ORIGINAL RESEARCH

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Impact of Orthodontic Treatment on Oral Health-Related Quality of Life in Adults: Comparative Analysis of Different Appliance Types and Periodontal Status.

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Abstract

Introduction. Orthodontic treatment plays an important role not only in improving dental function and appearance but also in influencing patients' comfort and confidence in everyday life. These effects become even more relevant in patients with periodontal problems. The aim of the study was to evaluate how orthodontic treatment influences the oral health-related quality of life (OHRQoL) in adults and to explore its relationship with periodontal care and treatment characteristics.

Materials and methods: Adult patients who completed orthodontic treatment were evaluated using the short form of the Oral Health Impact Profile (OHIP-14) and a Visual Analogue Scale (VAS) for satisfaction. In our analysis, several factors such as gender, age, appliance type, treatment duration, and periodontal treatment were considered. Descriptive and comparative statistical tests were carried out, and a multivariate regression was then performed to find out which of these factors had the greatest influence on the OHIP-14 scores.

Results:

The mean OHIP-14 total score was 11.2 ± 7.6, reflecting a favorable outcome. Among OHIP-14 domains, physical pain and psychological discomfort showed the highest impact. Patients treated with clear aligners showed significantly lower OHIP-14 scores and higher satisfaction compared with those wearing fixed appliances ($p < 0.05$). Periodontal treatment during orthodontic therapy was associated with improved OHRQoL and greater satisfaction. Regression analysis revealed that several clinical factors, such as the type of appliance, bracket material, treatment duration, and periodontal management, influenced OHIP-14 scores.

Conclusions: Adult patients with orthodontic treatment presented an improved function, higher comfort, and a better self-image. Clear aligner therapy and periodontal care were the main factors that increased quality of life.

Keywords: orthodontic treatment, oral health-related quality of life, periodontal therapy, adults.

Introduction

The concept of oral health-related quality of life (OHRQoL) reflects a person's view of how their oral conditions affect daily function, comfort, and social confidence [1,2]. The concept goes beyond clinical results, capturing the emotional and social consequences of dental health [3].

The Oral Health Impact Profile (OHIP) developed by Slade and Spencer, and its short form, OHIP-14, are widely used instruments that measure the impact of oral disorders on quality of life [4,5]. In orthodontics, these tools have become valuable for understanding how treatment affects both function and patient satisfaction [6].

Orthodontic treatment in adults has become increasingly common over the past decade. Adult patients often seek treatment for esthetic and psychosocial reasons, but they also face challenges related to discomfort, longer treatment duration, and the coexistence of periodontal problems [7,8]. Studies have shown that orthodontic treatment can improve OHRQoL by enhancing appearance and self-confidence [9], but may temporarily worsen oral comfort due to pain, speech difficulties, and hygiene challenges during active treatment [10,11].

In recent years, clear aligners have become more popular compared to conventional fixed appliances, due to their esthetic appearance, improved comfort, and oral hygiene [12]. Despite these advantages, fixed appliances are still essential in treating complex malocclusions, as they allow more precise control of tooth movement[13].

In adults, orthodontic treatment is frequently associated with periodontal therapy. Maintaining periodontal health during tooth movement is an important factor in obtaining stable and esthetic results, improved comfort, and long-term success in orthodontic patients [14,15,16,17].

Given the growing adult population seeking orthodontic treatment, especially those with periodontal issues, assessing OHRQoL outcomes after therapy and identifying predictive factors related to appliance type, treatment duration, and periodontal management are of clinical relevance. The present study aims to evaluate these aspects in adult orthodontic patients.

The study was based on the null hypothesis that there were no significant differences in oral health-related quality of life or patient satisfaction between adult patients treated with different types of orthodontic appliances or between those who received and those who did not receive periodontal care.

Material and methods

This cross-sectional observational study was carried out between January 2024 and May 2025 in several private orthodontic practices located in Transylvania, Romania. A total of 130 adult patients were evaluated immediately after completing orthodontic treatment.

Inclusion criteria:

- age ≥18 years;
- completion of fixed appliance, aligner, or combined therapy within the study period;
- willingness and ability to complete all questionnaires.

