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Favorable treatment outcomes and shorter durations: a retrospective case series on seven patients using Orthoworld FASTBRACES®

Abstract

Objective: This retrospective case series aimed to evaluate the effectiveness and user experience of Orthoworld FASTBRACES® in seven patients undergoing orthodontic treatment. Emphasizing these specific patients was essential for assessing the shorter treatment duration compared to reported treatment ranges of 12 to 14 months for FASTBRACES® Technologies. Data and images were collected from cases treated between 2016 and 2023, and a Treatment Evaluation Form was sent to participating doctors to gather information about patient experiences with the product.

Materials and methods: The seven patients included in the study received orthodontic treatment with FASTBRACES® at various orthodontic practices. The Treatment Evaluation Form completed by participating providers included questions related to treatment details, number of visits, types of brackets and wires used, issues encountered during treatment, patient understanding of treatment, overall comfort level, compliance, and satisfaction with treatment speed.

Results: The analysis of patient data revealed variability in patient compliance with treatment protocols and understanding of treatment, with scores ranging from 2 to 4 on the respective scales. The number of brackets used ranged from 10 to 28, and the number of wires utilized ranged from 1 to 4. Most patients reported minimal issues during treatment, with only one reported issue in two cases. Overall, patients reported a high level of comfort, with an average score of 3.43 out of 4.

Conclusion: The findings highlight the importance of patient education and communication in promoting better compliance and treatment success. The variability in bracket and wire utilization suggests that the severity and complexity of malocclusions may influence the treatment approach. FASTBRACES® demonstrated success in minimizing patient discomfort, achieving faster alignment, and enhancing overall satisfaction. Further research is needed to investigate the factors underlying differences between the metal and ceramic bracket groups and explore mechanisms behind reported issues. The study underscores the significance of precise bracket and wire placement and the expertise of orthodontic practitioners throughout the treatment process. This case series provides valuable insights into the effectiveness and user experience of Orthoworld FASTBRACES® and lays the groundwork for future research and larger-scale studies.

Keywords: orthodontics, bracket, Orthoworld, Fastbraces, short duration

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Introduction

Orthodontic treatment is a critical component of modern dentistry, with the goal of correcting malocclusions and improving dental aesthetics and functionality. Teeth are gradually and methodically realigned using orthodontic appliances such as brackets, wires and elastomerics. Orthodontic clinical research has led to impressive breakthroughs in treatment protocols, resulting in improved patient experiences and outcomes.[1–3]

Moreover, orthodontic treatment transcends its fundamental cosmetic function, assuming a pivotal role in the comprehensive improvement of oral health. Misaligned teeth can lead to a range of oral health problems including difficulties with mastication and articulation, an increased vulnerability to dental caries, periodontal disease, and possible temporomandibular joint dysfunction. Considering these repercussions, it's imperative to address malocclusions thereby safeguarding against potential, oral health problems.[4–7]

In assessing a specific orthodontic treatment protocol, a comprehensive exploration of pertinent parameters also requires evaluation of the orthodontic literature. Numerous studies have underscored the significance of studying treatment outcomes and patient comfort in orthodontic care. Patient-reported outcomes encompassing treatment duration, comfort, adherence, and satisfaction provide significant data in gauging the efficacy of orthodontic interventions.[8–13]

During orthodontic treatment planning one of the most recurrent queries posed by patients, whether young or adult, pertains to the anticipated treatment duration. Research shows that the duration of treatment may fluctuate contingent upon case or patient intricacies and the orthodontic system in use. A spectrum of studies has reported mean treatment durations spanning from 18 to 36 months for orthodontic braces systems.[14] It's prudent to recognize that the reported span of treatment duration may oscillate based on individual variables, the specific treatment needs of each patient and the design of the research study.[14–18] However, based on the assimilation of 22 individual studies involving 1089 participants through a systematic

review, the average orthodontic treatment duration was 20 months.[19] Two recent retrospective studies on FASTBRACES® Technologies reported an average treatment duration of 12-14 months.[20,21]

This paper assesses the effectiveness and user experience of Orthoworld FASTBRACES® Orthodontic Brackets in seven case studies with short treatment durations. By conducting a comprehensive analysis of orthodontic treatment experiences within these case studies, this paper explores critical aspects, including treatment duration, adjustments, patient issues, comfort, compliance, and treatment quality.

