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Bracket failure in orthodontic practice: Perception of understanding from orthodontist and patient point-of view a questionnaire based survey

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Abstract

Background: Bracket failure during orthodontic treatment is a prevalent issue that affects the treatment duration, cost, and patient compliance. Orthodontic treatment often involves fixed appliances where brackets play a crucial role. Bracket failure can occur due to various factors, affecting treatment efficacy and patient satisfaction.

Methodology: A questionnaire-based survey was conducted among 100 practicing orthodontists and 100 orthodontic patients in India. The questionnaires, distributed via email and social media, included 15 questions each and were designed to gather insights on bracket failure from both groups.

Results: The orthodontist survey revealed that 81.1% preferred suction and cotton rolls for isolation during the bonding procedure, and Trans bond XT conventional primer was used by 57.1%. High intensity LED was the preferred curing method for 85.7% of respondents. Bracket failures were reported more frequently in the lower arch (72.4%) and the posterior region (79.3%). Premolar teeth had the highest incidence of debonding. Patients' responses indicated that bracket failure was often noticed while chewing hard foods, and 89.2% did not attribute the failures to physical trauma. The majority of patients brushed once a day, and only 56.8% drank soft drinks occasionally.

Conclusion: Effective strategies to enhance patient cooperation, especially among adolescents, are essential to minimize bracket failures and optimize orthodontic treatment outcomes. Both orthodontists and patients need to collaborate closely to achieve successful treatment plans.

Keywords: Responses, conventional, often

Introduction

Bracket failure is a common problem encountered issue during orthodontic treatment, impacting treatment duration, expenses, patient compliance, and attitudes toward orthodontic care. Therefore, it is important to understand the perception of bracket failure both from orthodontist and orthodontic patient's point of view.

Orthodontics involves treatment approaches aimed at correcting dentoalveolar malocclusions to restore both dentofacial aesthetics and function. The most widely accepted approach to achieve these objectives is through the use of fixed appliances. In fixed appliance orthodontics, brackets are bonded to apply forces from archwires and other auxiliaries to the dentition^[1].

The premature debonding of brackets during fixed appliance treatment can be a significant inconvenience for both the patient and the clinician. This issue can arise due to factors such as poor patient compliance, subpar clinical bonding techniques, or the use of inadequate bonding materials^[2].

Several factors influence the rate of orthodontic bracket bond failure, including bracket material, bonding material, the arch (maxillary or mandibular), the region (anterior or posterior), and the patient's age. Studies are carried out to evaluate the bond failure rate using different bonding materials, techniques, and curing procedures, leading to varying conclusions.

³Therefore, in this questionnaire study assessment and understanding the perception regarding bracket failure from orthodontist and patient's point of view will be studied.

Aim

The objective of this questionnaire survey is to evaluate the perception and understanding of bracket failure from both the orthodontist's and the patient's perspectives.

Methodology

The questionnaire study consists of sample size of approximately 200 which will consist of 100 practicing orthodontists of (Group A) and 100 orthodontic patients of (Group B) of both the genders respectively in the questionnaire-based survey. Questions are modelled in English language for the orthodontist and orthodontic patients. The questionnaire was created on Google Forms, and the link was then circulated to the participants via personal message and various orthodontists Telegram & WhatsApp groups consisting of approximately 160 orthodontists from all over India. The study assessed various variables related to bracket failure, and the results were analyzed based on the available data.

Settings and Design: The study is conducted among Indian Population with a time period of one month. Two separate self-designed questionnaire forms for orthodontist and orthodontic patients consisting of 15 questions with multiple choice or short answers. The question are formulated and is developed and circulated via email and social media platforms amongst orthodontist and orthodontic patient.

Need for study: To understand the orthodontist and orthodontic patients perception regarding bracket failure which is a common problem in orthodontic practice.

Sample Selection

- Inclusion criteria compromised only registered orthodontists in India (that included practicing consultants, clinicians, and academicians) and patients undergoing orthodontic treatment (of both the genders with no age limits).
- Exclusion criteria included General dentist, non-orthodontist and patient who are not undergoing any orthodontic treatment.