Exclusion criteria:

- patients with systemic oral conditions;
- patients with incomplete records;
- patients without informed consent.

For each participant, demographic information (age, sex), orthodontic information such as appliance type (fixed, aligner, mixed), and treatment duration (in months) were recorded. Additionally, any periodontal procedures such as scaling, root planing, antimicrobial therapy, and maintenance care that were performed during orthodontic treatment were collected .

OHRQoL was assessed using the validated Romanian version of the OHIP-14 questionnaire, consisting of 14 items scored from 0 ("never") to 4 ("very often")[18]. Higher scores indicated a stronger negative impact on quality of life. We calculated domain scores and total scores (range 0–56) for each participant.

To find out the overall satisfaction of the patients, we used a 10-point Visual Analogue Scale (VAS), where higher values represented greater satisfaction. The participants also answered one global question about the changes in their oral health after treatment, using a five-point scale from 1, meaning "much worse to 5, meaning "much better [12,16].

All study data were analyzed using descriptive statistics, including means, standard deviations, and frequencies. Differences between groups, such as fixed versus aligner therapy, were carried out using t-tests or ANOVA and chi-square tests, as appropriate. A p-value below 0.05 was considered statistically significant. All analyses were performed using SPSS software, version 27.0 (IBM Corp., Armonk, NY, USA).

Results

A total of 130 adult patients participated in the study. The mean age was 28.7 ± 6.5 years (range 18–46), with most participants between 25 and 34 years old, as shown in Figure 1. The sample included 70 females (53.8%) and 60 males (46.2%), as illustrated in Figure 2.

Most participants underwent fixed orthodontic therapy (n = 92, 70.8%), followed by aligner treatment (n = 31, 23.8%) and combined approaches (n = 7, 5.4%) (Figure 3).

The mean OHIP-14 total score for the whole sample was 11.2 ± 7.6, while the mean VAS satisfaction score was 7.9 ± 1.0. Descriptive domain scores indicated low levels of physical and psychological impact and generally favorable perceptions of treatment outcomes (Table 1).

Female participants showed slightly higher OHIP-14 scores in the domains of physical pain and psychological discomfort compared

to males, though differences were not statistically significant ($p > 0.05$) (Figures 4–5). Younger adults (< 25 years) recorded slightly higher OHIP-14 scores (mean = 11.7) and similar satisfaction levels compared to older adults (≥ 25 years, mean = 11.4) ($p > 0.05$) (Figure 6). Patients treated with clear aligners demonstrated significantly lower OHIP-14 scores and higher VAS satisfaction values than those with fixed appliances ($p < 0.05$) (Figure 7).

A considerable proportion of participants (n = 52, 40.0%) received periodontal care during orthodontic treatment. These patients who received periodontal therapy showed lower OHIP-14 scores and higher satisfaction levels than those without periodontal treatment ($p = 0.006$) (Figures 8–9).

Regression model showed that several factors such as treatment duration, type of bracket or appliance, and bracket material, significantly influenced OHIP-14 scores (Table 2). Patients treated with fixed appliances, metallic brackets, with longer treatment duration, and without periodontal therapy were associated with higher OHIP-14 values, suggesting a greater discomfort and a negative impact on quality of life. In contrast, patients treated with clear aligners and those who received periodontal care reported a more positive experience and a better quality of life ($p< 0.05$).

Most patients reported an improvement in self-perceived oral health after treatment, with 83.1% indicating "slightly better" or "much better" outcomes on the global change item (Figure 10).

Figures

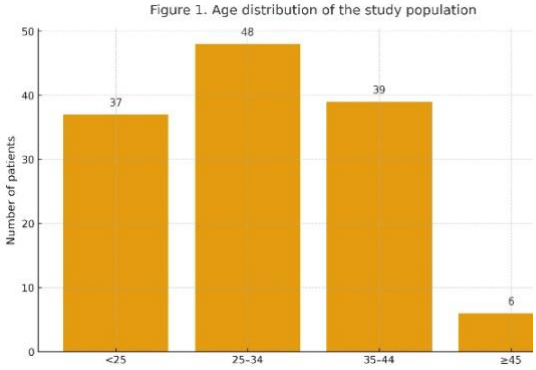

Figure 1. Age distribution of the study population.

