm 1.10$	<b>0.021</b>	-6.11, -0.35
		4-10	$-2.11 \pm 1.10$	0.208	-0.71, 5.05
	2	3	$-1.06 \pm 1.40$	0.873	-4.71, 2.59
		4-10	$0.06 \pm 1.40$	1.000	-3.59, 3.71
	3	4-10	$1.12 \pm 1.40$	0.855	-2.53, 4.71

PIDAQ Dimension	IOTN-AC Grade	Comparison IOTN-AC Grade	Mean Difference	p-value	95% Confidence Intervals
Aesthetic Concern	1	2	-0.22±0.65	0.986	-1.90, 1.46
		3	0.08±0.65	0.999	-1.61, 1.76
		4-10	1.08±0.65	0.346	-0.61, 2.76
	2	3	0.29±0.82	0.984	-1.84, 2.43
		4-10	1.29±0.82	0.392	-0.84, 3.43
	3	4-10	1.00±0.82	0.613	-1.13, 3.13
Self-Perceived Orthodontic Need	1	2	0.53±0.27	0.226	-0.19, 1.24
		3	0.64±0.27	0.093	-0.07, 1.36
		4-10	1.00±0.27	<b>0.002</b>	0.28, 1.71
	2	3	0.12±0.35	0.987	-0.79, 1.02
		4-10	0.47±0.35	0.530	-0.44, 1.38
	3	4-10	0.35±0.35	0.987	-1.02, 0.79

The gender-wise mean differences comparison for the PIDAQ dimensions have been shown in Table 3. As shown, no difference in any of the mean values was found between male and female participants.

**Table 3: Gender Wise Comparison of the Mean Values of the Five Dimensions of PIDAQ**

	Male	Females	Mean Difference	p-value
Dental Self-Confidence	10.88±4.59	12.14±4.71	1.26±0.90	0.161
Social Impact	5.07±4.71	4.52±4.80	0.55±0.92	0.545
Psychosocial Impact	5.37±4.41	5.54±4.16	0.18±0.82	0.831
Aesthetic Concern	5.49±2.19	5.91±2.48	0.42±0.46	0.340
Self-Perceived Orthodontic Need	4.90±1.02	4.94±1.10	0.03±0.21	0.866



## DISCUSSION

In the present study, most of the participants self-rated themselves as having an IOTN-AC grade 1 ( $n = 69$ , 57.5%). A study from Islamabad showed similar results with 46.5% of the participants rating themselves as having grade 1.<sup>8</sup> Klages et al. also reported having similar results to our study, with 33.5% of the participants rating themselves as having grade 1.<sup>16</sup> However, a study performed by Munizeh and colleagues<sup>18</sup> reported that a greater proportion of participants reported as having grade 2 (35%). The possible difference could be due to the sample selection, as Munizeh and colleagues had only selected patients for their study.<sup>18</sup> However, in this study 51 (42.5%) participants were dentists. The IOTN-AC results of our study suggest that most of the participants were satisfied with the aesthetic appearance of their facial outlook.

On comparing the psychosocial impact of dental aesthetics with gender, no significant association was found. This suggests that dental aesthetics in this sample was not affected by gender. Similar results were reported by Klages and colleagues and Carlos and colleagues.<sup>16,19</sup>

Comparing the psychosocial impact of dental aesthetics between participants with different IOTN-AC grades revealed interesting results. Participants with grade 1 had significantly higher 'dental self-confidence' scores than individuals with grades 3 ( $p < 0.001$ ) and 4-10 ( $p < 0.001$ ). Participants with grade 1 also had significantly lower scores than individuals reporting to have grades 3 ( $p = 0.011$ ) and 4-10 ( $p < 0.001$ ).

'Social impact' of an individual based on one's 'Dental self-confidence' reflects the level of confidence and contentment an individual has with one's soft tissue profile, smile and in turn, projects an impact on the person's emotional outlook. Having satisfied dental aesthetics not only improves one's confidence but also improves the self-esteem of a person.<sup>20</sup> On the other hand, having dental aesthetics with which one is not happy can lead to low social confidence and low self-esteem, thereby negatively impacting one's social and personal life. All these associations were supported by the results of our study. People who perceived as having good dental aesthetics (IOTN-AC grade 1) reported having better 'dental self-confidence' and having lesser 'social impact' than those participants who believed that

their dental aesthetics had been altered (grades 3 and 4-10). Previous studies have shown similar results to this study.<sup>16,18</sup>

The 'psychosocial impact' refers to individuals' low perception when comparing themselves with others with better perceived dental aesthetics, thereby referring to an inferiority complex. Although this study found individuals with grade 1 to be having lower 'psychosocial impact' scores than those with grade 3, no significant difference was found between the scores of participants with grade 1 and 4-10. Therefore, the evidence is insufficient to suggest an association between the psychosocial impact and dental aesthetics. However, studies by Munizeh and colleagues and Klages and colleagues reported a strong association between psychosocial impact and dental aesthetics.<sup>16,18</sup> Lack of sufficient evidence to suggest a strong association in this study could be due to smaller sample size.

'Aesthetic concern' is associated with the feeling a person has upon seeing themselves smile in photographs and is related to how a better smile may change one's appearance and become a source of successful and confident social interactions. This study found no association between 'aesthetic concern' and dental aesthetics.

'Self-perceived orthodontic need' assesses how one feels that he or she requires orthodontic treatment for correction of their dental aesthetics. Individuals with IOTN-AC grade 1 were found to have a significantly higher score as compared to those with grades 4-10. This shows that despite rating them as having excellent dental aesthetics, people with grade 1 still felt that they do need corrective treatment to improve their dental aesthetics. On the contrary, this also implies that individuals who perceived their aesthetics to be poor still did not feel the need to get orthodontic treatment to improve this condition.

Some limitations were present in this study. Firstly, this study had a relatively small sample size. It is noteworthy to point out the IOTN-AC grading is based on photographs of anterior segment malocclusion with only 10 photographs. Many of the participants found it difficult to associate their current condition with any of the photographs, suggesting that perhaps a wider spectrum of photographs should have been available. In addition, conditions such as diastema, anterior

crossbites, class III malocclusion, open bite and increased overjet were not seen in the included photographs.

It is recommended that in the future, studies should be done to compare this association between individuals who have had orthodontic treatment, as compared to those who have had no treatment. Moreover, socioeconomic status should also be considered as a confounding factor in future studies. A strong association between dental aesthetics and the psychosocial impact was found in our study. This substantiated the results of previous studies. Even slight changes to a person's dental aesthetics may significantly impact their psychosocial life. Thus, it is recommended that the treatment needs of an individual are assessed not only normatively by the orthodontist but also by taking into consideration the perceptive needs of the individual who is the 'patient'.

### CONCLUSION

The results suggest a strong correlation between self-perceived dental aesthetics and its psychosocial impact on an individual. An increased want for orthodontic treatment may rise from the psychosocial impact.

### DISCLAIMER

None to declare.

### CONFLICT OF INTEREST

There is no conflict of interest to be declared by the authors.

### ETHICAL STATEMENT

Ethical approval was taken from the institute's ethical review committee before data collection.

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drafting of the manuscript: F. Usman, N. Zaib, A. Butt

Critical review of the manuscript: N. Zaib, A. Aslam

Approval of the final version of the manuscript to be published: F. Usman, N. Zaib, A. Butt, A. Aslam

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