Statistical Analysis: Quantitative variables, including age, hemoglobin levels, iron status, and others, will be analyzed using descriptive statistics like mean and standard deviation. Categorical or qualitative variables, such as co-morbid conditions, gender, and socioeconomic status, will be represented by frequency and percentage.

Results

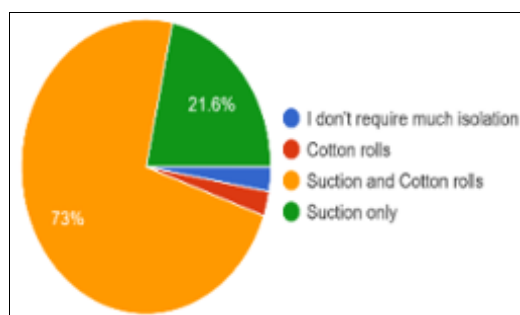
Approximately 100 responses were received in the orthodontist questionnaire form in which 81.1% orthodontist preferred suction and cotton rolls as the form of isolation in bonding procedure. 57.1% trans bond XT conventional primer, 39.3% trans bond plus self-etching primer were preferred. To cure the primer 42.9% cured for 10 sec, 25% cured for 1 sec, 14.3% cured for 20sec 17.9% did not cure. For curing method 85.7% used high intensity LED and 14.3% used Quartz Tungsten halogen and lights.

Effect of etchant concentration on bracket failure 89.7% stated yes and 10.3% stated no. To cure the composite 37.9% cured for 5sec, 17.2% cured for 10sec and 20 sec respectively and 27.6% cured for 20 sec. Bracket debond occurred more in lower arch 72.4% than upper arch 27.6%. Bracket debond occur more in posterior region 79.3% than anterior region 20.7%. Premolar tooth is mostly debonded whereas canines were least debonded.

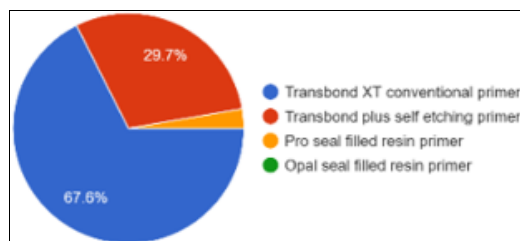
In less than 6 months period 69% of time bracket failure more mostly reported .51.7% of round NiTi wire and 27.6% stainless steel wire and 20.7% rectangular NiTi wires were seen in bracket failure. Failure of brackets in skeletal vertical relationship were seen in 89.7% of deep bite and 10.3% in open bite patients. 12-15 years of age group were seen with most bracket failure. 51.7% of stainless steel brackets and 48.3% ceramics brackets were seen in bracket failure. Frequency of bracket failure occurred more in fluorosed teeth 86.2% than normal teeth 13.8%.

In patients questionnaire form approximately 100 responses were received. Male to female ratio were 1:1 with 70.3% preferred vegetarian diet and 24% non -vegetarian diet. Patients did not use mouth wash on regular basis. Majority of patients brushed their teeth once a day around for 1-2 minutes. Patient realized that their bracket was broken on chewing hard foods and while eating. Majority of patients 89.2% stated that bracket failure was not due to physical trauma. 83.8% patient tried debonding their bracket. 56.8% claimed that bonding can be done in single setting whereas 43.2% patient did not agree for the same. Around 40.5% patient uses horizontal brushing technique whereas 13.5% used circular technique. 56.8% of patients drank soft drinks occasionally and majority of them did not floss daily.