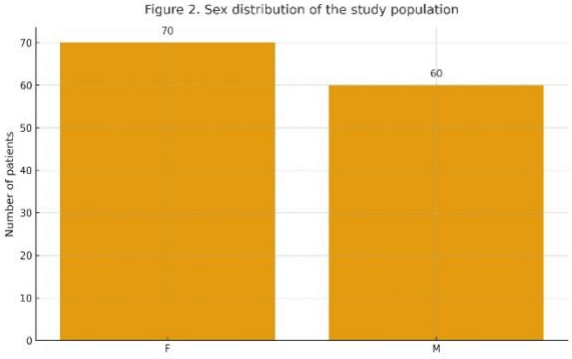

Figure 2. Gender distribution of the study population.

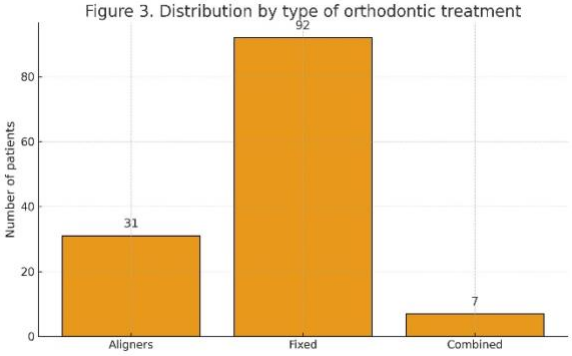

Figure 3. Distribution by type of orthodontic treatment.

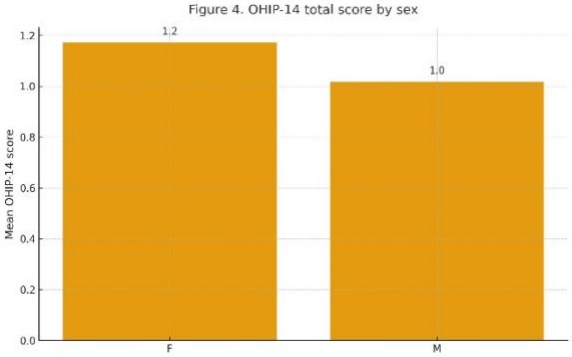

Figure 4. Comparison of OHIP-14 domain scores between females and males

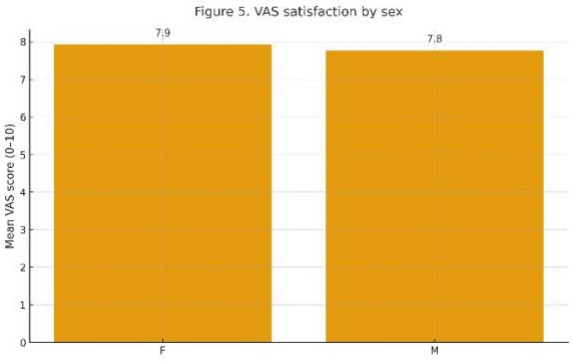

Figure 5. Comparison of total OHIP-14 and VAS satisfaction between genders

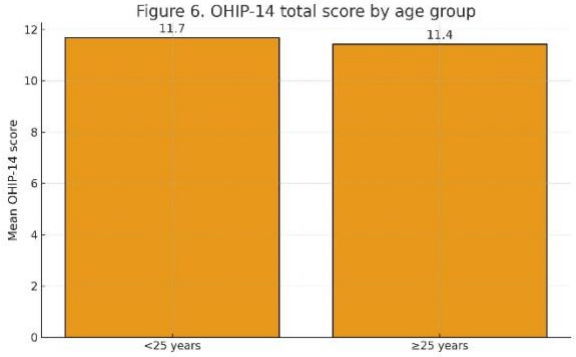

Figure 6. Comparison of OHIP-14 and VAS scores between younger (<25 years) and older (≥25 years) adults.

