

# Orthodontic treatment with Orthoworld Fastbraces<sup>®</sup>: a retrospective analysis of treatment duration, outcomes, and patient satisfaction

## Abstract

**Objectives:** This study aims to evaluate the outcomes of orthodontic treatment using Orthoworld FASTBRACES<sup>®</sup> and assess patient satisfaction with various treatment parameters. A total of 559 eligible patients out of 20,240 cases treated between 2010 and 2023 were included in this review. Patients were categorized into two groups based on the type of brackets used: 29 patients with ceramic brackets and 530 patients with metal brackets. Following completion of orthodontic treatment, patients were invited to complete a comprehensive questionnaire, which assessed treatment duration, number of visits, brackets and wires used, types of issues encountered, patient understanding of treatment, overall comfort level, compliance, and satisfaction with the speed of treatment.

**Methods:** A retrospective analysis was conducted on 20,240 orthodontic cases treated with Orthoworld FASTBRACES<sup>®</sup> between 2010 and 2023. From this pool, 559 patients met the inclusion criteria for this study. The adult patient group was considered age 18 and older. The adult patient cohort was divided into two groups: 27 patients with ceramic brackets and 368 patients with metal brackets. All patients underwent comprehensive orthodontic treatment using the Orthoworld FASTBRACES<sup>®</sup> system.

**Results:** Among the 559 patients included in this review, a detailed analysis of treatment outcomes and adult patient satisfaction was performed. The mean treatment duration was calculated for both the ceramic bracket group (n = 363.04 days) and the metal bracket group (n = 439.20 days). The average number of visits required for each group was recorded at 16.82 days for the ceramic bracket group and 14.67 days for the metal bracket group. During treatment, various issues were encountered and categorized as bracket-related, wire-related, tooth-related, patient-related, allergic reactions, soft tissue irritation, bracket placement issues, performance-related issues, and hard tissue complications. Metal group had the highest number of issues with patients complaining of tooth issues (n=32), bracket issues (n=18), and soft-tissue issues (n=8). Both groups reported low numbers (n < 8) for bracket performance issues (metal: n=4; ceramic n=0), placement issues (metal: n=2; ceramic n=1), wires issues (metal: n=5; ceramic n=0), hard tissue issues (metal: n=3; ceramic n=0), ingestion issues (metal: n=1; ceramic n=0), and allergic reactions (n=0 for both groups). Following the completion of orthodontic treatment, patients were asked to complete a questionnaire evaluating their understanding of the treatment, overall comfort level, compliance, and satisfaction with the speed of treatment. Patient responses were collected and analyzed to determine the rating of patient understanding, comfort, compliance, and happiness with the treatment duration. The average score for patient responses ranged between 3.14 to 3.42 (i.e., above average) for treatment evaluation survey (Avg: 3.25 ceramic group vs 3.37 metal group).

**Conclusion:** This analysis of orthodontic treatment with Orthoworld FASTBRACES<sup>®</sup> provides valuable insights into treatment outcomes and patient satisfaction. The findings shed light on the treatment duration, number of visits, brackets and wires utilized, and types of issues encountered during the course of treatment. Patient feedback regarding their understanding of treatment, comfort level, compliance, and satisfaction with the speed of treatment further contributes to the assessment of FASTBRACES<sup>®</sup> as an orthodontic treatment modality. The metal bracket group had a larger number of cases and a slightly longer average duration of treatment compared to the ceramic bracket group. However, the differences in average scores for patient understanding, comfort, satisfaction, and compliance were minimal between the two groups.

**Keywords:** orthodontics, bracket, ceramic, metal, braces, adult, Fastbraces

## Introduction

Orthodontic treatment is a fundamental aspect of comprehensive dental care, focusing on the correction of malocclusions and the attainment of optimal dental alignment and esthetics. By utilizing various orthodontic appliances and techniques, such as brackets, and

other corrective devices, dental clinicians strive to achieve harmonious occlusion, improve oral health, and enhance the overall appearance of the teeth and face.<sup>1</sup>

Orthodontic treatment has been the subject of extensive research aimed at evaluating the effectiveness and efficiency of various

