



# Assessment of Oral Health-Related Quality of Life in Adolescents Wearing Aligners versus Adolescents Wearing Fixed Multibracket Appliances

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**How to cite this paper:** El Benna, S., Tonamou, F., Ghazzal, R., Bellamine, M., El Bour, H. and Ben Yahya, I. (2025) Assessment of Oral Health-Related Quality of Life in Adolescents Wearing Aligners versus Adolescents Wearing Fixed Multibracket Appliances. *Open Access Library Journal*, 12: e14398. <https://doi.org/10.4236/oalib.1114398>

**Received:** October 5, 2025

**Accepted:** October 28, 2025

**Published:** October 31, 2025

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## Abstract

**Background:** Oral health plays a vital role in general well-being, especially during adolescence, when physiological and psychosocial development is at its peak. Dental malocclusions can negatively affect oral function and self-esteem, leading to impaired oral health-related quality of life (OHRQoL). While orthodontic treatment aims to correct these issues, comparative evidence on how clear aligners versus fixed appliances affect adolescents' OHRQoL remains limited in Morocco. **Objective:** To compare the oral health-related quality of life among adolescents aged 14 - 18 years treated with clear aligners and those using fixed multibracket appliances. **Methods:** A cross-sectional analytical study was conducted between March and May 2025 in multiple dental centers, including the Mohamed VI University of Health Sciences Dental Care Center and several private clinics. A total of 100 adolescents (50 with clear aligners, 50 with fixed appliances) completed the validated **Oral Health Impact Profile (OHIP-14)** questionnaire. Descriptive and inferential analyses were performed using SPSS. Group comparisons were made with Student's t-test and Chi-square tests, with significance set at  $P < 0.05$ . Ethical approval was obtained from the UM6SS Ethics Committee, and informed consent was collected from participants and their guardians. **Results:** Adolescents treated with clear aligners reported significantly lower OHIP-14 mean scores ( $9.92 \pm 2.49$ ) compared to those with fixed appliances ( $30.92 \pm 2.79$ ,  $P < 0.01$ ), indicating a better OHRQoL. Across all seven OHIP-14 dimensions, clear aligner users scored lower, with the most notable differences observed in functional limitation, physical pain, psychological discomfort, and social disability. **Conclusion:** Clear aligners were associated with a significantly

more favorable oral health-related quality of life among Moroccan adolescents compared to fixed appliances. These findings highlight the psychosocial and functional advantages of aligner therapy and emphasize the importance of incorporating quality-of-life outcomes in orthodontic treatment planning.

## Subject Areas

Dentistry

## Keywords

Quality of Life, OHIP-14, Adolescents, Aligners, Multi-Attachments

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## 1. Introduction

Oral health is a key component of overall well-being, influencing both physiological functions, such as mastication and speech, and psychosocial aspects, including self-confidence and social interactions [1]. During adolescence, a period of major physical and social change, the impact of a healthy and well-aligned dentition is particularly significant. Proper dental alignment contributes not only to efficient oral function but also to the development of positive self-esteem, which is essential for healthy social relationships [2]. Conversely, dental malocclusions, defined as tooth misalignment or abnormal relationships between dental arches, can adversely affect both oral function and psychological well-being.

Malocclusions are highly prevalent among adolescents worldwide and are associated with impaired mastication, speech difficulties, and, in severe cases, temporomandibular pain [2]. In addition to these functional problems, visible dental irregularities can expose adolescents to social stigma and teasing, leading to decreased self-esteem, social withdrawal, and even emotional distress. Orthodontic treatment, therefore, represents an essential intervention aimed at restoring functional balance and improving aesthetic and psychosocial outcomes [3].

Two main orthodontic approaches are currently available: clear aligners and fixed multi-bracket appliances [1]. Clear aligners are removable, nearly invisible plastic trays designed using digital scanning and 3D modeling, offering comfort and aesthetic advantages, although their success depends heavily on patient compliance [4]. Fixed appliances, in contrast, are non-removable systems that provide reliable control of complex dental movements but may cause discomfort, aesthetic concerns, and hygiene difficulties [5] [6].

