

# CORRESPONDING PERIODONTAL HEALTH STATUS OF ORTHODONTIC PATIENTS

Babita Pawar<sup>1</sup>, Aditya Agrawal<sup>2</sup>, Sanket Brahmhatt<sup>3</sup>, Harshal Sanap<sup>4</sup>, Sagar Kausal<sup>5</sup>, Abhijeet N. Misal<sup>6</sup>

1. Professor, Dept of Periodontology and Implantology, Rural Dental College, PIMS, Loni

2. PG student, Dept OF Orthodontics and Dentofacial Orthopedics, Rural Dental College, PIMS, Loni

3. PG student, Dept OF Periodontology and Implantology, Rural Dental College, PIMS, Loni

4. PG student, Dept OF Orthodontics and Dentofacial Orthopedics, Rural Dental College, PIMS, Loni

5. PG student, Dept OF Orthodontics and Dentofacial Orthopedics, Rural Dental College, PIMS, Loni

6. Professor, Dept OF Orthodontics and Dentofacial Orthopedics, Rural Dental College, PIMS, Loni

## ABSTRACT:

This study was undertaken to assess the effects of orthodontic treatment on the periodontal health of young patients. 50 patients were randomly selected irrespective of sex from the department of Orthodontics of Rural dental college, Loni, Maharashtra. Periodontal examination was performed before, after six months and after treatment. Periodontal disease index (PDI) was used to assess the periodontal health of indexed teeth. The results showed that patients undergoing orthodontic treatment do show the signs of periodontal disease.

**Keywords:** Periodontal Disease Index, Oral Hygiene, Orthodontic Appliance.



## INTRODUCTION:

Importance of oral hygiene in orthodontic patients is always intensified to prevent any further periodontal disease. In the absence of oral hygiene maintenance, plaque accumulation on orthodontic appliance components is paving way to destruction of periodontal tissues. Due to greater tooth area covered and complex nature of the orthodontic appliances make it difficult to maintain oral hygiene.<sup>[1,2,3]</sup>

Maintaining oral hygiene during orthodontic treatment will help in good gingival health, which reflects in final orthodontic treatment outcome.<sup>[4]</sup> But the

level of gingival health knowledge among orthodontic patients is not adequate. Poor maintenance of oral hygiene is due to either lack of knowledge or negligence by patients themselves. Patients are not given with proper instructions, may be one big reason for patient's noncompliance.<sup>[2,3]</sup> However, despite receiving appropriate instructions, many individuals fail to follow instructions. Also many of them lack knowledge on maintenance. It is important to motivate them to compile the instructions and maintain oral health. It is always needed to assess the knowledge of orthodontic patients on gingival health.

The aim of this study was to assess periodontal health of the patients undergoing orthodontic treatment from the start of the treatment (pre-ortho), at the six months of the treatment (intra-ortho) and after the end of the treatment (post-ortho).

**MATERIAL AND METHODS:**

By simple random sampling method 50 orthodontic patients (31 females and 19 males) were selected from orthodontic department in Rural Dental College, Loni, Maharashtra. Inclusion criteria were to select patients with complete dentitions apart from third molars. The patients falling in the age group of 13 years to 25 years were selected for the study, with a mean value of 17.86. Informed consent was taken of all the patients prior to the treatment and the complete study was thoroughly explained. All the patients underwent oral prophylaxes and were given oral hygiene instructions at the start of orthodontic treatment.

The patients were examined before the start of orthodontic treatment (FIGURE 1), after 6 months (FIGURE 2 AND 3) and after completion of treatment(FIGURE 4 AND 5). To eliminate any bias and to minimise human error, a single periodontist carried out examinations of all the patients.

The recordings were carried out using The periodontal disease index (PDI), given by Ramjford in 1959. The index consists of three components, the gingival and periodontal component, the plaque component and the calculus component. The six Ramjford teeth were examined in all surfaces (i.e. buccal, mesial, distal, palatal/lingual). The average data was analysed and various comparisons were carried out using chi-square test.

**RESULT:**

Due to lack of co-operation or unwillingness to participate in the study 8 patients dropped out. The remaining 42 patients were examined and the result was evaluated.

There was significant increase in the PDI during the intra-ortho evaluation of the patients as compared to the pre-ortho and post-ortho evaluation.

However, there were no significant changes in the pre-ortho and post-ortho evaluation of the patients, as illustrated in TABLE.1

This concludes that there is definitely an increase in the periodontal microflora during the treatment of the patients which affects the oral hygiene of the patients.

