

The Relationship between Malocclusion Severity and Quality of Life in North Iran Students

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Abstract

Background

A malocclusion is a misalignment or incorrect relation between the teeth of the two dental arches when they approach each other as the jaws close. Considering the prevalence of malocclusion and its role in quality of life (QOL), we aimed to investigate the relationship between need of orthodontic treatment and QOL in North Iran students.

Materials and Methods

This is a cross-sectional descriptive-analytical study; the sample size was estimated to be 270 students using a two-stage sampling method. After entering the study, the Orthognathic Quality of Life Questionnaire (OQLQ) was completed for each student. Need of orthodontic treatment was assessed based on the dental health component of index of treatment need (IOTN). SPSS software version 22.0 was used for data analysis.

Results

274 students (133 boys and 141 girls) participated in this study. The mean age was 14.86 ± 0.54 . The mean QOL scores were 13.31 ± 11.78 and it was not significant statistically in boys and girls ($P=0.893$). Mean QOL scores were not statistically significant ($P = 0.306$) according to grade of IOTN. Grade 2 had the highest frequency (37.2%) with the lowest mean score of QOL (11.65 ± 10.31), and Grade 5 had the lowest frequency (2.6%) with the highest mean score of QOL (15.83 ± 7.78). IOTN was not statistically significant in both groups ($P>0.05$).

Conclusion

In our study, students with dental malocclusion had the lowest QOL, although no significant relationship was observed. Almost a quarter of students needed orthodontic treatment. The most common malocclusion was displacement of contact points.

Key Words: Malocclusion, Student, Orthodontic Treatment, Quality of Life.

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1- INTRODUCTION

According to definitions, malocclusion refers to the inappropriate relationship between teeth and jaws, which is one of the most common abnormalities in recent decades. In other words, the condition of abnormal pairing of the teeth and jaws is called malocclusion (1, 2). Understanding the concept of occlusion and its definition was presented in the late 1800s and one person who played the most roles in developing the concept of occlusion of normal teeth was Edward Angle. The first important step in the evolution of orthodontics was the suggestion of Angle's classification of malocclusions around 1890 (3). Studies indicate that 35% of the population has normal occlusion and 65% of people have malocclusion, the cause is unknown in 60% of them (4, 5).

Numerous studies on the prevalence of types of malocclusion in different age and ethnic groups have reported a different prevalence between 11 and 93% (6-8). Malocclusion is mainly hereditary and transmitted to children through parents, but environment plays a role. The symptoms of malocclusion are abnormal placement of teeth, abnormal appearance of face, problem or discomfort when biting or chewing, speech difficulties such as lallation, oral breathing, and mouth breathing (9). Dental abnormalities can cause social and psychological problems, severe abnormalities can be considered a social disability and this factor can have a significant effect on the appearance and daily work according to research conducted (3). Jaw abnormalities cause speech, health problems, discomfort in the temporomandibular joint and, most importantly, psychological problems for bad appearance and social non-acceptance, if it is not treated. The use of quality of life (QOL) outcomes has been emphasized in the researches of oral health like all other medical branches in recent decades (11, 12). The tendency for orthodontic

treatment has been increased for aesthetic reasons over the past two decades, although this tendency is also rooted in socioeconomic status, age, gender, and self-esteem. If orthodontic treatment is not performed, dental and jaw disorders will remain forever (4, 13). It is particularly important to examine the position of children and adolescents' teeth (14). Considering the prevalence of malocclusion and its role in QOL, we aimed to investigate the relationship between need of orthodontic treatment and QOL in North Iran students.

2- MATERIALS AND METHODS

According to definitions, malocclusion refers to the inappropriate relationship between teeth and jaws, which is one of the most common abnormalities in recent decades. In other words, the condition of abnormal pairing of the teeth and jaws is called malocclusion (1, 2). Understanding the concept of occlusion and its definition was presented in the late 1800s and one person who played the most roles in developing the concept of occlusion of normal teeth was Edward Angle.

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Table-1: DHC component of IOTN (21).

Grade 1: No treatment needed
1. Extremely minor malocclusion with contact point displacements of less than 1 mm.
Grade 2: Minor anomaly, no treatment needed
Overjet > 3.5 mm and ≤ 6 mm (with competent lip closing) Anterior or posterior crossbite with 1 mm discrepancy between retruded contact position (RCP) and intercuspal position (ICP) Contact point displacements > 1 mm and ≤ 2 mm Increased overbite of ≥ 3.5 mm (without gingival contact).
Grade 3: Borderline treatment need
Overjet > 3.5 mm and ≤ 6 mm (incompetent lip closing) Reverse overjet between 1 and ≤ 3.5 mm Anterior or posterior crossbite with > 1 mm and ≤ 2 mm discrepancy between RCP and ICP Contact point displacements > 2 mm and ≤ 4 mm Deep overbite with gingival contact or contact with palatal mucosa (but without trauma).
Grade 4: Treatment need
Less severe hypodontia requiring prerestorative orthodontics or orthodontic space closure to obviate the need for prosthetic restoration Overjet > 6 mm and ≤ 9 mm Reverse overjet > 3.5 mm (without masticatory or speech problems) Reverse overjet > 1 mm and ≤ 3.5 mm (without masticatory or speech problems) Anterior or posterior crossbite with > 2 mm discrepancy between RCP and ICP Posterior lingual crossbite with no functional occlusal contact in one or both buccal segments Major contact point displacements > 4 mm Increased and complete overbite with gingival or palatal trauma.
Grade 5: Treatment need
Impeded tooth eruption (3rd molars) attributable to crowding, displacements, supernumerary teeth, retained deciduous teeth and all pathological reasons Extensive hypodontia with restorative impact (more than 1 congenitally missing tooth in any quadrant) requiring prerestorative orthodontics Increased overjet > 9 mm Reverse overjet > 3.5 mm with masticatory problems and speech disorders.

