

Impact of malocclusion on Oral Health-Related Quality of Life (OHRQoL) using the Oral Health Impact Profile (OHIP-14)

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Abstract

Aim: The present study aims to examine the oral health-related quality of life (OHRQoL) using the Oral Health Impact Profile (OHIP-14) among patients with orthodontic complaints in terms of malocclusion classification from the aspects of gender and age.

Methods: The present study was carried out using face-to-face interviews with 150 patients (73 females and 77 males) aged between 12 and 34 years. Demographic information, including age and gender, was requested from the patients via the questionnaire form. Participants were requested to complete the abbreviated version of the OHIP-14 to assess the OHRQoL. Patients were classified into three groups: Class I (n = 50), II (n = 65), and III (n = 35) by Angle classification. In order to measure the OHRQoL, the patients were asked to answer the Turkish version of the Oral Health Impact Profile (OHIP-14). The statistical analyses were performed using ANOVA, Bonferroni, and the Student's t-test. The statistical significance level was set at $p < 0.05$.

Results: In OHRQoL, the Class III group was found to have statistically significant higher values when compared to the Class II and Class I groups ($p < 0.05$). The mean scores in the psychological discomfort and handicap subscales were found to be statistically significantly higher ($p < 0.05$).

Conclusion: Malocclusion has a negative effect on OHRQoL. The increasing severity of malocclusion causes lower OHRQoL.

Keywords: Malocclusion, oral health-related quality of life, Oral Health Impact Profile-14, orthodontic patient, orthodontic treatment

Introduction

Developing generally in the childhood period, malocclusion refers to common anomalies arising from the wrong relations between teeth or dentofacial adjacent tissues [1, 2]. Malocclusion is a developmental issue when there is a deviation from the normal connection or alignment of the teeth with other teeth in the same arch and/or with the teeth in the opposite arch [3]. Malocclusions are the third most common oral health condition, behind dental caries and periodontal disease [4]. The World Health Organization recognizes malocclusion as an important public health problem because of its high occurrence [5]. Among the individuals suffering malocclusion, besides the dissatisfaction with facial appearance, also insufficiencies in chewing system functions, temporomandibular joint dysfunction, swallowing and speaking problems, periodontal problems, predisposition to caries, and predisposition to traumatic facial injuries may be seen [6, 7]. The most common malocclusions include anterior open bite, excessive overjet, Class II malocclusions, and posterior crossbite [8, 9]. Older children and adolescents frequently have crowded teeth due to a lack of space in their dental arches [10, 11].

Oral disorders have a considerable negative impact on the functional, social, and psychological well-being of children and their families [3]. Malocclusion affects people's quality of life. It affects social and personal life. Depending on its severity, malocclusion negatively affects the lives of individuals [12, 13]. Correction of malocclusions with orthodontic treatment was found to have a positive correlation with the increase in quality of life in different age groups [14].

The term "health-related quality of life" (HRQoL), which is a multidomain concept, refers to an individual's assessment of how the following factors affect his or her well-being: pain/discomfort, physical function, psychology, and social function [15]. When these considerations center on orofacial issues, oral health-related quality of life (OHRQoL) is measured [16].

Individuals with severe malocclusions have lower self-esteem in their social relationships. The presence of malocclusion in dental and facial morphology negatively affects the self-perception of individuals throughout his/her life and it might also result in social reactions and emotional and mental problems [17, 18]. This situation also affects oral health-related quality of life (OHRQoL) [18]. OHRQoL is a multidimensional structure reflecting individuals' comfort while eating, sleeping, and social interaction and it is defined as the individual's self-esteem and satisfaction with oral health [19]. Various OHRQoL assessment methods were developed in order to assess the functional and psychosocial effects of dental diseases [20].

Nowadays, the most common, reliable, and comprehensive instrument for assessing the OHRQoL is the Oral Health Impact Profile (OHIP) and its short version OHIP-14 [14, 21, 22].

