

## Effect of orthodontic treatments on quality of life in adolescents

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### Original Article

#### Abstract

**BACKGROUND AND AIM:** Dental problems and oral diseases can have their own effects on social-psychological aspects, physical conditions, as well as quality of life (QOL) in individuals. In this regard, malocclusion can influence functional, socio-economic, and psychological aspects in patients. Therefore, the purpose of the present study was to evaluate the effects of orthodontic treatments on QOL.

**METHODS:** This prospective study was conducted on 65 patients with malocclusion selected through simple convenience sampling method. The data were collected via a demographic characteristics information form and 22-item Orthognathic Quality of Life Questionnaire (OQLQ) in 4 domains (social aspects, dentofacial aesthetics, oral functions, and awareness of dentofacial aesthetics) before treatment, six months after treatment, and at the end of treatment. The data were then analyzed using SPSS software and analysis of variance (ANOVA) with repeated measures. The P-value was considered at a 0.0500 significance level.

**RESULTS:** In the present study, 73.8% of the patients were women. The mean and standard deviation (SD) of the age of the study participants was also equal to  $18.79 \pm 7.35$  years. As well, the mean and SD scores of the questionnaire before treatment, six months after treatment, and at the end of treatment were reported as  $14.71 \pm 11.37$ ,  $18.05 \pm 12.12$ , and  $12.07 \pm 8.13$ , respectively. No significant correlation was also observed between gender and QOL. In addition, QOL had significantly degraded six months after treatment. Furthermore, there was a significant difference between QOL at pre- and post-treatment stages.

**CONCLUSION:** Based on the finding of the present study, OQLQ was reported significantly poorer six months after treatment compared to that before treatment. Orthodontic treatment could also significantly boost QOL. Finally, it was recommended to consider QOL in orthodontic treatments.

**KEYWORDS:** Quality of Life; Orthodontic Treatment; Malocclusion

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The concept of oral health-related quality of life (OHRQOL) has been utilized to measure the effects of oral health on daily functioning and quality of life (QOL).<sup>1</sup> In recent years, more attention has been correspondingly paid to OHRQOL in children and adolescents for the reason that dental problems and oral diseases such as dental caries or cavities and

malocclusion can have an adverse impact on physical and mental satisfaction in the youth.<sup>2,3</sup> Likewise, dental problems and oral diseases influence a person's social-psychological aspects, physical conditions, as well as QOL through interruptions in terms of presence in society and interpersonal relationships.<sup>4</sup> In this regard, malocclusion is known as a dental problem that affects people's

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functional, social, and psychological aspects.<sup>5</sup>

Some studies have similarly reported that individuals with malocclusion tended to feel embarrassed.<sup>6,7</sup> Although the goal of orthodontic treatments is to improve oral health status and functions, importance of beauty and its psychological impact is ever-increasing. Following the completion of orthodontic treatment, patients have normally reported a better physical appearance and higher levels of self-confidence.<sup>8,9</sup> Accordingly, Chen et al., investigating the effect of malocclusion on OHRQOL in adolescents, demonstrated that malocclusion could have a negative effect on psychological discomfort and disability.<sup>10</sup> Examining the impact of the type and the severity of malocclusion on OHRQOL, it was confirmed that the mean score of OHRQOL had become critical in patients suffering from more severe malocclusion.<sup>11-13</sup> Furthermore, Zheng et al. showed that the type of malocclusion was significantly correlated with the improvement of various aspects of OHRQOL.<sup>14</sup> Fixed orthodontic treatments in patients aged 12-15 years could also significantly enhance individuals' understanding of their beauty,<sup>15</sup> and orthodontic treatments in adults significantly increased their self-esteem.<sup>16</sup> Over the past years, several research instruments have been employed to measure QOL in orthodontic patients including Orthognathic Quality of Life Questionnaire (OQLQ) used as a research tool for assessing QOL associated with orthodontic conditions.<sup>17,18</sup> The given questionnaire contained 22 items and 4 domains of social aspects, dentofacial aesthetics, oral functions, and awareness of dentofacial aesthetics.<sup>18</sup> Since it has been reported that sociocultural differences<sup>19</sup> as well as individual and environmental characteristics can affect QOL,<sup>17</sup> and considering that the same study had not been carried out thus far in the city of Kerman, Iran, the present study aimed at determining the effects of orthodontic treatments on QOL in patients referred to orthodontic centers in this city.