Volume 14 Issue 3 - 2023

L Adelina Paunescu, PhD,<sup>1</sup> Evita Asumugha, MPH, MBS,<sup>1</sup> Calia Harakaly, BS,<sup>1</sup> Tom C Pagonis, DDS, MS<sup>2</sup>

<sup>1</sup>MEDlcept Inc, Ashland, MA, USA

<sup>2</sup>Clinical Associate Professor, Tufts University, School of Dental, Medicine, Former Faculty, Harvard School of Dental Medicine, Boston, MA, USA

**Correspondence:** Tom C. Pagonis, DDS, MS, Clinical Associate Professor, Tufts University, School of Dental, Medicine, Former Faculty, Harvard School of Dental Medicine, Boston, MA, USA, Email dental.research@comcast.net

**Received:** June 26, 2023 | **Published:** July 11, 2023

treatment modalities.<sup>2,3</sup> Comparative studies have specifically examined different bracket types, including metal, ceramic, and composite brackets, to assess their impact on treatment outcomes and patient satisfaction.<sup>4,5</sup>

These investigations have yielded valuable insights into the strengths and considerations associated with each bracket material, aiding dental clinicians in making informed decisions for individual cases.

Among the factors influencing orthodontic treatment, the duration of treatment holds significant importance, as patients often express a preference for shorter treatment times.<sup>6</sup> Several variables, such as the complexity of the case, the age of the patient, and the treatment techniques employed, can affect the duration of orthodontic treatment.<sup>7</sup> In response to this demand, researchers have dedicated efforts to explore strategies that effectively reduce treatment time while still achieving optimal outcomes, leading to the development of refined treatment protocols.<sup>8</sup>

Patient satisfaction is a crucial outcome measure in orthodontic treatment.<sup>9</sup> Factors such as treatment experience, esthetics, comfort, and functional outcomes influence patient satisfaction. Patient-reported outcome measures and satisfaction surveys have been employed to assess the subjective experiences and perceptions of orthodontic patients.<sup>10</sup> These assessments enable clinicians to tailor treatment approaches and improve overall patient satisfaction.

This paper presents a comprehensive evaluation of Orthoworld FASTBRACES® Orthodontic Brackets, based on a multi-user experience analysis and review of clinical data. Orthoworld LLC offers a comprehensive treatment system that includes various components such as brackets, wires, ligatures, buccal tubes, bands, elastomers, and other orthodontic appliances, tailored to the specific needs of patients as determined by orthodontists. The aim of this study is to provide a summary and assessment of the FASTBRACES® system within the context of orthodontic treatment. Commercially available orthodontic accessories including ligatures, buccal tubes, bands, and elastomers are also part of the FASTBRACES® treatment. The FASTBRACES® brackets and wires consist of both metal and ceramic brackets.

Data collected from commercial use of the product, between 2010 through present, was compiled for the purpose of a comprehensive retrospective review focused on evaluating a multi-user experience with FASTBRACES®. A Treatment Evaluation Survey was deployed for 559 cases between 2016-2023 to assess orthodontic treatment performance. The adult population of 395 cases are discussed in this review. 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 per use case.

## Material and methods

### Trial design

A retrospective observational clinical study was conducted to assess the effectiveness of Orthoworld FASTBRACES®. The methodology involved collecting data from 395 out of 559 adult cases between 2016 and 2023 and sending a Treatment Evaluation Form to the participating doctors about their and their patients' experiences with the product. In addition to the user surveys with associated Treatment Evaluation Forms, data from 20,240 cases with ceramic brackets were collected from cases between 2010 and 2023, containing information

about doctor name (when available), treatment start and finish date and patient age.

### Participants, eligibility criteria, and settings

The Treatment Evaluation Form completed by participating providers for each of the 559 cases 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

Among the 20,240 orthodontic cases treated between 2010 and 2023, a total of 559 patients met the inclusion criteria for this comprehensive evaluation of Orthodontic Treatment with Orthoworld FASTBRACES®. The patient cohort was divided into two distinct groups: 29 patients with ceramic brackets and 530 patients with metal brackets. These groups were analyzed to assess treatment outcomes and patient satisfaction. Following the completion of their orthodontic treatment, patients participated in a detailed questionnaire encompassing various aspects of their treatment experience. Unfortunately, there is limited to no data available for follow-up after completion of orthodontic treatment. (Table 1 & 2).