Orthoworld, LLC offers FASTBRACES®, a comprehensive orthodontic treatment system that includes a variety of components such as brackets, wires, ligatures, buccal tubes, bands, elastomerics, and other orthodontic appliances as determined necessary by orthodontic practitioners. Commercially available orthodontic accessories including ligatures, buccal tubes, bands, and elastomerics are also part of the FASTBRACES® treatment. The FASTBRACES® brackets and wires consists of both metal and ceramic brackets.

Data collected from commercial use of the product between 2016 and 2023 were compiled to conduct a comprehensive retrospective review, focusing on evaluating detailed individual experiences with FASTBRACES®. Specific aspects such as treatment duration, overall comfort, patient compliance, satisfaction with treatment speed and patient understanding of treatment were evaluated by the orthodontic providers for each case.

Materials and methods

Trial design

A retrospective review of seven case studies was conducted to closely assess the effectiveness of Orthoworld FASTBRACES® on an individual level. Data and images were collected from patients who underwent treatment between 2016 and 2023. To gather comprehensive information about patients' experiences with the product, participating doctors were provided with a Treatment Evaluation Form.

Participants, eligibility criteria, and settings

The Treatment Evaluation Form completed by participating providers for each patient included questions pertaining to type of FASTBRACES® bracket, treatment start and end date, number of visits during treatment, number of brackets used, number of wires used, types of issues (types: bracket, wire, tooth, patient, allergic, ingestion soft tissues, placement, performance, hard tissue), rating of patient understanding of treatment, patient overall comfort level, patient compliance, patient happiness with speed of treatment.

This data was compiled and analyzed using pivot tables in Microsoft Excel to assess trends in overall efficacy and safety of FASTBRACES® as well as to gain more nuanced insights on user experience.

Results

Patient details

The case series comprised seven patients who underwent orthodontic treatment using Orthoworld FASTBRACES® Orthodontic Brackets. The patients' ages ranged from 14 to 37 years, reflecting a diverse group of individuals with varying orthodontic needs. Each patient's treatment journey was documented and analyzed to assess treatment duration, number of adjustment visits, bracket and wire utilization, patient issues, overall comfort, compliance with treatment protocols, and understanding of treatment.

Orthodontic treatment experience analysis data for seen case studies

Treatment duration and adjustments

One of the key aspects analyzed in the seven case studies is the treatment duration and the number of adjustments required for each patient. The results indicate considerable variations in treatment duration, ranging from 120 to 304 days. Case ID 43 had the longest treatment duration (Figure 1), spanning 304 days, whereas Case ID 26 had the shortest treatment duration (Figure 2), requiring only 120 days. These variations may be attributed to the complexity of malocclusions, individual patient factors, and the effectiveness of treatment planning and execution (Table 1).

Figure 1 Case 43; (L) Underbite before treatment **(R)** after completion of treatment in 304 days.

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Figure 2 Case 26; (L) Open bite before treatment **(R)** after completion of treatment in 120 days.

