Research Article

Comparison of oral hygiene and gingival health response in patients wearing two types of orthodontic retainers

Sunayna Chowdhary[1], Ravindra Kumar Jain[1], M. P. Santhosh Kumar[2]*

ABSTRACT

Background: The use of retainers either bonded to the lingual/palatal tooth or a removable type after completion of orthodontic treatment is a common practice that can affect gingival health. **Objective:** The aim of the present study was to compare the oral hygiene and gingival health response in patients wearing Begg's removable retainers and lingual bonded retainers. **Methods:** A total of 5 patients wearing Begg's removable retainers and 7 patients wearing lingual bonded (fixed) retainers were followed up for the gingival response over a period of 3 months from a baseline time of debonding and placement of the retainers. Gingival response was measured based on modified gingival index. **Results:** Mild gingivitis was more prevalent on the lingual interdental region in fixed lingual retainers than removable retainers. However, the magnitude of the inflammatory response was not significantly high. **Conclusion:** According to this study, the clinical observation of an increased tendency for calculus formation around fixed retainers was confirmed. However, a comparable limited gingival inflammation was found in the presence of both the types of retainers.

KEY WORDS: Gingival health, Lingual bonded retainer, Oral hygiene, Removable retainers

INTRODUCTION

Orthodontists tend to recommend the long-term use of retainers for enhanced stability, which may require years or even decades of retainer wear. When removable retainers are used, clinicians have to rely on patients' discipline and long-term compliance. Oral hygiene, however, will not be complicated by this kind of appliance. The introduction of bonding techniques enabled the construction of permanent interdental wire connections as retention device. As these retainers are placed "invisibly" on the lingual tooth surfaces, patients' acceptance is evident and compliance with the orthodontic retention therapy is high.[1-4] The continuing presence of the retention wires, however, creates areas that are difficult to keep clean, thus favoring plaque formation and food impaction.[5] This situation may lead to the development of carious lesions, favor the formation of calculus, and induce gingival inflammation and periodontal disease.

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Periodontal destruction is induced by the deleterious effects of inflammatory mediators that appear as a result of bacterial plaque buildup around the tooth. With fixed retention periods become longer, it is important to evaluate the possible effects of long-term fixed retention on the surrounding tissues.

Meanwhile, deficient oral hygiene in orthodontic patients appears to be a key factor in the development of white spot lesions, dental caries, and gingival inflammation due to the presence of dental plaque accumulation.[6] In the presence of insufficient dental hygiene, orthodontic treatment may lead to the transposition of the supragingival dental plaque subgingivally, resulting in infrabony pocket formation.[7,8] The aim of the present study was to compare the oral hygiene and gingival health response in patients wearing Begg's removable retainers and lingual bonded retainers.

MATERIALS AND METHODS

A total of 12 patients (age range from 18 to 27 years) were selected for this study. This prospective study

[1]Department of Orthodontics and Craniofacial Orthopaedics, Saveetha Dental College, Saveetha University, Chennai, Tamil Nadu, India, [2]Department of Oral and Maxillofacial Surgery, Saveetha Dental College, Saveetha University, Chennai, Tamil Nadu, India

***Corresponding author:** Dr. M. P. Santhosh Kumar, Saveetha Dental College, Saveetha University, 162, Poonamallee High Road, Velappanchavadi, Chennai – 600 077, Tamil Nadu, India. Phone: +91-9994892022.
E-mail: santhoshsurgeon@gmail.com

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consisted of two experimental groups. Group 1 ($n = 5$) consisted of patients wearing removable Begg's retainer and Group 2 ($n = 7$) wearing lingual bonded (fixed) retainer. At the end of active orthodontic treatment, standard procedures for adhesive removal, polishing, and prophylaxis were performed. For the lingual bonded retainers, care was taken not to leave any bonding substance in contact with gingival tissues. All removable retainers had a labial arch embedded in an acrylic plate. At the time of retainer insertion, oral hygiene instructions were given. The patients were instructed to brush 2 times a day. In order not to influence measurements, disinfecting or fluoride-containing mouth rinsing solutions could not be applied. The daily use of wooden toothpicks for interdental hygiene was expected from patients with fixed retainers, whereas patients wearing removable retainers used dental floss.