OHIP originally consists of 49 items, and OHIP-14, in its short form, was organized into seven groups. The groups used in shortening the scale were named functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap [23]. Mumcu et al. prepared the Turkish version of the OHIP-14 scale in 2006, and its reliability and validity were approved [24].

The present study aims to examine the oral health-related quality of life of patients who applied for orthodontic treatment at the Orthodontic Clinic of Dentistry Faculty of Sakarya University in terms of malocclusion classification from the aspect of gender and age. The null hypothesis was that OHRQoL would decrease with an increase in the severity of malocclusion.

Materials and Methods

In order to confirm the voluntary participation, the consent forms were obtained from the patients, and the participation rate was 100% (07.11.2020-12.17.2020). The ethics committee approval was obtained from Sakarya University's Non-Interventional Clinical Research Ethics Committee (date of 07.10.2020 and number of 71522473/050.01.04/411). The consents of patients were obtained in accordance with the principles of the Helsinki Declaration.

Designed as a cross-sectional descriptive study, the present study was carried out by conducting a face-to-face interview with 150 (73 females and 77 males) patients who applied to the Orthodontic Clinic of Dentistry Faculty of Sakarya University and were aged between 12 and 34 years (mean age of 20 ± 5.6 years) (Table 1). The inclusion criteria were as follows: no orthodontic treatment history, age of 12 or older, no absent teeth except for third molar teeth, no caries or periodontal problem, and no craniofacial anomaly.

In the questionnaire form, the patients were asked to provide demographic information such as age and gender. In order to measure the OHRQoL, the patients were asked to answer the short version of OHIP-14. The researcher determined dental Angle class of patients.

OHIP-14 has been used in many previous studies to measure OHRQoL [14, 21, 22]. OHIP-14 is the original questionnaire's short version, which is self-administered, and it includes 14 items from 7 fields measuring the effect of orthodontic treatment on OHRQoL. The fields were functional limitation (Q1 and Q2), physical pain (Q3 and Q4), psychological discomfort (Q5 and Q6), physical disability (Q7 and Q8), psychological disability (Q9 and Q10), social disability (Q11 and Q12), and handicap (Q13 and Q14). The patients were asked about how negative experiences they have had in these fields and the answers were recorded using a 5-point Likert scale (0 = never, 1 = almost never, 2 = sometimes, 3 = frequent, 4 = very frequent). The total OHIP score was calculated by summing the scores of all items (total number method). The total OHIP-14 score ranges between 0 and 56,

whereas the sphere of influence scores range between 0 and 8. OHIP-14 scores were calculated using mean values. Higher OHIP-14 scores indicate lower OHRQoL.

Statistical analysis

The data were analyzed using IBM SPSS 25.0 software (IBM, Armonk, New York, USA).

The cross-sectional comparisons between age groups and gender groups were performed using student's t-test. The comparisons between malocclusion classes were performed using the ANOVA test, and post-hoc comparisons were made using the Bonferroni test. The level of significance was set at $p < 0.05$.

Results

As seen in Table 2, the comparisons between OHIP-14 subscales and total scale scores by the malocclusion classification were performed using ANOVA and Bonferroni test.

In the mean total OHIP-14 scores, the Cl III group was found to have statistically significantly higher values when compared to Cl II and Cl I groups ($p = 0.009$). The scores of the Cl III group in psychological discomfort, physical disability, psychological disability, and social disability subscales were found to be statistically significantly different from those of the Cl I group ($p = 0.046$, $p = 0.039$, $p = 0.023$, $p = 0.036$).

Table 3 shows a comparison of OHIP-14 subscales and total scale mean scores between the genders using a student's t-test. It was determined that, when compared to males, females had significantly higher mean scores in total OHIP-14, physical pain, psychological discomfort, and psychological disability subscales ($p = 0.032$, $p = 0.034$, $p = 0.025$, $p = 0.046$).