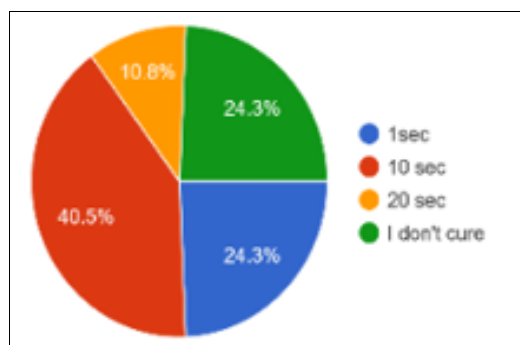
Graph: Results statistics according to orthodontist point of view



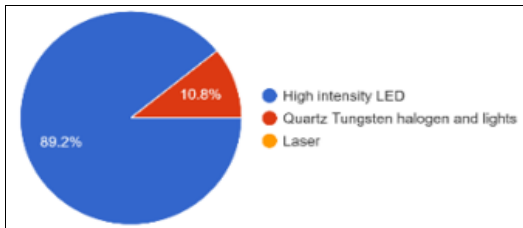
Graph 1: What type of isolation types do you prefer for procedure of bonding



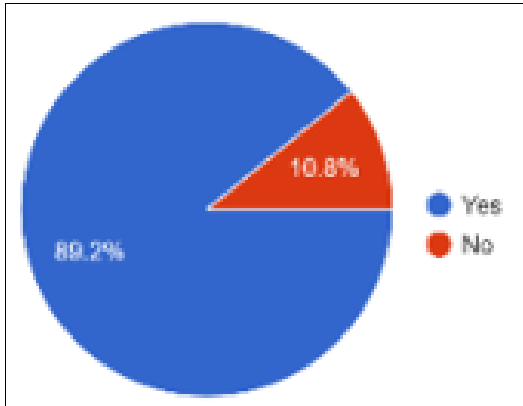
Graph 2: What type of primer do you prefer



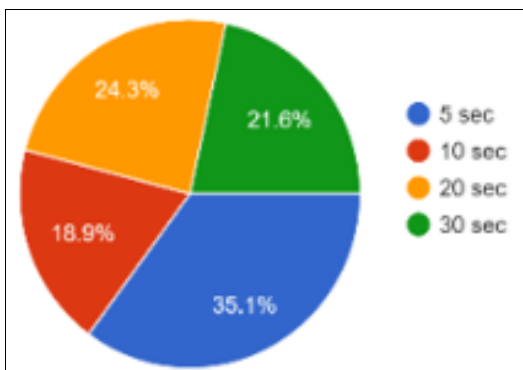
Graph 3: For how much time do you cure the primer?



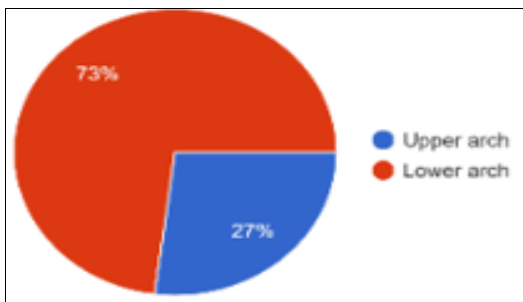
Graph 4: What method of curing do you prefer?



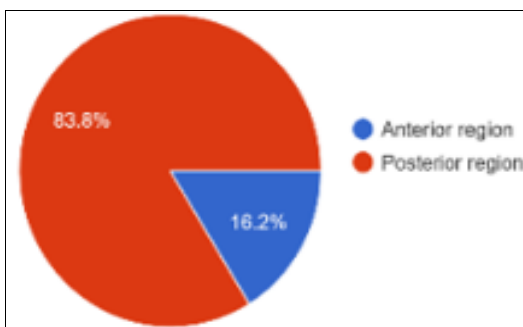
Graph 5: Is there any effect of etchant concentration on bracket failure?



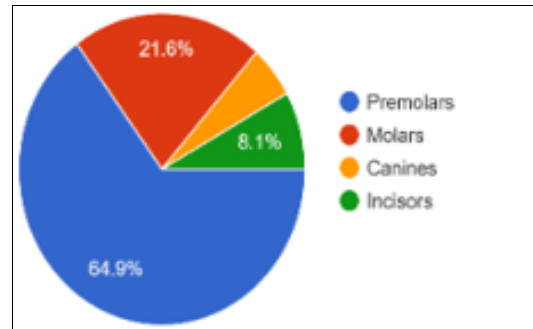
Graph 6: How much time do you cure the composite