DHC: Dental Health Component; LOTN: Index of Treatment Need.

3- RESULTS

274 students (133 boys and 141 girls) participated in this study. The minimum age of the students was 14 years and the maximum age was 18 years. The mean age was 14.86 ± 0.54 . The mean QOL scores were 13.31 ± 11.78 which was higher in boys (13.95 ± 13.32) than in girls (12.63 ± 9.91), and it was not significant

statistically in boys and girls ($P=0.893$). The most common anomalies found according to DHC questionnaire were displacement of contact points and overjets, respectively. Most of the students in grades 4 and 5 had missing teeth. Most grade 3 students had overjets, displacement of contact points, crossbites, respectively (**Table.2**).

Table-2: Frequency DHC components regarding missing teeth, overjets, crossbites, displacement of contact points and overbites.

IOTN	Missing teeth	Overjets	Crossbites	Displacement of contact points	Overbites
5	30	12	7	42	2
4	10	8	4	44	4
3	0	42	28	31	12
2	0	2	2	48	14
1	0	0	0	13	0

DHC: Dental Health Component; LOTN: Index of Treatment Need.

Mean QOL scores of students were not statistically significant ($P = 0.306$) according to grade of IOTN. Grade 2 had the highest frequency (37.2%) with the lowest mean score of QOL (11.65 ± 10.31), and Grade 5 had the lowest frequency (2.6%) with the highest mean score of QOL (15.83 ± 7.78) (**Figure.1** and

Table.3). Comparing the mean QOL scores of students according to the need for orthodontic treatment showed that there was no relationship between QOL scores and the need for orthodontic treatment ($P=0.264$). IOTN was not statistically significant in both genders ($P=0.079$).

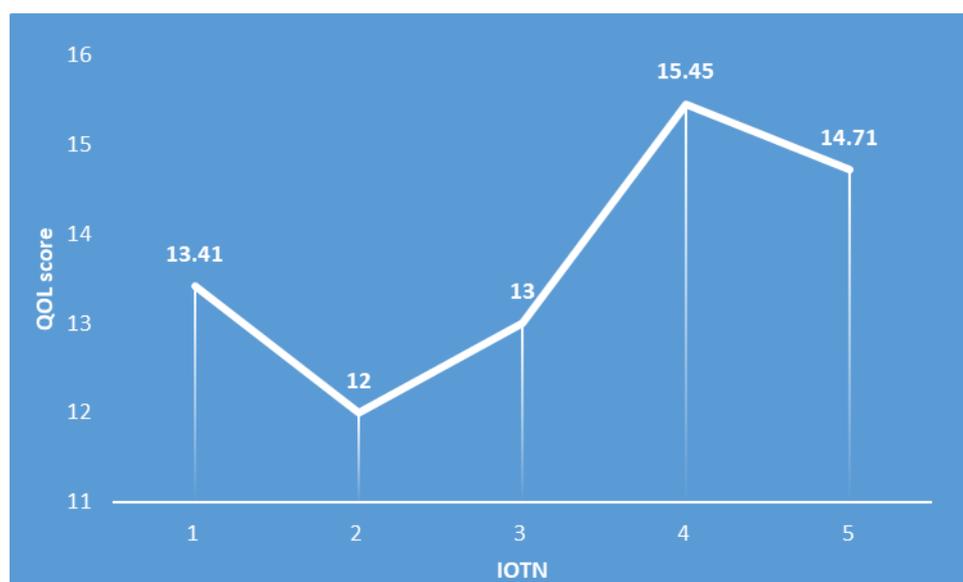


Fig.1: Comparison of the mean QOL scores with IOTN in students.
LOTN: Index of Treatment Need, QOL: Quality of life.

Table-3: Comparison of IOTN and mean QOL scores of students by separate genders.

IOTN	Boys Frequency (%)	Girls Frequency (%)	QOL scores (Mean \pm SD)
1	29 (21.8)	32 (22.7)	13.41 \pm 10.87
2	51 (38.35)	51 (36.17)	12 \pm 10.67
3	22 (16.54)	20 (14.18)	13 \pm 8.7
4	30 (22.56)	32 (22.7)	15.45 \pm 15.91
5	1 (0.75)	6 (4.25)	14.71 \pm 7.7
P-value	0.079*		0.264**

* Kruskal Wallis test, ** Chi-square test, SD: Standard deviation, QOL: quality of life.