In Morocco, national oral health initiatives have emphasized preventive and corrective care, yet malocclusions remain widespread among adolescents [1]. Epidemiological studies have reported that more than half of Moroccan teenagers present dental malalignment, with a considerable proportion requiring orthodontic intervention [2] [3] [7]. Despite this high prevalence, few studies have explored how different orthodontic treatments influence adolescents' oral health-related quality of life (OHRQoL).

The present study, therefore, aims to compare the OHRQoL of adolescents aged 14 - 18 years treated with clear aligners and those using fixed multi-bracket appliances, based on the validated Oral Health Impact Profile (OHIP-14) questionnaire. The underlying hypothesis is that adolescents treated with clear aligners experience better oral health-related quality of life compared to those treated with fixed appliances.

## **2. Materials and Methods**

This cross-sectional analytic study was conducted between March and May 2025. The survey was conducted in a multicenter setting, involving patients followed at the Dental Care Center of Mohammed VI University of Health Sciences (UM6SS) and several private dental clinics.

### **2.1. Study Population**

The participants were adolescents aged 14 - 18 years who were undergoing orthodontic treatment, with either clear aligners or fixed multi-bracket appliances.

At the time of data collection, all participants were in the active treatment phase. The average treatment duration was  $8.3 \pm 2.1$  months for the fixed-appliance group and  $7.9 \pm 1.8$  months for the clear aligner group. None of the participants were in the initial adjustment phase (<1 month), ensuring comparability in treatment adaptation.

### **2.2. Inclusion Criteria**

- Adolescents aged 14 - 18 years.
- Teenagers attending middle or high school.
- Under active orthodontic treatment with clear aligners or fixed appliances.
- Written informed consent was obtained from participants and their legal guardians.

### **2.3. Exclusion Criteria**

- Adolescents with severe pre-existing oral conditions (e.g., advanced periodontitis, major dental anomalies unrelated to orthodontics).
- Patients who discontinued or changed orthodontic devices during treatment.
- Adolescents with systemic comorbidities affecting overall quality of life.

### **2.4. Sample Size**

The sample size was calculated using Cohen's formula for comparing two means, with a significance level of 0.05, a power of 80%, and a moderate effect size ( $d = 0.5$ ). The minimum required sample was 50 participants per group, for a total of 100 adolescents.

### **2.5. Recruitment and Sampling**

Participants were recruited using consecutive sampling from the patient registries

of the UM6SS Dental Care Center and collaborating private clinics in Casablanca. Eligible adolescents who met inclusion criteria were invited to participate during their regular follow-up appointments. Participation was voluntary, and no financial incentives were provided.

#### **Baseline Malocclusion Severity**

Baseline malocclusion severity was assessed using the Index of Orthodontic Treatment Need (IOTN) for all participants. All participants presented mild-to-moderate malocclusion requiring non-extraction orthodontic treatment, ensuring comparable clinical indications across groups.

### **2.6. Data Collection**

Data were collected using a structured questionnaire with two sections:

- Sociodemographic data (age, gender).
- Oral Health Impact Profile (OHIP-14): a validated tool for assessing oral health-related quality of life (OHRQoL), covering domains such as physical pain, psychological discomfort, and social disability. Responses were scored on a 5-point Likert scale (0 = never to 4 = very often).

### **2.7. Data Analysis**

Data were entered into SPSS software. Descriptive statistics summarized quantitative variables as means and their standard deviations and qualitative variables as percentages. Comparisons between groups were performed using Student's *t*-test or Welch's test for quantitative data, and Chi-square or Fisher's exact test for qualitative data. Statistical significance was set at  $P < 0.05$ .

#### **Statistical Assumption and Non-Parametric Testing**

The normality of OHIP-14 scores was tested with the Shapiro-Wilk test. As the data did not meet normality assumptions ( $P < 0.05$ ), non-parametric Mann-Whitney U tests were employed to compare the two groups. Statistical significance was set at  $P < 0.05$ .

### **2.8. Ethical Considerations**

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki. The research protocol was reviewed and approved by the Ethics Committee of Mohammed VI University of Health Sciences. Written informed consent was obtained from all participants, co-signed by the adolescents and their legal guardians. Data confidentiality was strictly maintained: participants' personal information was anonymized and securely processed to ensure full protection throughout the study.

