Evaluating the relationship between Orthodontic Treatment need and Oral Health-Related Quality of life Among students aged 15-18 year in Shiraz

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Abstract

Introduction:
The major demand for orthodontic treatment is associated with esthetic complaints rather than with the severity of occlusal irregularities. This study evaluated the relationship between orthodontic treatment need based on index of complexity, outcome, and need (ICON) and orthodontic-specific quality of life (QOL) among high school students in Shiraz.

Materials and methods:
Based on the correlation between ICON and QOL score (r = 0.254) with α = 0.05 and an estimated power of 80%, 118 high school students (49 girls and 69 boys) aged 15-18 years were selected for this analytical cross-sectional study. The students were randomly selected. The need for orthodontic treatment was determined according to ICON and was compared with QOL, which was assessed using Cunningham's questionnaire. Data analysis was performed by SPSS-21 using Spearman's correlation coefficient and Mann-Whitney tests. (p<0.05)

Results:
Analysis based on Spearman's correlation coefficient, showed no significant association between QOL score and ICON (r=0.95, p=0.282), Mann-Whitney test did not show a significant difference between boys and girls. QOL score was considerably higher in boys (median = 18.50, mean ± SD = 14.82 ± 18.5) compared with girls (median = 9.00, mean ± SD = 14.3 ± 15.02) (p = 0.58).

Conclusion:
No significant difference among boys and girls in relation to orthodontic treatment need was observed, although girls had a significantly lower QOL score than boys. Correlation between orthodontic treatment need and its impact on QOL was also not significant. Therefore, dental esthetics has a greater impact on social acceptance and self-concept among girls.

Key words:
•Index of Orthodontic Treatment Need •Quality of Life •Students

Introduction

Malocclusion, more than being a disease, is considered as a deviation from social esthetic norms. The primary expectation from treatment is improvement in oral function and patient's appearance. Such a treatment leads to improved psychosocial status, increased self-esteem, and less anxiety and stress while interacting with social groups.[1] The major demand for orthodontic treatment is associated with esthetic complaints rather than with severity of the occlusal irregularities and the subsequent negative effects on dental health.[2]

Quality of life (QOL) is an ambiguous and general term, used in a wide range of contexts.[3] The World Health Organization (WHO), defines QOL as the individual's perception of their position in life in the context of culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns.[4] Oral health-related QOL is a more specific term that concerns the impact of oral and dental health status on an individual's QOL. Oral and dental health is defined as a set of standards that enables an individual to eat, speak, and socialize without active disease, discomfort, or embarrassment. Oral health has a direct effect on psychological and functional status. Therefore, it profoundly affects enhancement of the overall sense of well-being.[5] In this context, orthodontic treatment could serve as an aid in improving function, and esthetics and, as a result, enhance oral health-related QOL.[6]

In the past 50 years, numerous indices have been developed to evaluate the need for orthodontic treatment.[7] These occlussal indices have been developed based on the type of malocclusion and its negative effects on oral health to assess orthodontic treatment need.[8] Among these indices, the index of complexity, outcome, and need (ICON) is worth mentioning.[9]

One of the QOL assessment tools, associated with orthodontic status, is a questionnaire designed by Cunningham in 2001. Cunningham developed this assessment tool to evaluate orthodontic-specific QOL in orthodontic patients with dento-facial deformities, and also showed its validity and reliability in his studies; He introduced this questionnaire as a useful assessment tool for evaluating oral health-related QOL in clinical studies.[10]

Several studies have shown a significant correlation between QOL and oral and orthodontic status [10, 11]; however few other investigations reported contrasting results.[12, 13]

Thus due to such contradictory results, the latest establishment of ICON, the lack of sufficient regional studies on this subject, and the effect of regional, social, and cultural factors on QOL, the present study aimed at evaluating the relationship between orthodontic treatment need based on ICON and orthodontic-specific QOL among high school students in Shiraz.

Materials and Methods

This analytical cross-sectional study was conducted on a sample of 118 high school students (49 girls and 69 boys) aged 15-18 years, which was based on the correlation between ICON and QOL score (r = 0.254) with α = 0.05 and an estimated power of 80%.

The subjects were randomly selected from four high schools (two boys' and two girls' high schools). Because the examination of the students was possible only through permission from Shiraz education office, high schools located in four different regions were selected by an educationalist. Each student was numbered in the educational system. By using the table of random numbers, 118 students were randomly selected for the present study. The list of selected students was checked with school authorities to exclude students with depression, bipolar and body dysmorphic disorders.

Other exclusion criteria were: history of orthodontic treatment and currently under treatment. Individuals who needed orthodontic treatment or were currently under treatment because of a diagnosed psychological disorder were also excluded.

Furthermore, before the start of the study, a letter was given to the parents/ guardians of the students to seek consent for their cooperation to participate in the study. This letter also served to inform the parents/ guardians about the examination procedure and to assure them of the confidentiality of any information collected. Only positive consent was accepted.