## Methods

The present study was a longitudinal research of descriptive-analytical type that was conducted on patients referred to two private orthodontic centers and the School of Dentistry in Kerman City to undergo fixed orthodontic treatments. The inclusion criteria in this study were patient's consent, no history of orthodontic treatments, and lack of oral and maxillofacial surgery (OMFS) in their treatment plan, as well as mild malocclusion in need of fixed orthodontic treatments. To this end, a trained student of dentistry attended these centers for 3 days, identified patients meeting the inclusion criteria, explained the project procedure, and then provided them with OQLQ. Patient collection was done through randomized simple method. The questionnaire contained 22 items in 4 domains of social aspects, dentofacial aesthetics, oral functions, and awareness of dentofacial aesthetics. It should be noted that the validity and the reliability of the Persian version of this questionnaire had been already confirmed. Validity of this questionnaire based on Cronbach's alpha was 0.86 and reliability based on weighted kappa was 0.91.<sup>20</sup> The demographic characteristics information about patients also included age, gender, level of education, and type of malocclusion which were then recorded in the questionnaire. The questionnaires were then coded and maintained by the project executor. Afterwards, at intervals of 6 months and at the end of orthodontic treatments, the questionnaire was provided to the patients for completion.<sup>21</sup> The questionnaire was also scored based on a four-point Likert-type scale in which point zero indicated that the statement did not annoy the patient at all, point 1 showed that the statement was somewhat annoying, point 2 meant that the statement was annoying a lot, and point 3 showed that the statement was extremely annoying. As a result, the range of the scores was between 0-66. So, the domain of social aspects (8 items) was in a score range of 0-24, and dentofacial aesthetics (5 items), oral

functions (5 items), and awareness of dentofacial aesthetics (4 items) were in the score range of 0-15, 0-15, and 0-12, respectively. After 12 months, the questionnaires were scored using SPSS software (version 21, IBM Corporation, Armonk, NY, USA) at a significance level of 0.0500 and then analyzed via analysis of variance (ANOVA) with repeated measures. The research proposal was also approved with the code number of IR.KMU.REC.13 95.747 by the Ethics Committee of Kerman University of Medical Sciences.

### Results

Of 97 patients at the onset of the study, 65 individuals responded all the items within three intervals. Out of 65 patients, 17 (26.2%) were men and 48 (73.8%) were women. The mean age of the participants was also reported as  $18.79 \pm 7.35$  years. The mean orthognathic QOL before treatment was  $14.77 \pm 11.37$ , and this value was equal to  $18.05 \pm 12.12$  and  $12.07 \pm 8.13$  six months after treatment and at the end of treatment, respectively (Figure 1). Considering the completion of the questionnaire at the pre-treatment stage, the most highly answered items by 11 patients (16.9%) was "item 22" reading "I feel really upset to comment on my appearance, even when I know that others are just joking about it" associated to social aspects domain and then "item 9" as "I spend a lot of time looking at and investigating my teeth in the mirror" in the domain of awareness of dentofacial aesthetics answered by 9 patients (13.8%) as too much. Within 6 months after treatment, "item 9"

reading "I spend a lot of time looking at and investigating my teeth in the mirror" in the domain of awareness of dentofacial aesthetics was answered as too much by 10 individuals (15.4%) and the item 10 "It is hurting to take picture of me" in the domain of dentofacial aesthetics was responded by 9 patients (13.8%) as too much. At the end of the treatment, none of the responses was assigned as too much.

There was also a significant difference between QOL scores before treatment, 6 months after treatment, and at the end of treatment. However, no statistically significant difference was observed between the mean scores of different domains before treatment, 6 months after treatment, and at the end of treatment (Table 1). In the present study, there was similarly a significant difference between male and female patients in terms of orthognathic QOL in the domain of awareness of dentofacial aesthetics before and 6 months after treatment. As well, female patients reported poorer QOL (Table 2).