## **3. Results**

As part of our study, 124 questionnaires were distributed, and 24 were excluded due to missing or incomplete responses. The final analysis was therefore based on 100 valid questionnaires, corresponding to a response rate of 80.6%. This relatively

high rate indicates good acceptability of the study among participants.

### 3.1. Sample Characteristics

The study population consisted of adolescents aged 14 to 18 years undergoing orthodontic treatment with either clear aligners or fixed multi-bracket appliances. The mean age was 16.0 years (SD = 1.5), with the 15 - 16-year-old group being the most represented. Both genders were included, reflecting a balanced distribution in the study sample (Table 1).

**Table 1.** Demographic characteristics of the participants.

	Effective (n)	Percentage (%)
<b>Age</b>		
14 - 15 years	7	7.0
15 - 16 years	38	38.0
16 - 17 years	29	29.0
17 - 18 years	26	26.0
<b>Gender</b>		
Female	56	56.0
Male	44	44.0

### 3.2. Comparison of Median Scores across the Seven OHIP-14

The comparison of median scores obtained for the seven OHIP-14 dimensions revealed a consistent difference between the two groups. Overall, adolescents treated with clear aligners presented lower median scores across all dimensions compared to those treated with fixed multi-bracket appliances, indicating a better oral health-related quality of life in the aligner group.

More specifically, for the dimensions of functional limitation, physical disability, and handicap, the median score was 1 among patients in the clear aligner group, whereas it reached 5 in the fixed appliance group. Similarly, in the domains of physical pain and social disability, the aligner group recorded median scores of 2, compared with 5 among patients wearing fixed appliances.

Regarding psychological discomfort, the observed median score was 2 for adolescents with clear aligners, while it was significantly higher (5) for those with fixed appliances. A comparable trend was observed in psychological disability, with a median score of 2 in the aligner group versus 5 in the fixed appliance group.

Taken together, these findings demonstrate that clear aligners were consistently associated with lower scores in all seven OHIP-14 dimensions, reflecting fewer functional, physical, psychological, and social limitations when compared to fixed appliances. Importantly, the observed differences between the two groups were statistically significant ( $P < 0.01$ ), confirming the robustness of these results (Table 2).

**Table 2.** Comparison of median scores across the seven OHIP-14 domains between the clear aligners group and the fixed appliance group.

Domain	Fixed appliances			Clear Aligners			Statistical finding
	Median	Min	Max	Median	Min	Max	P-Value
Functional limitation	5	2	6	1	0	4	<0.01
Physical pain	4	2	6	2	0	4	<0.01
Psychological discomfort	4	2	6	1	0	4	<0.01
Physical disability	5	2	6	1	0	4	<0.01
Psychological disability	5	2	6	2	0	4	<0.01
Social disability	4	2	6	2	0	4	<0.01
Handicap	5	2	6	1	0	3	<0.01

### 3.3. Comparison of OHIP-14's Mean Scores

The analysis of OHIP-14's mean scores showed a marked difference between the two groups. Adolescents treated with clear aligners had an OHIP-14's mean score of 9.92 (SD = 2.49), with a 95% confidence interval ranging from 9.21 to 10.62. This relatively low score reflects a more favorable oral health-related quality of life among patients using clear aligners.

In contrast, participants in the fixed appliance group reported a substantially higher OHIP-14's mean score of 30.92 (SD = 2.79), with a 95% confidence interval between 30.12 and 31.71. This high score indicates an important negative impact of fixed multi-bracket appliances on the quality of life of adolescents.

The statistical comparison between the two groups confirmed that the observed difference was highly significant ( $P < 0.01$ ), underscoring the stronger burden associated with fixed appliances compared to clear aligners. These findings are consistent with the hypothesis that aligner therapy is associated with better oral health-related quality of life outcomes in adolescents (Table 3).

**Table 3.** Comparison of the mean OHIP-14 scores between groups.

Group	N	Mean $\pm$ SD	95% CI (min - max)	P-value
Clear aligners	50	9.92 $\pm$ 2.49	9.21 - 10.62	<0.01
Fixed appliances	50	30.92 $\pm$ 2.79	30.12 - 31.71	<0.01
Total	100	20.42 $\pm$ 10.87	18.26 - 22.57	—

## 4. Discussion

### 4.1. Objective of the Study

The present study aimed to evaluate and compare the impact of orthodontic treatments with clear aligners versus fixed appliances on the quality of life of adolescents followed at the Mohammed VI Dental Care Center and in several private practices.