As seen in Table 4, the comparisons between mean scores of OHIP-14 subscales and the total scale of age groups were performed using a student's t-test. When compared to the age group of 12-18 years, the age group of 19-34 years was found to have significantly higher mean scores in total OHIP-14, psychological discomfort, and psychological disability ($p = 0.013$, $p = 0.021$, $p = 0.003$).

Table 1. Demographic data and malocclusion classification.

	n	%
Gender		
Female	77	51.3
Male	73	48.6
Age		
12-18	86	57.3
19-34	64	42.6
Malocclusion classification		
Cl I	50	33.3
Cl II	65	43.3
Cl III	35	23.3

Table 2. Comparison of OHIP-14 subscale and total scale mean scores by malocclusion classification.

	Cl I (a) Mean $\pm$ SD	Cl II (b) Mean $\pm$ SD	Cl III (c) Mean $\pm$ SD	ANOVA p	Bonferroni p
Total OHIP-14	6.02 $\pm$ 3.80	9.65 $\pm$ 5.72	14.18 $\pm$ 6.20	0.002 **	0.009 ** c>a,b
Functional limitation	0.41 $\pm$ 0.23	0.76 $\pm$ 0.21	1.12 $\pm$ 0.63	0.654	
Physical pain	0.30 $\pm$ 0.12	0.55 $\pm$ 0.49	0.98 $\pm$ 0.95	0.789	
Psychological discomfort	1.95 $\pm$ 0.86	2.23 $\pm$ 0.87	3.34 $\pm$ 1.01	0.043*	0.046 * c>a
Physiological disability	0.43 $\pm$ 0.21	1.49 $\pm$ 0.76	2.60 $\pm$ 0.46	0.021*	0.039 * c>a
Psychological disability	1.56 $\pm$ 0.98	2.02 $\pm$ 0.95	3.45 $\pm$ 1.03	0.035*	0.023 * c>a
Social disability	0.95 $\pm$ 0.56	2.15 $\pm$ 0.96	2.31 $\pm$ 0.98	0.048*	0.036 * c>a
Handicap	0.42 $\pm$ 0.23	0.45 $\pm$ 0.21	0.48 $\pm$ 0.56	0.945	

* $p < 0.05$, ** $p < 0.01$, ANOVA and Bonferroni test

Table 3. Comparison of OHIP-14 subscale and total scale mean scores by gender.

	Female Mean $\pm$ SD	Male Mean $\pm$ SD	P
Total OHIP-14	5.21 $\pm$ 0.98	3.65 $\pm$ 0.85	0.032*
Functional limitation	0.16 $\pm$ 0.05	0.18 $\pm$ 0.06	0.698
Physical pain	0.31 $\pm$ 0.06	0.02 $\pm$ 0.01	0.034*
Psychological discomfort	1.98 $\pm$ 0.30	1.15 $\pm$ 0.32	0.025*
Physiological disability	0.03 $\pm$ 0.02	0.16 $\pm$ 0.04	0.677
Psychological disability	1.86 $\pm$ 0.54	1.21 $\pm$ 0.23	0.046*
Social disability	0.76 $\pm$ 0.13	0.83 $\pm$ 0.21	0.789
Handicap	0.11 $\pm$ 0.05	0.10 $\pm$ 0.03	0.985

Student's t-test; $p < 0.05$ **Table 4.** Comparison of OHIP-14 subscale and total scale mean scores by age

	12-18 years Mean $\pm$ SD	19-34 years Mean $\pm$ SD	P
Total OHIP-14	6.61 $\pm$ 0.74	7.90 $\pm$ 0.54	0.013*
Functional limitation	0.23 $\pm$ 0.04	0.19 $\pm$ 0.25	0.869
Physical pain	0.12 $\pm$ 0.06	0.46 $\pm$ 0.01	0.503
Psychological discomfort	1.88 $\pm$ 0.60	2.69 $\pm$ 0.32	0.021*
Physiological disability	0.63 $\pm$ 0.02	0.19 $\pm$ 0.04	0.562
Psychological disability	1.99 $\pm$ 0.44	2.98 $\pm$ 0.23	0.003*
Social disability	1.65 $\pm$ 0.21	1.24 $\pm$ 0.65	0.695
Handicap	0.11 $\pm$ 0.05	0.15 $\pm$ 0.09	0.862

