

# COMPARISON OF LIFE QUALITY IN PATIENTS TREATED WITH FIXED ORTHODONTIC TREATMENT AND CLEAR ALIGNER THERAPY

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## ABSTRACT

So far, very little research has been done on the effectiveness of Clear Aligner Therapy. The current study aimed to compare the quality of life regarding the anxiety level, patient satisfaction, and oral health caused by treatment in patients treated with Clear Aligner Therapy and Fixed Orthodontic Treatment. In this descriptive-analytical research, a total of 200 patients were studied, of which 100 patients were undergoing Fixed Orthodontic Treatment and 100 patients were undergoing Clear Aligner Therapy. The Oral Health Impact Profile (OHIP-14) questionnaire was utilized to compare the impact of these two treatments on the life quality of these patients' oral health. Also, the Patient Satisfaction Questionnaire (PSQ-18) was utilized to study patients' satisfaction. In addition, the State-Trait Anxiety Inventory was utilized to check patients' anxiety. In this research, 78 patients were male and 122 were female. The average life quality of health mouth was 53.26, average patient satisfaction was 42.46, and the mean of anxiety caused by treatment was about 72.26. Based on the results, the average anxiety related to the Clear Aligner Therapy group was significantly higher than the Fixed Group Orthodontic Treatment ( $P < 0.001$ ). The average life quality regarding oral health in the Clear Aligner Therapy group was significantly lower than the Fixed Orthodontic Treatment group ( $P < 0.001$ ). The results of the current study revealed that the anxiety level and satisfaction of Clear Aligner Therapy recipients was higher and they had a lower quality of life.

**Key words:** Patients, Orthodontics, Dentistry, Treatment.

## Introduction

Clear Aligner Therapy was first introduced in 1945 by Kesling. Clear Aligner Therapy is suitable for mild to moderate crowding (1 to 6 mm), mild to moderate interdental spaces (1 to 6 mm), and after fixed treatments. The main benefits of Clear Aligner Therapy include improved hygiene, reduced post-treatment pain, and better assessments during treatment. But along with these advantages, there are also disadvantages such as reduced control over teeth movement, higher cost, reduced dental changes, and greater dependence on the patient's cooperation [1, 2]. Quality of life is defined as a person's sense of well-being, which is caused by his satisfaction or lack of satisfaction with important aspects of his life [3, 4]. The life quality regarding oral health can be defined as the lack of negative impact of oral conditions on social life and a person's positive feelings about their dental conditions [5]. Studies have shown that oral and dental problems affect the mental, social, and physical aspects of the patient and can impact the life quality and important aspects of a person's life by disrupting interpersonal relationships and social presence [6, 7].

By knowing the effect of malocclusion on people's lives, it is possible to understand the demand for orthodontic therapy beyond clinical factors and clinician diagnosis. Of course, various people's perceptions of malocclusion are diverse, and a person's awareness of malocclusion may not be regarding its severity. These differences of opinion cause

differences in the demand for orthodontic therapy using various people. The quality of life related to health means a person's satisfaction with his physical and mental characteristics, based on which a person can perform his daily activities. Nowadays, the quality of life regarding oral and dental health and other general diseases has gained significant importance [8, 9].

Oral health-related quality of life has important implications for dental clinical practice and dental research is a perfect part of well-being and public health and has been recognized by the WHO as a vital part of the global oral health program [8]. The life quality regarding oral and dental health is defined in a multi-dimensional way, which reflects the comfort and convenience of people when eating, sleeping, participating in social interactions, self-esteem, and satisfaction with the state of their oral and dental health [8]. There are different ways to check the quality of life. One of the most common of them is the 49-question Oral Health Impact Profile (OHIP). The abbreviated version of this questionnaire was introduced as OHIP-14 (6 and 7). OHIP-14 questionnaire was used in this study. To answer the questions, a person must choose one of the options never, rarely, sometimes, most of the time, and almost always. A score of zero indicates the absence of any influence and a score of four indicates the worst effect of oral health on the life quality. The range of the score is between 0 and 56, and a higher score shows a lower life quality regarding oral health [10, 11].

Satisfaction with treatment is the main factor in predicting the process and outcome of patients' treatment. The satisfaction of the patient, the conditions, the process, and the outcome of the treatment affect the degree of compliance with the given orders and finally, the improvement of the condition and control of the disease, and the patients who are more satisfied with the doctor follow his orders much better [12-14].

It is essential to pay attention to the issue of measuring patient satisfaction in health services, and an authentic and reliable tool is needed to perform this evaluation. The psychosomatic questionnaire PSQ, including 10 questions in four areas of personal pressures, environmental pressures, and mental and physical pressures, was designed by Osipow [15]. The scoring of this scale is based on a 5-point Likert scale from rarely [1] to most of the time [5], and higher scores indicate more psychological stress.