Table 1 Experience analysis in Orthodontic treatments

Case ID #	*36*	*29*	*43*	*22*	*44*	*39*	*26*	**Mean avg**
Disease diagnosis	Crowding	Crossbite	Underbite	Spacing	Spacing	Overbite	Open Bite	
Patient age (year)	14	14	15	24	29	35	37	24
Treatment duration (days)	139.00	147.00	304.00	311.00	238.00	177.00	120.00	205.14
Number of adjustment visits	6.00	11.00	14.00	11.00	6.00	10.00	9.00	9.57
Number of brackets used	24.00	24.00	28.00	24.00	10.00	24.00	24.00	22.57
Number of wires used	2.00	4.00	3.00	3.00	1.00	1.00	4.00	2.57
Patient issues**	0.00	0.00	0.00	1.00	0.00	0.00	1.00	0.29
Patient overall comfort*	4.00	4.00	3.00	3.00	3.00	4.00	3.00	3.43
Patients compliance*	3.00	4.00	3.00	2.00	4.00	4.00	4.00	3.43
Patient happy with treatment speed**	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Quality of orthodontic treatment*	3.00	4.00	4.00	3.00	3.00	4.00	4.00	3.57
Patient understood treatment*	3.00	4.00	4.00	2.00	3.00	3.00	3.00	3.14
*Excellent = 4, Good = 3, Fair = 2, Poor = 1 ** No = 0;Yes = 1								

Additionally, the number of adjustment visits also varied among the case studies, ranging from 6 to 14. Case ID 43 necessitated the highest number of adjustments, while Case ID 26 required the least (Figure 1 & 2). The frequency of adjustments is crucial in orthodontic treatment as it allows clinicians to assess treatment progress, make necessary adjustments to the appliances, and ensure the alignment process is on track. The differences in adjustment visits among the cases reflect the diverse challenges and treatment requirements faced by individual patients. Furthermore, the selection and utilization of brackets and wires are influenced by the severity and complexity of malocclusions, as well as the treatment plan devised by the orthodontic practitioner. Patients with more severe malocclusions may require a higher number of brackets and wires to achieve optimal tooth movement and alignment.

Highlighting the importance of these variances in treatment duration, frequency of adjustment visits, and the application of brackets and wires underscores the importance for individualized treatment strategies in orthodontics. The distinct nature of each patient's case mandates a personalized treatment regimen designed to target their specific orthodontic requirements. Furthermore, consistent evaluation and monitoring during treatment play a pivotal role in ensuring the trajectory of progress, along with the ability to make necessary modifications towards successful outcomes.[22–24]

Bracket and wire utilization

The utilization of brackets and wires is a fundamental aspect of orthodontic treatment, as these components play a pivotal role in the repositioning of teeth and achieving proper alignment. The analysis of seven case studies reveals variations in the number of brackets and wires used, ranging from 10 to 28 brackets and 1 to 4 wires. Case ID 44 had the fewest brackets (Figure 3) and wires utilized, while Case ID 43 required the most (Figure 1). Case ID 44, requiring the fewest brackets and wires (Figure 3), indicates a less severe malocclusion and simpler treatment plan. Patients with minor dental misalignments may necessitate a smaller number of brackets and wires to achieve satisfactory results. Conversely, Case ID 43, which utilized the highest number of brackets and wires (Figure 1), likely had a more complicated malocclusion, necessitating a more extensive orthodontic treatment approach.

Figure 3 Case 44; (L) Spacing before treatment **(R)** after completion of treatment in 238 days.

Dentists and orthodontists carefully evaluate each patient's malocclusion, considering factors such as dental crowding, spacing, overbites, underbites, and midline discrepancies. Based on this assessment, they formulate a customized treatment plan, determining the appropriate number and placement of brackets and wires to facilitate optimal tooth movement and alignment. Precise bracket and wire placement are crucial in ensuring the effectiveness of treatment and preventing any potential complications that may arise during orthodontic therapy.

Patient issues and comfort

Another significant aspect analyzed in the case studies is the occurrence of patient issues during the orthodontic treatment process. The results show that most patients experienced minimal issues, with only one reported issue each (i.e., tooth issue) in Case ID 22 (Figure 4) and Case ID 26 (Figure 2). The low incidence of patient issues suggests that orthodontic treatment was generally well-tolerated and did not lead to substantial discomfort or complications.

Figure 4 Case 22; (L) Spacing before treatment **(R)** after completion of treatment in 311 days.