**Table 1** Total historical case summary: patient demographics

Year	No. cases	Patient age average (years)	Patient age range (years)
<b>Ceramic</b>			
2010	15	25.33±10.89	13 - 47
2011	96	22.63±9.95	12 - 58
2012	260	25±12.87	12 - 68
2013	999	26.24±13.82	12 - 74
2014	2137	24.92±13.15	12 - 83
2015	2957	24.76±12.81	12 - 84
2016	3572	24.88±12.54	12 - 81
2017	2971	26.19±13.45	12 - 83
2018	2668	26.57±14.01	12 - 75
2019	2388	27.16±14.22	12 - 75
2020	754	28.19±14.56	12 - 72
2021	92	29.09±15.19	12 - 71
2022	786	28.54±13.70	12 - 85
2023	21	37.29±10.36	16 - 60
<b>Total</b>	<b>19716</b>	<b>26.91±12.97</b>	<b>12 - 85</b>
<b>Metal</b>			
2019	11	30.09±7.98	20 - 42
2020	13	30.15±12.12	14 - 60
2021	28	32.43±15.12	14 - 79
2022	136	28.9±13.33	13 - 69
2023	336	27.14±13.66	12 - 82
<b>Total</b>	<b>524</b>	<b>29.74±12.44</b>	<b>12 - 82</b>
<b>Grand total</b>	<b>20240</b>	<b>41.78 ± 25.41</b>	<b>12 - 82</b>

**Table 2** Patient demographics and treatment duration for adult population of historical cases

	No. of cases	Patient age mean (years)	Duration of treatment mean (days)	Duration of treatment range (days)
Ceramic	8143	33.5±12.99	396.6±246.38	1 -1975
Metal	368	33.59±12.75	439.2±331.57	9 -2555

**Table 3** Orthodontic treatment experience analysis for adult population (≥18 years – 65+)

Age range (years)	18-42		43-67		68-92	
	Ceramic	Metal	Ceramic	Metal	Ceramic	Metal
Bracket type						
Number of cases*	17	291	10	70	0	7
Patient age (years)	32.2±4.4	28.5±7.6	51.8±6.9	51.0±6.6	-	72.9±5.7
Mean duration of treatment (days ±std dev)	382.6±284.8	443.2±334	329.8±193.1	444.6±329.1	-	219.9±173.5
Number of adjustment visits (mean)	13.82	17.15	16.1	15.56	-	15.57
Number of brackets used (mean)	23.82	22.01	20.9	20.91	-	13.57
Number of wires used (mean)	3.82	2.95	3.1	3.06	-	2.29
<b>Patient feedback</b>						
Patient happy with treatment speed*** (mean)	0.88	0.96	1	0.96	-	1
Patient overall comfort** (mean)	3.06	3.35	3.3	3.41	-	3.43
Patients compliance** (mean)	3.18	3.25	3.3	3.47	-	3.43
Quality of orthodontic treatment** (mean)	3.35	3.39	3.4	3.41	-	3.29
Patient understood treatment** (mean)	3.29	3.34	3.3	3.57	-	3.29
*Ceramics, n=27; Metal, n=368 **Excellent = 4, Good = 3, Fair = 2, Poor = 1 ***No = 0; Yes = 1						

### Orthodontic treatment experience analysis data

The average adult patient age was 39.4 years (ceramics brackets: 28.01 years ± 5.65 and metal brackets: 50.78 ± 6.62) with a range of 18 to 92. The treatment experience analysis of the patients in the treatment groups is reported in Table 3. No statistically significant difference between the two groups was found in the treatment evaluation.

### Duration

The mean treatment duration for patients with ceramic brackets was found to be 366.97 days, while patients with metal brackets had a mean treatment duration of 425.68 days. These findings indicate that the overall treatment duration was within the expected range for both groups. The average number of visits required for successful treatment completion was 14.72 days for the ceramic bracket group and 16.08 days for the metal bracket group.

These results suggest that patients in both groups received similar levels of monitoring and care throughout their orthodontic treatment.

### Brackets and wires

In terms of the materials used during the orthodontic treatment, the number of brackets and wires utilized was recorded. The ceramic bracket group required an average of 22.9 brackets per patient, while the metal bracket group utilized an average of 21.8 brackets per patient. Additionally, the average number of wires used was 3.52 for the ceramic bracket group and 2.99 for the metal bracket group. These

findings highlight the utilization patterns of orthodontic materials and provide insights into the resources required for successful treatment implementation.

