



The Correlation between Orthodontic Treatment Need and Psychosocial Impact of Dental Aesthetics among Patients Seeking Orthodontic Treatment

Mohammadreza Pouralimardan¹, Mehrnaz Karimi Afshar², Marzieh Karimi Afshar^{3*}

¹Dentist, Private Practice, Kerman, Iran

²Department of Prosthodontics, School of Dentistry, Shiraz University of Medical Sciences, Shiraz, Iran

³Department of Orthodontics, School of Dentistry, Kerman University of Medical Sciences, Kerman, Iran

Abstract

Background: The influence of orthodontic treatment on self-confidence and quality of life is a major reason for patients to seek treatment. This study was designed to assess the relationship between orthodontic treatment need and psychosocial impact of dental aesthetics in patients seeking orthodontic treatment.

Methods: This descriptive analytical cross-sectional study was performed on 165 patients referred to orthodontic clinics in Kerman to start treatment. Patients were selected by census method to reach the specified sample size. The data collection tools included 3 forms: demographic information form, Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ) and a form for recording information obtained from clinical examination to determine orthodontic treatment need based on Index of Orthodontic Treatment Need (IOTN). Data analysis was performed through SPSS 22 and using *t* test, ANOVA, and linear regression at a significance level of 0.05.

Results: The educational level of subjects and their parents and economic status showed no significant relationship with total PIDAQ score and any of its domains ($P > 0.05$). In psychological impact domain, women's score was significantly higher ($P = 0.016$) and there was a significant relationship between the treatment need based on aesthetic component (AC) and the domains of dental self-confidence ($P = 0.003$), social impact ($P = 0.049$) and psychological impact ($P = 0.066$), as well as the total score of questionnaire ($P = 0.012$). Treatment need based on dental health component had no statistically significant relationship with PIDAQ score ($P > 0.05$).

Conclusion: AC of IOTN had significant relationship with dental self-confidence, social impact and psychological impact as well as the total score of PIDAQ. In orthodontic treatments, in addition to malocclusion, the psychological aspects should also be considered.

Keywords: Orthodontics, Malocclusion, Treatment need

Citation: Pouralimardan M, Karimi Afshar M, Karimi Afshar M. The Correlation between Orthodontic Treatment Need and Psychosocial Impact of Dental Aesthetics among Patients Seeking Orthodontic Treatment. *Journal of Kerman University of Medical Sciences*. 2022;29(6):536-541. doi:10.34172/jkmu.2022.65

Received: February 18, 2022, **Accepted:** June 27, 2022, **ePublished:** December 31, 2022

Introduction

Malocclusion is any deviation of occlusion from the normal state, which includes dental crowding or lack of proper intermaxillary relation. Although malocclusion is not considered a life threatening disease, it is one of the oral issues, which affect self-esteem, psychological and social aspects of life and plays an imperative role in the quality of life of individuals (1-4). Epidemiological investigations show that 87% of Iranians have malocclusion (5).

Today, paying attention to the psychological and social dimensions of malocclusion is one of the key reasons for patients to seek orthodontic treatment (6). The influence of orthodontic treatment on self-confidence and quality of life of patients has been reported in numerous studies and it has been shown that these effects occur after the formation of positive physical and psychological outcomes of the treatment (7). The methods used in the past to

evaluate the need for orthodontic treatment were often on the basis of determining the degree of malocclusion and the need for treatment, and the influence of malocclusion on the quality of life has not been considered. Therefore, investigation of the reasons of seeking orthodontic treatment was not based on the patients' real reason for seeking treatment and attention was paid to the use of psychological indicators that measured oral health-related quality of life (OHRQoL) (8,9).

The Psychosocial Impact of Dental Aesthetics (PIDAQ) questionnaire is one of these items, that based on OHRQoL, provides researchers with highly valuable information about the influence of dental aesthetic on the psychological condition of individuals. This questionnaire is a self-assessment tool that has 4 sections: dental health-related self-confidence, social impact, psychological impact and aesthetic impact (10).