All measurements were taken in the maxilla and mandible from canine to canine just before debonding (baseline) and at 1 month and 3 months. The same clinician scored the lingual, interdental, and buccal tooth sites.

Modified Gingival Index (MGI)

The MGI permits a non-invasive evaluation of early and subtle visual changes in the severity and extent of gingival inflammation. It is scored as follows: Absence of inflammation (0), part of gingival unit mild inflammation (1), complete gingival unit mild inflammation (2), moderate inflammation (3), and severe inflammation (4).

For each of the two study groups (fixed or removable retainer), mean values at baseline, 1 month, and 3 months were tabulated and the results were obtained.

RESULTS

The scores obtained from the MGI were tabulated, and descriptive statistics was performed.

Mild gingivitis was more prevalent in all the patients on the lingual interdental region in fixed lingual retainers, whereas in removable retainers, gingivitis if present ($n = 3$) was more prevalent in the buccal interdental region. The results obtained are shown in Figure 1.

DISCUSSION

The results of this study show that the prolonged use of lingual bonded retainers may promote gingivitis to a mild degree, whereas in the case of patients wearing removable retainers, there was variability in the presence of gingivitis. This variability in the presence of gingivitis in patients wearing removable retainers could have been influenced by the variation

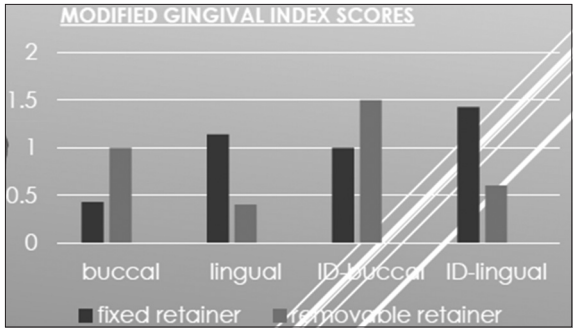

Figure 1: Modified gingival index scores for both the groups

in the patient's adherence to carry out the oral hygiene instructions.

The use of lingual fixed retainers in the mandibular arch offers the advantage of a lack of occlusal interferences and the necessity for bonding the wire in the proximity of free gingiva. On the other hand, bonding of this type of retainer in the maxillary arch is often complex since the opposing mandibular incisors occlude with the wire or adhesive, whereas gingival orientation of the wire to avoid premature contacts may promote gingival reactions.[9-11]

Continuous bands of plaque were rarely recorded. Rather commonly, spots of plaque have been noticed at the cervical margin. This non-ideal situation of oral hygiene remained until the 3-month follow-up. It could be considered acceptable because the local gingival condition showed no real inflammation.

The lingual plaque condition in both the groups did not improve after debonding. This could be explained by the lack of direct view on those surfaces, which makes oral hygiene more difficult and seemingly less necessary.[12-14] The presence of the fixed wires was accompanied by a rather small but there was a non-significant increase in plaque accumulation on the lingual surfaces. Until the 3-month follow-up, the measured plaque levels had not caused any significant gingival inflammation. This is in accordance with the results of Artun and Zachrisson in which there were no significant differences in gingival inflammation nor accumulation of plaque and calculus after 4 months with fixed or removable retainers.[4] The deposit of calculus was nearly non-existent on the buccal tooth surfaces. For the lingual sites, this applied for both kinds of retainers.[15]

The most likely explanation for the enhancement in gingival health in patients wearing removable retainers is the generally higher oral hygiene level associated with improvement in tooth-brushing accessibility after appliance removal. The obvious explanation for the discrepancy between the calculus registrations is that coronal scaling was performed at the time of the removal of orthodontic appliances.

CONCLUSION

A comparable limited gingival inflammation was found in the presence of both types of retainers. The clinical observation of an increased tendency of calculus formation around fixed retainers was confirmed. However, this difference was already present before the placement of the fixed retainer. If a professional plaque and calculus removal accompanied by a session on motivation and oral hygiene instruction is repeated every 6 months, it is likely that the periodontal health should not be compromised by the presence of bonded lingual wires.

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