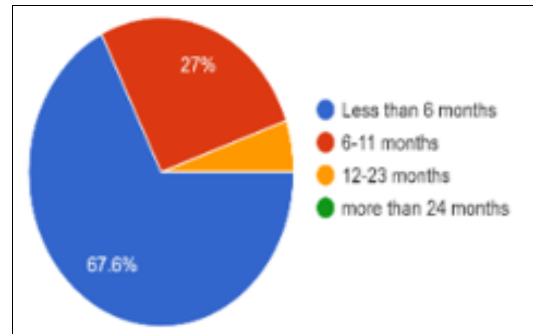
Graph 7: Do brackets debond more in the upper arch or lower arch?



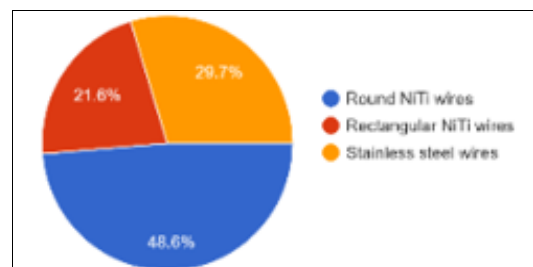
Graph 8: Do brackets debond more in anterior or posterior region?



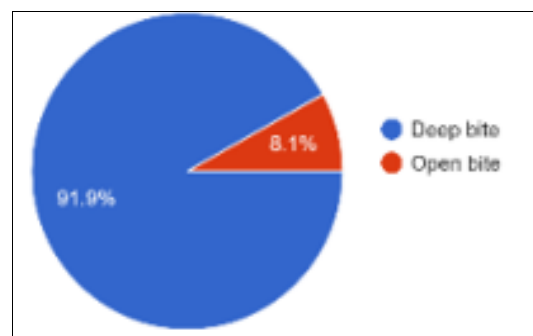
Graph 9: Which tooth bracket is mostly debonded?



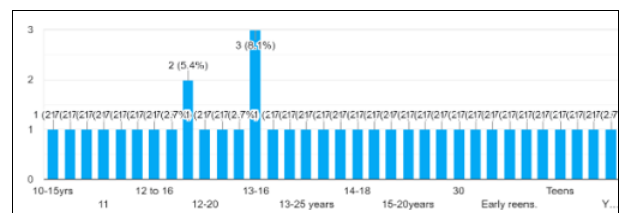
Graph 10: In which period of treatment bracket failure is mostly reported?



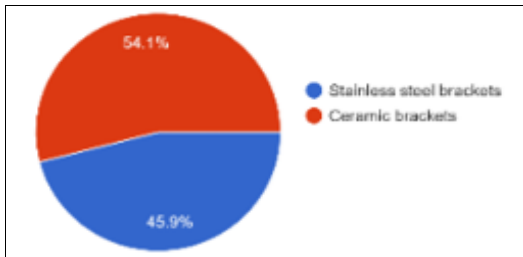
Graph 11: Failure of brackets are seen with which wire?



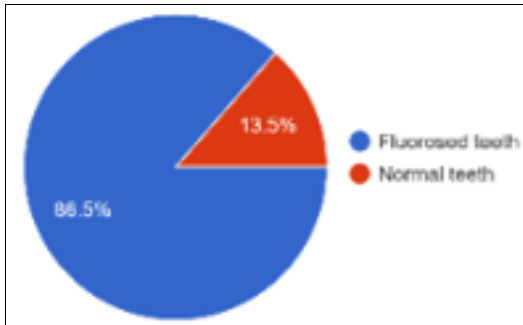
Graph 12: Failure of brackets are seen more in which skeletal vertical relationship?



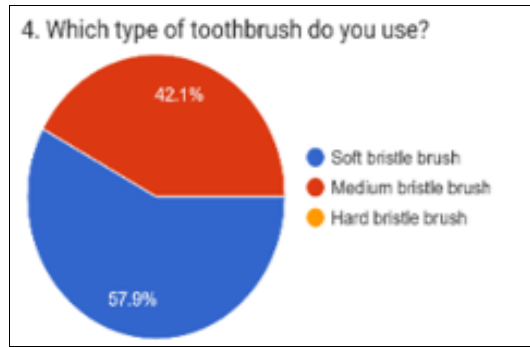
Graph 13: More bracket failure is seen in which group of age?