The results revealed a statistically significant difference between the two groups ( $P < 0.01$ ). Overall, patients treated with clear aligners presented a lower mean OHIP-14 total score compared to patients treated with fixed appliances, reflecting a more favorable perception of their quality of life.

This cross-sectional study provided a better understanding of adolescents' perceptions of their quality of life during active orthodontic treatment.

#### **4.2. Comparison of the Seven OHIP-14 Domains between the Aligner Group and the Fixed Multi-Bracket Group**

The comparative analysis of the seven OHIP-14 domains demonstrated a consistent and statistically significant advantage of clear aligners over fixed multi-bracket appliances across all aspects of adolescents' oral health-related quality of life ( $P < 0.01$ ). In the functional limitation domain, fixed appliances were strongly associated with difficulties in speech articulation and taste alteration. The presence of metallic brackets and wires on the buccal surfaces of teeth interfered with the natural movement of the lips and tongue, particularly affecting labial and sibilant sounds, leading to reduced fluency and social discomfort. Furthermore, some patients reported an unpleasant metallic taste, probably related to ion release from orthodontic alloys. In contrast, clear aligners caused only minor, transient disturbances, mainly during the first days of adaptation. Their thin thermoplastic surface allowed rapid adjustment, enabling patients to maintain clear speech and normal taste perception. In terms of physical pain, fixed appliance users reported persistent oral soreness, mucosal irritation, and chewing discomfort, particularly after activation appointments, while aligner wearers experienced only mild, short-term pressure during tray changes, without soft-tissue trauma or food-related discomfort. This difference translated into improved daily comfort and reduced need for analgesics among aligner users. Regarding psychological discomfort and psychological disability, the metallic appearance of fixed appliances often generated embarrassment, reduced self-confidence, and social anxiety, particularly in appearance-conscious adolescents. Conversely, aligners, being nearly invisible, preserved the natural smile, promoted social ease, and enhanced emotional well-being. In the physical disability dimension, fixed appliances significantly interfered with eating habits; the device frequently led to meal interruptions and avoidance of certain foods. Aligner wearers, who could remove their trays during meals, maintained unrestricted eating and dietary satisfaction. The social disability domain revealed that adolescents with fixed appliances were more irritable, stressed, and faced greater difficulty managing daily tasks due to discomfort, hygiene constraints, and treatment visibility. By contrast, aligner users exhibited better emotional stability, adaptability, and social participation. Finally, the global handicap score underscored the cumulative burden of fixed appliances, perceived as intrusive and limiting, whereas aligner therapy was described as comfortable, discreet, and easily integrated into everyday life. Collectively, these findings demonstrate that clear aligners substantially improve the functional, psychological, and social

dimensions of adolescents' oral health-related quality of life, confirming their superiority over traditional fixed orthodontic appliances as a more patient-centered therapeutic option.

#### **Functional and Physical Dimensions:**

The present study demonstrated a statistically significant advantage of clear aligners over fixed multi-bracket appliances across the functional and physical dimensions of the OHIP-14 ( $P < 0.01$ ). In the functional limitation domain, fixed appliances were associated with frequent speech difficulties and altered taste perception, reflected by a median score of 5 compared to 1 for the aligner group. The presence of metallic brackets and archwires interferes with tongue and lip movements, impairing articulation of labial and sibilant sounds. This phenomenon has been consistently reported in previous studies, where Baeshen *et al.* [8] observed that speech disturbances induced by aligners are temporary and subside within days, whereas those caused by fixed appliances persist longer. Similarly, Jaber and al. confirmed that bracketed appliances disrupt articulation more significantly than removable devices [9].

Regarding taste perception, metallic appliances are often associated with an unpleasant metallic taste due to ion release from orthodontic alloys, as shown by Mickiewicz *et al.* [10]. Clear aligners, being thermoplastic and inert, neither alter gustation nor accumulate corrosion products. The ability to maintain normal speech and taste is a crucial determinant of adolescents' psychosocial well-being, reinforcing the functional advantage of aligners.