TABLE.1

| <b>PERIODONTAL DISEASE INDEX (PDI)</b><br><b>[Average of 42 patients]</b> | Gingival and periodontal Component | Plaque Component | Calculus Component |
|---|------------------------------------|------------------|--------------------|
| Pre orthodontic stage   | 1.8                                | 2.5              | 2.0                |
| Intra orthodontic stage   | 3.3                                | 3.8              | 3.4                |
| Post orthodontic stage  | 2.2                                | 2.6              | 2.2                |

## DISCUSSION:

In this study the periodontal status before, during and after the placement of fixed orthodontic appliances was evaluated in the patients who were selected for orthodontic treatment. The hypothesis of study was that there is a change in the periodontal status of the patients receiving fixed orthodontic treatment. The study supported this hypothesis, however the periodontal status between pre ortho and post ortho patients was not very significant. There was a marked change in the periodontal and gingival status in patients undergoing orthodontic treatment (i.e. during the intra-ortho stage). The orthodontic patient's inability to clean adequately should be expected to contribute to the development of gingival inflammation. Gingivitis and gingival enlargement appear to be the main short-term effects of orthodontic treatments on the periodontium. It has been noted that gingival enlargement occurs after placement of a fixed appliance.<sup>[5,6]</sup> This is in agreement with the results of Naranjo et al who reported that the placement of brackets influenced the ecological environment by the accumulation of the biofilm at the retentive sites.<sup>[4]</sup> Similar results were observed by Ristic and co-workers as there was a marked increase in both the clinical and microbiological parameters in 3 months' time after the fixed appliance placement.<sup>[5,6,7]</sup> Almost every fixed orthodontic patient develops gingival disease at some time during treatment.<sup>[8,9,10,11,12]</sup>

It has been noted that gingival enlargement occurs after placement of a fixed appliance.<sup>[13,14,15]</sup> The condition rapidly improves within 48 hours of the appliance being removed. The increase in probing depth during orthodontic treatment has been attributed, by others, to this enlargement.<sup>[17,18,19]</sup> The risk of loss of attachment can be anticipated when such iatrogenic irritations are inevitable.<sup>[17]</sup>

Adolescents have certainly been shown to suffer worse gingivitis than adults during orthodontic treatment<sup>[12]</sup>. The gingival recession has been shown to be a common adverse effect during and/or after the orthodontic treatment. This effect has been noted more frequently while using buccal orthodontic movements.<sup>[20]</sup> If teeth that have thin tissue are going to be moved lingually, there is a potential for the tissue to move coronally and become thicker.<sup>[24]</sup> It has been shown that most cases of gingival recession which occur during an orthodontic treatment occurred in the regions of the anterior upper and lower teeth.<sup>[21,22,23,25,26]</sup>

A recent study of Thornberg and co-workers<sup>[27]</sup> aimed to document and investigate changes in periodontal pathogen levels before, during, and after orthodontic treatment in adolescents, eight pathogens were examined; *Actinobacillus actinomycetemcomitans* (AA), *Porphyromonas gingivalis* (PG), *Prevotella intermedia* (PI), *Tannerella forsythia* (TF), *Eikenella*

corrodens (EC), *Fusobacterium nucleatum* (FN), *Treponema denticola* (TD), and *Campylobacter rectus* (CR). It has been shown that for six (PI, TF, EC, FN, TD, CR) of the eight pathogens, the percentages of subjects with high pathogen counts increased significantly after six months of fixed appliance treatment, but these returned to pre-treatment levels by 12 months of orthodontic treatment.

Thus, it of paramount importance that adequate oral hygiene instructions are followed during orthodontic treatment. Proper brushing is ideal for good gingival health, while prolonged brushing may distort the gingival tissues. Wasting diseases like abrasion are mainly caused by improper brushing. On awareness of gingival health, comparatively very few are having awareness while most of them are not aware of that.<sup>[13,14]</sup>

## REFERENCES:

1. Kitada K, de Toledo A. Increase in detachable opportunistic bacteria in oral cavity of orthodontic patients. *Int J Dent Hyg* 2009; 7(2): 121-25.
2. Alexander SA. Effects of orthodontic attachments on the gingival health of permanent second molars. *Am J Orthod Dentofacial Orthop* 1991; 100(4):337-40.
3. Alstad S, Zachrisson BU. Longitudinal study of periodontal condition associated with orthodontic treatment in adolescents. *Am J Orthod* 1979;76(3): 277-86.
4. Naranjo AA, Trivino ML, Jaramillo A, Betancourth M, Botero JE. Changes in the subgingival microbiota and periodontal parameters before and 3 months after bracket placement. *Am J Orthod Dentofacial Orthop* 2006;130:275 e17-22.
5. Ristic M, Vlahovic Svabic M, Sasic M, Zelic O. Clinical and microbiological effects of fixed orthodontic appliances on periodontal tissues in adolescents. *Orthod Craniofac Res* 2007;10:187-95.

