ORIGINAL RESEARCH

Evaluation of Bracket Failure among children Undergoing Orthodontic Therapy

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ABSTRACT

Background: This study was conducted for the evaluation of bracket failure among children undergoing orthodontic therapy. **Material and methods:** In this study, a total of 100 subjects were involved. The study included subjects who underwent fixed appliance therapy of maxillary and mandibular arches using metal brackets. The patients aged between 12 years and 25 years. The subjects were divided into two groups based on their ages. The first group consisted of subjects aging between 12-18 years while the second group consisted of subjects aged between 18-25 years. One hundred patients had two thousand brackets affixed to their enamel surfaces. Before being etched with 37% phosphoric acid for 20 seconds, the enamel surfaces of the incisors, canines, and premolars were polished with fluoride-free pumice using a rubber polishing cup. **Results:** In the present study, a total of 100 patients having an age range of 12 to 25 years with a total of 2000 bonded attachments between them for their fixed orthodontic treatment were studied. Out of 2000 brackets bonded, 400 bracket failures were reported. The incidence of bracket failure in this study was found to be 20%. The incidence of anterior bracket failure was 2.5%, and posterior bracket failure was 17.5%. **Conclusion:** It was found that the incidence of bracket failure was found to be 20%.

Keywords: bracket failure, orthodontic therapy, malocclusion

INTRODUCTION

Malocclusion is defined as an irregularity of the teeth or a mal-relationship of the dental arches beyond the range of what is accepted as normal.[1] Malocclusions can be managed effectively by the orthodontist with the use of various appliances that may be removable, fixed, or functional, which also results in the correction and improvement of dentofacial esthetics, function, and speech. To obtain a satisfactory result following fixed orthodontic treatment, the adhesion of brackets to the teeth as handles for applying force is absolutely essential.

One of the most common clinical problems encountered by an orthodontist, which can be frustrating during orthodontic treatment, is the accidental breakage of brackets. Clinical experience strongly suggests that some patients are more prone than others to bracket failures. Bracket failure increases chair-side time and inevitably compromises treatment time/results. Identification of factors contributing to treatment overruns is, therefore, extremely important to success in orthodontic practice.[2]

Hence, this study was conducted for Evaluation of Bracket Failure among children Undergoing Orthodontic Therapy.

MATERIAL AND METHODS

In this study, a total of 100 subjects were involved. The study included subjects who underwent fixed appliance therapy of maxillary and mandibular arches using metal brackets. The patients aged between 12 years and 25 years. The subjects were divided into two groups based on their ages. The first group consisted of subjects aging between 12-18 years while the second group consisted of subjects aged between 18-25 years.One hundred patients had two thousand brackets affixed to their enamel surfaces. Before being etched with 37% phosphoric acid for 20 seconds, the enamel surfaces of the incisors, canines, and premolars were polished with fluoride-free pumice using a rubber polishing cup. Compressed air was used to dry the enamel surfaces after a 60-second

thorough washing. The surface of the tooth was primed. After firmly positioning the bracket on the tooth, composite was applied to the bracket base. After removing any excess composite from the tooth surface using a pointed probe, the material was cured for 40 seconds. Initial archwires typically made of 0.014-inch Nickel-Titanium (NiTi) wire, then gradually thicker NiTi wires, and lastly stainless-steel wires measuring 0.019 × 0.025-inch. To avoid unintended bracket failure due to excessive force application, the NiTi wire was deflected to a maximum of 2 mm during first ligation in cases of crowded teeth. As soon as a patient saw a bond failure, they were instructed to go to the clinic.

RESULTS

Table 1: prevalence of failure of orthodontic brackets.

Fate of orthodontic brackets	Number of subjects
Failure	400
Success	1600
Total	2000

In the present study, a total of 100 patients having an age range of 12 to 25 years with a total of 2000 bonded attachments between them for their fixed orthodontic treatment were studied. Out of 2000 brackets bonded, 400 bracket failures were reported. The incidence of bracket failure in this study was found to be 20%. The incidence of anterior bracket failure was 2.5%, and posterior bracket failure was 17.5%.

DISCUSSION

The World Health Organization (WHO) in 1948 defined “Health as a state of complete physical, mental and social well-being and not only the absence of disease or infirmity”. Quality of life (QoL) was described as “patients’ attitudes of their condition in being in the context of culture and value ways in which they exist and concerning their goals, expectations, standards, and concerns” [3]. Quality of life (QoL) can be affected by poor oral health [4] and assessing Oral Health-Related Quality of Life (OHRQoL) helps professionals to clarify the role of oral health status on the overall quality of life [5].

Orthodontic treatment is disparate from most of the distinct medical interventions by that it aims to correct malocclusion from an arbitrary norm [6]. Besides enhancement of dentofacial aesthetics, orthodontic treatment restores occlusal function. It also improves the psychosocial well-being, which, in turn, results in the betterment of oral health-related quality of life in particular and overall health related quality of life in general [7,8].

Hence, this study was conducted for Evaluation of Bracket Failure among children Undergoing Orthodontic Therapy.

Jakavičė R et al [9] evaluated the frequency of bracket bond failure and find out risk factors. A total of 101 patients with an age range of 11–56 years were included in this retrospective study and treated for a mean period of 30.2 months. Inclusion criteria were: males and females with permanent dentition and completed orthodontic treatment in both fully bonded dental arches. Risk factors were calculated using binary logistic regression analysis. The overall bracket failure rate was 14.65%. The bracket failure rate was significantly higher in the younger patients’ group ($p = 0.003$). In most cases, patients experienced bracket failures in the first month of the treatment. Most of the bracket bond failures occurred on the left lower first molar (29.1%) and were twice as common in the lower dental arch (66.98%). Patients with increased overbite had an increased likelihood of bracket loss ($p = 0.042$). Class II malocclusion increased the relative risk of bracket failure, while Class III decreased the rate of bracket failure, but the difference was not statistically significant ($p = 0.093$).The bracket bond failure rate was higher in younger patients than in older patients. Brackets placed on mandibular molars and premolars had the highest failure rate. Class II was associated with an increased bracket failure rate. Increased overbite statistically significantly increases bracket failure rate.

CONCLUSION

It was found that the incidence of bracket failure was found to be 20%.

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