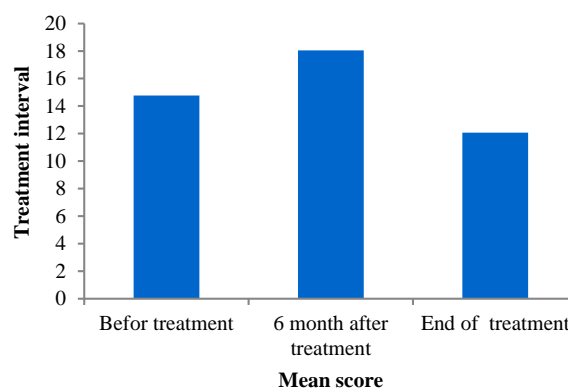


Figure 1. The mean score of questionnaire according to treatment interval

Table 1. Correlation between mean score of orthodontic quality of life (QOL) and domains according to treatment interval

Variables	Before treatment (mean $\pm$ SD)	6 months after treatment (mean $\pm$ SD)	The end of treatment (mean $\pm$ SD)	P
Social aspects domain	5.68 $\pm$ 5.59	6.90 $\pm$ 6.19	3.88 $\pm$ 3.38	0.0001
Dentofacial aesthetic domain	3.84 $\pm$ 3.62	4.56 $\pm$ 4.23	3.37 $\pm$ 2.24	0.0140
Oral function domain	2.46 $\pm$ 2.23	3.68 $\pm$ 2.75	3.77 $\pm$ 2.29	0.0001
Dentofacial knowledge domain	4.47 $\pm$ 2.76	4.71 $\pm$ 2.84	3.29 $\pm$ 2.46	0.0010
Orthodontic QOL	14.77 $\pm$ 11.37	18.05 $\pm$ 12.12	12.07 $\pm$ 8.13	0.0030

SD: Standard deviation; QOL: Quality of life

**Table 2.** Correlation between mean score of orthodontic quality of life (QOL) and domains in different treatment interval according to gender

Variables		Before treatment (mean ± SD)	6 months after treatment (mean ± SD)	End of treatment (mean ± SD)
Social aspects domain	Men	6.06 ± 4.50	7.70 ± 6.50	4.68 ± 3.39
	Women	7.17 ± 5.94	6.60 ± 6.12	3.60 ± 3.13
P		NS	NS	NS
Dentofacial aesthetic domain	Men	3.67 ± 3.00	4.06 ± 3.15	3.14 ± 3.00
	Women	4.11 ± 3.69	4.73 ± 4.55	3.50 ± 2.33
P		NS	NS	NS
Oral function domain	Men	2.64 ± 2.52	4.47 ± 3.18	3.87 ± 2.44
	Women	2.41 ± 2.13	3.39 ± 2.56	3.74 ± 2.66
P		NS	NS	NS
Dentofacial knowledge domain	Men	2.64 ± 2.13	3.38 ± 1.69	2.23 ± 2.41
	Women	5.02 ± 2.75	5.16 ± 3.09	3.31 ± 2.50
P		0.0150	0.0040	NS
Total score of orthodontic QOL	Men	12.53 ± 10.75	20.66 ± 11.67	14.66 ± 10.32
	Women	17.89 ± 11.96	18.55 ± 12.59	14.18 ± 8.25
P		NS	NS	NS

NS: Not significant; SD: Standard deviation; QOL: Quality of life

## Discussion

Dental problems and oral diseases can affect a person's social-psychological aspects and physical conditions and they can consequently influence QOL through interruptions in terms of presence in society and interpersonal relationships.<sup>4</sup> In this respect, malocclusion is considered as a dental problem that can affect functional, social, and psychological aspects of individuals.<sup>5</sup> In the present study, there was no statistically significant difference between the total score of QOL and gender although women had generally experienced poorer orthodontic QOL. These findings were not consistent with the results of other investigations.<sup>22,23</sup> The cause of this inconsistency was the study population or the questionnaires used in the present study.

