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Original Article

Patient Satisfaction and Oral Health-Related Quality of Life in Fixed vs. Clear Aligner Therapy

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Abstract

The effectiveness of clear aligner therapy has not been fully studied so far. The present study aimed to investigate the quality of life in patients undergoing fixed orthodontic treatment and clear aligner therapy regarding anxiety levels, patient satisfaction, and oral health outcomes. In this descriptive-analytical study, 200 patients were studied, 100 of whom underwent clear aligner therapy and 100 of whom underwent fixed orthodontic treatment. The effects of these two treatments on the oral health quality of these patients' lives were compared using the Oral Health Impact Profile (OHIP-14) questionnaire. Additionally, patient satisfaction was assessed using the Patient Satisfaction Questionnaire (PSQ-18). In addition, patients' anxiety was assessed using the State-Trait Anxiety Inventory. In this study, 122 female and 78 male patients participated. The mean quality of life of a healthy mouth was 53.26, the mean patient satisfaction was 42.46, and the average treatment-related anxiety was approximately 72.26. The findings showed that the clear aligner treatment group experienced significantly more anxiety on average than the fixed orthodontic treatment group ($P < 0.001$). Compared to the fixed orthodontic treatment group, the mean quality of life of the clear aligner treatment group in terms of oral health was significantly lower ($P < 0.001$). The findings of the present study showed that beneficiaries of clear aligner treatment had a lower quality of life and higher levels of worry and contentment.

Key words: Patients, Orthodontics, Dentistry, Treatment

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Introduction

Kesling was the first to introduce clear aligner therapy in 1945. Mild to moderate crowding (1-6 mm), mild to moderate interdental gaps (1-6 mm), and following fixed procedures are all appropriate candidates for clear aligner therapy. Better hygiene, less pain after treatment, and superior evaluations throughout therapy are the primary advantages of clear aligner therapy. However, these benefits come with drawbacks as well, like less control over tooth movement, increased expense, fewer dental adjustments, and a stronger reliance on patient participation [1, 2]. A person's sense of well-being, which results from his or her level of contentment with significant areas of his life, is referred to as quality of life [3, 4]. The absence of detrimental effects of oral health issues on social life and a person's favorable attitudes towards their dental health are two indicators of life quality regarding oral health [5]. Research has demonstrated that oral and dental issues affect a patient's mental, social, and physical well-being. They can also have an impact on a person's life quality and significant life events by upsetting social presence and interpersonal connections [6, 7].

Naturally, different people have different perceptions of malocclusion, and a person's awareness of malocclusion may not be about its severity. However, by understanding the impact of malocclusion on people's lives, it is possible to understand the demand for orthodontic therapy beyond clinical factors and clinician diagnosis. These divergent viewpoints lead to variations in the demand for orthodontic treatment among different individuals. Health-related quality of life refers to an individual's contentment with his or her physical and mental attributes, which serve as the foundation for carrying out daily tasks. In the modern era, oral and dental health as well as other general diseases have become much more substantial [8, 9].

The WHO has acknowledged dental research as an essential component of the global oral health program, and oral health-related quality of life has significant implications for dental clinical practice [8]. The multifaceted definition of oral and dental health life quality includes people's comfort and convenience when eating, sleeping, and social interactions, as well as their sense of self-worth and contentment with their current oral and dental health [8]. The quality of life can be assessed in a variety of ways. The 49-question Oral Health Impact Profile (OHIP) is one of the most widely used of these. 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].

The primary determinant of the course and result of a patient's treatment is their level of satisfaction with their care. The patient's satisfaction, the conditions, the process, and the outcome of the treatment all influence the degree of compliance with the given orders, and finally, the improvement of the condition and control of the disease, and patients who are more satisfied with the doctor follow his orders much better [12-14].

The problem of gauging patient satisfaction with health care must be taken seriously, and this assessment requires a valid and trustworthy instrument. Osipow created the psychosomatic questionnaire PSQ, which consists of 10 questions divided into four categories: environmental pressures, mental and bodily pressures, and personal stresses [15]. More psychological stress is indicated by higher scores on this measure, which is scored on a 5-point Likert scale ranging from rarely [1] to most of the time [5].

Due to increasing awareness, improved access to healthcare, and patients' growing focus on appearance, orthodontic treatments have been more and more popular in various nations in recent decades [16]. It might be argued that the primary reason for seeking orthodontic treatment is to enhance one's beauty, as well as one's dental function, mental health, and overall quality of life [17]. During therapy, orthodontic brackets may cause pain, discomfort, and an ugly appearance in addition to limiting jaw motions [18]. People often like cosmetic braces, and the demand for cosmetic dental procedures is rising across the board. Among the techniques that have been suggested to enhance appearance during orthodontic treatments include ceramic brackets, lingual brackets, and Clear Aligner Therapy [19].