Delivering proper instructions on gingival health maintenance to orthodontic patients plays a vital role in this aspect. Motivating and making them to practice oral hygiene measures in young age groups will certainly enhance the levels of oral hygiene standards.<sup>[26,27]</sup>

## CONCLUSION:

The periodontal microflora is significantly increased in patients during orthodontic treatment. This correspondingly increases the gingival inflammation and periodontal destruction. However, if proper oral hygiene methods are adhered to by the patients, the post-treatment periodontal condition improves considerably and almost mimics the pre-treatment periodontal status of the patient. Hence patient compliance plays a major role in maintenance of gingival and periodontal health, during and after the orthodontic treatment.

6. Ristic M, VlahovicSvabic M, Sasic M, Zelic O. Effects of fixed orthodontic appliances on subgingival microflora. *Int J DentHyg* 2008;6:129-36.
7. Huser MC, Baehni PC, Lang R. Effects of orthodontic bands on microbiologic and clinical parameters. *Am J Orthod Dentofacial Orthop* 1990;97:213-18.
8. Paolantonio M, di Girolamo G, Pedrazzoli V, di Murro C, Picciani C, Catamo G, et al. Occurrence of *Actinobacillus actinomycetemcomitans* in patients wearing orthodontic appliances. A cross-sectional study. *J Clin Periodontol* 1996;23:112-18.
9. Alexander SA. Effects of orthodontic attachments on the gingival health of permanent second molars. *Am J Orthod Dento facial Orthop* 1991;100:337-40.
10. Boyd RL, Baumrind S. Periodontal implications of orthodontic treatment in adults with reduced or normal periodontal tissue versus those of adolescents. *Angle Orthod* 1992. 42;62: 117-26.
11. Zachrisson S, Zachrisson BU. Gingival conditions associated with orthodontic treatment. *Angle Orthod* 1972; 42: 26-34.
12. Hamp SE, Lundstrom F, Nyman S. Periodontal conditions in adolescents subjected to multiband orthodontic treatment with controlled oral hygiene. *Eur J Orthod* 1982; 4(2): 77-86.
13. Boyd RL, Murray P, Robertson PB. Effects of rotary toothbrush versus manual tooth brush on periodontal status during orthodontic treatment. *Am J Orthod Dentofac Orthop* 1989;96: 342-47.
14. Polson AM, Subtelny JD, Meitner SW, Polson AP, Sommers EW, Iker HP et al. Long term periodontal status after orthodontic treatment. *Am J Orthod Dentofac Orthop* 1988; 93:51-58.
15. Eliasson LA, Hugoson A, Kurol J, Siwe H. The effects of orthodontic treatment on periodontal tissues in patients with reduced periodontal support. *Eur J Orthod* 1982; 4:1-9
16. Baer PN, Coccaro PJ. Gingival enlargement coincident with orthodontic therapy. *J Periodontol* 1964;35:436-9.
17. Alexander SA. Effects of orthodontic attachments on the gingival health of permanent second molars. *Am J Orthod Dentofacial Orthop* 1991;100:337-40.
18. Kloehn JS, Pfeifer JS. The effect of orthodontic treatment on the periodontium. *Angle Orthod* 1974;44:127-34.
19. Zachrisson BU, Zachrisson S. Gingival condition associated with partial orthodontic treatment. *Acta Odontol Scand* 1972;30:127-36.
20. Wennstrom JL, Lindhe J, Sinclair F, Thilander B. Some periodontal tissue reactions to orthodontic tooth movement in monkeys. *J Clin Periodontol* 1987;14:121-9.
21. Sadowsky C, BeGole EA. Long-term effects of orthodontic treatment on

- periodontal health. Am J Orthod 1981;80:156-72.
22. Polson AM, Reed BE. Long-term effect of orthodontic treatment on crestal alveolar bone levels. J Periodontol 1984;55:28-34.
23. Alstad S, Zachrisson BU. Longitudinal study of periodontal condition associated with orthodontic treatment in adolescents. Am J Orthod 1979;76:277-86.
24. Boyd RL. Mucogingival considerations and their relationship to orthodontics. J Periodontol 1978;49:67-76.
25. Hall WB. The current status of mucogingival problems and their therapy. J Periodontol 1981;52:569-75
26. Pearson LE. Gingival height of lower central incisors, orthodontically treated and untreated. Angle Orthod 1968;38:337-9.
27. Thornberg MJ, Riolo CS, Bayirli B, Riolo ML, Van Tubergen EA, Kulbersh R. Periodontal pathogen levels in adolescents before, during, and after fixed orthodontic appliance therapy. Am J Orthod Dentofacial Orthop 2009;135:95-8.

## FIGURES:



Fig- 1- Plaque Detection Using Bismark Brown  
(Pre-Ortho Treatment)



Fig-2- Plaque Detection Using Bismark Brown  
(Intra-Ortho Treatment)



Fig-3- Gingival And Periodontal Component  
Detection-  
Probing Depth  
(Intra-Ortho Treatment)



Fig-5- Gingival And Periodontal Component  
Detection-  
Probing Depth  
(Post-Ortho Treatment)



Fig-4- Plaque Detection Using Bismark  
Brown  
(Post-Ortho Treatment)