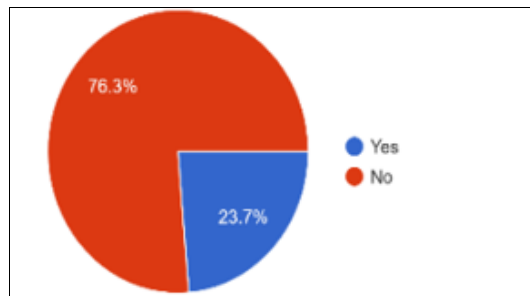
Graph 14: Bracket failure is seen more with which bracket?



Graph 15: Frequency of bracket failure in which type of teeth is more?

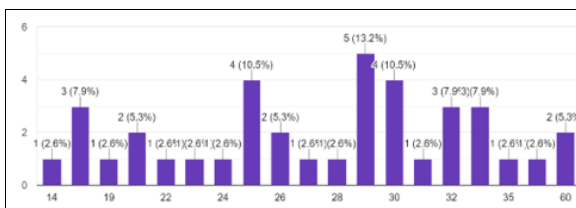


Graph 4: Which type of toothbrush do you use?

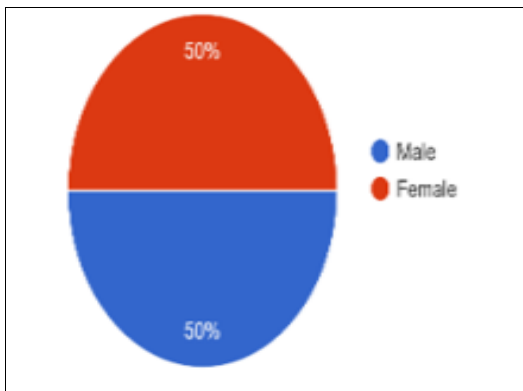


Graph 5: Do you use mouth wash on a regular basis?

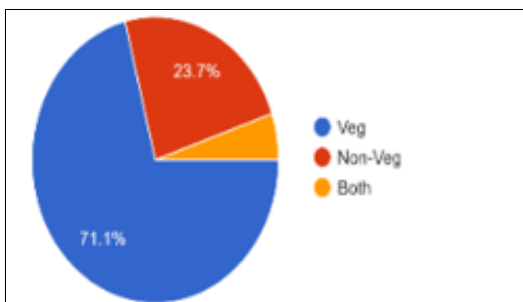
Graph 2: Results statistics according to patient's point of view:



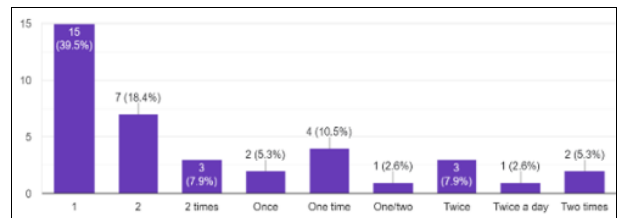
Graph 1: What is your age?



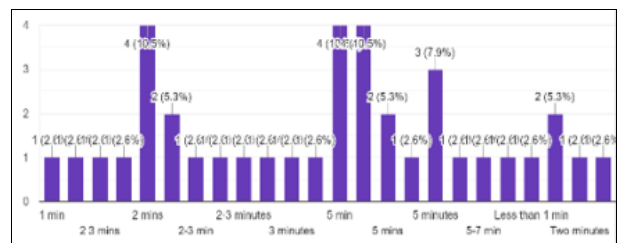
Graph 2: Male are female?



