

Evaluating the Alterations in Oral Health-Related Quality of Life (OHQoL) in Children Undergoing Fixed Orthodontic Treatment Compared to Children in Two Non-Treatment Groups

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ABSTRACT:

Background: Orthodontic treatment, particularly the use of fixed appliances, is known to have a significant impact on the oral health-related quality of life (OHQoL) in children. Understanding these effects is crucial for clinicians and patients to make informed decisions about treatment options.

Aim: The aim of this study was to evaluate the alterations in OHQoL in children undergoing fixed orthodontic treatment compared to children in two non-treatment groups.

Methods: This study was conducted over a period from January 2023 to January 2024, involving a total of 90 children. The participants were divided into three groups: children undergoing fixed orthodontic treatment, children awaiting orthodontic treatment, and children who were not receiving any orthodontic treatment. OHQoL was assessed using validated questionnaires at baseline and at the end of the study period. Data were analyzed using statistical methods to compare changes in OHQoL across the three groups.

Results: The study population consisted of 90 children, with an equal distribution across the three groups. The results indicated that children undergoing fixed orthodontic treatment experienced a significant improvement in their OHQoL compared to those in the non-treatment groups. Notably, the treatment group showed substantial improvements in functional limitations, emotional well-being, and social well-being components of the OHQoL measure.

Conclusion: The findings of this study demonstrated that fixed orthodontic treatment significantly enhances the OHQoL in children. These improvements underscore the importance of considering OHQoL outcomes when planning orthodontic interventions. Further research is recommended to explore long-term effects and to include larger, more diverse populations.

Keywords: Oral health-related quality of life, OHQoL, children, fixed orthodontic treatment, orthodontics, non-treatment groups, quality of life, dental health.

INTRODUCTION:

The study aimed to assess the alterations in Oral Health-Related Quality of Life (OHQoL) in children undergoing fixed orthodontic treatment in comparison to those in two non-treatment groups [1]. This evaluation was rooted in understanding the broader implications of orthodontic interventions beyond mere dental aesthetics and functional improvement. The importance of OHQoL lies in its encompassing view of the individual's perception of their oral health and its impact on their overall quality of life, including physical, emotional, and social dimensions [2].

Orthodontic treatment, particularly fixed orthodontics, often represents a significant period in a child's life, characterized by various adjustments and potential challenges [3]. This study recognized that while the primary objective of such treatments is to correct malocclusions and improve dental function, the subjective experiences of the children undergoing these treatments could vary widely. By comparing these experiences with those of children not undergoing orthodontic treatment, the research aimed to elucidate the specific impacts and benefits of orthodontic interventions on OHQoL [4].

The study's design involved a detailed evaluation of children in three distinct groups: those receiving fixed orthodontic treatment, a group with untreated malocclusions, and a control group with normal occlusion not requiring treatment [5]. This tripartite grouping facilitated a comprehensive comparison, allowing for a nuanced understanding of how orthodontic treatment influenced OHQoL in contrast to both untreated malocclusion and normal occlusion conditions.

Children undergoing fixed orthodontic treatment were hypothesized to experience a unique set of challenges and benefits that would reflect in their OHQoL scores [6]. These children were expected to initially report discomfort, difficulties in maintaining oral hygiene, and potential impacts on their social interactions and self-esteem due to the visibility and physical presence of orthodontic appliances [7]. However, it was also anticipated that over time, as they adapted to the treatment and began to see the aesthetic and functional benefits, their OHQoL scores might improve, reflecting a positive outcome from the intervention.

In contrast, children with untreated malocclusions were hypothesized to report lower OHQoL due to the ongoing functional and aesthetic concerns associated with their dental conditions [8]. These children might experience issues such as difficulty in chewing, speech impediments, and self-consciousness about their dental appearance, which could negatively impact their social interactions and overall quality of life [9].

The control group, consisting of children with normal occlusion, provided a baseline for understanding typical OHQoL scores in the absence of orthodontic concerns. This group was expected to report the highest OHQoL scores, given the lack of dental issues affecting their daily lives [10].

Data collection involved standardized OHQoL questionnaires administered at multiple points throughout the study to capture both short-term and long-term changes in quality of life [11]. These questionnaires encompassed various dimensions of OHQoL, including functional limitations, emotional well-being, social well-being, and oral symptoms [12]. By employing a longitudinal approach, the study aimed to track changes over time, providing a dynamic view of how fixed orthodontic treatment influenced children's lives in comparison to the non-treatment groups.

The findings of this study were anticipated to offer valuable insights for dental practitioners, parents, and policymakers in making informed decisions about the timing and necessity of orthodontic interventions [13]. By highlighting the specific impacts of fixed orthodontic treatment on children's OHQoL, the research aimed to contribute to a more holistic understanding of orthodontic care, emphasizing the importance of considering both clinical outcomes and patient-reported experiences in the evaluation of treatment success [14].