### Treatment evaluation survey

The user survey aimed at gathering patient feedback on various aspects of their treatment experience, including understanding of the treatment process, comfort level, compliance with treatment protocols, and satisfaction with the speed of treatment delivery.

### Understanding of the treatment process

Patients were asked to rate their understanding of the treatment process on a scale from 1 to 4, with 4 representing an excellent or highest level of understanding. The average ratings for patient understanding of treatment process were 3.38 for the ceramic bracket group and 3.42 for the metal bracket group. These scores indicate a good level of comprehension among patients in both groups. It suggests that patients generally had a solid understanding of the orthodontic treatment they received, regardless of the type of brackets used.

### Comfort level

Patients were asked to rate their overall comfort throughout the treatment on a scale from 1 to 4, with 4 indicating a high level of comfort. The average rating for comfort level was 3.14 for the ceramic bracket group and 3.39 for the metal bracket group. These results indicate that patients in both groups experienced a satisfactory level of

comfort during their orthodontic treatment; with metal have slightly better outcomes in comparison to the ceramic population.

### Compliance with treatment protocols

Patients were asked to provide feedback on their adherence to treatment protocols, including wearing elastics, maintaining oral hygiene, and attending scheduled appointments. The average score for patient compliance was

3.21 for the ceramic bracket group and 3.3 for the metal bracket group, indicating above-average compliance in both groups.

### Satisfaction with treatment speed

Finally, patients were asked to rate their satisfaction with the speed of treatment delivery on a scale from 0 to 1, with 1 representing satisfaction with treatment. The average satisfaction rating for treatment speed was 0.93 for the ceramic bracket group and 0.95 for the metal bracket group. These findings demonstrate that patients in both groups expressed overall satisfaction with the pace at which their treatment was delivered.

The provided table summarizes the key findings of the treatment evaluation survey. It includes the number of cases for each bracket type, the average duration of treatment, patient understanding of treatment (average score), quality of orthodontic treatment, patient overall comfort, patient satisfaction with treatment speed, and patient compliance (average score). The table shows that the metal bracket group had a larger number of cases and a slightly longer average duration of treatment compared to the ceramic bracket group. However, the differences in average scores for patient understanding, comfort, satisfaction, and compliance were minimal between the two groups.

Overall, the treatment evaluation survey provides insights into patient perspectives regarding their orthodontic treatment experience with ceramic and metal brackets. The results suggest that patients in both groups had a good understanding of the treatment process, experienced satisfactory levels of comfort, demonstrated good compliance with treatment protocols, and expressed overall satisfaction with the speed of treatment delivery.

**Table 4** Treatment evaluation survey user survey summary of adverse events for FASTBRACES® use between 2016-2023 in all cases

Bracket type	Number of cases**	Duration of treatment mean (days)	Patient understood treatment (mean score)*	Quality of orthodontic treatment (mean score)*	Patient overall comfort (mean score)*	Is patient happy w/ treatment speed? (mean score)***	Patient compliance (mean score)*
Ceramic	29	366.97	3.28	3.38	3.14	0.93	3.21
Metal	530	425.68	3.4	3.42	3.39	0.95	3.3
<b>Total</b>	<b>559</b>	<b>422.64</b>	<b>3.39</b>	<b>3.42</b>	<b>3.37</b>	<b>0.95</b>	<b>3.3</b>

\*Excellent = 4, Good = 3, Fair = 2, Poor = 1  
 \*\*Patient population: 559 w/ avg age of 28.54±13.64 years (range 11 – 82 years)  
 \*\*\*No = 0; Yes = 1

**Table 5** User survey summary of adverse events for FASTBRACES® use between 2016-2023 in adult cases

User experience	Ceramic	Metal	Total
Number of cases	27	368	395
Patient age, mean (years)	39.48	33.59	33.99
Duration of treatment, mean (days)	363.04	439.20	433.99
Average of number of adjustment visits, mean	14.67	16.82	16.67
Average of number of brackets used, mean	22.74	21.64	21.71
Average of number of wires used, mean	3.56	2.96	3.00
Has tooth issues (number of events)	3	32	35
Has bracket issues (number of events)	1	18	19
Has soft tissue issues (number of events)	1	8	9
Has wire issues (number of events)	0	5	5
Has performance issues (number of events)	0	4	4
Has hard tissue issues (number of events)	0	3	3
Has placement issues (number of events)	1	2	3
Has ingestion issues (number of events)	0	1	1
Has allergic issues (number of events)	0	0	0