The evaluation of the need for orthodontic treatment is also measured by different indicators. A valid indicator of the need for orthodontic treatment should have features such as validity, repeatability, ease of use, general acceptance, and shorter measurement time than other approaches. The results of the studies which used these indicators are mostly used to assess distribution of the need for treatment in the community and to determine the priority of treatment (11).

One of the common indicators that evaluates the need for orthodontic treatment in children and adults is the Index of Orthodontic Treatment Need (IOTN). This index has two distinct components; a clinical component (dental health component, DHC) that measures the patient's dental health, and an aesthetic component (AC) that measures the need for treatment based on the dental aesthetic aspect. Researches that have examined the relationship between AC and the quality of life showed that dental aesthetic has an influence on the quality of life, particularly in the psychosocial field (12,13). Given that a research has not been performed in Iran so far, this study was done to examine the relationship between the need for orthodontic treatment based on IOTN index and psychosocial impact of dental aesthetics based on PIDAQ questionnaire in patients seeking orthodontic treatment in Kerman.

Materials and Methods

This is a descriptive-analytical cross-sectional study that was performed on 165 patients referred for orthodontic treatment in Kerman. The sample size was determined by considering $p=0.5$, $d=0.08$, $z=1.96$ as 160 patients. Patients were selected through a convenience random sampling until getting the specified sample size. After explaining the aim of the research, mentioning the optionality of participation in the study and the confidentiality of information, a questionnaire was provided to the patient. Inclusion criteria were patients over 16 years old who required a fixed orthodontic appliance and were willing to answer the questionnaires. Exclusion criteria comprised of mental retardation, craniofacial, cleft lip and cleft palate syndromes, need for orthognathic surgery, previous orthodontic treatment, and unwillingness to respond (13,14). The questionnaire was distributed and collected by a trained senior dental student who was able to answer any ambiguities with an orthodontist, and in a case of disagreement, the opinion of another orthodontist was sought.

The data collection tools comprised of 3 forms. The first form included demographic information (age, sex, education of the patient and his/her parents, and economic status based on the patient's statement). The second form was PIDAQ (Psychosocial Impact of Dental Aesthetics Questionnaire). The third form was also utilized to record the information obtained from the clinical examination to

determine the need for orthodontic treatment based on scores of dental health and ACs of IOTN.

Forms No. 1 and 2 were in the form of a questionnaire and were completed by the patient. Form No. 3 was completed after examining the patient's occlusion and teeth on the dental chair with a disposable mirror and gauge under the unit light.

In this research, the Persian version of the PIDAQ questionnaire was used for evaluating psycho-social impact of dental aesthetics, which includes 23 questions in 4 domains of dental self-confidence (questions 1 to 6), social impact (questions 7 to 14), psychological impact (questions 15 to 20) and aesthetic impact (questions 21 to 23). This questionnaire was approved by Naseri et al with a validity coefficient of 0.92 (Cronbach's alpha) and a reliability coefficient of 0.931 (7). The 5-point Likert scale was applied to score these sections. "Never" was given a score of zero, "a little" a score of one, "somewhat" a score of two, "a lot" a score of three and "very much" a score of four. So the overall score range was from 0 to 92. A higher score means a more negative influence of dental aesthetic on the psychosocial status. In the dental self-confidence section (unlike other sections) the items are positive, so the reverse of these codes was used to score (15).

The IOTN index was used to determine the need for orthodontic treatment. This index has two distinct components, a clinical component (DHC) and an AC.

A series of 10 standard photographs were used to assess the AC of IOTN. The AC included a 10-point scale of color photographs of the frontal view of the dentition, which was used to display different levels of dental attractiveness and beauty. Photographs were arranged from the most attractive dentition (score 1) to the least attractive (score 10), in which the frontal view of the patient's mouth was compared and scored with these standard pictures. Scores 1 to 4 indicate no need for treatment or low need, scores 5, 6, and 7 indicate borderline need, and scores 8, 9, and 10 indicate an obvious need for orthodontic treatment based on aesthetic. This study has been proposed and approved in the ethics committee of the research council of Kerman University of Medical Sciences (IR.KMU.REC.1398.482).

