Archives of Dental Research 2022;12(1):29–32

Content available at: https://www.ipinnovative.com/open-access-journals

Archives of Dental Research

Journal homepage: https://www.adr.org.in/

Original Research Article

Changes in clinical periodontal parameters after removal of fixed orthodontic appliances

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ARTICLE INFO

Article history:
Received 25-06-2022
Accepted 09-07-2022
Available online 28-07-2022

Keywords:
Periodontal
Probing
Debonding
Interproximal

ABSTRACT

Introduction: The placement of orthodontic appliances influences plaque growth and maturation. Significant differences in biofilm formation and periodontal reaction between different bracket types and between bonded teeth compared with control teeth have been reported, however, have reported significant attachment loss during orthodontic treatment.
In patients with a history of periodontitis resulting in displaced teeth, possible orthodontic tooth movements include changes in alignment, space redistribution, and intrusion.
Aim: To see the changes in clinical periodontal parameters after removal of fixed orthodontic appliances
Materials and Methods: After debonding of braket at dental clinic and before final polishing, probing depth (PD), plaque index (PI), gingival index (GI) and bleeding on probing (BOP) were assessed on the first molars and central incisors of both arches.
Result: Probing depth decreased in the right maxillary first molar. Plaque index and gingival index also got deceased. Bleeding on Probing reduced significantly.
Conclusion: Buccal probing depth returned to < 3 mm in the first month and interproximal depth in the second month. The mean gingival index was 0.5 after 2 months. Bleeding on probing in half of the teeth was negative after the first month and in other half in the second month.

1. Introduction

The placement of orthodontic bands and brackets influences plaque growth and maturation (Lee et al., 2005; Gomes et al., 2007; van Gastel et al., 2008). Significant differences in biofilm formation and periodontal reaction between different bracket types and between bonded teeth compared with control teeth have been reported (van Gastel et al., 2007).

Most studies on gingival changes after bracket placement suggest only reversible periodontal changes (Thomson, 2002; Gomes et al., 2007). Others, however, have reported significant attachment loss during orthodontic treatment (Janson et al., 2003).

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https://doi.org/10.18231/j.adr.2022.006

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The placement of orthodontic appliances influences plaque growth and maturation.[1] Significant differences in biofilm formation and periodontal reaction between different bracket types and between bonded teeth compared with control teeth have been reported.[2] Most studies on gingival changes after bracket placement suggest only reversible periodontal changes.[3] Others, however, have reported significant attachment loss during orthodontic treatment.[4]

In patients with a history of periodontitis resulting in displaced teeth, possible orthodontic tooth movements include changes in alignment, space redistribution, and intrusion.[5] The primary aim, before orthodontic intervention might start, is to stabilize the periodontal condition. Bone loss alters the position of the tooth's center of rotation and the force required to achieve the movement; however, the orthodontist can use reduced or increased force moments to avoid excessive alveolar bone loss.[5] Therefore in this prospective study, we assessed periodontal conditions of patients undergoing fixed orthodontic treatment on the day of debonding and 1, 2 and 3 months after debonding and up to 6 months for subjects in which these parameters did not return to normal after 3 months.

2. Materials and Methods

For this prospective study, samples were collected from patients receiving treatment in Dental Clinic, who were in the final phase of comprehensive orthodontic treatment and were ready for debonding. The inclusion criteria for the participants were as follows: No history of systemic diseases, no smoking, no extensive restorations, plaque index < 20%, no history of periodontal diseases before orthodontic treatment, no history of antibiotic use during and 2 months before the start of the study, no calculus on experimental teeth, no pockets > 5 mm, fixed orthodontic appliances in both arches and oral hygiene instructions before orthodontic commencement.

After debonding and before final polishing, probing depth (PD), plaque index (PI), gingival index (GI) and bleeding on probing (BOP) were assessed on the first molars and central incisors of both arches.

Williams periodontal probe was used for assessing probing depth which is the distance from the free gingiva to the depth of the gingival sulcus.[6]

The probing depth was measured at 4 points around the tooth (mesial, buccal, distal and lingual). Bleeding on probing (BOP) was measured 15 seconds after the insertion of probe into the gingival sulcus. For probing, a standardized pressure of 25g was used to eliminate operator bias. The following scores were assigned to each tooth: 0: No bleeding; 1: Bleeding on probing.

Considering the measurements of the variables, repeated-measures statistical techniques were used for the analysis of data. Based on data available from previous studies, the sample size was estimated at 24. Twenty-four patients with a mean age of 18.86 ± 4.64 years and an age range of 13-30 years were selected.

3. Results

3.1. Probing depth

In the right maxillary first molars probing depth decreased. A significant decrease in mesial probing depth on the left side was seen. Post hoc Tukey test showed a significant decrease in mesial probing depth from the first month (T2) and for distal and buccal probing depth from the second month (T3). Figure 1 shows comparison of probing depths in maxillary central incisors at different time intervals. For mandibular first molars there was a significant decrease from the first month (T2) on the distal and buccal surfaces but from second month (T3) in the mesial aspect.