At the end of the treatment, orthognathic QOL was significantly improved in patients compared to that before treatment. Thus, the results were in line with those reported in other studies.<sup>22,24,25</sup> Additionally, Choi et al. described QOL in individuals using 36-item Short Form Survey (SF-36), Oral Health Impact Profile-14 (OHIP-14), and OQOL, and found that the mean scores of OHIP-14 and OQOL had significantly improved during treatment compared to pre-treatment stage,<sup>26</sup>

which were in agreement with the findings in the present study.

In this study, the most frequent answers were to the option of too much (indicating the deterioration of the situation in the questionnaire) in the item reading "I feel really upset to comment on my appearance, even when I know that others are just joking about it" by 11 patients (16.9%). Considering the mean age of the individuals recruited in this research, it seemed that appearance in adolescence and early adolescence was one of the factors that had caused discomfort. At the end of the treatment, no one responded to this item choosing the option of too much. In fact, orthodontic treatments could have a positive impact on this issue, and they could consequently make patients' appearance more attractive.

The effect of orthodontic treatments could be also observed in the item of "I spend a lot of time looking at and investigating my teeth in the mirror". At the onset of treatment, 38.5% of the individuals had spent time and a lot of time on this issue, which dropped to 16.9% at the end of treatment.

The results of this study showed that the mean scores in terms of social aspects increased slightly within 6 months after treatment. That is, QOL had worsened and it



had significantly improved at the end of the treatment. It should be noted that malocclusion is not by itself a life-threatening condition but may have an unpleasant effect on social interactions and good psychological feelings in patients.<sup>27-29</sup>

The findings of this study showed that the mean score of OQLQ in the domain of dentofacial aesthetics had improved 6 months after treatment compared to that before treatment and it had consequently decreased at the end of treatment. In fact, QOL had worsened 6 months after treatment and it was better at the end of treatment. The reason for this might be that some orthodontic appliances placed in patients' mouth and aligning the teeth during the treatment until their return to the final position could affect this part of orthognathic QOL.

The results of the study by Isiekwe et al. showed a difference between self-assessment, beauty norm, and QOL associated with individuals' health status especially in psychological domains.<sup>30</sup>

In the research by Pabari et al., tendency to correct and straighten their teeth to improve smile view was the most important motivational factor for patients aged 18-64 years to undergo orthodontic treatments.<sup>31</sup> In the research by Bortoluzzi et al. aimed at localization of OQLQ, it was reported that facial beauty was the most important factor affecting QOL in individuals with dentofacial deformities.<sup>17</sup>

Moreover, 6 months after treatment, the mean score of oral functions was more than that at the beginning and the end of treatment. In fact, orthodontic QOL had become poorer in this respect. The presence of orthodontic appliances in the mouth had similarly affected oral functions. In the research study by Alghamdi et al., QOL had significantly worsened in the domain of chewing experience in patients with palatal expanders.<sup>24</sup>

Assessing OHRQOL in patients with fixed

appliances and twin blocks, Alzoubi et al. reported that in the early stages, QOL had worsened in both groups and it had improved at the end of the treatment.<sup>22</sup>

The results of this study showed that the mean score in the domain of dentofacial aesthetics increased 6 months after treatment compared to the onset of the treatment and after it. There was also a significant difference between gender and mean scores in this domain before treatment and at intervals of 6 months. Women also had lower QOL in this domain. It could be concluded that women had paid more attention to their appearance than men.

**Limitations:** This study was conducted on selected centers and patients without tooth extraction in treatment plan and sever malocclusion; so, the results cannot be extended to all orthodontics patients.

### Conclusion

The results of this study showed that orthodontic treatments could have positive effects on orthodontic QOL. All the domains of orthodontic treatments had also improved QOL. There was no statistically significant difference between gender, years of education, and QOL scores. It seemed QOL was required to be more taken into account in orthodontic treatments.

It was suggested to conduct further studies on QOL in orthodontic patients within different intervals in terms of types of treatment and appliances used.

### Conflict of Interests

Authors have no conflict of interest.

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