Changes of Oral Health Related Quality of Life During and After Fixed Orthodontic Treatment

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Abstract

Introduction: In this study, we investigated the changes in oral health related quality of life (OHRQoL) among adolescents during and after fixed orthodontic appliance therapy.

Method and material: In this prospective study,71 patients including 19 males and 52 females (aged 14-17 years) , who had sought fixed orthodontic treatment were enrolled. In order to assess OHRQoL, each subject was asked to complete a reliable and valid Iranian form of OHRQoL questionnaire which evaluates four domains consisting oral symptom, functional limitations, emotional wellbeing and social wellbeing at 4 times: before treatment (T0) , at two month (T1) and 6 month (T2) after the placement of the fixed appliance, and 3 months after the removal of the fixed orthodontic appliance (T3). In addition to evaluate their expectations, at T0 they were given another similar questionnaire to complete it with their imagination of their life after treatment. Repeated measurement test was used to compare the relative changes of OHRQoL and its domains among different time points, and also in order to evaluate the differences between the results of treatment and their expectations, t-test was used.

Results: OHRQoL and its domains had no significant differences between boys and girls at any time point. OHRQoL and all domains except emotional wellbeing were decreased at T1 compare with T0 but at T2 and T3 we experienced the improvement in OHRQoL and all of its domains relative to T0. There were significant differences between OHRQoL, emotional and social wellbeing of patients after the treatment and their expectations.

Conclusion: Orthodontic treatment can have a great positive influence on the quality of life. Although, the orthodontic treatment might be associated with some problems and discomforts at the beginning of procedure but by the progression of the treatment all of the quality of life domains increase. At the end of treatment, OHRQoL never reaches the level of patients' expectation.

Keywords: Oral health related quality of life; Fixed orthodontic treatment; Adolescents

Introduction

The terms "quality of life" and "health related quality of life (HRQoL)" were used increasingly in the literature during recent 15 years. On the basis of Becker's et al. [1] definition, quality of life may be in the form of individual's feeling about health or happiness. This feeling is resulted from satisfaction or displeasure of important aspects of one's life. One of the main subtypes of one's physical health is oral health. On the basis of definition of oral health includes health of mouth and surrounding tissues that enable individuals in speaking, eating and incorporating in social activities without difficulty or feeling of discomfort and shamefulness and totally affect emotional health of people [2].

On the other hand, the essential advantage of orthodontic treatments is improving oral functions including mastication, swallowing, speaking and appearance of patient that directly affect psychological and social health and individual's quality of life. In the case of every patient, own perception and subjective imagination have a determinant role in the field of need to orthodontic treatments. So according to one's perception, the standards of esthetics and normal occlusion may be so different

from orthodontists' viewpoint. During the past decade or so, investigators have surveyed the oral health related quality of life (OHRQL) before and after orthodontic treatment to define the impact of orthodontic treatment on OHRQL. Some of these authors have declared that orthodontic treatment resulted in improvement of quality of life [3-9] while others found no or little relationship between orthodontic and esthetic treatment and improvement of quality of life [10-14]. The difference between conclusions could be due to differences in cultures, economic and social conditions of subjects participated in different studies, and differences of questionnaires that were used for assessing the quality of life in different studies.

Today, to increase motivation and cooperation of orthodontic patients, it is better to provide patients with evidence-based information collected through epidemiological studies. The aim of this study was evaluation of oral health related quality of life changes before, during and after orthodontic treatment.

Materials and Methods

Two hundreds and eighteen patients aged 14-17 year-old seeking fixed orthodontic treatment at the Orthodontic Clinic of Mashhad Dental School (Iran) between May and December 2010, were recruited in this prospective study. Patient selection was independent of type and severity of malocclusion. Excluding criteria were history of chronic disease, taking drug, previous orthodontic treatment, craniofacial anomalies, extensive caries and periodontal problems and need to orthogenetic surgery. The study was approved by the Ethic Committee of the Mashhad University of Medical Sciences.

For OHRQoL assessment, a questionnaire had been developed by adopting items from OHRQoL questionnaires such as the CPQ 11-14, OHIP and OIDP. The validity and reliability of this questionnaire had been determined in our previous study [15]. This questionnaire has 48 questions categorized into four domains: oral symptoms, functional limitations and emotional and social wellbeing. A maximum time of 20 minutes was considered for each participant to answer the questions. There are five scores for every question that indicate the incidence of the given item in the past 3 months: 0 = never, 1 = once or twice, and 2, 3, 4 = sometimes, often, and every day, respectively. The total sum of these points for each patient yields the OHRQOL score. The greater the sum, the lower the level of the OHRQOL and vice versa.