In recent decades, the demand for orthodontic treatments has increased in different societies, which is due to the increase in people's awareness and health facilities and more attention to beauty by patients [16]. People who want orthodontic treatments seek to improve their appearance, oral function, mental state, and quality of life; it can be said that the main motivation of a person for orthodontic treatment is to improve appearance [17]. Orthodontic brackets can cause unsightly appearance, limitations in jaw movements, discomfort, and pain during treatment [18]. The demand for cosmetic dental treatments is increasing in all fields and people usually prefer cosmetic braces. Ceramic brackets, lingual brackets, and Clear Aligner Therapy are among the methods that have been proposed to improve aesthetics during orthodontic treatments [19].

Discomfort and worry about fixed orthodontic appliances can affect the patient's way of thinking and satisfaction with the treatment [20, 21]. Fixed orthodontic appliances have long been known as the gold standard method of treatment, although patients' requests for more aesthetic treatments have led to the development and introduction of newer methods. It is said that, in addition to beauty, Clear Aligner Therapy provides less pain, less root resorption, and the possibility of more hygiene for the patient [22]. However, Clear Aligner Therapy has weaker clinical results despite the mentioned advantages compared to fixed appliances [23]. At the beginning of its introduction, Clear Aligner Therapy was only used to treat mild abnormalities related to dental crowding [24]. Identifying discomfort related to the use of orthodontic appliances in daily life can lead to realistic expectations of treatment by the orthodontist and can also help the therapist in choosing a more appropriate treatment [19, 25].

So far, very little research has been done on the effectiveness of Clear Aligner Therapy. The current study aimed to compare the quality of life regarding anxiety level, patient satisfaction, and oral health caused by treatment in patients treated with Clear Aligner Therapy and Fixed Orthodontic

Treatment.

**Materials and Methods**

In this descriptive-analytical research, a total of 200 patients were studied, of which 100 patients were undergoing Fixed Orthodontic Treatment and 100 patients were undergoing Clear Aligner Therapy.

In this study, PSQ-18, state-trait anxiety inventory, and OHIP-14 questionnaires were used. The Spielberger state anxiety questionnaire (STAY-I) contains 40 questions, the first 20 of which measure the state of anxiety and the second 20 of which measure the anxiety trait. The anxiety state scale (manifest anxiety) consists of 20 statements that evaluate the person's feelings at this moment and the time of response. The anxiety streak scale (hidden anxiety) also includes 20 sentences that measure people's general and ordinary feelings.

The inclusion criteria for this study included: the patient's willingness to participate in the study, mild to moderate dental irregularity without the need for extractions, and the passage of 6 months since receiving orthodontic treatment. Exclusion criteria from this study included: cognitive and behavioral problems (medical history and use of psychotic drugs), chronic systemic problems, and severe periodontal problems.

This descriptive-analytical research was done on 100 patients undergoing Fixed Orthodontic Treatment, 6 months had passed since the beginning of their treatment, and 100 patients undergoing Clear Aligner Therapy, 6 months had passed since the beginning of their treatment. In this study, both groups were matched in terms of gender and age. OHIP-14 questionnaire was utilized to study the impact of these two treatments on the life quality of these patients' oral health. Also, the PSQ-18 questionnaire was utilized to check patients' satisfaction and the State-Trait Anxiety Inventory was utilized to check patients' anxiety status.

For statistical analysis, independent T-tests and parametric bread equations were used if needed.

**Results and Discussion**

In this study, 200 patients were investigated. In **Table 1**, the groups were compared in terms of gender, and it was found that the two groups did not differ significantly in gender distribution terms (P = 0.355).

**Table 1.** Frequency distribution of men and women in the groups under study

Gender	Group		Total	Chi-square test result
	Clear Aligner Therapy	Fixed Orthodontic Treatment		

Male	36 (35.6%)	42 (42%)	78 (38.8%)
Female	65 (64.4%)	58 (58%)	122 (61.2%)
Total	100 (100%)	100 (100%)	200 (100%)

$\chi^2 = 0.85$   
 $P = 0.355$

In **Table 2**, the groups were compared in terms of age and anxiety caused by treatment, patient satisfaction with

treatment, and quality of life-related to oral health. There was no significant difference between the groups in age terms ( $P=0.054$ ), but the mean variables of anxiety caused by treatment, patient satisfaction with treatment, and quality of life related to oral health were significantly higher in the transparent aligners group than in the fixed orthodontic group ( $P<0.001$ ).