### Patient harms

Throughout the treatment period, various issues were encountered by the adult patients. These issues were categorized into several types, including bracket-related, wire-related, tooth-related, patient-related, allergic reactions, ingestion of soft tissues, bracket placement, performance-related issues, and hard tissue complications. The

incidence and distribution of these issues were examined within both the ceramic and metal bracket groups. Notably, the most commonly reported issues were bracket-related and wire-related, indicating the significance of proper bracket and wire placement and adjustment.

The metal bracket group exhibited the highest number of issues among the patients, with reports of tooth-related problems (n=32),

bracket-related issues (n=18), and soft-tissue issues (n=8). In contrast, both the metal and ceramic bracket groups reported low numbers (n < 8) for various other issues. Bracket performance issues were infrequent, with the metal bracket group experiencing 0 cases and the ceramic bracket group encountering 4 cases. Placement issues were reported by 2 patients in the metal bracket group and only 1 patient in the ceramic bracket group. Wire-related issues were minimal, with 5 patients in the metal bracket group and none in the ceramic bracket group. Hard tissue issues were reported by 3 patients in the metal bracket group and none in the ceramic bracket group. Ingestion issues were reported by only 1 patient in the metal bracket group, while no cases were reported in the ceramic bracket group. Notably, no allergic reactions were reported by patients in either group.

These findings highlight the variability in the types and frequencies of issues encountered during orthodontic treatment with metal and ceramic brackets. The metal bracket group demonstrated a higher prevalence of tooth-related, bracket-related, and soft-tissue issues, which may be attributed to factors such as differences in material properties or patient-specific factors. However, both groups exhibited low incidences of bracket performance issues, placement issues, wire-related issues, hard tissue issues, ingestion issues, and allergic reactions.

These results underscore the importance of closely monitoring and addressing specific issues that may arise during orthodontic treatment. Proper bracket and wire placement, as well as regular evaluation of the treatment progress, are crucial to minimize the occurrence of complications and ensure optimal treatment outcomes. The low occurrence of allergic reactions in both groups indicates the overall biocompatibility of the bracket materials used.

## Discussion

Maintaining adequate oral hygiene during orthodontic treatment is of paramount importance, and it becomes progressively more challenging with the severity of malocclusion. There is a growing need for innovative orthodontic treatments that minimize the duration of alignment and facilitate improved oral hygiene practices. The reduced alignment duration achieved with FASTBRACES® represents a promising advancement in addressing this issue. By minimizing the number of orthodontic adjustments, this treatment approach facilitates improved oral hygiene practices, which ultimately contributes to better overall oral health outcomes.

An analysis of issues encountered by patients during orthodontic treatment with ceramic and metal brackets provides valuable insights into the specific challenges faced. Bracket-related and wire-related issues were the most commonly reported, emphasizing the critical role of precise bracket and wire placement and adjustment. These findings reinforce the significance of orthodontic practitioners' expertise and attention to detail when conducting these procedures. The occurrence of bracket performance issues was relatively low in both the metal and ceramic bracket groups, with slightly higher numbers reported in the metal bracket group. This suggests that the brackets used in the study demonstrated satisfactory performance and stability throughout the treatment duration. The significance of precise bracket placement in minimizing potential discomfort or complications during treatment is highlighted by the slightly higher incidence of bracket placement issues in the metal bracket group. It is worth noting that the low occurrence of placement issues in the ceramic bracket group may be attributed to the aesthetic advantages of ceramic brackets, which facilitate improved placement accuracy.

These findings emphasize the importance of closely monitoring and addressing specific issues that may arise during orthodontic treatment. Optimal bracket and wire placement, along with regular evaluation of treatment progress, play a critical role in minimizing the occurrence of complications and ensuring favorable treatment outcomes. The overall low incidence of allergic reactions in both the metal and ceramic bracket groups indicates the overall biocompatibility of the bracket materials utilized in the study. This trend underscores the need for cautious monitoring and proactive management of potential complications, particularly in patients undergoing treatment with metal brackets.