Pain and masticatory discomfort further distinguished the two treatment modalities. In our study, fixed-appliance users reported moderate yet persistent pain (median = 4), whereas aligner wearers experienced only transient mild pressure (median = 2). These findings align with the randomized trial by White *et al.* [11], which showed significantly lower pain intensity and analgesic use among aligner patients. Likewise, the systematic review by Zhang *et al.* [12] confirmed that aligners are associated with lower pain perception and fewer daily activity limitations. The underlying mechanism likely lies in the gentler, intermittent forces produced by aligners compared with the continuous, sometimes higher-magnitude forces of fixed systems.

Chewing difficulties and meal-related discomfort, captured under the physical disability domain, also favored aligners. Adolescents with fixed appliances reported meal interruptions, food entrapment, and avoidance of certain foods due to fear of damaging the appliance. These results mirror the observations of Miller *et al.* [13] and White *et al.* [11], who both reported higher dietary restrictions and oral discomfort in fixed-appliance users. The removable nature of aligners allows normal eating and contributes to better adherence and satisfaction. Clinically, the reduction of physical pain and dietary discomfort enhances both comfort and treatment compliance in adolescents.

#### **Psychological and Social Dimensions:**

Psychological and social well-being were markedly better among adolescents treated with clear aligners. The psychological discomfort and psychological disability

domains showed median scores of 1 - 2 for aligners and 4 - 5 for fixed appliances ( $P < 0.01$ ). The visibility of metallic brackets remains a major source of self-consciousness and embarrassment among teenagers, affecting self-esteem and social interactions. This finding corroborates Shalish *et al.* [14], who reported that esthetic appliances, including aligners, significantly reduce self-consciousness and social anxiety. Miller *et al.* [13] also observed that aligner wearers experienced improved self-confidence and reduced emotional tension as early as the first week of treatment.

The psychological advantage of aligners extends beyond aesthetics. Their comfort, lack of pain, and minimal interference with speech or eating allow patients to “forget” their appliance during daily life. This contributes to relaxation and reduces psychological strain, an effect previously emphasized by Shalish *et al.* [14] and Paes da Silva *et al.* [15], who linked discrete orthodontic systems to better emotional adaptation and quality of life.

Social disability, which includes irritability and difficulty performing daily tasks, also differed significantly between groups (median = 2 for aligners vs 4 for fixed appliances). Adolescents wearing fixed appliances reported greater irritability and social withdrawal due to pain, hygiene constraints, and treatment visibility. In contrast, aligner users exhibited better emotional stability and social participation. These findings are consistent with the reports of White *et al.* [11] and Shalish *et al.* [14], which showed that fixed appliances negatively affect mood and daily organization, whereas aligners are more easily integrated into adolescents’ routines. Given that adolescence is a period of heightened aesthetic and social sensitivity, these psychosocial effects may strongly influence overall treatment perception.

#### **Global Handicap and Overall Quality of Life:**

The global handicap domain synthesized the cumulative impact of orthodontic therapy on patients’ lives. Fixed appliances yielded a median score of 5 versus 1 for aligners ( $P < 0.01$ ), reflecting a global perception of burden and limitation. This aligns with Zhang *et al.* [12], who concluded that clear aligners exert a significantly lower overall impact on oral health-related quality of life (OHRQoL), and Shalish *et al.* [14], who found higher adaptability and satisfaction among aligner users. The combination of physical, psychological, and social advantages explains the minimal handicap perception observed in aligner wearers.

In the overall OHIP-14 analysis, adolescents treated with clear aligners achieved a mean score of  $9.92 \pm 2.49$  compared with  $30.92 \pm 2.79$  for those with fixed appliances, confirming a markedly better OHRQoL. Similar findings have been reported by Zhou *et al.* [16], Paes da Silva *et al.* [15], and Souza *et al.* [17], all of whom demonstrated superior quality-of-life outcomes among aligner patients. The meta-analysis by Kaklamanos *et al.* [18] reinforced these observations, indicating consistent benefits of aligners across comfort, aesthetics, and psychosocial domains. However, Sharma *et al.* [19] found no significant global difference, suggesting that contextual and individual factors may moderate the relationship between appliance type and perceived quality of life.

Longitudinal evidence also indicates that fixed-appliance therapy induces a temporary decline in OHRQoL during the initial months, with improvement after appliance removal [20] [21]. Adolescents tend to experience a stronger psychosocial burden early in treatment but greater recovery post-therapy, whereas adults report more stable yet less pronounced changes [9] [19]. These patterns highlight the dynamic and age-dependent nature of quality-of-life responses to orthodontic treatment.