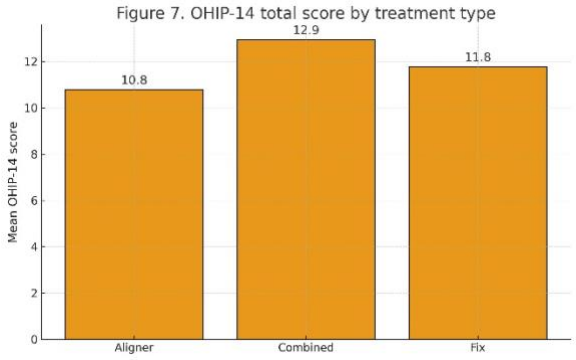

Figure 7. Comparison of OHIP-14 and VAS scores between aligner and fixed-appliance patients.

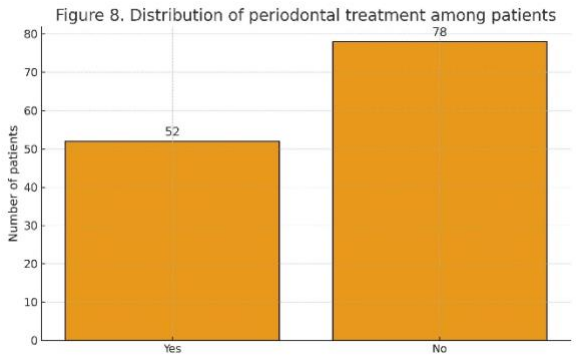

Figure 8. Distribution of periodontal treatment among participants

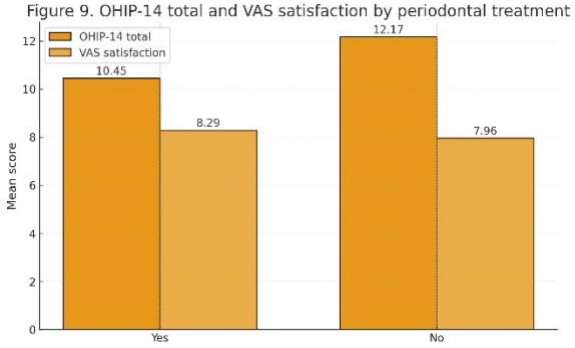

Figure 9. Comparison of OHRQoL outcomes between patients with and without periodontal treatment.

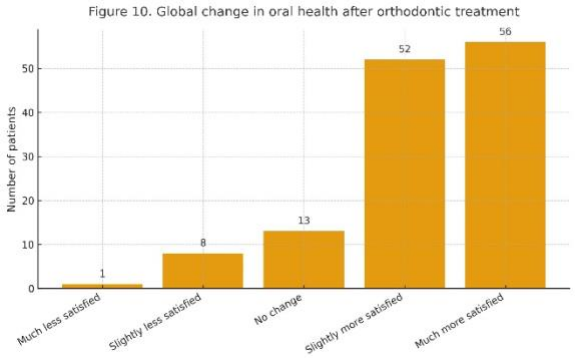

Figure 10. Global change in self-perceived oral health after treatment.

Tables

Table 1. Summary of mean OHIP-14 and VAS scores across subgroups

	SUBGROUP	MEAN OHIP-14 (MEAN ± SD)	VAS SATISFACTION (MEAN ± SD)	P-VALUE
1.	Fixed appliances	13.5 ± 7.9	7.8 ± 1.3	**0.021***
2.	Aligners	8.9 ± 6.3	9.1 ± 0.8	**0.021***
3.	With periodontal treatment	9.6 ± 6.5	8.8 ± 0.9	**0.006***
4.	**WITHOUT PERIODONTAL TREATMENT**	**12.8 ± 7.1**	**7.6 ± 1.2**	**0.006***

Note: $p \leq 0.05$ is considered statistically significant

Table 2. Multivariate regression analysis of predictors for OHIP-14 scores

VARIABLE	COEFFICIENT (B)	95% CI	P-VALUE
FIXED APPLIANCES	+2.1	0.9 – 3.3	**0.001**
METALLIC BRACKETS	+1.4	0.3 – 2.5	**0.015**
LONGER TREATMENT DURATION (PER MONTH)	+0.12	0.05 – 0.18	**0.002**
NO PERIODONTAL TREATMENT	+1.8	0.7 – 2.9	**0.003**
ALIGNER THERAPY	–2.0	–3.5 – –0.5	**0.009**
PERIODONTAL TREATMENT	**–1.6**	**–2.7 – –0.5**	**0.006**