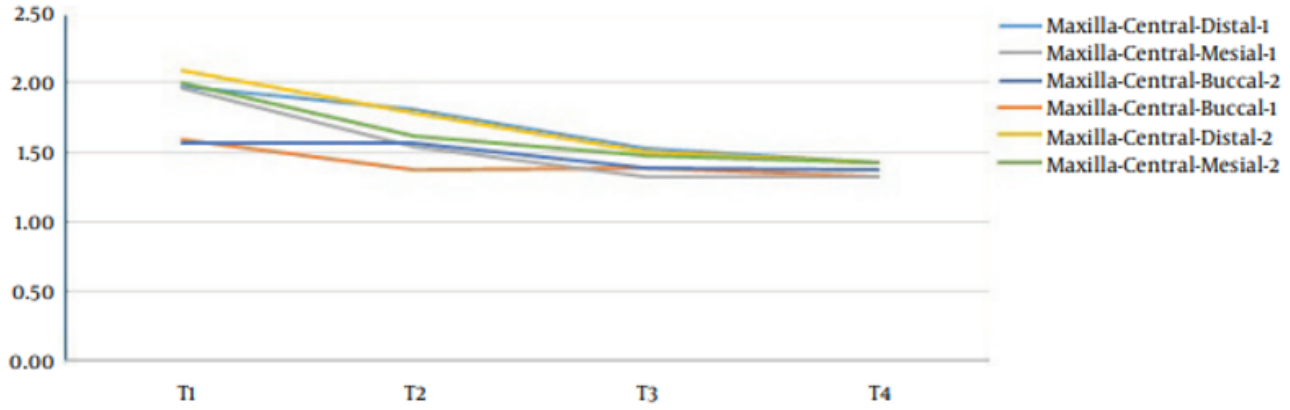

Figure 1: Comparison of probing depth in maxillary central teeth.

3.2. Gingival index

Post hoc Tukey test showed that for all the experimental teeth gingival index decreased significantly ($P < 0.05$) from the second month.

3.3. Bleeding on probing

Bleeding on probing decreased from T1 to T4. Post hoc Tukey test showed that BOP decreased significantly in lower incisors, upper first molars and left upper incisors from the first month (T2) and in the lower first molars and upper right incisors from the second month (T3).

3.4. Plaque index

According to the results, PI decreased from T1 to T4.

4. Discussion

There is still much doubt about permanent effects of orthodontic treatment on the periodontium in previous studies. The results of the present study support the recovery of periodontal parameters 1 to 2 months after treatment.

In 2014, Ghijselings et al. investigated long-term changes in microbiology and clinical periodontal variations after orthodontic treatment. They assessed microbiology, probing depth, bleeding on probing and sulcular fluid flow at baseline (T1), after debonding (T2) and 2 years after treatment. They concluded that orthodontic treatment increases bacterial load and gingival inflammation. A 2-years follow-up showed that gingiva returned to pretreatment status. These results are consistent with the present study although its third follow-up is much longer.[7]

Bollen investigated the effects of orthodontic treatment on periodontal health in a systematic review.[8,9] Because of lack of evidence, they were unable to report any decisive conclusions. The articles did not have favorable follow-up periods, sampling and proper comparison between the groups. In addition, it is suggested that more teeth as samples and more parameters like periodontal microbiology and sulcular fluid be checked. It is also better to match the samples in terms of the retainer type that is used after debonding because fixed retainers, for example, have been criticized for their potential to compromise the periodontal status, due to accumulation of plaque and calculus along the retainer because oral hygiene maintenance is difficult with them for patients.[10]

5. Conclusions

1. Buccal probing depth returned to < 3 mm in the first month and interproximal depth in the second month.
2. The mean gingival index was 0.5 after 2 months.
3. Bleeding on probing in half of the teeth was negative after the first month and in other half in the second month.

6. Source of Funding

None.

7. Conflicts of Interest

None.

References

1. Lee S. Prevalence of putative periodontopathogens in subgingival dental plaques from gingivitis lesions in Korean orthodontic patients. *J Microbiol*. 2005;43(3):260–5.
2. Van Gastel JL, Quirynen M, Teughels W, Coucke W, Carels C. Influence of bracket design on microbial and periodontal parameters in vivo. *J Clin Periodontol*. 2007;34(5):423–31. doi:10.1111/j.1600-051X.2007.01070.x.
3. Thomson W. Orthodontic treatment outcomes in the long term: findings from a longitudinal study of New Zealanders. *Angle Orthod*. 2002;72(5):449–55. doi:10.1043/0003-3219(2002)072<0449:OTOITL>2.0.CO;2.

4. Jansen J, Pilot T, Corba N. Histologic evaluation of probe penetration during clinical assessment of periodontal attachment levels. An investigation of experimentally induced periodontal lesions in beagle dogs. *J Clin Periodontol*. 1981;8(2):98–106. doi:10.1111/j.1600-051x.1981.tb02349.x.
5. Willmot D. Orthodontic treatment and the compromised periodontal patient. *Eur J Dent*. 2008;2(1):1–2.
6. Newman MG, Takei H, Klokkevold PR, Carranza FA. Carranza's clinical periodontology. 11th Edn. Elsevier Health Sciences; 2011.
7. Ghijselings E, Coucke W, Verdonck A, Teughels W, Quirynen M, Pauwels M. Long-term changes in microbiology and clinical periodontal variables after completion of fixed orthodontic appliances. *Orthod Craniofac Res*. 2014;17(1):49–59.
8. Bollen AM. Effects of malocclusions and orthodontics on periodontal health: Evidence from a systematic review. *J Dent Educ*. 2008;72(8):912–8.
9. Zachrisson BU, Zachrisson S. Gingival condition associated with partial orthodontic treatment. *Acta Odontol Scand*. 1972;30(1):127–36.
10. Artun J. Caries and periodontal reactions associated with long-term use of different types of bonded lingual retainers. *Am J Orthod*. 1984;86(2):112–8.

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Cite this article: Raina S, Raaj V, Raina R, Mallik M, Raj N, Toshi. Changes in clinical periodontal parameters after removal of fixed orthodontic appliances. *Arch Dent Res* 2022;12(1):29-32.