### 4.3. Study Limitations and Perspectives

This study presents several limitations that should be acknowledged to better interpret its findings and to guide future research.

- First, as a cross-sectional comparative study, it captures data at a single point in time, thus limiting the ability to establish causal relationships between the type of orthodontic device and the perceived quality of life. A longitudinal design would have provided a more comprehensive understanding of how the impact of orthodontic treatment evolves over time.
- Second, the use of a non-probabilistic sampling method introduces a potential selection bias, which restricts the generalizability of the results to the broader adolescent population undergoing orthodontic care.
- Third, the relatively modest sample size requires cautious interpretation of the findings, particularly regarding the statistical robustness of the observed differences.
- Fourth, although variables such as age and sex were considered during participant inclusion, it is not guaranteed that both groups were entirely comparable in all potential confounding factors that could influence quality of life. This represents a possible source of bias.
- Finally, the use of self-administered questionnaires may have introduced biases related to social desirability or subjective interpretation, particularly in the psychological dimensions.
- Additionally, several unmeasured confounding factors may have influenced the observed associations, including socioeconomic status, adherence to aligner wear schedules, prior pain tolerance, and family support. Although these variables were not directly assessed, their possible impact should be recognized and considered in future studies. Incorporating behavioral and socioeconomic measures in future designs would provide a more comprehensive understanding of the determinants of oral health-related quality of life.

Despite these limitations, the results of this study provide valuable insights into contemporary orthodontic research and highlight the importance of integrating quality-of-life indicators in the evaluation of orthodontic treatments, especially among adolescents.

#### Perspectives

- **Methodological approach:** Future research should adopt prospective longitudinal designs on larger and more diverse samples, using the same validated questionnaire. This would allow for a more accurate assessment of changes in

oral health-related quality of life over time, depending on the type of orthodontic appliance and treatment duration. While cross-sectional studies offer a snapshot, longitudinal studies follow the same individuals throughout treatment, minimizing recall bias and revealing temporal trends. Increasing the sample size would enhance statistical power, while controlling for potential confounders such as age, sex, and malocclusion severity.

- **Exploration of psychological dimensions:** The inclusion of additional validated instruments, such as the *Psychosocial Impact of Dental Aesthetics Questionnaire* (PIDAQ), adapted to Moroccan adolescents [22], would allow for a deeper understanding of the aesthetic and emotional consequences of orthodontic treatments, a crucial aspect for this age group.
- **Patient-centered therapeutic approach:** The findings support the promotion of a patient-centered orthodontic practice aligned with the principles of personalized medicine, taking into account adolescents' individual preferences, expectations, and lifestyles.
- **Continuing professional education:** These results could also contribute to the development of continuing education and e-learning programs for orthodontists, emphasizing patient quality of life, communication skills, and psychosocial aspects of care.
- **Extension of target populations:** Broadening this research to include other age groups or specific populations (e.g., adolescents with disabilities or social anxiety) would strengthen the clinical relevance and general applicability of the findings.

## 5. Conclusion

Contemporary orthodontics has undergone significant transformation with the emergence of new techniques, particularly clear aligners, which complement the traditional use of fixed multibracket appliances. This study aimed to compare the impact of these two orthodontic approaches on the oral health-related quality of life (OHRQoL) of adolescents, to better identify their respective benefits and limitations. Results based on the domains and total mean score of the OHIP-14 questionnaire indicate that adolescents treated with clear aligners reported a better OHRQoL than those treated with multibracket appliances. Lower OHIP-14 mean scores among the aligner group reflect a more favorable perception of the treatment's impact on daily life. Detailed analysis revealed that this difference extended across several OHIP-14 domains, including functional limitation, physical pain, psychological discomfort, and social disability. Adolescents treated with aligners reported less pain and eating-related discomfort, less embarrassment about dental appearance, and fewer psychosocial or social limitations, enabling them to maintain daily activities more easily. In contrast, the discomfort associated with fixed appliances appears related to pain and the accumulation of food debris around brackets, requiring greater motivation and effort to maintain oral hygiene. These findings align with a substantial body of literature attributing the advantages of aligners to key factors such as aesthetics, removability during meals, and improved