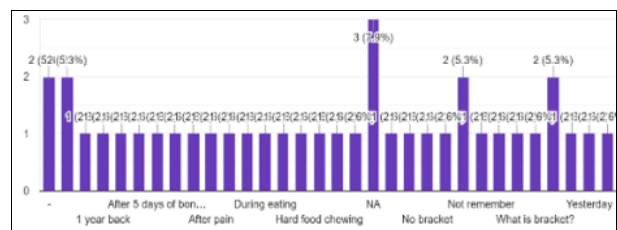
Graph 3: Which type of diet do you have on a regular basis?



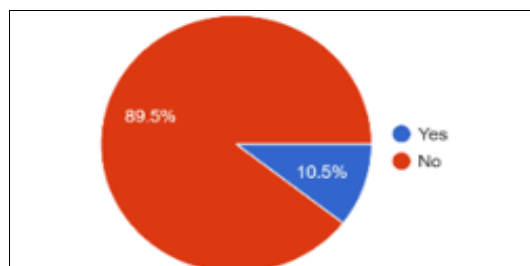
Graph 6: How many times do you brush in a day?



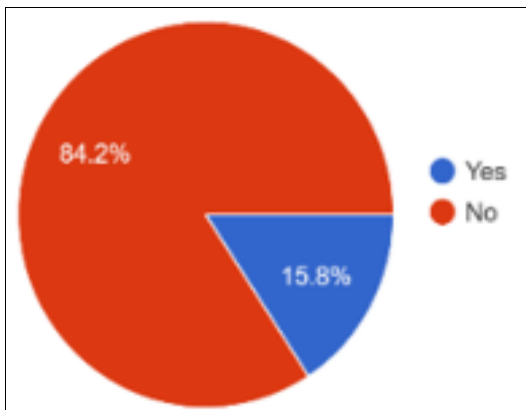
Graph 7: For how much time do you brush?



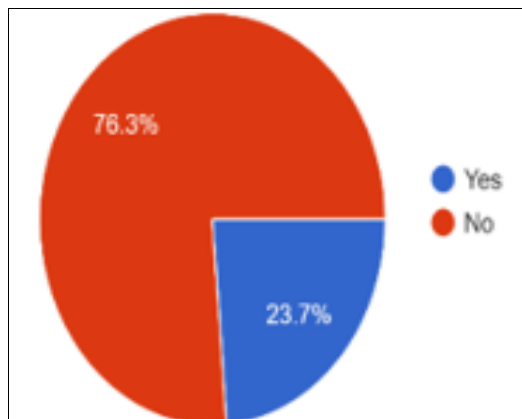
Graph 8: When did you first realize that the bracket was broken?



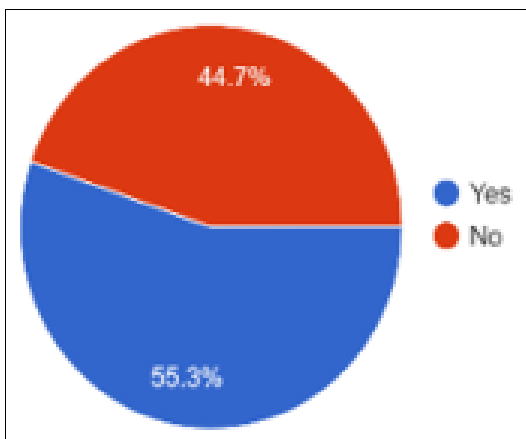
Graph 9: Is bracket failure due to any physical trauma?



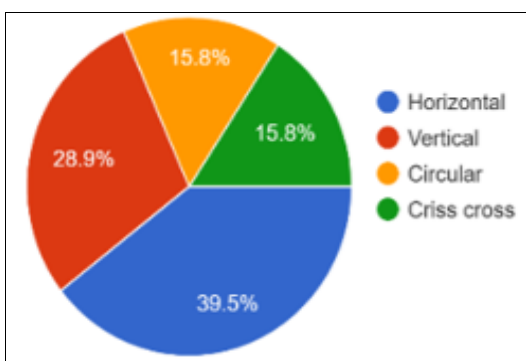
Graph 10: Have you yourself tried debonding the bracket?