Measuring the QOL index:
Cunningham's questionnaire was used to

assess QOl. The validity of the questionnaire was checked and confirmed by a group of orthodontists, and subsequently the required changes were applied. Cronbach's α (α = 0.82) was adopted for determining the reliability. The questionnaire was also further checked and edited by a sociologist.

Before completing the questionnaire, necessary instructions were given to the students. They were asked to fill the questionnaire according to their personal opinion.

Determining the need for orthodontic treatment using ICON:

In order to obtain accuracy in the use of ICON, four orthodontic residents underwent training and calibration exercise. Inter-examiner reliability was assessed under the supervision of a board- certified orthodontist, and intra-examiner reliability was evaluated within 2 weeks. The inter- and intra- examiner reliability values were 89% and 90%, respectively.

For measuring ICON, oral examination was performed using a mouth mirror. Dental esthetics, crowding, and spacing in the upper arch, crossbite, overbite, and molar relationships were evaluated. Each subject was given a grade from 1 to 10 according to the standard form of esthetics. Based on the severity of crowding and spacing in the upper arch, each subject was given a grade from 0 to 5. Subjects were given a score of 1 in the case of posterior cross-bite, and 0 if no posterior cross-bite. Incisor bite was scored 1-3, and occlusion was graded 0-2.[9]

Data from the questionnaire were classified. QOL was measured according to these data and was compared with the average treatment need diagnosed by the dentist according to the ICON. After data collection and classification, statistical analysis was performed using SPSS 21. Spearman' correlation coefficient and Mann-Whitney tests were used for data analysis. (p<0.05)

Results

Analysis based on Spearman's correlation coefficient, showed no significant association between QOL score and ICON (r = 0.95, p = 0.282).

There was also no significant difference between QOL score and ICON among the two genders in the study (Table1), based on Mann-Whitney test. However, QOL score was considerably higher in boys (median = 18.50, mean ± SD = 14.82 ± 18.5) compared with girls (median = 9.00, mean ± SD = 14.3 ± 15.02) (p = 0.58) (Table2).

Table 1. Relationship between ICON and quality of life among the students (n = 118)

	Quality of life			
	P		R	
ICON	Boys	Girls	Boys	Girls
	0.653	0.327	0.116	0.061

Table 2. Relationship between ICON and quality of life among the students according to gender (n = 118).

	Gender		P
	Girls	Boys	
ICON	4.00	3.00	
(mean ± SD)	1.98± 4.09	2.51± 4.01	0.58
Quality of life	9.00	18.50	
(mean ± SD)	15.02 ±14.3	18.5 ±14.82	0.022

Discussion

Among the different age groups, adolescents are more concerned about their physical appearance; consequently, they become sensitive about their dental appearance and esthetics. This could play a significant role in their psychosocial well-being.This study evaluated the relationship between orthodontic treatment need as perceived by a dentist and its impact on oral health-related QOL, among high school students aged 15-18 years.

Among the different indices, the ICON was selected in this study to determine the need for orthodontic treatment. This index places more emphasis on anterior teeth instead of the whole arch. Moreover, it is simple to use on dental casts and thus could be easily applied in clinical settings. This index was also shown to demonstrate better agreement with the perception of orthodontists regarding the need for orthodontic treatment in comparison with IOTN and PAR indices.[14]

In the current study, the correlation between need for orthodontic treatment and its impact on QOL was not significant, which is consistent with the results of earlier studies.[12, 13] However, significant association was also reported by some other studies.[6, 8, 11]The reason for these contradictory results could be attributed to age, ethical, cultural, and social differences; and variation in subjective perception of QOL. These factors could not be fully considered in the questionnaire.

Nevertheless in order to make a comparison, it should be taken into account that earlier studies that reported a significant association had used IOTN, whereas we used ICON to assess the need for orthodontic treatment.

We also assessed the gender differences among the study subjects in terms of QOL. The results indicated that QOL is significantly lower among girls. This finding could be attributed to the fact that dental esthetics has a greater impact on social acceptance and self-concept among girls. In general, with the same severity of malocclusion, girls feel more shy in social contexts and their body self-concept is negatively affected, whereas the same malocclusion might be perceived differently by boys.They might be indifferent or even satisfied, whereas girls usually get concerned about minor irregularities.[15]Regarding orthodontic treatment need among the study subjects, we found no significant gender difference, which is in accordance with the study by Daniela et al. [15] This finding indicates a similar prevalence of malocclusion among both boys and girls.[15]The lower QOL among girls compared with boys despite the same orthodontic treatment need could be attributed to the fact that QOL is measured subjectively based on each person's self-perception, whereas orthodontic treatment need is objectively determined using specific criteria.One of the primary limitations of this study was the lack of complete cooperation on behalf of the school authorities during filling the questionnaires. Therefore, it is recommended that a more comprehensive study be conducted in a broader context.

Conclusion

No significant difference among boys and girls in relation to orthodontic treatment need was observed, although girls had a significantly lower QOL score than boys. Correlation between orthodontic treatment need and its impact on QOL was also not significant. Therefore, dental esthetics has a greater impact on social acceptance and self-concept among girls.

Acknowledgments

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