In addition, for DHC, a descending sequential scale including missing teeth, overjet, crossbite, displacement of contact points of teeth, and overbite (open bite) was used to record the worst occlusal characteristics. Data were collected and statistically analyzed using *t* test, ANOVA and linear regression at a significance level of 0.05.

Results

Out of a total of 171 distributed questionnaires, 165 questionnaires were fully answered. The mean age of the participants was 20.8 ± 4.46 years. Table 1 shows the demographic information of the participants and as it is seen, in terms of gender distribution, most of the

Table 1. The frequency distribution of participants according to demographic variables

Variable		Number	Percent
Gender	Female	130	78.8
	Male	35	21.2
Patient's education	School student	48	27.1
	Diploma	42	25.5
	University student	29	17.6
	Associate degree	4	2.4
	Bachelor	34	20.6
	Master degree and higher	8	4.8
	Illiterate	7	4.2
Father's education	Primary	8	4.8
	Intermediate school	8	4.8
	Diploma	42	25.4
	Associate degree	7	4.2
	Bachelor	75	45.5
	Master degree and higher	18	10.9
	Illiterate	9	5.5
Mother's education	Primary	0	0
	Intermediate school	21	12.7
	Diploma	64	38.8
	Associate degree	24	14.5
	Bachelor	35	21.2
	Master degree and higher	12	7.2
Economic status	Low	4	2.4
	Medium	99	60.0
	Good	59	35.7
	Excellent	3	1.8

participants in this study (78.8%) were female.

In response to the question “I think my teeth are in a very good position” (dental self-confidence domain in PIDAQ), 26.7% selected “never” and 32.1% “rarely”. Also, in response to the question “I am proud of my teeth”, 23.6% have chosen the “rarely” option.

In terms of social impact, 20% stated that “I almost always pull myself back when I smile so that my teeth are not visible too much”. In response to the question “Comments about my teeth upset me, even if it is a joke”, 18.2% chose the option “almost always” and the same number chose the option “most of the time”. Furthermore, 59.4% stated that they “never” refuse to participate in social situations because of their teeth.

In terms of psychological impact, for the question “I wish my teeth look better”, 49.7% chose the option “almost always” and 21.8% chose the option “most of the time”.

In terms of aesthetic concern, in response to the question “I avoid seeing my teeth in the photo” and “When I watch a movie of myself, I avoid seeing my teeth”, 15.8% chose the option “almost always”.

Regarding the need for treatment based on the DHC of IOTN (IOTN-DHC), 20.6% of the study participants had a “great need” and a “very great need” for orthodontic treatment. Regarding the need for treatment based on the AC of IOTN, 5.5% of the subjects had an obvious need for treatment. Figures 1 and 2 show the frequency distribution

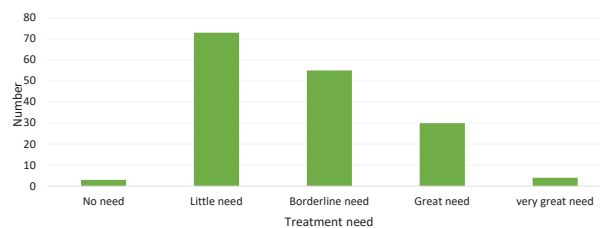


Figure 1. Frequency distribution of participants according to treatment need based on dental health component of IOTN.

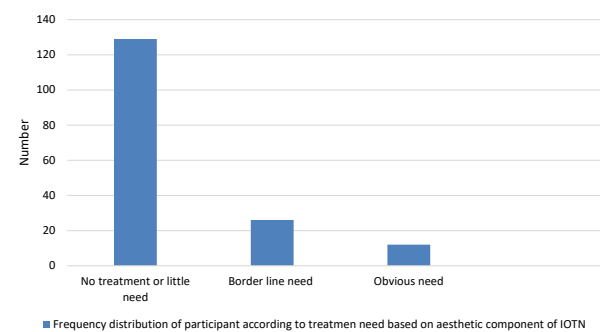


Figure 2. Frequency distribution of participants according to treatment need based on aesthetic of IOTN.

of individuals based on the need for treatment based on DHC and AC of IOTN index.