Furthermore, patients in all case studies reported a high level of comfort, with an average comfort score of 3.43 out of 4. This finding underscores the success of orthodontic treatment in minimizing patient discomfort and enhancing overall satisfaction. Advancements in orthodontic technology and treatment approaches, such as the utilization of low-friction brackets and efficient wire systems, may have contributed to the improved patient comfort reported in these case studies.

Comfort is a critical factor in determining patient compliance and treatment success. When patients experience minimal discomfort during orthodontic treatment, they are more likely to adhere to their treatment plan and maintain proper oral hygiene practices. High patient compliance is essential for achieving optimal treatment outcomes and ensuring that teeth move according to the desired treatment objectives. The positive patient experiences and high comfort levels reported in these case studies reflect the commitment of orthodontic practitioners to providing quality care and addressing patient needs.

Patient compliance and understanding of treatment

Patient compliance is a crucial factor in the success of orthodontic treatment. The analysis of seven case studies reveals variations in

patient compliance, with scores ranging from 2 to 4 on the compliance scale. A score of 4 indicates excellent compliance, while a score of 2 suggests fair compliance. The range of compliance levels suggests that some patients were highly cooperative and adhered closely to their treatment protocols (Case ID 29; Figure 5), while others may have encountered challenges in following the prescribed guidelines (Case ID 22; Figure 4).

Figure 5 Case 29; (L) Crossbite before treatment **(R)** after completion of treatment in 147 days.

Adherence to treatment protocols plays a significant role in achieving optimal treatment outcomes. Patients must diligently follow instructions regarding wearing elastics, maintaining oral hygiene, attending scheduled appointments, and avoiding certain foods that could hinder the progress of treatment. When patients are compliant with these guidelines, it enhances the effectiveness of orthodontic appliances in moving teeth into their desired positions and could reduce the treatment duration.

To improve patient compliance, orthodontic practitioners must prioritize effective communication and patient education. By providing clear information about the treatment plan, expected outcomes, and the importance of compliance, patients become active participants in their treatment journey. Regular communication addresses concerns and difficulties, fostering a supportive environment and motivating patients to follow protocols diligently. Understanding the treatment process is crucial for compliance, as patients with clear comprehension are more likely to adhere to recommendations. The analysis shows variations in patient understanding across cases (scores ranging from 2 to 4, representing fair understanding and excellent understanding, respectively), underscoring the need for comprehensive education to ensure informed and engaged patients throughout their orthodontic journey.

Quality of orthodontic treatment

The assessment of the quality of orthodontic treatment yielded scores ranging from 3 to 4, with an average score of 3.57. A score of 4 indicates excellent quality (Case ID 39; Figure 6), while a score of 3 represents good quality treatment (Case ID 36; Figure 7). The variations in scores among the cases suggest that the overall quality of orthodontic treatment was very satisfactory in the majority of cases. However, the slight variations in scores indicate the need for continuous improvement and individualized treatment approaches to ensure optimal treatment outcomes for each patient.

Orthodontic treatment outcomes are shaped by a multitude of elements, encompassing the proficiency of the clinician precision in placing brackets and wires, meticulous treatment planning, and the efficacy of treatment protocols. Patient cooperation further contributes to treatment quality. As each case holds its distinct attributes, orthodontic practitioners are tasked with customizing treatment strategies to cater to the precise requirements and objectives of every patient.[25–29]

Figure 6 Case 39; (L) Overjet/overbite before treatment **(R)** after completion of treatment in 177 days.

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Figure 7 Case 36; (L) Crowding before treatment **(R)** after completion of treatment in 139 days.

Discussion

Patient compliance with treatment protocols varied among the cases, with scores ranging from 2 to 4 on the compliance scale. The variability in patient compliance and understanding of treatment observed in this case series, with scores ranging from 2 to 4, highlights the critical role of patient education and communication in achieving successful orthodontic outcomes. Patients who better understand the treatment process and adhere to treatment protocols are more likely to experience favorable results. Therefore, orthodontic practitioners should prioritize clear communication with patients, providing them with comprehensive information about their treatment plans, expected outcomes, and the importance of compliance.