Although patients' requests for more aesthetic treatments have led to the development and introduction of newer methods, patients' discomfort and anxiety about fixed orthodontic appliances can affect their way of thinking and their satisfaction with the treatment [20, 21]. Clear Aligner Therapy is said to offer more than just beauty; it also reduces pain, root resorption, and the potential for increased hygiene for the patient [22]. Nevertheless, despite the aforementioned benefits, Clear Aligner Therapy's clinical outcomes are less favorable than those of fixed appliances [23]. At the outset of its debut, Clear Aligner Therapy was only utilized to correct mild problems associated with dental crowding [24]. Recognizing discomfort associated with wearing orthodontic appliances daily can help the therapist select a more suitable course of treatment and allow the orthodontist to set reasonable expectations for treatment [19, 25].

The efficacy of clear aligner therapy has not been thoroughly studied so far. The purpose of the current study was to assess the quality of life experienced by patients receiving fixed orthodontic treatment versus clear aligner therapy in terms of anxiety levels, patient satisfaction, and dental health.

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%)	$\chi2 = 0.85$ P = 0.355
Female	65 (64.4%)	58 (58%)	122 (61.2%)	
Total	100 (100%)	100 (100%)	200 (100%)	

Age, treatment-related anxiety, patient satisfaction, and oral health-related quality of life were compared between the groups in **Table 2**. Age-wise, there was no significant difference between the groups (P = 0.054), but the transparent aligners group had significantly higher mean values for treatment-related anxiety, patient satisfaction, and oral health quality of life (P < 0.001) than the fixed orthodontic group.

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

There were 78 male patients and 122 female participants in this study. Compared to the fixed orthodontic treatment group, the clear aligner therapy group experienced significantly higher average anxiety. Compared to the fixed orthodontic treatment group, the clear aligner therapy group's average dental health quality of life was noticeably worse.

Participants in the current study ranged in age from 9-58 years. The participants were 26.3 years old on average. A broad age range was used for this investigation since younger patients may not cooperate as well [26]. The patients in the Lin *et al*. study [19] ranged in age from 25 to 35. Alajmi *et al*. [27] also looked into individuals with an average age of 26.56 years who were between the ages of 18 and 50 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]. There were also more women in the clear aligner therapy group in the research by Lin *et al*. [19], Alajmi *et al*. [27], and AlSeraidi *et al*. [28].

The clear aligner therapy group's average dental health quality of life was substantially worse than that of the fixed orthodontic treatment group in the current study. Individuals who receive clear aligner therapy may have a reduced quality of life because they are more sensitive and anxious. According to Zhang *et al*. [29], children's average quality of life declines following fixed orthodontic treatment (because of limitations in mouth opening and everyday activities), with the first month showing the lowest value. According to Azaripour *et al*. [30], patients who had clear aligner therapy had superior quality of life and periodontal health when compared to those who received fixed orthodontic treatment. The study by Alajmi *et al*. [27] also revealed that the group receiving fixed orthodontic treatment had a noticeably greater incidence of tissue irritations and oral ulcers. However, nearly everyone in both groups stated that they would suggest their treatment to others. Patients who had only had one week of treatment were the subjects of the Alajmi *et al*. study [27].

According to the current study, patients in the group receiving clear aligner therapy were more satisfied with their care than those receiving fixed orthodontic treatment. Flores-Mir *et al*.'s study [31] found that over half of people who received clear aligner therapy were completely satisfied with their meals, compared to 24% of people who received fixed orthodontic treatment. Clear aligner therapy recipients reported higher levels of satisfaction and comfort than those receiving fixed orthodontic treatment in the study by White *et al*. [32] and Nedwed *et al*. [33], and clear aligner therapy recipients reported higher levels of satisfaction than those receiving fixed orthodontic treatment in the study by AlSeraidi *et al*. [28].

Compared to the fixed orthodontic treatment group, the clear aligner therapy group experienced considerably more treatment-related anxiety on average. Receivers of clear aligner therapy have trouble speaking, which is one of the causes of this issue [27]. Clear aligner therapy patients typically take longer to speak normally. Additionally, patients are more stressed and anxious about forgetting or losing their aligners because they may have to be taken out [27]. Both groups reported the same level of discomfort, but the group receiving clear aligner therapy reported more urgent pain, whereas the group receiving fixed orthodontic treatment reported slow, throbbing pain. Perhaps as a result of more manageable pressure pain, the group receiving fixed orthodontic treatment also consumed more painkillers. The largest source of discomfort and anxiety for clear aligner therapy recipients, according to the study by Pacheco-Pereira *et al*. [34], was taking off and putting on the aligners for eating and afterward, as well as food buildup in the aligner and between the teeth, particularly when they lacked access to a toothbrush.

Conclusion

In general, patients were more satisfied with clear aligner therapy and had less anxiety than they did with fixed orthodontic treatment, according to the study's findings. However, their quality of life was poorer. Compared to the fixed orthodontic group, there was no statistically significant difference in the average usage of clear aligner therapy among women and older adults in this study.

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