In terms of frequency, the most common dental problem in DHC of IOTN index was for “teeth contact points displacement (crowding)” (35.2%). Also, the most common item (35.8%) for IOTN AC was score 3.

ANOVA test was used to assess the relationship of PIDAQ and its domains with the need for treatment based on the AC and the DHC of the IOTN. There was a statistically significant relationship between the need for treatment based on AC and domains of dental self-confidence ($P=0.003$), social impact ($P=0.066$) and psychological impact ($P=0.049$) as well as the total score of the questionnaire ($P=0.012$). Nevertheless, the need for treatment based on DHC did not have a statistically significant relationship with any of the questionnaire’s domains and total PIDAQ score. Also, the results did not show a statistically significant relationship between the educational level of subjects and their parents and any of the questionnaire’s domains and total PIDAQ score. There was no statistically significant relationship between economic status and domains of the PIDAQ.

The findings of the current research did not show a relationship between gender and the four domains of the PIDAQ and its total score, as well as dental aesthetic and health components of the IOTN index based on *t* test analysis. Only in the domain of psychological impact, women’s score was significantly higher ($P=0.016$) that shows the psychological impact of malocclusion was greater on them.

In the present study, the age group of over 20 years received a significantly higher score in the psychological

impact domain of the questionnaire ($P=0.046$).

Regression analysis indicated that higher educational level of the patient and his/her father, higher score of AC (i.e. the need for treatment is more), and lower economic status resulted in the higher total score of the questionnaire (greater negative psychological and social impact). Moreover, higher educational level of the father, and higher score of AC (which means the more treatment is needed) were associated with the higher self-confidence score. Lower economic status, and younger age were associated with the higher social domain score. The older age, and higher health component score were associated with higher psychological score (Table 2).

Discussion

Several factors affect the patients seeking orthodontic treatment, but among them, aesthetic issues are the most important factors in seeking treatment (3).

Findings of the current study indicated a statistically significant relationship between the need for treatment based on aesthetic component (IOTN-AC) and the domains of dental self-confidence, social impact and psychological impact, as well as the total score of the PIDAQ questionnaire. But the need for treatment based on DHC (IOTN-DC) did not have a statistically significant relationship with any of the domains of the questionnaire and the total PIDAQ score. The results of the research of Sari et al (16) also indicated that subjective orthodontic treatment need based on the AC of IOTN is related to PIDAQ, which is in line with the results of our study.

Nonetheless, in the study of Lin et al (14), a statistically significant relationship was observed between IOTN dental health and PIDAQ scores. Also in the study of Iranzo-Cortés et al (17), a statistical significant relationship was reported between the need for treatment based on dental aesthetic index and both components of IOTN and PIDAQ. The reason for this inconsistency could be the more detailed and specialized assessment of DHC-IOTN, which our study participants may not have been aware of.

In terms of the need for treatment based on the DHC-

IOTN, the participants in the current study were in great need and a very great need of orthodontic treatment. In the study of Nugroho et al (18), which evaluated the need for treatment based on DHC-IOTN in a specialized orthodontic clinic over a period of 4 years, 59.6% of individuals had great and very great need of orthodontic treatment. They were in grade 4 in terms of need for treatment, while in our study, the majority of individuals were in grade 2. Also, in the research of Feu and Hassan (19,20), 56.5% and 52.5% of the referring adolescents had respectively great and very great need for orthodontic treatment. The reason for these differences can be the differences in the duration of the study and statistical population in terms of age group.

In the study of Iranzo-Cortés et al (17), the need for treatment based on DHC-IOTN in a group of adolescents of 12 to 16 years old was 10.09%, which contradicts the findings of the current study and could be due to the difference in statistical population, and age range of participants in the two studies.

Regarding the need for treatment based on the AC-IOTN, 5.5% of the subjects had an obvious need for treatment. In the research of Iranzo-Cortés et al (17), the need for treatment was reported to be 5.93%, which is in line with the findings of the current study. However, this rate is lower than the study of Sari et al (16) who reported 25.3% need for treatment based on the AC-IOTN.

