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## **The effect of periodic oral prophylaxis on periodontal health in fixed orthodontic patients**

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**Abstract**--Background: In addition to providing good alignment, fixed orthodontic treatment improves dentoalveolar and maxillomandibular function. Periodic oral prophylaxis was utilised in this study to assess the periodontal health of fixed orthodontic patients. Materials & Methods: A total of 240 fixed orthodontic patients participated in the study. Two study groups, each with 120 patients, were constituted as follows: All first premolar extraction with fixed orthodontic therapy in Group I: Subjects having Class I malocclusion. Home care instructions were offered in these themes. All first premolar extraction

with fixed orthodontic therapy in Group II: Subjects with Class I malocclusion. In every fifth month of fixed orthodontic therapy, these participants received home maintenance instructions as well as scaling. Results: There were 40 males and 80 females in Group I, and 70 females and 50 males in Group II. At initial ( $T_0$ ) and follow up after 1 year ( $T_1$ ) in Group I, the gingival index mean was 0.60 and 1.16, plaque index was 0.92 and 1.36, and pocket depth was 1.52 and 1.70, respectively. At initial ( $T_0$ ) and follow up after 1 year ( $T_1$ ) in group II, the gingival index was 0.82 and 0.12, plaque index was 1.16 and 0.80, and pocket depth was 1.30 and 1.56, respectively. Conclusion: For patients undertaking orthodontic fixed appliance therapy, periodic oral prophylaxis can significantly improve periodontal health.

**Keywords**---fixed orthodontic, oral hygiene, periodontal health.

## **Introduction**

The orthodontic therapy ensures that the dental tissues are properly aligned and that occlusal connections are improved. Improved masticatory function, speech function, and face aesthetics are further benefits. As a result, there is an improvement in general and oro-dental health, as well as a considerable change in quality of life. At the same time, orthodontic treatment has been linked to a number of risks and concerns. <sup>1</sup> One of the usual complications linked with orthodontic therapy is periodontal diseases. Patients with orthodontic braces and auxiliaries, sometimes struggle to maintain appropriate oral health and cleanliness, leading in inflammatory diseases in the oral tissues. Gingivitis and gingival overgrowth are two common sequelae of orthodontic therapy. <sup>2</sup> Previous research has found a link between increased plaque formation and orthodontic treatment due to incorrect brushing procedures.<sup>3</sup> This is obvious clinically when orthodontic appliances are placed in deep gingival tissue. The reactionary gingival expansion hampers plaque removal, consequently encouraging the periodontopathic microorganism's dominance.<sup>4,5</sup> As a result of the foregoing information, the purpose of this research was to assess the periodontal condition of fixed orthodontic patients receiving periodic oral prophylaxis.

## **Materials & Method**

The current study was conducted at the Dental institution's Department of Orthodontics and Dentofacial Orthopaedics. The ethical committee approved the ethical clearance for the Dental institution's investigation. The study was explained to all of the patients, and their consent was obtained. The current study included 240 individuals undergoing fixed orthodontic therapy. A proforma was created, and all of the subjects' clinico-demographic information was recorded. Patients with any congenital bone pathology were not included in the current investigation. A clinical examination was performed, and primary cast models were prepared. As stated below, the patients were randomly divided into two groups of 120 each:

Group I: A case of class I molar relationship and bimaxillary protrusion with all four first premolar extractions. Patients were provided with oral hygiene instructions and a kit with chemotherapeutic measures such as dentifrices, mouthwashes, orthodontic toothbrushes, and interproximal brushes.

Group II: A fixed orthodontic case with Class I molar relation and bimaxillary protrusion with all four first premolar extractions. At every 5th-month scaling, patients receive conventional oral hygiene instructions and an oral hygiene kit with chemotherapeutic measures such as dentifrices, mouthwashes, orthodontic toothbrushes, and interproximal brushes.

For periodontal health indexing, the selected teeth were:

- Maxillary right first molar
- Maxillary right second premolar
- Mandibular left first molar
- Mandibular left central incisor
- Mandibular right second premolar

Gingival index, pocket depth, and plaque index were also measured at initial ( $T_0$ ) and follow up after 1 year ( $T_1$ ).

### Statistical Analysis

The data were entered into an Excel spreadsheet, which was then imported into SPSS. The results were tabulated and analysed using SPSS. A p value of less than 0.05 was considered statistically significant. ( $P < 0.05$ ).