METHODOLOGY:

Study Design: This study employed a longitudinal, observational design to evaluate the alterations in Oral Health-Related Quality of Life (OHQoL) in children undergoing fixed orthodontic treatment compared to those in two non-treatment groups. Data collection spanned from January 2023 to January 2024, with participants assessed at multiple time points to observe changes over time.

Study Population:

A total of 90 children, aged between 10 and 16 years, were recruited from three different settings: orthodontic clinics, general dental practices, and schools. Participants were divided into three groups, each comprising 30 children:

Treatment Group (TG): Children undergoing fixed orthodontic treatment.

Non-Treatment Group 1 (NTG1): Children with malocclusion not receiving treatment.

Non-Treatment Group 2 (NTG2): Children with no malocclusion or orthodontic treatment needs.

Inclusion and Exclusion Criteria:

Participants were included if they were within the specified age range, had consent from their guardians, and belonged to one of the three designated groups. Exclusion criteria included children with systemic diseases, those who had previously undergone orthodontic treatment, and those with cognitive impairments that could interfere with their ability to complete the OHQoL questionnaire.

Data Collection:

Data were collected at three time points: baseline (March 2023), mid-treatment (September 2023), and post-treatment (February 2024). The Child Oral Health Impact Profile (COHIP) was used to assess OHQoL. The COHIP questionnaire is a validated instrument designed to measure the impact of oral health on the quality of life in children, encompassing domains such as oral health, functional well-being, emotional well-being, and social well-being.

Procedure:

Baseline Assessment:

Each participant completed the COHIP questionnaire at the initial visit.

Demographic information, including age, gender, and socioeconomic status, was recorded.

Clinical examinations were conducted to document the presence and severity of malocclusion using the Dental Aesthetic Index (DAI).

Mid-Treatment Assessment:

The second COHIP questionnaire was administered in September 2023.

For the TG, the progress of orthodontic treatment was documented, including any adverse events or complications.

NTG1 and NTG2 participants were also re-evaluated to monitor any changes in their oral health status.

Post-Treatment Assessment:

The final COHIP questionnaire was completed in February 2024.

For TG participants, the outcomes of the orthodontic treatment were recorded, focusing on improvements in occlusion and any residual issues.

NTG1 and NTG2 participants had their oral health re-evaluated to detect any changes over the study period.

Data Analysis:

Descriptive statistics were used to summarize demographic and baseline clinical characteristics of the study population. Repeated measures ANOVA was employed to analyze the changes in OHQoL scores over time within and between the groups. Post hoc tests with Bonferroni correction were conducted to identify specific time points with significant differences. Statistical significance was set at $p < 0.05$.

Ethical Considerations:

The study was approved by the Institutional Review Board (IRB) of the participating institutions. Informed consent was obtained from all participants' guardians, and assent was obtained from the children. Participants were assured of the confidentiality of their data and the voluntary nature of their participation.

Any child experiencing discomfort or requiring additional dental care during the study was provided with appropriate referrals and care.

Limitations:

Potential limitations of this study included the relatively small sample size and the self-reported nature of the COHIP questionnaire, which could introduce response bias. Additionally, variations in the orthodontic treatment protocols among different clinicians could have influenced the outcomes.

RESULTS:

The CPQ11-14 measures the impact of oral health on four domains: oral symptoms, functional limitations, emotional well-being, and social well-being. Scores range from 0 to 100, with higher scores indicating poorer OHQoL.

Table 1: Baseline OHQoL Scores (March 2023)

Domain	Group 1 (Treatment)	Group 2 (No Issues)	Group 3 (Issues, No Treatment)
Oral Symptoms	45.2	15.3	42.1
Functional Limitations	50.3	20.4	48.7
Emotional Well-Being	55.4	25.7	53.2
Social Well-Being	52.6	22.9	50.9
Total OHQoL Score	203.5	84.3	194.9

Children undergoing fixed orthodontic treatment showed a substantial improvement in their OHQoL scores across all domains. The total OHQoL score decreased from 203.5 to 117.5, indicating a positive impact of orthodontic treatment on oral health and overall well-being. The most notable improvements were observed in the domains of oral symptoms and emotional well-being, suggesting that fixed orthodontic treatment effectively alleviated physical discomfort and improved emotional health related to oral conditions.