Note: Positive coefficients indicate a higher OHIP-14 score (worse quality of life), while negative coefficients indicate a lower OHIP-14 score (better quality of life). All predictors were statistically significant ($p < 0.05$),

Discussions

The present study evaluated the oral health-related quality of life (OHRQoL) of adult patients following orthodontic treatment, emphasizing the influence of periodontal interventions and appliance characteristics. The mean OHIP-14 score (11.2 ± 7.6) suggests an overall positive outcome, which is similar to other studies showing that orthodontic treatment in adults can improve self-esteem, function, and social confidence [4,8]. Some patients reported mild discomfort or short-term sensitivity after treatment, particularly in the domains of physical pain and psychological adaptation, but these faded quickly [9].

The high VAS scores (mean = 7.9 ± 1.0) confirm that most patients viewed their treatment results as positive. These findings are consistent with other studies showing that orthodontic treatment in adults improves appearance, self-esteem, and social confidence [4,5,10,21]. Recent findings suggest that a more attractive smile can contribute to greater psychological comfort and professional confidence, and not just oral health [7,11].

Compared to fixed appliances, patients treated with alligners reported lower OHIP-14 scores and higher satisfaction levels, in line with research showing improved comfort, oral hygiene, and esthetic satisfaction in alligner therapy patients [8,9,11,22].

Although fixed systems remain indispensable for complex cases, the reduced pain and visibility of aligners appear to improve the perceived quality of life during treatment [8,9,11].

Periodontal procedures performed during orthodontic therapy were associated with slightly better OHRQoL outcomes and higher satisfaction scores. These results are consistent with the literature showing that supportive periodontal care enhances both functional stability and psychosocial well-being in adult orthodontic patients [13,16,17]. Because periodontal disease has a major impact on oral health–related quality of life [15,22], maintaining healthy periodontal tissues throughout orthodontic treatment is critical for achieving stable and satisfying results. The collaboration between orthodontic and periodontal specialists promotes better tissue health, higher treatment acceptance, and a more comfortable patient experience [14,17].

Our results, which are similar to other studies, highlight that successful orthodontic treatment in adults depends on more than just tooth alignment. The patients' experience, comfort, and perception are strongly influenced by the type of appliance, treatment duration, and periodontal health throughout therapy [8,9,10,11,12].

The positive influence of periodontal therapy observed in this study is in line with previous studies showing that both regenerative and supportive periodontal procedures can improve patient comfort and overall well-being [13,15–17]. These findings highlight that orthodontic success must be assessed not only through objective clinical parameters but also through the patient's subjective experience and quality of life. Questionnaires such as OHIP-14 and VAS remain practical and validated instruments for

capturing the subjective impact of orthodontic therapy. [1,5,18,21].

Limitations. The cross-sectional design of this study does not allow for the evaluation of temporal changes in OHRQoL. Because participants were recruited from private practices within a single region, the results may be limited and the sample may not represent the general adult population seeking orthodontic treatment in other clinical settings.

Because self-reported questionnaires depend on patients' memories, a degree of recall bias is also possible.

Future research should include longitudinal, multicenter designs to confirm these results and to explore long-term psychosocial adaptation after orthodontic treatment [13,16,17].

Conclusions

Orthodontic treatment in adults leads to a measurable improvement in oral health-related quality of life, confirmed by low OHIP-14 scores and high satisfaction levels.

Physical pain and pshychological discomfort were the most frequently affected areas during treatment, however, these effects were temporary.

Patients treated with fixed appliances, especially metallic brackets or longer treatment duration, reported higher discomfort levels and less favorable treatment experience.

Clear aligner therapy and periodontal care were associated with improved comfort, satisfaction, and psychosocial well-being.

These findings show the importance of an individualized and interdisciplinary treatment in adult orthodontics, including periodontal care and patient-oriented appliance selection in order to obtain not just the best functional results but also an improved quality of life.

Conflict of interest: None to declare.

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References

1. Slade GD. Derivation and validation of a short-form oral health impact profile. Community Dent Oral Epidemiol. 1997;25(4):284–90.