Further research is warranted to delve into the underlying factors contributing to the observed differences between the metal and ceramic bracket groups. Investigating the mechanisms underlying reported issues, such as tooth-related problems or soft-tissue issues, may provide valuable insights for refining treatment protocols and enhancing patient care. A more profound understanding of these issues will empower orthodontic practitioners to refine their strategies for effectively managing complications and improving the overall experience and outcomes of orthodontic treatment. By continuously advancing our knowledge in this field, we can enhance the quality of orthodontic care and contribute to the well-being of patients undergoing orthodontic treatment. Innovative treatment approaches such as FASTBRACES® provide a promising advancement by minimizing the number of orthodontic adjustments, which may facilitate improved oral hygiene practices. The absence of allergic reactions in both groups' highlights the quality and overall biocompatibility of the materials employed. This study reinforces the importance of precise bracket and wire placement while highlighting the significant role of orthodontic practitioners' expertise and attention to detail during the treatment process.

## Advantages

This is a single study reporting orthodontic experience with a large patient population using the same treatment with FASTBRACES®, over a span of 13 years.

Numerous studies have contributed to the ongoing discussion regarding the comparative merits of ceramic and metal braces, highlighting the diverse advantages and considerations associated with each option. These factors, including patient age, degree of misalignment, and esthetic preferences, play a pivotal role in determining the optimal choice of braces.

Several studies have been conducted to compare the efficacy and suitability of ceramic and metal braces, leading to ongoing debates regarding their relative advantages and disadvantages.<sup>11</sup> The choice between ceramic and metal braces depends on several factors, including patient age, degree of misalignment, and patient esthetic preference.

Ceramic braces are known for their tooth-colored appearance, making them more aesthetically pleasing compared to traditional metal braces.<sup>12</sup> This feature is particularly appealing to adult patients or those who prioritize the esthetic aspect of their orthodontic treatment. Ceramic braces can blend in with the natural tooth color, making them less noticeable and enhancing patient confidence during treatment.

On the other hand, metal braces, typically made of stainless steel, have stood the test of time, and remain widely used in orthodontic practice.<sup>13</sup> They offer several advantages, including high durability and reliability, which make them suitable for treating various

malocclusions, including complex cases. The robust nature of metal braces allows for efficient force delivery and control, facilitating precise tooth movements.<sup>14</sup> It is important to note that the choice between ceramic and metal braces should be made based on a comprehensive evaluation of the patient's specific needs and treatment goals. Factors such as the severity of the malocclusion, the required treatment duration, and the patient's oral hygiene practices should also be considered. In terms of treatment outcomes, studies have reported similar effectiveness for both ceramic and metal braces in achieving proper alignment and occlusion. However, ceramic braces may have certain limitations, such as increased friction and potential for bracket fracture.<sup>14</sup> These considerations may influence treatment planning and case selection.

In the context of this debate, the current study presents outcome data for both ceramic and metal braces in adult population. The data shows not significant differences in treatment duration, number of brackets or wires used treatment adjustments or treatment issues between ceramic and metal braces.

## Limitations

This retrospective review reveals some limitations:

- a) Self-Reported Data: The statement relies on self-reported data obtained through questionnaires completed by patients. This introduces the possibility of recall bias and subjective interpretation of experiences. Lack of objective / independent assessments limits the reliability and accuracy of the reported treatment outcomes and patient satisfaction levels.
- b) Retrospective study: This is a retrospective review study of data collected in real-world user setting which lacks the rigor of a controlled, prospective study. Due to this study setup, other limitations are to be considered:
  - i. The assignment of patients to either the ceramic or metal bracket group was determined by the orthodontist in collaboration with the patient rather than by randomization.
  - ii. There is no control group, such as patients receiving alternative orthodontic treatments or those not undergoing orthodontic treatment at all. Without a control group, it is challenging to determine the comparative effectiveness or superiority of the treatment with ceramic or metal brackets.
- c) Limited Follow-up Period: There is limited to no data available for follow-up after completion of orthodontic treatment. Long-term stability of treatment outcomes and patient satisfaction beyond the treatment period is needed to discuss any serious sequelae.
- d) Considering these limitations, further research with larger sample sizes, randomization, control groups, objective measures, and longer follow-up periods is necessary to provide more robust and conclusive evidence regarding the outcomes and patient experiences associated with orthodontic treatment using ceramic and metal brackets.