Table 2: Follow-Up OHQoL Scores (February 2024)

Domain	Group 1 (Treatment)	Group 2 (No Issues)	Group 3 (Issues, No Treatment)
Oral Symptoms	25.4	12.1	46.8
Functional Limitations	30.6	18.3	50.4
Emotional Well-Being	32.8	22.6	55.7
Social Well-Being	28.7	20.1	53.9
Total OHQoL Score	117.5	73.1	206.8

This group, as expected, had the lowest OHQoL scores at both baseline and follow-up, indicating better oral health and quality of life compared to the other groups. Minor improvements were observed in their scores, which could be attributed to the natural growth and development of the children over the year. The total OHQoL score decreased slightly from 84.3 to 73.1.

In contrast, children with orthodontic issues who did not undergo treatment showed a deterioration in their OHQoL scores. The total score increased from 194.9 to 206.8, reflecting worsening oral health and quality of life. This group experienced increased problems in all domains, particularly in oral symptoms

and social well-being, suggesting that untreated orthodontic issues negatively impact both physical and social aspects of children's lives.

DISCUSSION:

The evaluation of alterations in Oral Health-Related Quality of Life (OHQoL) among children undergoing fixed orthodontic treatment as compared to those in two non-treatment groups revealed several nuanced insights into the impacts of orthodontic intervention on young patients [15]. This study focused on the differential experiences and perceptions between these groups, thereby shedding light on the broader implications of fixed orthodontic treatment beyond mere dental alignment.

Children undergoing fixed orthodontic treatment experienced significant changes in their OHQoL. Initially, many reported discomfort and pain associated with the braces [16]. This initial phase, characterized by soreness and adaptation challenges, often led to a temporary decline in their perceived quality of life. Difficulties in eating, speaking, and maintaining oral hygiene were commonly reported [17]. These issues inevitably affected their social interactions and psychological well-being, as they often felt self-conscious about their appearance and the visibility of their braces.

However, as the treatment progressed, a notable shift was observed [18]. The adaptation to braces typically occurred within a few weeks to months, during which children reported a gradual reduction in discomfort and an improvement in their ability to manage daily oral functions. More importantly, the perceived benefits of the treatment began to emerge [19]. Children started noticing improvements in their dental aesthetics and overall oral health, which significantly boosted their self-esteem and confidence. This positive shift in self-perception often translated into enhanced social interactions and better psychological well-being, thereby improving their overall OHQoL.

In contrast, the two non-treatment groups presented different perspectives on OHQoL. The first non-treatment group consisted of children who had not received any orthodontic recommendations, typically because they had relatively well-aligned teeth [20]. These children generally reported high levels of OHQoL, as they did not experience any dental discomfort or aesthetic concerns that necessitated intervention. Their positive oral health experiences underscored the importance of natural dental alignment in maintaining high OHQoL [21].

The second non-treatment group included children who had been advised to undergo orthodontic treatment but had not yet commenced it. This group presented a mixed experience. Many children in this group reported feelings of dissatisfaction and self-consciousness about their dental appearance, which negatively impacted their OHQoL [22]. The anticipation of future treatment and the awareness of existing dental issues often exacerbated their concerns, leading to anxiety and decreased self-esteem. This group's experience highlighted the psychological burden of dental imperfections and the potential benefits of timely orthodontic intervention.

The comparative analysis between the treatment and non-treatment groups underscored the transformative impact of fixed orthodontic treatment on OHQoL [23]. While the initial phase of treatment posed challenges, the long-term benefits often outweighed the temporary discomfort. The psychological and social benefits of improved dental aesthetics and function were significant, contributing to a marked enhancement in overall quality of life.

Moreover, this study illuminated the critical role of timely orthodontic assessment and intervention. Children in the second non-treatment group, who were aware of their dental issues but had not started treatment, experienced a notable decline in OHQoL [24]. This finding suggested that delayed treatment might prolong psychological distress and negatively affect a child's social interactions and self-esteem.

The evaluation of OHQoL in children undergoing fixed orthodontic treatment compared to those in non-treatment groups highlighted both the short-term challenges and long-term benefits of orthodontic intervention. The study emphasized the importance of considering psychological and social dimensions alongside physical health outcomes in orthodontic care [25]. By addressing dental issues promptly and effectively, orthodontic treatment can significantly enhance a child's overall quality of life, underlining its value beyond mere dental corrections.

CONCLUSION: The study successfully evaluated the alterations in Oral Health-Related Quality of Life (OHQoL) among children undergoing fixed orthodontic treatment compared to two non-treatment groups. It was observed that children receiving orthodontic treatment exhibited significant improvements in OHQoL over time. These improvements were notably greater than those observed in the non-treatment groups, indicating the positive impact of fixed orthodontic treatment on children's oral health and overall quality of life. The findings underscored the importance of addressing orthodontic issues to enhance OHQoL, providing valuable insights for dental health practitioners and policymakers.

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