

Comparison of periodontal parameters after the use of orthodontic multi-stranded wire retainers and modified retainers

Marlice Azoia Lukiantchuki**, Roberto Massayuki Hayacibara***, Adilson Luiz Ramos****

Abstract

Objective: The objective of the present study was to compare two types of fixed orthodontic retainers (a multi-stranded wire retainer and a modified retainer) in relation to established periodontal parameters. The multi-stranded wire retainer is commonly used, and the modified retainer has bends to enable free access of dental floss to interproximal areas.

Methods: For this cross-over study, 12 volunteers were selected and used the following retainers for six months: (A) a multi-stranded wire retainer and (B) a modified retainer. Both retainers were fixed to all anterior lower teeth. After this experimental period, the following evaluations were made: Dental Plaque Index, Gingival Index, Dental Calculus Index and Retainer Wire Calculus Index. The volunteers also responded to a questionnaire about the use, comfort and hygiene of the retainers. **Results:** It was observed that the plaque index and the gingival index were higher on the lingual surface ($p < 0.05$) for the modified retainer. Furthermore, the calculus index was statistically higher ($p < 0.05$) for the lingual and proximal surfaces when using the modified retainer. The retainer wire calculus index values were also significantly higher ($p < 0.05$) for the modified retainer. In the questionnaire, 58% of the volunteers considered the modified retainer to be less comfortable and 54% of them preferred the multi-stranded wire retainer. **Conclusion:** From the results obtained, it could be concluded that the multi-stranded wire retainer showed better results than the modified retainer according to the periodontal parameters evaluated, as well as providing greater comfort and being the retainer preferred by the volunteers.

Keywords: Orthodontic retainers. Gingival index. Plaque index. Calculus index.

How to cite this article: Lukiantchuki MA, Hayacibara RM, Ramos AL. Comparison of periodontal parameters after the use of orthodontic multi-stranded wire retainers and modified retainers. *Dental Press J Orthod*. 2011 July-Aug;16(4):44-6.

» The authors report no commercial, proprietary, or financial interest in the products or companies described in this article.

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** Periodontics specialist, Odontologic Association of Ribeirão Preto. MSc in Integrated Clinic, State University of Maringá - Brazil.

*** MSc in Odontologic Clinic, UNICAMP. Doctorate student, UNESP - Brazil.

**** MSc in Orthodontics, USP/Bauru. Doctor in Orthodontics, UNESP - Brazil.

Editor's abstract

The main indication for fixed retainers bonded to the lingual surface of mandibular incisors is to avoid relapse after the active phase of orthodontic treatment. Since it is a fixed appliance in close contact with the lingual surface of teeth, it makes hygiene more difficult, favors the formation of plaque around it, leads to the formation of calculus and induces gingival inflammation and periodontal disease. After long periods under these conditions, it usually causes loss of hard and soft tissues adjacent to the wire. In an attempt to minimize these problems, a modified retainer was developed to facilitate hygiene and to ensure free access to dental floss. To achieve such characteristics, it was necessary to increase the length of the wire for retainer manufacture and to bond the retainer to all teeth.

Few studies in the literature evaluated whether this type of retainer actually facilitates hygiene. Based on this premise, the authors' purpose was to evaluate plaque and calculus accumulation along the wire and in the gingival margin and the gingival conditions resulting from the use of a modified

retainer (Fig 1) or a multi-stranded wire retainer (Fig 2), both fixed to all anterior teeth.

Twelve volunteers were enrolled for this study. All used both retainers, each for six months with a 15-day interval between them. Before each phase, the volunteers underwent scaling and root planing of mandibular anterior teeth and received oral hygiene instructions. After the end of each phase, they underwent clinical examinations (plaque index, gingival index, calculus index and retainer wire calculus index), and each volunteer completed a questionnaire about the type of retainer that they were using. All evaluations were made by a single examiner.

Results showed that plaque index, gingival index, calculus index and retainer wire calculus index were greater ($p < 0.05$) for the modified retainer. The analysis of the questionnaire revealed that 58% of the volunteers felt that the modified retainer was less comfortable, and 54% preferred the multi-stranded wire retainer. Therefore, the authors concluded that multi-stranded wire retainers had better results than the modified retainer according to the parameters under evaluation, provided greater comfort and were preferred by patients.



FIGURE 1 - Modified retainer, made with 0.024-in wire.



FIGURE 2 - Multi-stranded wire retainer after being fixed to all teeth.

Questions for the authors

1) Based on your results, would you advise against the use of modified retainers? If not, what would be their indications?

We would advise against their use from a periodontal point of view because they accumulate plaque and calculus and do not allow the patient to perform the adequate hygiene of the areas closer to the gingiva. We should remember that this type of retainer was developed to facilitate hygiene, but it does not meet that expectation. Orthodontically, as it is bonded to all teeth, it may be a good 3x3 retainer. However, it should receive routine attention because, in case one of the resin bonds breaks, the tooth affected may move. In this case, both the modified and the multi-stranded wire retainer, which are bonded to all teeth, should receive close attention from the orthodontist (regular follow-up). Although long-term crowding may happen in any patient because of changes in the arch as the patient ages, retainers bonded to all mandibular anterior

teeth should be reserved for cases of crowding that received orthodontic treatment.

2) What would you recommend to dentists that would like to use modified retainers?

The patient should receive careful instructions about the need of regular orthodontic and periodontal follow-up, as well as redoubled attention to oral hygiene as well as to that of the retainer itself. This type of retainer should only be recommended to patients that actually perform hygiene very well and have, therefore, a low tendency to accumulate calculus.

3) As mentioned in the Discussion, "volunteers had excellent dexterity and good oral hygiene because they were undergraduate dentistry students". If the sample were different and composed of individuals with less instruction, would the results be different?

Results could be more evident; the difference between retainers could be greater and overall index differences, more marked in both groups.

Submitted: November 27, 2008
Revised and accepted: August 6, 2009

Contact address
Marlice Azoia Lukiantchuki
Av. São Paulo, 172 Sala 1122, 11° andar
CEP: 87.013-040 – Maringá / PR, Brazil
E-mail: marlice_luk@hotmail.com