The questionnaire given to the patients at four different times: one week before orthodontic treatment (T0), to serve as the baseline; 2 months (T1); and 6 months (T2) after initiation of orthodontic treatment, and 3 months after the removal of the fixed orthodontic appliances (T3). In addition to evaluate their expectations, at T0 they were given another similar questionnaire to complete it with their imagination of their life after finishing of treatment.

As previously mentioned, after screening, 218 patients were recruited to fill out the questionnaire. At T1, 180 patients were followed-up to answer the questionnaire and at T2 148 patients participated in this phase, and at T3 only 71 patients (including 19 male and 52 female) filled the questionnaire. The main reason for such a response rate was because participants missed their appointments given at the determinate times.

For statistical analysis, the data from those 71 patients who completed questionnaires at all time points were examined. To compare the relative changes of OHRQoL among different time points repeated measurement test was used and in order to evaluate the differences between the expected quality of life of treatment (before treatment) and the real quality of life after treatment of patients independent t test was used.

Results

Seventy one from 218 patients completed the OHRQoL questionnaire at all 4 times during the study. Fifty-two participants were female (73%) and their mean age was 15.9 years. The mean age of male patients was [16]. 12 years. There was no significant difference in the OHRQoL and its domain scores between the two sexes at any time. Table I illustrates mean values and standard deviations of OHRQoL and its domains. In addition the results of repeated measurements analysis have been shown in this table. According to these results there were significant changes of the scores of OHRQoL and its domains during this period.

For pair wise comparison of the scores over the time the Bonferroni was used. The results of this analysis are shown in table II. Also, the diagrams of the changes of OHRQoL and its domains are illustrated in figure I. The overall OHRQoL score and the scores of oral symptom, functional limitation and social wellbeing domains significantly increased from the T0 to T1 phase. The mean score of the emotional wellbeing domain decreased during this period, but its change was not significant (Table 1 & Figure 1).

Table 1: Means and standard deviations of overall and domains scores of quality of life at four times and the results of repeated measurements analysis.

		Before Treatment	2th month	6th month	After Treatment	
Oral Symptoms	M	12.21+9.432	15.53+10.112	8.74+6.181	3.58+2.388	P=0.000*
	F	10.94+7.627	13.02+8.021	8.65+6.158	5.02+3.723	
Functional Limits	M	7.58+7.167	10.68+7.008	4.79+3.994	2.42+2.723	P=0.000*
	F	8.9+7.949	12.58+8.852	8.04+6.851	3.02+3.893	

Emotional Well Being	M	21.53+17.296	20.58+14.709	11.59+9.486	8.42+3.934	P=0.000*
	F	22.88+12.743	21.12+70.273	14.44+7.630	12.25+8.616	
Social Well Being	M	6.37+6.202	8.42+6.194	2.63+3.849	3.37+2.499	P=0.000*
	F	7.25+5.390	10.42+5.112	3.10+4.136	3.37+3.166	
Quality of Life	M	47.68+36.58	55.21+34.87	28.05+21.19	17.78+8.317	P=0.000*
	F	49.98+24.37	56.78+23.73	34.23+17.77	23.59+15.39	

*The mean difference is significant at the .05 level.

Comparing the T2 phase with T1, we found a significant decrease of the OHRQoL scores and its domains. Moreover, at the T2 phase the scores of the domains were lower than their equivalents at the T0 phase, and in the (oral symptoms, social wellbeing, and emotional wellbeing domains) these differences were significant. At T3 (after the treatment) the scores of OHRQoL and its domains decreased significantly in comparison of T0. In addition, the scores of oral symptoms and functional limitation domains at T3 compared with T2 decreased significantly. However, the score of social wellbeing domain increased from T2 to T3, but this increase was not significant (Table 2).

Table 2: Pair wise comparisons of quality of life and its domains at four times.

		Quality of Life	Oral Symptom	Functional Limitation	Emotional Wellbeing	Social Wellbeing
before	2 months	1.000	0.000*	0.000*	1.000	0.000*
	6 months	0.000*	0.001	0.128	0.000*	0.000*
	after	0.000*	0.000*	0.000*	0.000*	0.000*
2 months	before	1.000	0.000*	0.000*	1.000	0.000*
	6 months	0.000*	0.000*	0.000*	0.000*	0.000*
	after	0.000*	0.000*	0.000*	0.000*	0.000*
6 months	before	0.000*	0.001	0.128	0.000*	0.000*
	2 months	0.000*	0.000*	0.000*	0.000*	0.000*
	after	0.897	0.000*	0.000*	0.124	1.000
after	before	0.000*	0.000*	0.000*	0.000*	0.000*
	2 months	0.000*	0.000*	0.000*	0.000*	0.000*
	6 months	0.897	0.000*	0.000*	0.124	1.000

*The mean difference is significant at the .05 level

Table 3: Comparison of the scores of quality of life and its domains after treatment with patie expectation of treatment.