The differences in the number of brackets and wires used (range: 10 to 28) among the cases indicate that the severity and complexity of malocclusions play a significant role in determining the orthodontic appliance needs. More severe cases may require a higher number of brackets and wires to achieve optimal alignment. This finding underscores the individualized nature of orthodontic treatment and the importance of tailoring treatment plans to each patient's unique needs.

The low incidence of patient issues during orthodontic treatment is encouraging and suggests that FASTBRACES® treatment was well-tolerated by the majority of patients. The high level of patient comfort reported by the participants further supports the success of this treatment approach in minimizing patient discomfort and promoting satisfaction. The faster alignment achieved with FASTBRACES® may contribute to the enhanced comfort experienced by patients during their orthodontic journey. By minimizing the number of orthodontic adjustments, FASTBRACES® treatment facilitates improved oral hygiene practices, leading to better overall oral health outcomes. The reduced number of adjustments reduces the risk of plaque accumulation and gingival inflammation, contributing to better periodontal health during orthodontic treatment.

Moving forward, additional research is warranted to explore the underlying factors contributing to the observed differences between the metal and ceramic bracket groups. Investigating the mechanisms behind reported issues, such as tooth-related problems or soft-tissue issues, will provide valuable insights for refining treatment protocols and enhancing patient care. A deeper understanding of these issues will empower orthodontic practitioners to develop more effective strategies for managing complications and improving the overall experience and outcomes of orthodontic treatment. Moreover, researching the potential relationship between decreased treatment duration and clinician experience could offer valuable insights into optimizing orthodontic efficiency and effectiveness.

The innovative approach offered by FASTBRACES®, with its potential to reduce the number of orthodontic adjustments and improve oral hygiene practices, shows promise in the field of orthodontics. The absence of allergic reactions in both the metal and ceramic bracket groups confirms the quality and biocompatibility of the materials used in this study. This reinforces the importance of precise bracket and wire placement, underscoring the significant role of orthodontic practitioners' expertise and attention to detail throughout the treatment process.

While the case series offers valuable insights, it also has inherent limitations, including a lack of comparable outcomes and limited generalizability. Nevertheless, by specifically selecting patients with shorter treatment durations (i.e., 6-7 months compared to the average FASTBRACES® treatment duration of 12-14 months), the study effectively demonstrated FASTBRACES®' effectiveness in achieving favorable treatment outcomes promptly. The shorter treatment duration aligns with patient preferences for reduced treatment times, enhancing FASTBRACES®' appeal as an orthodontic treatment option. Additionally, the study showcased good patient satisfaction and compliance, with high levels of comfort, understanding of treatment, and satisfaction with treatment speed.

This case series provides valuable preliminary insights into the orthodontic treatment experience using Orthoworld FASTBRACES® Orthodontic Brackets. To establish the treatment's efficacy and safety more robustly, future research should consider larger sample sizes, randomization, control groups, long-term follow-up, and comprehensive outcome measures.

Conclusion

Overall, the patient details section provides valuable insights into the diverse group of patients who underwent orthodontic treatment using Orthoworld FASTBRACES® Orthodontic Brackets. The varying ages, treatment durations, and treatment experiences highlight the need for personalized and tailored treatment approaches to address individual patient needs and ensure optimal treatment outcomes. The analysis of patient compliance, understanding, bracket, and wire utilization, as well as patient comfort, serves as a foundation for further discussion and interpretation of the case series

data in this research study. The findings underscore the importance of patient education, individualized treatment planning, and clear communication to achieve successful outcomes. The results also support the potential benefits of FASTBRACES® treatment in terms of faster alignment, enhanced patient comfort, and improved oral hygiene practices. However, further research and larger-scale studies are warranted to better understand the factors influencing treatment success and to establish the long-term efficacy and safety of this innovative orthodontic approach.

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Conflicts of interest

The authors declare that there are no conflicts of interest.

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