Student's t-test; $p < 0.05$

Discussion

The present study aimed to determine the individuals' quality of life by malocclusion classification, age group, and gender. The null hypothesis that OHRQoL would decrease with an increase in the severity of malocclusion was supported.

There are studies examining the effects of malocclusion on the quality of life [14, 15, 21, 22].

In the present study, it was determined that a decrease was observed in OHRQoL, together with the presence of malocclusion and high scores in psychological discomfort and psychological disability. Chen et al. reported that the maximum scores in psychological discomfort and psychological disability were observed before the orthodontic treatment in all the participants [25]. Malocclusion may have an adverse effect on social interactions and psychological well-

being. Liu et al. determined that malocclusion affected the psychological discomfort, psychological disability, social disability, and handicap subscales of OHIP-14 [26]. In another study, it was emphasized that malocclusion resulted in discomfort, especially in eating, and it might be related to physical disability [27]. Another study reported that the esthetical problems of individuals had the highest level of effect on psychological discomfort [28].

There also are studies reporting that the forms of malocclusion are related to facial pain [21, 29, 30]. In parallel with the previous studies, it was determined in the present study that, when compared to males, females had higher mean physical pain scores, and it suggests that women had chronic orofacial pain more frequently than men and they had more frequent symptoms [21, 31, 32]. The pain is thought to be perceived differently by individuals depending on cognitive, behavioral, age, educational status, sociocultural, and economic factors.

In the present study, women were found to have higher total OHIP-14 scores when compared to men, and many previous studies reported similar results [22, 23, 33]. Women are thought to be more aware of the effects of oral health when compared to men. In the present study, women's scores in psychological discomfort and psychological disability subscales were higher than men's. Rusanen et al. reported that men had lower scores in psychological discomfort, physical disability, handicap, and total OHIP-14 scores when compared to women, but there was a significant correlation between their existing malocclusions and these scores [33].

When compared to the individuals in the age group of 12-28 years, the individuals in the age group of 19-34 years had higher scores in total OHIP-14 and in psychological discomfort and psychological disability subscales. Rusanen et al. emphasized that young individuals had higher OHIP-14 scores than adult individuals [33]. Their social relationships and they were not satisfied were determined that, with the idea that an esthetical smile would be effective in increasing physical attractiveness, young individuals complain about the effects of oral health more frequently [34]. In other studies, it was reported that there was a higher correlation between malocclusion and OHRQoL among adult individuals [23, 35]. Quality of life is believed to affect individuals from emotional aspects more than functional and social aspects [36]. In terms of self-esteem, the patients having malocclusion emphasized that they felt embarrassed with their image [37]. In seeking orthodontic treatment, young adult individuals aim not only to have improved oral functions but also to increase their self-respect and eliminate their esthetic concerns in social life [38].

The routine use of the OHIP-14 scale in assessing the OHRQoL is believed to be useful in the diagnosis process. It would be helpful for providing information about the treatment priorities and maximizing patient satisfaction. It also allows for assessing the patients from a psychological aspect.

Conclusion

Malocclusion has a negative effect on OHRQoL. Higher levels of malocclusion severity yield lower levels of OHRQoL. The highest levels of effect were observed in psychological discomfort and psychological disability. When compared to men, women are psychologically affected more by the malocclusion. When compared to young individuals, the OHRQoL of adults is affected more by the presence of malocclusion.

Disclosures

Ethics Committee Approval: Ethics committee approval was received for this study from Sakarya University Non-Interventional Clinical Research Ethics Committee, with the approval number: 2020-71522473/050.01.04/411.

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