

Assessment of Periodontal Health in Nepalese Orthodontic Patients

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ABSTRACT

Objective: To assess periodontal status of the patients undergoing orthodontic treatment and to compare periodontal health of patients with and without orthodontic treatment.

Materials & Method: A cross sectional study was done on 100 patients (50 orthodontic and 50 non-orthodontic). CPITN (Community Periodontal Index for Treatment Need) was used to assess the periodontal health of indexed teeth. SPSS version 17 and Chi Square test were used to analyze and compare the data.

Result: There was a statistically significant association in CPITN score between orthodontic and non-orthodontic patients ($p < 0.01$).

Conclusion: Patients undergoing orthodontic treatment have increased plaque accumulation and probing depth that may be associated with periodontal destruction. Patient motivation to maintain oral hygiene and regular scaling will minimize hazardous effects in orthodontic patients.

Key words: CPITN, fixed orthodontic treatment, gingivitis, pocket depth

INTRODUCTION

Gingivitis is an inflammation of gums surrounding the teeth. Gingivitis is one of the periodontal diseases that affects health of the periodontium.¹ Fixed orthodontic appliances may impair plaque removal, proper oral hygiene, and affect gingival health.² Gingivitis may develop in patients who do not institute proper oral hygiene measures and it can become quite profound in 21 days.³ Patients often exhibit gingival hypertrophy, bleeding, increased plaque accumulation, and calculus formation during orthodontic treatment.⁴ Thus, oral hygiene measures are recommended because bands, brackets, ligature wires, and elastics encourage the accumulation of microbial flora and food residues.^{5,6} In time, the plaque accumulation around orthodontic appliances may cause periodontal disease and caries.⁷

The aim of this study was to assess periodontal status of the patients undergoing orthodontic treatment and to compare periodontal health of patients with and without orthodontic treatment.

MATERIALS AND METHOD

A cross sectional study was performed on 50 orthodontic patients i.e. ortho group and 50 non-orthodontic patients i.e. non-ortho group selected from Orthodontic and Periodontic Departments of Kantipur Dental College, Kathmandu, Nepal. Patients included in the study were in age range of 15–28 years of both sexes with more than 3 months duration after starting the orthodontic treatment. Patients with any systemic disease, generalized periodontal problems/disease, cyst, cleft or congenital malformations, and patients receiving removable appliance treatment were excluded from the study.

All patients were assessed by using CPITN (Community Periodontal Index for Treatment Need)⁸ on the index teeth (16, 11, 26, 36, 31, 46). The recording of data was based on the WHO Oral Health Assessment Survey Form (proforma). A questionnaire was used to assess the use of oral hygiene aids by the participants.

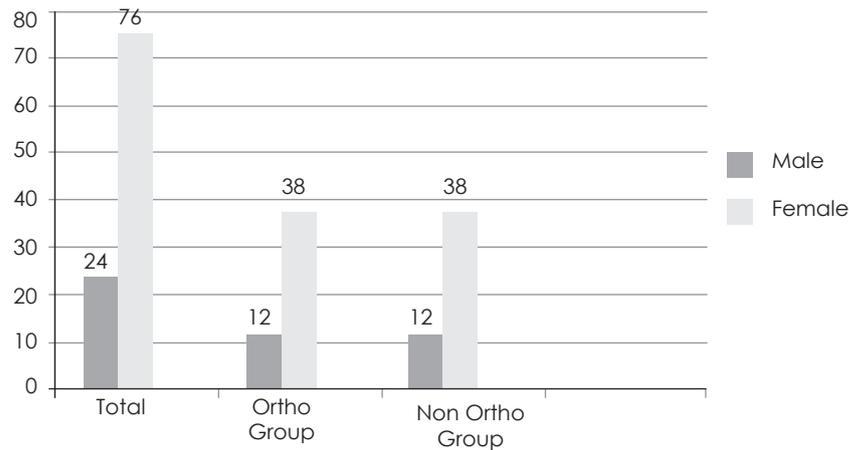


Figure 1: Gender distribution among the subjects

Examination Procedure

Each subject was examined on dental chair under adequate natural light using mouth mirror and WHO CPITN Probe. The Examination was performed in a systemic manner beginning from maxillary right sextant. The tip of the probe was gently inserted parallel to the long axis of the tooth, between the tooth and gingiva starting at the distobuccal surface of index tooth, to the full depth of the sulcus or pocket and the probing depth was read by observing the black position of the black band. The sites probed were the distal, midline and mesial on both facial and lingual/palatal surfaces. The appropriate highest score for each sextant was determined and recorded in the appropriate box.

