

Effect of Motivational Techniques on Oral Hygiene in Orthodontic Patients¹Dr. Ravichandra K. Handral, ²K. Prasanna Kumar, ³Fatima Zohra Lingadalli**Corresponding Author:** Dr. Ravichandra K. Handral,**Citation of this Article:** Dr. Ravichandra K. Handral, K. Prasanna Kumar, Fatima Zohra Lingadalli, “Effect of Motivational Techniques on Oral Hygiene in Orthodontic Patients”, IJDSIR- January - 2023, Volume –6, Issue - 1, P. No.275– 278.**Copyright:** © 2023, Dr. Ravichandra K. Handral, et al. This is an open access journal and article distributed under the terms of the creative commons’ attribution non-commercial License. Which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.**Type of Publication:** Original Research Article**Conflicts of Interest:** Nil**Abstract**

Orthodontic treatment with fixed appliances is a risk factor for plaque accumulation. Therefore, the maintenance of oral hygiene is essential to prevent the occurrence and severity of gingivitis and periodontal disease. Thus, this study aimed to evaluate the effectiveness of verbal and illustration methods of motivation for patients who are undergoing fixed mechanotherapy. Forty orthodontic patients were selected and randomly divided into two groups and gingival and plaque index were scored at baseline and after one month. There was a significant reduction in plaque in both groups. However, the illustration method was more effective than verbal instructions only.

Keywords: Dental plaque, oral hygiene motivation, orthodontic appliances.**Introduction**

The presence of fixed orthodontic appliances obstructs toothbrushing and due to the ability of fixed appliance components to retain the plaque biofilm micro-organisms, it predisposes to the accumulation of dental

plaque around the bands and brackets thereby making it more difficult to maintain good oral hygiene, due to the inefficient plaque control techniques.¹

If patients don’t maintain proper oral hygiene during orthodontic treatment, the increased biofilm formation around the brackets exposes the enamel surface to increased acidogenic bacteria, which will lead to several adverse effects such as enamel demineralization, formation of white spot lesions, staining of the teeth, cavity formation and plaque-induced gingivitis and change in the microbial flora of periodontium with progressive destruction of periodontal ligament and alveolar bone with the pocket formation and recession.²

However long-term effects of orthodontic therapy on periodontal health have not suggested orthodontic therapy as a major factor in determining periodontal health.³

Various motivational techniques generally used are verbal, written or visual based (videotapes) to control the progression of periodontal complications.

Literature reveals, Written instructions appear to be the least effective.⁴ McGlynn⁵ studied the effectiveness of an oral hygiene booklet and repeated lectures with professional prophylaxis. No significant differences between the booklet and lecture groups were found.

Hence this study was conducted to compare the effectiveness of verbal and illustration catalogue motivational methods for patients who are undergoing fixed orthodontic mechanotherapy.

Materials and Method

Forty patients undergoing orthodontic treatment in the department of orthodontics were randomly selected with fully bonded pre-adjusted edgewise appliances in both arches. To enroll in the study, the subjects need to meet the following

inclusion criteria

- 1) Male and female participants aged between 13 to 20 years.
- 2) Patients with fixed orthodontic appliances in both arches, same material with similar ligature-tie methods
- 3) Belonging to similar socioeconomic status.
- 4) Minimum 20 natural teeth

Exclusion criteria

- 1) Underlying periodontal or systemic disease.
- 2) Under antibiotics in the past two months.
- 3) Use of floss, mouth rinses, and tooth-whitening products
- 4) Presence of prosthetic crowns and bridges.
- 5) History of allergies to dentifrice products

The samples were randomly divided into two main motivational groups.

Group A – 20 subjects who received verbal information.

Group B – 20 subjects who received information using an illustration catalogue.

The microbial plaque was made visible using a plaque-disclosing solution. The Plaque and Gingival index were

recorded for three teeth in a lower arch of each patient at the baseline and after one month of investigation.

Study assessments were made on the vestibular surface of the lower right canine, lower left central incisor, and lower left first or second premolar. Second premolars were scored for all cases unless they had been extracted as part of orthodontic treatment, in which case first premolars were scored. The Plaque was scored for the five boxes alongside or gingival to the bracket to give a possible maximum mouth score of 15 using Greene & Vermillion's (1960) plaque index.⁶

The gingival index was based upon that of Loe & Silness (1963)⁷ with grades of 0–3 denoting absent, mild, moderate, and severe inflammation, respectively. The same three teeth were used for the plaque index, with three areas per tooth being scored: mesiobuccal, mid-buccal, and distobuccal.

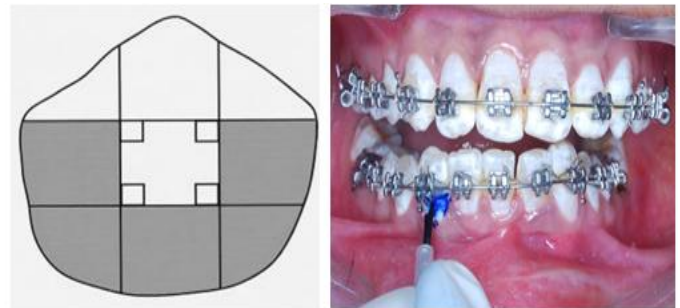


Fig 1: The grid used to record plaque scores based on five boxes per tooth.



Fig 2: The mesiobuccal, mid buccal, and distobuccal areas of teeth scored for gingival index.

Statistical Analysis

The scores were tabulated and subjected to statistical analysis.

Mean and standard deviation was calculated for both groups. Student's t-test was carried out at the baseline and after one month of the study.