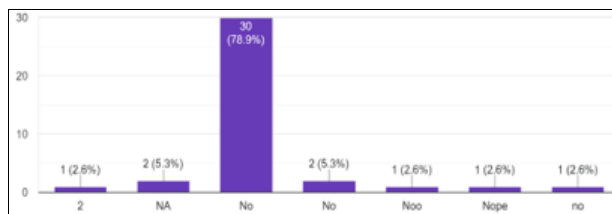
Graph 15: Do you floss daily?



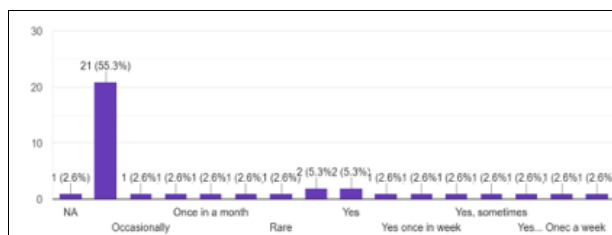
Graph 11: Is bonding done in one sitting?



Graph 12: Which type of brushing technique do you use?



Graph 13: Are you a smoker, if yes then how many times do you smoke in a day



Graph 14: Do you drink soft drinks? If yes what is the frequency?

Discussion

The questionnaire is given to the orthodontist and orthodontic patient which was simple and easy to understand male and female responded equally with ratio 1:1. According to the orthodontist point of view for isolation techniques most of the orthodontist preferred suction and cotton roles. Trans bond XT conventional primer were preferred whereas to cure the primer. For curing method majority 85.7% used high intensity LED and 14.3% used Quartz Tungsten halogen and lights. Effect of etchant concentration on bracket failure 89.7% stated yes and 10.3% stated no. To cure the composite most of the orthodontist 37.9% cured for 5sec, 17.2% cured for 10sec and 20 sec respectively and 27.6% cured for 20 sec. Bracket deboned occurred more in lower arch than upper arch and more often in posterior region than anterior region. In less than 6 months period of the time 69% of time bracket failure more mostly reported .51.7% of round NiTi wire and 20.7% rectangular NiTi wires were seen in bracket failure. Failure of brackets in skeletal vertical relationship were seen in 89.7% of deep bite and 10.3% in open bite patients.

12-15 years of age group were seen with most bracket failure. 51.7% of stainless steel brackets and 48.3% ceramics brackets were seen most bracket failure. Frequency of bracket failure occurred more in fluorosed teeth than normal teeth.

The literature indicates bracket failure rates ranging from 1.57% to 55.6% and may vary depending on factors such as age, gender, specific tooth, side and location within the arch, and skeletal class. Aikins and Ututu conducted a similar study, reporting an incidence of 17.0%, which was lower than the findings of Moninuola *et al.* conducted in South West Nigeria [4].

According to patients questionnaire forms patient realised that their bracket was broken on chewing hard foods and while eating. Majority of patients stated that bracket failure was not due to physical trauma. 83.8% patient tried debonding their bracket. 56.8% claimed that bonding can be done in single setting whereas 43.2% patient did not agree for the same. Around 40.5% patients uses horizontal brushing technique whereas 13.5% used circular technique. 56.8% of patients drank soft drinks occasionally and majority of them did not floss daily.

Identifying the demographic characteristics of patients who frequently experience bracket breakage, as well as the most commonly affected arches and teeth, could assist orthodontists in proactively preventing this issue. Hence, this study observed patients with factors such time, brushing technique, food habits etc. which were analyzed with bracket failure. In general, taking into account the areas and teeth more prone to breakage and failure, the practitioner can

meticulously conduct the bonding procedure in these regions, ensuring minimal contamination with saliva and positioning the bracket without interference from occlusion^[5].

Conclusion

Therefore, strategies to motivate patients, particularly adolescents, should be employed to enhance their cooperation and optimize orthodontic treatment so that both the orthodontist and the patient can successfully plan and treat the orthodontic treatment.

Limitations

The study only evaluated data over a one-month period. It is possible that changes occurring beyond this time frame could differ from the reported findings.

Conflict of Interest

Not available

Financial Support

Not available

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