oral hygiene maintenance—all contributing to better comfort and periodontal health. Nonetheless, aligners also have constraints: their effectiveness depends on patient compliance and motivation to wear them for the prescribed duration. Perceptions of quality of life remain subjective, influenced by factors such as individual temperament, pain tolerance, social environment, family socioeconomic status, and expectations. This study thus contributes to a nuanced understanding of the advantages and challenges of both orthodontic approaches, emphasizing a balanced interpretation rather than a simplistic opposition. Future longitudinal studies with larger samples and control groups should further explore the impact of malocclusion types and socioeconomic status on adolescents' OHRQoL.

### Conflicts of Interest

The authors declare no conflicts of interest.

### References

- [1] Maatouk, F., Baccouche, F., Baaziz, A., Ghedira, H., Chala, S. and Ben Abdelaziz, A. (2022) La santé bucco-dentaire au Grand Maghreb: Revue systématique de la littérature. *Santé Publique*, **34**, 309-318. <https://doi.org/10.3917/spub.222.0309>
- [2] Lahcen, O., Hiba, K. and Ikrame, D. (2024) Prevalence of Orthodontic Malocclusions among Adolescents: A National Survey. *OALib*, **11**, 1-11. <https://doi.org/10.4236/oalib.1111876>
- [3] Sante Buccodentaire (Programme National de Santé Bucco-Dentaire, Maroc) <https://www.sante.gov.ma/revuepresse/dossiersante/Documents/Sante%20Buccodentaire.pdf>
- [4] Yu, X., Li, G., Zheng, Y., Gao, J., Fu, Y., Wang, Q., *et al.* (2022) 'Invisible' Orthodontics by Polymeric 'Clear' Aligners Molded on 3D-Printed Personalized Dental Models. *Regenerative Biomaterials*, **9**, rbac007. <https://doi.org/10.1093/rb/rbac007>
- [5] Baseer, M.A., Almayah, N.A., Alqahtani, K.M., Alshaye, M.I. and Aldhahri, M.M. (2021) Oral Impacts Experienced by Orthodontic Patients Undergoing Fixed or Removable Appliances Therapy in Saudi Arabia: A Cross-Sectional Study. *Patient Preference and Adherence*, **15**, 2683-2691. <https://doi.org/10.2147/ppa.s343084>
- [6] Kado, I., Hisatsune, J., Tsuruda, K., Tanimoto, K. and Sugai, M. (2020) The Impact of Fixed Orthodontic Appliances on Oral Microbiome Dynamics in Japanese Patients. *Scientific Reports*, **10**, Article No. 21989. <https://doi.org/10.1038/s41598-020-78971-2>
- [7] Ousehal, L., El Kaki, S., & Koucha, S. (n.d.). Prevalence of Orthodontic Anomalies among High School Students in Casablanca, Morocco (14-18 Years Old). *Journal de la médecine dentaire, African Journal of Dentistry and Implantology*, 48-62.
- [8] Ali Baeshen, H., El-Bialy, T., Alshehri, A., Awadh, W., Thomas, J., Dhillon, H., *et al.* (2022) The Effect of Clear Aligners on Speech: A Systematic Review. *European Journal of Orthodontics*, **45**, 11-19. <https://doi.org/10.1093/ejo/cjac018>
- [9] Jaber, S.T., Hajeer, M.Y., Burhan, A.S. and Latifeh, Y. (2022) The Effect of Treatment with Clear Aligners Versus Fixed Appliances on Oral Health-Related Quality of Life in Patients with Severe Crowding: A One-Year Follow-Up Randomized Controlled Clinical Trial. *Cureus*, **14**, e25472.
- [10] Mikulewicz, M., Chojnacka, K. and Wołowicz, P. (2014) Release of Metal Ions from Fixed Orthodontic Appliance: An *in Vitro* Study in Continuous Flow System. *The*