4- DISCUSSION

We aimed to investigate the relationship between need of orthodontic treatment and QOL in North Iran students. In the present study, grade 2 had the highest frequency and higher QOL than other grades. Grades 4 and 5 of IOTN had the lowest QOL and needed orthodontic treatment. There was no significant relationship between QOL scores and IOTN grades in both genders. Approximately 25% of students needed orthodontic treatment. Displacement of contact points was the most common anomaly found in subjects. Malocclusion is considered one of the most important dental and jaw abnormalities that has a psychologically negative effect on a person's morale and makes one susceptible to affect, periodontal diseases, and tooth decay, in addition to the possible bad effects on nutrition because of its effect on the appearance and face of the person (22). It can prevent many complications such as oral diseases, jaw functional disorders and psychosocial problems via timely diagnosis of malocclusion and leading people to proper treatment. Malocclusions caused by impacted teeth, early loss of primary and permanent molars, mild to moderate crowding and some jaw deformities, odontoma, etc. are among potential orthodontic problems which should be diagnosed by a dentist and, if the dentist is unable to timely diagnose or treat the issue initially, more complex problems may occur in the future (22).

The results of current study showed that 25.2% of high school students in Sari had a definite need for orthodontics based on the component of dental health. In this study, there was no significant relationship between malocclusion severity and quality of life. In the study by Khanemasjedi et al., like our study, the relationship between oral health-related QOL with IOTN was not significant (23). In a study to examine the impact of malocclusion on oral health-related quality of life, Carvalho et al. observed malocclusion in 46.2% of the study population; also, the effect of malocclusion on oral health-related QOL was 32.7% in children and 27.1% in their families. No negative effect was observed on oral health-related QOL among children with malocclusion and their families (24). Momeni et al., in a study titled tendency to orthodontic treatment with QOL related to it in 10-14 year-old adolescents in Shiraz (Iran), state that the difference of two groups under study was statistically significant in three domains: "self-esteem", "awareness of dental-facial cosmetic" "and "dental-facial cosmetic". The difference between the case and control groups was not significant in the other two domains, i.e., "social aspect" and "oral function" (15). The results of both the social aspect and oral function were consistent with the present study. Simões et al. stated that children with severe malocclusion had a more negative effect on QoL compared to children with mild malocclusion or without malocclusion. The result of their study showed that

malocclusion affects the QOL and this effect is more in the social and emotional dimension (25). Healey et al. in 2016 showed that malocclusion affects QoL of orthodontic patients before treatment (26). Boronat-Catala et al. showed that 9-year-old children need orthodontic treatment 15.4%, 12-year-old children 20.9%, and 15-year-old children 12.8% according to IOTN. They concluded that the need for orthodontic treatment is more in the mixed dentition period and decreases by increasing age (22). In a study to investigate the impact of malocclusion on oral health-related quality of life, Chen et al. state that the severe need for orthodontic treatment was 27.9% in their community. The results of this study showed that malocclusion had a significant negative effect on the oral health-related quality of life, especially in disability and mental distress. Orthodontic treatment of malocclusion improves oral health-related QOL of patients (27).

In a study to examine the relationship between oral health-related QOL and occlusal features, Farzanegan et al. reported that a statistically significant relationship was observed in the relationship between oral health-related QOL and index of complexity, outcome and need (28). The results of this study were inconsistent with the results of the present study. In a study to determine the need for orthodontic treatment according to Dental Aesthetic Index, Aesthetic Construct, DHC, IOTN, and determine its relationship with gender among 12-year-old students based on World Health Organization recommendations for surveys of oral health, Puertes-Fernández et al. found that none of the children had been under orthodontic treatment before, 4 percent of children in group 5 had a severe need of treatment and 9.2 percent in group 4 had a severe need of treatment. There was no significant difference in terms of IOTN between male and female students

(29). The results of these studies were not consistent with the present study. One of the reasons for the inconsistency may be the difference in the age range of the target group in the different studies. As people get older, the criteria for determining QOL change, and what is certain is the child's perception of orthodontic treatment, and its importance is less in lower age. Another cause can be the variation of using different QOL questionnaires in different studies. Racial and ethnic diversities is another determining factor that can create various social understanding from mentality about oral and tooth conditions and facial cosmetic. In fact, there is sometimes human error when answering questions of the person involved in these studies. Not considering the dental-facial cosmetic of IOTN is the limitation of this study. Studies that are more extensive may be needed with more diverse sample size for more accurate evaluation. It is suggested that the dental health and cosmetic index of IOTN criteria be simultaneously evaluated. In addition, we suggest that such a study be examined with a larger sample size in future studies considering that the malocclusion severity and QOL were not significant. Moreover, it is suggested the need for orthodontic treatment be evaluated in different age groups in order to obtain a more definite result.

5- CONCLUSION

In our study, students with dental malocclusion had the lowest QOL, although no significant relationship was observed. Almost a quarter of students needed orthodontic treatment. The most common malocclusion was displacement of contact points.

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7- CONFLICT OF INTEREST: None.

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