Results

Table 1: Comparison of Plaque Index at baseline and after one month

Groups	Baseline		1 Month		% Change	T - Value	P - Value
	Mean	Sd	Mean	Sd			
Group A	12.10	2.18	10.50	2.17	13.22	4.311	0.002
Group B	11.70	1.64	6.50	0.85	42.98	11.143	0.000

$P < 0.005$

Table 2: Comparison of Gingival Index at baseline and after one month.

$P < 0.005$

Groups	Baseline		1 Month		% Change	T - Value	P - Value
	Mean	Sd	Mean	Sd			
Group A	4.20	0.92	3.70	0.82	4.13	2.236	0.052
Group B	4.30	1.16	3.00	0.67	10.74	6.091	0.000

There was a statistically significant difference in the scores of plaque index between both groups. However, group B has more significant scores than Group A for the gingival index.

Discussion

Dental plaque is the primary etiological factor in developing gingivitis, which will eventually lead to periodontitis. Oral hygiene maintenance is necessary for orthodontic patients to prevent caries and periodontal disease during and after fixed orthodontic treatment.

Orthodontic appliances tend to retain the bacterial biofilm and alter the gingival ecosystem. An increase in

Prevotella melanogenic, Prevotella intermedia and Actinomyces odontolyticus were detected in the gingival sulcus after the placement of orthodontic bands.⁸

Actinobacillus actinomycetumcomitans was found in at least one site in 85 children wearing orthodontic appliances compared to control subjects.⁹

Hence it is necessary to instruct and make the patients aware of oral hygiene maintenance before and at the start of fixed appliance treatment and to constantly reinforce them to follow the oral hygiene instructions at regular appointments.

In this study, subjects were divided into two motivational groups consisting of twenty participants in each group and were constantly motivated to use the assigned toothbrushes and toothpaste. All the subjects were instructed to brush with a modified bass brushing technique, for a minimum of two minutes to ensure thorough brushing.

Boyd evaluated the effectiveness of self-monitoring plaque control as an adjunct in orthodontic patients. He determined that the plaque control instruction using a disclosing solution was more effective in plaque control when compared to the control group and instruction-only group.¹⁰

In the present study, the Greene and Vermilion plaque index and Gingival index advocated by Loe & Silness were used to determine the amount of microbial plaque accumulation on teeth with brackets and the associated gingival inflammation.

The plaque index scores reduced significantly from baseline to 1 month in both groups, with a percentage reduction of 13.22 % and 42.98% in groups A and B, respectively. While the gingival index scores were more significant in group B with a percentage reduction of 6.091%. Though the plaque scores improved with the motivational methods, the illustration method using the

catalogue was more effective in controlling the plaque and maintaining the gingival health of the patients.

In contradiction to our study Lees et al compared written, verbal, and videotape oral hygiene instruction methods for patients with fixed appliances. They found no significant differences between the written, verbal, and videotape instruction methods.¹¹

Therefore, verbal instructions alone might not be effective enough in controlling the plaque, verbal instructions along with a simple illustrative catalog can be used to raise awareness of the significance and complications of oral hygiene maintenance.

Conclusion

- 1) The present study showed a significant difference in the reduction of plaque in both groups over a period of one month.
- 2) There were significant differences between the gingival index scores in Group B from baseline to one month.
- 3) Motivating the patients with the illustration catalog method has improved oral hygiene maintenance than verbal instructions only,

References

1. Arici S, Alkan A, Arici N. Comparison of different toothbrushing protocols in poor – toothbrushing orthodontic patients. The European Journal of Orthodontics. 2007 Oct 1;29(5):488-92.
2. Mei L, Chieng J, Wong C, Benic G, Farella M. Factors affecting dental biofilm in patients wearing fixed orthodontic appliances. Progress in orthodontics. 2017 Dec;18(1):1-6.
3. Sadowsky C, BeGole EA. Long-term effects of orthodontic treatment on periodontal health. American journal of orthodontics. 1981 Aug 1;80(2):156-72.
4. Self TH, Brooks JB, Lieberman P, Ryan MR. The value of demonstration and role of the pharmacist in

teaching the correct use of pressurized bronchodilators. Canadian Medical Association Journal. 1983 Jan 1;128(2):129.

5. McGlynn FD, LeCompte EJ, Thomas RG, Courts FJ, Melamed BG. Effects of behavioural self-management on oral hygiene adherence among orthodontic patients. American Journal of Orthodontics and Dentofacial Orthopaedics. 1987 Jan 1;91(1):15-21.
6. Greene JC, Vermillion JR. The oral hygiene index: a method for classifying oral hygiene status. The Journal of the American Dental Association. 1960 Aug 1;61(2):172-9.
7. Loe H, Silness J. Periodontal disease in pregnancy I. Prevalence and severity. Acta Odontologica Scandinavica. 1963 Jan 1;21(6):533-51.
8. Diamanti-Kipioti A, Gusberti FA, Lang NP. Clinical and microbiological effects of fixed orthodontic appliances. Journal of Clinical Periodontology. 1987 Jul;14(6):326-33.
9. Paolantonio M, di Girolamo G, Pedrazzoli V, di Murro C, Picciani C, Catamo G, Cattabriga M, Piccolomini R. Occurrence of Actinobacillus actinomycetemcomitans in patients wearing orthodontic appliances: A cross-sectional study. Journal of clinical periodontology. 1996 Feb;23(2):112-8.
10. Boyd RL. Longitudinal evaluation of a system for self-monitoring plaque control effectiveness in orthodontic patients. Journal of clinical periodontology. 1983 Aug;10(4):380-8.
11. Lees A, Rock WP. A comparison between written, verbal, and videotape oral hygiene instruction for patients with fixed appliances. Journal of orthodontics. 2000 Dec;27(4):323-8.