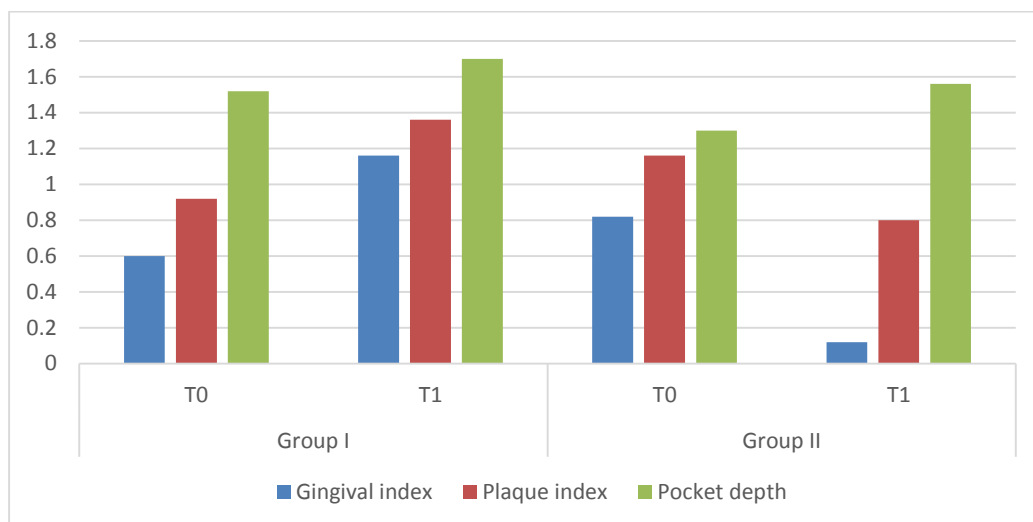
### Results

A total of 240 fixed orthodontic patients were enrolled in the current study. There were 40 males and 80 females in Group I, and 70 females and 50 males in Group II. Table 1 shows that the gingival index mean was 0.60 and 1.16, the plaque index was 0.92 and 1.36, and pocket depth was 1.52 and 1.70 at  $T_0$  and  $T_1$  in Group I, respectively (Graph 1). The gingival index was 0.82 and 0.12, plaque index was 1.16 and 0.80, and pocket depth was 1.30 and 1.56 at  $T_0$  and  $T_1$  in group II, respectively. P-value of less than 0.05 ( $P < 0.05$ ) was considered significant.

Table 1: Comparison of periodontal measurements

Index	Group I		P-value	Group II		P-value
	T0	T1		T0	T1	
Gingival index	0.60	1.16	0.02*	0.82	0.12	0.01*
Plaque index	0.92	1.36	0.01*	1.16	0.80	0.03*
Pocket depth	1.52	1.70	0.04*	1.30	1.56	0.04*

\*Significant



Graph 1: Periodontal measurements

## Discussion

Orthodontic therapy makes it difficult to maintain proper oral hygiene and oral health. At the same time, it promotes the onset of gingivitis and periodontitis. The precise underlying mechanism for gingivitis is uncertain, but plaque is thought to be the universal causal cause.<sup>6</sup> It is also believed that certain persons are predisposed to its development due to genetic or epigenetic causes. These include genetic polymorphisms and changes in genetic susceptibility.<sup>7</sup> Gingivitis evolves to periodontitis in such cases. The role of orthodontic materials and appliances in the progression of gingivitis to periodontitis is significant in orthodontics. Plaque can accumulate between orthodontic appliances and the gingival margins, resulting in an unattractive appearance.<sup>8</sup>

Plaque retention is a major etiological cause for demineralization, gingival and periodontal disorders during fixed orthodontic treatment. Metal brackets, bands, and auxiliaries' cytotoxicity produces localised irritation; because metal bands are typically put sub-gingivally, gingivitis is prevalent with them.<sup>9</sup> Gingival enlargement triggered by gingivitis further impedes plaque clearance, increasing the bacterial dominance of periodontopathic microorganisms (*Actinobacillus actinomycetemcomitans*, *Porphyromonas gingivalis*, and *Bacteroides forsythus*).<sup>10</sup> As a result of the findings presented above, the current study purpose was to evaluate the periodontal condition of fixed orthodontic patients receiving periodic oral prophylaxis.

There were 40 males and 80 females in group I in the present study, and in Group II, there were 70 females and 50 males. Pandey et al.<sup>11</sup> conducted a questionnaire study on orthodontic patients to assess practise management in oral health maintenance and calculated Dental Neglect and Oral Hygiene Index simplified scores. They discovered that just 26% of orthodontic patients brushed twice daily, and only 9% used other interdental oral hygiene tools. They also

discovered a link between the simplified oral hygiene index score and dental neglect scores.

In the present study, we observed that the gingival index mean was 0.60 and 1.16, the plaque index was 0.92 and 1.36, and pocket depth was 1.52 and 1.70 at T<sub>0</sub> and T<sub>1</sub> in Group I, respectively (Graph I). The gingival index was 0.82 and 0.12, plaque index was 1.16 and 0.80, and pocket depth was 1.30 and 1.56 at T<sub>0</sub> and T<sub>1</sub> in group II, respectively. Our findings were consistent with those of Francis et al.,<sup>12</sup> who discovered comparable outcomes in their own investigation. They studied 20 patients who received fixed orthodontic therapy. Upon comparing periodic oral prophylaxis and conventional at-home oral care methods, the influence of typical home oral care therapy on periodontal status has only been studied. Gingival index, index for plaque around bonded bracket, as well as probing depth, were all calculated. The findings revealed that oral prophylaxis performed in the fifth month could be highly effective for improving gingival and periodontal health in orthodontic patients.<sup>12</sup> Researchers examined how demographic data and orthodontic treatment duration affect periodontal health according to Alhajja et al.<sup>13</sup> They assessed the patient's awareness of the situation. They looked at nearly 300 cases, with an average age of roughly eighteen. They discovered that the magnitude of teeth involved, the age of the patients, and the overall time duration of fixed orthodontic treatment all influenced patients' awareness of gingival and periodontal health while receiving fixed orthodontic treatment.<sup>13</sup> In another study, Moshkelgosha V et al compared the efficiency of computerised oral hygiene education to verbal approach among fixed orthodontic patients. They determined that computerised oral care instruction is more effective than traditional approaches in giving adequate oral health status to individuals receiving fixed orthodontic therapy.<sup>14</sup>

## **Conclusion**

The use of periodic oral prophylaxis improved periodontal health among patients receiving fixed orthodontic appliance therapy.

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