**Table 2.** Comparison of age, anxiety caused by treatment, patient satisfaction with treatment, and quality of life-related to oral health between groups

Variable	Fixed Orthodontic Treatment		Clear Aligner Therapy		Mann-Whitney test result
	Mean ± SD	Median (Interquartile range)	Mean ± SD	Median (Interquartile range)	
Age (Years)	27.25 ± 5.95	25 (7)	25.37 ± 9.04	24 (14)	Z = 1.93 P = 0.054
Anxiety caused by treatment	68.14 ± 12.89	67.50 (17)	76.34 ± 13.78	78 (21)	Z = 4.23 P < 0.001
Satisfaction from treatment	40.03 ± 7.74	40 (10.75)	44.86 ± 6.37	48 (9)	Z = 5.05 P < 0.001
Quality of life regarding oral health	48.73 ± 11.08	48.50 (16)	57.74 ± 7.71	59 (11)	Z = 5.94 P < 0.001

In this study, the patients included 122 females and 78 males. The average anxiety was significantly higher in the Clear Aligner Therapy group than in the Fixed Orthodontic Treatment group. The average quality of life regarding oral health was significantly lower in the Clear Aligner Therapy group than in the Fixed Orthodontic Treatment group.

Patients in the age group of 9-58 years participated in current research. The average age of the participants was 26.3 years. In younger patients, the patient's cooperation may be affected [26], therefore, a wide age range was selected in this study. In Lin *et al.* study [19], the age range of patients was between 25 and 35 years. Alajmi *et al.* [27] also investigated patients in the age range of 18 to 50 years with an average age of 26.56 years.

In the current study, the average age of patients in the Clear Aligner Therapy group was higher, but there was no significant difference between the two groups. In the current study, the number of women participating in the study was more than men. In the Clear Aligner Therapy group, the number of women was more than in the Fixed Orthodontic Treatment group, but the difference was not significant. Aesthetic issues are expected to be more important in women than in men, so many of them prefer Clear Aligner Therapy to Fixed Orthodontic Treatment [17]. In the studies of Lin *et al.* [19], Alajmi *et al.* [27], and AlSeraidi *et al.* [28], the number of women in the Clear Aligner Therapy group was also higher.

In the present study, the average quality of life regarding oral health in the Clear Aligner Therapy group was significantly lower than in the Fixed Orthodontic Treatment group. The reason for the lower quality of life in Clear Aligner Therapy patients can be due to the higher level of

anxiety and sensitivity of these patients. Zhang *et al.* [29] also showed that the average quality of life of children decreases after Fixed Orthodontic Treatment (limitation in mouth opening and daily functions), the lowest value of which is related to the first month. Azaripour *et al.* [30] found that patients using Clear Aligner Therapy had better periodontal health and quality of life compared to Fixed Orthodontic Treatment. In Alajmi *et al.*'s study [27], it was also seen that the amount of oral ulcers and tissue irritations is significantly higher in the Fixed Orthodontic Treatment group. But in both groups, almost all people declared that they would recommend their treatment to others. In Alajmi *et al.* study [27], the examined patients were people who had only been treated for one week.

In the present study, patient satisfaction with the treatment in the Clear Aligner Therapy group was higher than in the Fixed Orthodontic Treatment group. In the study of Flores-Mir *et al.* [31], it was seen that nearly half of Clear Aligner Therapy recipients have 100% satisfaction with eating, but this amount was equal to 24% in Fixed Orthodontic Treatment recipients. In AlSeraidi *et al.* study [28], Clear Aligner treatment recipients were more satisfied than Fixed Orthodontic Treatment recipients. The recipients of Clear Aligner Therapy in the study of White *et al.* [32] and Nedwed *et al.* [33] also had more satisfaction and comfort compared to the recipients of Fixed Orthodontic Treatment.

The average anxiety caused by the treatment was significantly higher in the Clear Aligner Therapy group than in the Fixed Orthodontic Treatment group. One of the reasons for this problem is the difficulty of speaking in Clear Aligner Therapy recipients [27]. In general, recipients of Clear Aligner Therapy take longer to speak normally. Also, due to the possibility of removing these aligners, the stress

and anxiety of patients to forget or lose them is greater [27]. Both groups reported the same amount of pain, but the pain reported by the Clear Aligner Therapy group was more of a pressing type, but in the Fixed Orthodontic Treatment group, it was of a dull and throbbing type. The consumption of painkillers was also higher in the Fixed Orthodontic Treatment group, which may be due to more tolerable pressure pain. In the study of Pacheco-Pereira *et al.* [34], the biggest cause of discomfort and worry in Clear Aligner Therapy recipients was when removing and putting on the aligners for eating and afterward and food accumulation in the aligner and between the teeth, especially when they did not have access to a toothbrush.

### Conclusion

The findings of this study demonstrated that in general, patients' satisfaction with Clear Aligner Therapy and their level of anxiety was higher than that of Fixed Orthodontic Treatment, but their quality of life was lower than that of Fixed Orthodontic Treatment. In this study, in older people and women, the use of Clear Aligner Therapy was higher on average, but there was no statistically significant difference with the fixed orthodontic group.

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