2. Locker D. Measuring oral health: a conceptual framework. Community Dent Health. 1988;5(1):3–18.

3. Chen M, Andersen RM, Barmes DE, Leclercq MH, Lyttle CS. Comparing oral health care systems: a second international collaborative study. World Health Organization. 1997.

4. Zhou Y, Wang Y, Wang X, Volière G, Hu R. The impact of orthodontic treatment on quality of life: a systematic review. BMC Oral Health. 2014;14:66.

5. Mary AV, Koruthu A, Varghese RK, Nayana S, Sreelakshmi N, Varkey R. Assessing quality of life using the Oral Health Impact Profile (OHIP-14). J Int Oral Health. 2017;9(2):84–9.

6. Chen W, Xu T, Tang X, Sun W. Oral health-related quality of life between Chinese and American orthodontic patients. Int J Oral Sci. 2022;14(1):20.

7. Curto A, Alvarado-Lorenzo A, Roldan S, Cobo J. Oral health-related quality of life and anterior open bite in adult orthodontic patients. Healthcare (Basel). 2022;10(1):129.

8. Correa LR, De Almeida-Pedrin RR, Vieira CIV, et al. A longitudinal pilot study examining the influence of orthodontic system chosen in adult patients (brackets versus aligners) on OHRQoL and anxiety. BMC Oral Health. 2024;24:4464.

9. Alvarado-Lorenzo A, Curto A, Cobo J, et al. Comparative analysis of periodontal pain and quality of life in fixed vs removable orthodontics. BMC Oral Health. 2023;23:3565.

10. Su J, Wang C, Zhang X, et al. Analysis of the current status and influencing factors of oral health-related quality of life in orthodontic patients with fixed appliances. BMC Oral Health. 2025;25:6466.

11. Dash KS, Shukla A, Kumar R, et al. Impact of orthodontic aligner treatment on oral health-related quality of life. J Pharm Bioallied Sci. 2025;17(Suppl 2):122.

12. Abbas MH, Abdalla EM, El Harouni NM, Marzouk ES. Analysis of quality of life and periodontal health with an eight-unit maxillary fixed retainer: a prospective clinical trial. Sci Rep. 2025;15:88309.

13. Feng Y, Wang Y, Liu L, et al. Orthodontic treatment in patients with chronic periodontitis significantly improves clinical outcomes and quality of life. Front Dent Oral Health. 2025;PMC12351562.

14. Zhong Y, Xie H, Chen J, et al. Expert consensus on orthodontic treatment of patients with periodontal disease. Int J Oral Sci. 2025;doi:10.1038/s41368-025-00356-w.

15. Efeoğlu C, Başer U. Evaluation of the impact of different stages of periodontitis on quality of life with OHIP-14: a systematic review. J Clin Periodontol Res. 2025;doi:10.1097/jcpres.0000000000000128.

16. Jepsen K, Götz W, Bäumer D. Synergy of regenerative periodontal surgery and orthodontic treatment: impact on OHRQoL. Biomed Eng Online. 2023;10(6):695.
17. Luchian I, Martu I, Maftei GA, et al. The influence of orthodontic treatment on periodontal status and quality of life. Medicina (Kaunas). 2024;60(3):49074.
18. Slusanschi, Oana et al. "Validation of a Romanian version of the short form of the oral health impact profile (OHIP-14) for use in an urban adult population." Oral health & preventive dentistry vol. 11,3 (2013): 235-42. doi:10.3290/j.ohpd.a30166
19. Saele PK, et al. Orthodontic status and association with oral-health-related quality of life in adolescents with cleft lip and palate. Int J Environ Res Public Health. 2024;21(5):550.
20. Al-Bitar ZB, et al. Association between periodontal health status and quality of life: a cross-sectional study. Front Oral Health. 2024;5:1346814.
21. Topal R, Dindaroglu F, Ozbek E. Impact of malocclusion on oral health-related quality of life using OHIP-14. J Orthod Res. 2023;6(2):45–51.
22. Quintão AP, et al. OHIP-14 via telephone interview: reliability study. J Prosthet Dent. 2023;129(4):655–61.

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