		Mean±S.D	N	Std. Error	P. value
Quality of Life	after	14.54±9.97	71	1.18	.000*
	expectation	7.35±10.53	71	1.25	
Oral Symptom	after	4.63±3.46	71	0.41	.297
	expectation	3.93±5.15	71	0.61	
Functional Limitation	after	2.86±3.54	71	0.42	.407
	expectation	3.42±5.29	71	0.62	
Emotional Wellbeing	after	11.23±7.80	71	0.92	.000*
	expectation	5.39±7.28	71	0.86	
Social Wellbeing	after	3.32±2.98	71	0.35	.014*
	expectation	1.96±4.06	71	0.48	

*The mean difference is significant at the .05 level.

For comparison the expected quality of life of treatment (before treatment) and the real quality of life after treatment of patients independent t test was used that its results were shown in Table 3. According to this table, there were significant differences between expected quality of life and emotional and social wellbeing domains and their corresponding after treatment (P. value=.000, .000, .014 respectively). The level of expected OHRQoL and its domain were higher than those after treatment.

Discussion

This study was launched to evaluate the effect of orthodontic treatment on oral health quality of life in 14 to 17 year old patients. In this stage of life, subjects are sensible to their appearances, also the shaping of one's identity occurred in this period. So unpleasant appearance of teeth and face can result in emotional disturbances and damaging in relationships of teenagers [16]. We found that improvement of occlusion status substantially affect the oral health quality of life as the other studies confirm this result [3,5-9]. Also Daniela Feu and her colleagues in a recent study pointed out that fixed orthodontic treatment in Brazilian children resulted in significantly improved OHQoL after two years [17]. Although Shaw et al. [4] not found a significant relationship between orthodontic treatment and oral health quality of life especially after adolescence stage.

In present study, by the beginning of treatment not only the quality of life did not improve but also decreased specially in the oral symptoms, functional limitations and social health domains. But this negative trend was become reverse gradually. The quality of life was improved in sixth month and become superior in comparison to pretreatment stage. These findings were in contrast to the results of Liu et al. [12] According to their study in Hong Kong, the quality of life decreased in the first six months of treatment but improved in [12] months later, however never reached to the level of pretreatment phase. The cause of this controversy can be cultural difference and difference in the quality of life evaluation criteria. We didn't find significant difference in results between two genders. Albitar et al. [18] and Marques et al. [19] reported similar results in this respect. While Bernabe et al. [7] and Rusanen et al [20] found that malocclusion had more effect in females' life than males'.

In the present study, oral symptoms in each period had statistically significant difference with other evaluated periods. At the beginning of treatment oral symptoms were increased. This process was reversed in sixth month and after that. Finally after finishing of fixed orthodontic treatment get to a lower level in comparison to outset. One of the reasons of increase of oral symptom at the beginning of treatment may be incompatibility of patients with orthodontic appliances. This result is similar to findings of Chen et al. [21]. In the first two months of treatment, functional limitations of patients increased, but along with increased compliance of patients, declined gradually. Zhang et al.

[9] stated the level of functional limitations of patients increased in comparison to pretreatment phase. This controversy may be related to cultural differences. According to other studies 6, 11, 16 emotional well being of patients had a positive trend simultaneous with progression of treatment. Shiori Azuma6 reported that emotional well being of patients was improved after orthognatic surgery and reached to normal occlusion. Also Kolawole et al. [22] found a significant correlation between dental esthetic and emotional health and individual's confidence.

In our study, social well being of patients declined during two month but improved gradually. After treatment the level of social well being was acceptable. Klima et al. [23] reported that the psychosocial effects of orthodontic treatments were inconsiderable. This disparity was related to design of this study. They didn't study the same patients before and after treatment, as a result factors such as patient's characteristic and familial and social conditions affected the results definitely. The expectation level of patients in emotional and social well being domains was higher than their levels after treatment. This difference was statistically significant. Also Zhang M9 reported the same result and pointed out that increasing knowledge of patients resulted in modification of their expectation level.

Conclusion

OHQoL was decreased in all fields except emotional health in the first two months of treatment. Six months after beginning of treatment OHQoL was improved in all fields in comparison to pretreatment. After orthodontic treatment OHQoL was improved significantly. Expectation level of patients in fields of emotional health, social health and quality of life was higher than real results after treatment.

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