In the current study, there was no statistically significant difference between gender and the score of dental health and ACs of IOTN, which is consistent with the results of Yi (21), but contrary to the result of Bellot-Arcís et al (22) in which AC-IOTN was significantly higher in men. The difference in results may be due to differences in the study population, because in their research, the study has been performed on a group of students with a different age range from our study and not on people seeking treatment, and the AC-IOTN score has been self-assessed. Also in recent years, attention to different aesthetic and orthodontic treatments in men has been increased.

The most common dental problems in the DHC-IOTN of the subjects were displacement of dental contact points, anterior or posterior crossbite, and excessive overjet. Bellot-Arcís et al (22) and Hassan et al (20) reported the most common problems as tooth displacement, excessive overjet and deep bite.

In the current study, the level of education of the subjects and their parents, as well as economic status did not show statistically significant relationships with any of the domains of the questionnaire and the total PIDAQ score. In the study of Iranzo-Cortés et al (17), no correlation was found between social class and PIDAQ scores, which is consistent with the results of the current study.

The findings of this research did not show a relationship between gender and the social impact, dental self-confidence and aesthetic domains of PIDAQ, but the

Table 2. The relationship between PIDAQ domains and demographic variables based on regression analysis

PIDAQ	Variable	B	T	P value
Total score of questionnaire	Patient's education	3.17	3.19	0.002*
	Father's education	2.15	1.92	0.056*
	AC of IOTN	4.57	4.49	0.000*
Dental self confidence	Father's education	0.65	2.47	0.015*
	AC of IOTN	0.78	3.14	0.002*
Social impact score	Age	-0.15	-1.97	0.050*
	Economic status	-1.36	-1.97	0.050*
Psychological impact score	Age	0.19	3.22	0.002*
	Dental health component of IOTN	0.77	1.89	0.060*

score of psychological impact domain in women was significantly higher. Iranzo-Cortés et al (17), too, have reported that the scores of psychological impact and concern about aesthetic and the total score of PIDAQ in women are significantly higher. This can be explained by the more general concern of women about health issues compared to men, which is reflected in the form of more attention to health, greater awareness of the impact of facial beauty and quality of life considerations.

In this study, a significant relationship was observed between age and dental health and ACs of IOTN and PIDAQ psychological domain score, so that in the age group over 20 years, more treatment was needed and the psychological impact of malocclusion was higher, which is contrary to the results of Masood et al (23), who have reported that the effect of malocclusion on younger people (adolescents) is greater. The cause of this inconsistency can be due to the more need for treatment in the age group over 20 years and the long-term effect of malocclusion on these people.

Limitations and suggestions

The current research was carried out on patients referred to an orthodontic clinic, which decreases the generalizability of the obtained results to larger populations. Also, research has been done on cross-sectional data and the answer to some questions has been self-declared. Further studies are recommended to examine personality traits and other factors affecting the patients seeking orthodontic treatment.

Conclusion

The psychosocial effect of malocclusion is one of the important factors affecting the decision for orthodontic treatment and increases with increase of the severity of malocclusion. The orthodontist should consider these issues in addition to the person's occlusion status when examining the patient to begin treatment.

Author Contributions

Conceptualization: Marzieh Karimi Afshar.

Data curation: Mohammadreza Pouralimardan.

Formal Analysis: Mehrnaz Karimi Afshar.

Funding acquisition: Marzieh Karimi Afshar.

Investigation: Mohammadreza Pouralimardan.

Methodology: Marzieh Karimi Afshar.

Project administration: Mohammadreza Pouralimardan.

Resources: Marzieh Karimi Afshar.

Software: Mehrnaz Karimi Afshar.

Supervision: Marzieh Karimi Afshar.

Validation: Mehrnaz Karimi Afshar.

Visualization: Mohammadreza Pouralimardan.

Writing – original draft: Marzieh Karimi Afshar.

Writing – review & editing: Mehrnaz Karimi Afshar.

Conflict of Interests

There is no conflict of interest.

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