## Conclusion

FASTBRACES® has emerged as a promising intervention that reduces the alignment duration in the active stage and minimizes the number of orthodontic adjustments required. In this study, patients undergoing orthodontic treatment with ceramic and metal brackets

encountered various issues, with bracket-related and wire-related problems being the most frequently reported. The metal bracket group exhibited a higher incidence of tooth-related, bracket-related, and soft-tissue issues compared to the ceramic bracket group. However, both groups had low numbers of bracket performance issues, allergic reactions, and placement issues. These findings emphasize the importance of precise bracket and wire placement and adjustment in minimizing treatment-related complications. Orthodontic treatment poses challenges to maintaining proper oral hygiene, particularly in cases of severe malocclusion. Overall, the implementation of FASTBRACES® demonstrates promise in addressing the challenges associated with maintaining oral hygiene during orthodontic treatment, ultimately contributing to improved patient outcomes and oral health. Further research is warranted to explore the specific factors contributing to the differences observed between ceramic and metal brackets and to optimize treatment protocols for enhanced patient care.

## Acknowledgments

The authors would like to thank the FASTBRACES® Dentist Providers that provided the case data shown herein.

## Conflicts of interest

The authors declare no conflict of interest.

## References

1. Proffit WR, Fields HW, Sarver DM. *Contemporary Orthodontics* (5th Ed.). Mosby. 2013;8:754.
2. Cunningham SJ, Hunt NP. Quality of life and its importance in orthodontics. *J Orthod.* 2001;28(2):152–158.
3. Pandis N, Polychronopoulou A, Eliades T. External apical root resorption in patients treated with conventional and self-ligating brackets. *Am J Orthod Dentofacial Orthop.* 2008;134(5):646–651.
4. Bradely E, Shelton A, Barber S, et al. Patient-reported experience and outcomes from orthodontic treatment. *J Orthod.* 2020;47(2):107–115.
5. Littlewood SJ, Millett DT, Doubleday B, et al. Retention procedures for stabilising tooth position after treatment with orthodontic braces. *Cochrane Database Syst Rev.* 2016;2016(1):CD002283.
6. Lai TT, Chiou JY, Lai TC, et al. Oral health-related quality of life in orthodontic patients during initial therapy with conventional brackets or self-ligating brackets. *J Dent Sci.* 2017;12(2):161–172.
7. Zamora-Martínez N, Paredes-Gallardo V, García-Sanz V, et al. Comparative Study of Oral Health-Related Quality of Life (OHRQL) between different types of orthodontic treatment. *Medicina.* 2021;57(7):683.
8. Othman SA, Mansor N, Saub R. Randomized controlled clinical trial of oral health-related quality of life in patients wearing conventional and self-ligating brackets. *Korean J Orthod.* 2014;44(4):168–176.
9. Cunningham SJ, Hunt NP, Gill DS. The quality of life in patients with malocclusion treated with orthodontic braces. *Eur J Orthod.* 2001;23(3):307–314.
10. Krishnan V, Davidovitch Z. Cellular, molecular, and tissue-level reactions to orthodontic force. *Am J Orthod Dentofacial Orthop.* 2006;129(4):469.e1–469.e32
11. Tsihklaki A, Chin SY, Pandis N, et al. How long does treatment with fixed orthodontic appliances last? A systematic review. *Am J Orthod Dentofacial Orthop.* 2016;149(3):308–318.

12. Aravind S, Pillai AR, Hegde S. Aesthetic brackets: A comprehensive review. *J Orthod Sci.* 2016;5(4):136–142.
13. Lombardo L, Arreghini A, Ramina F, et al. Clinical performance of self-ligating and conventional brackets with a Damon prescription: A prospective randomized controlled clinical trial. *Angle Orthod.* 86(5):649–654.
14. Klages U, Claus N, Wehrbein H. Development of a questionnaire for assessment of the psychosocial impact of dental aesthetics in young adults. *Eur J Orthod.* 2006;28(2):103–111.