- Angle Orthodontist*, **84**, 140-148. <https://doi.org/10.2319/113012-911.1>
- [11] White, D.W., Julien, K.C., Jacob, H., Campbell, P.M. and Buschang, P.H. (2017) Discomfort Associated with Invisalign and Traditional Brackets: A Randomized, Prospective Trial. *The Angle Orthodontist*, **87**, 801-808. <https://doi.org/10.2319/091416-687.1>
- [12] Zhang, B., Huang, X., Huo, S., Zhang, C., Zhao, S., Cen, X., et al. (2020) Effect of Clear Aligners on Oral Health-Related Quality of Life: A Systematic Review. *Orthodontics & Craniofacial Research*, **23**, 363-370. <https://doi.org/10.1111/ocr.12382>
- [13] Miller, K.B., McGorray, S.P., Womack, R., Quintero, J.C., Perelmuter, M., Gibson, J., et al. (2007) A Comparison of Treatment Impacts between Invisalign Aligner and Fixed Appliance Therapy during the First Week of Treatment. *American Journal of Orthodontics and Dentofacial Orthopedics*, **131**, 302.e1-302.e9. <https://doi.org/10.1016/j.ajodo.2006.05.031>
- [14] Shalish, M., Cooper-Kazaz, R., Ivgi, I., Canetti, L., Tsur, B., Bachar, E., et al. (2011) Adult Patients' Adjustability to Orthodontic Appliances. Part I: A Comparison between Labial, Lingual, and Invisalign. *The European Journal of Orthodontics*, **34**, 724-730. <https://doi.org/10.1093/ejo/cjr086>
- [15] Paes da Silva, S., Pitchika, V., Baumert, U., Wehrbein, H., Schwestka-Polly, R., Drescher, D., et al. (2019) Oral Health-Related Quality of Life in Orthodontics: A Cross-Sectional Multicentre Study on Patients in Orthodontic Treatment. *European Journal of Orthodontics*, **42**, 270-280. <https://doi.org/10.1093/ejo/cjz064>
- [16] Zhou, Y., Wang, Y., Wang, X., Volière, G. and Hu, R. (2014) The Impact of Orthodontic Treatment on the Quality of Life a Systematic Review. *BMC Oral Health*, **14**, Article No. 66. <https://doi.org/10.1186/1472-6831-14-66>
- [17] Souza, G.L.N., de Campos França, E., de Araújo Lombardi, M., da Costa, G.C., da Rocha, N.B. and Abreu, L.G. (2024) Impact of Treatment with Orthodontic Aligners on the Oral Health-Related Quality of Life. *BMC Oral Health*, **24**, Article No. 419. <https://doi.org/10.1186/s12903-024-04183-z>
- [18] Kaklamanos, E.G., Makrygiannakis, M.A. and Athanasiou, A.E. (2023) Oral Health-Related Quality of Life Throughout Treatment with Clear Aligners in Comparison to Conventional Metal Fixed Orthodontic Appliances: A Systematic Review. *International Journal of Environmental Research and Public Health*, **20**, Article 3537. <https://doi.org/10.3390/ijerph20043537>
- [19] Sharma, R., Drummond, R., Wiltshire, W., Schroth, R., Lekic, M., Bertone, M., et al. (2021) Quality of Life in an Adolescent Orthodontic Population. *The Angle Orthodontist*, **91**, 718-724. <https://doi.org/10.2319/062820-592.1>
- [20] Costa, A.A., Serra-Negra, J.M., Bendo, C.B., Pordeus, I.A. and Paiva, S.M. (2016) Impact of Wearing Fixed Orthodontic Appliances on Quality of Life among Adolescents: Case-Control Study. *The Angle Orthodontist*, **86**, 121-126. <https://doi.org/10.2319/100514716.1>
- [21] Alfawal, A.M.H., Burhan, A.S., Mahmoud, G., Ajaj, M.A., Nawaya, F.R. and Hanafi, I. (2022) The Impact of Non-Extraction Orthodontic Treatment on Oral Health-Related Quality of Life: Clear Aligners versus Fixed Appliances—A Randomized Controlled Trial. *European Journal of Orthodontics*, **44**, 595-602. <https://doi.org/10.1093/ejo/cjac012>
- [22] Bourzgui, F., Serhier, Z., Sebbar, M., Diouny, S., Bennani Othmani, M. and Ngom, P.I. (2015) Adaptation and Validation of the Moroccan Arabic Version of the Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ). *The Saudi Dental Journal*, **27**, 180-186. <https://doi.org/10.1016/j.sdentj.2014.11.016>