The following CPI coding system was used to record periodontal status: 0, healthy periodontium; 1, bleeding observed after probing; 2, calculus detected during probing, but the black band on the probe was visible; 3, pocket 4–5mm (the black band on the probe is within the gingival margin); 4, pocket ≥6mm (black

band on the probe not visible); X, excluded sextant (>2 teeth present); and 9, not recorded.

All recorded data were statistically analyzed using SPSS version 17 and various comparisons were performed by chi square test.

RESULTS

Out of 100 patients examined, 24 were male and 76 were female; detail distribution of subjects is given in Figure 1. Age range of the patients was 15 to 28 years. Out of 50 patients in ortho group; 30 patients i.e. 60% had periodontal pocket (CPITN score 3 & 4). Table 1 shows distribution of CPITN Score between orthodontic and non-orthodontic patients. While comparing the CPITN score between ortho group and non-ortho group, 81.1% had periodontal pocket (CPITN score 3 & 4) in ortho group where as only 18.9% had periodontal pocket (CPITN score 3 & 4) in non-ortho group. There is statistically significant association between advancement of periodontal disease in ortho and non-ortho groups ($p < 0.01$) (Table 2).

Table 1: Distribution of CPITN Score among orthodontic and non-orthodontic patients

CPITN	Score 0	Score 1	Score 2	Score 3	Score 4	Total
Orthodontic patient	2	14	4	29	1	50
Non-orthodontic patient	11	24	8	7	0	50

Table 2: Comparison of CPITN Score between orthodontic and non-orthodontic patients

CPITN	Score 0,1,2	Score 3,4	p-value
Orthodontic patient (N=50)	20 (31.7%)	30 (81.1%)	0.000*
Non-orthodontic patient (N=50)	43 (68.3%)	7 (18.9%)	

*Statistically significant

Comparison of patients using and not using interdental aids in all subjects is shown in Figure 2. The study revealed that, only 3% patients using interdental aids had periodontal pocket (CPITN score 3 & 4); whereas 34% had periodontal pocket who were not using interdental aids (CPITN score 3 & 4). There is significant association in advancement of periodontal disease between interdental aids users and non-users among all patients ($p < 0.01$) (Table 3).

Among orthodontic patients only 3(6%) using interdental brush had periodontal pocket (CPITN score 3 & 4), whereas 27(54%) patient had periodontal pocket (CPITN score 3 & 4) who were not using it (Figure 3).

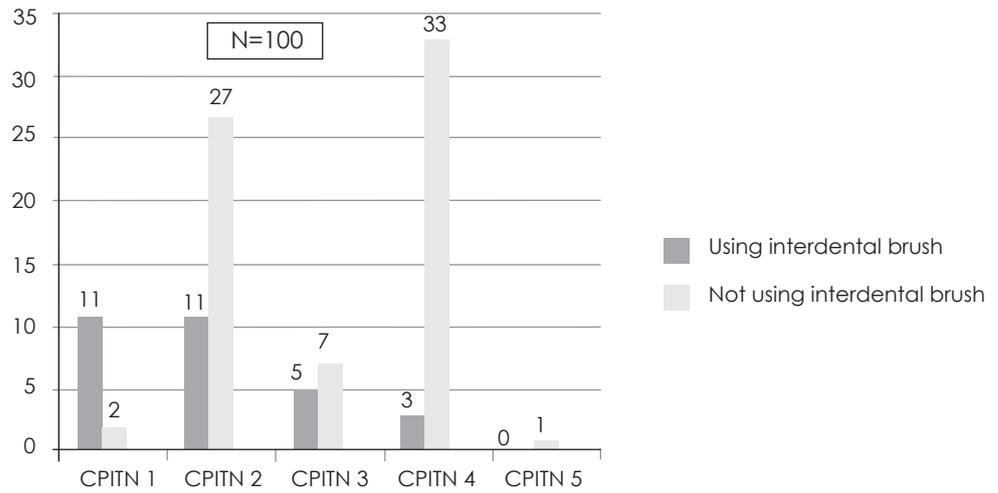


Figure 2: Distribution of CPI score and use of interdental aids

Table 3: Comparison of CPITN Score between interdental aids uses and non users

CPITN score	Score 0,1,2	Score 3,4	p value
Using interdental aids (N=30)	27 (90%)	3 (10%)	0.000*
Not using interdental aids (N=70)	36 (51.4%)	34 (48.6%)	

*Statistically significant

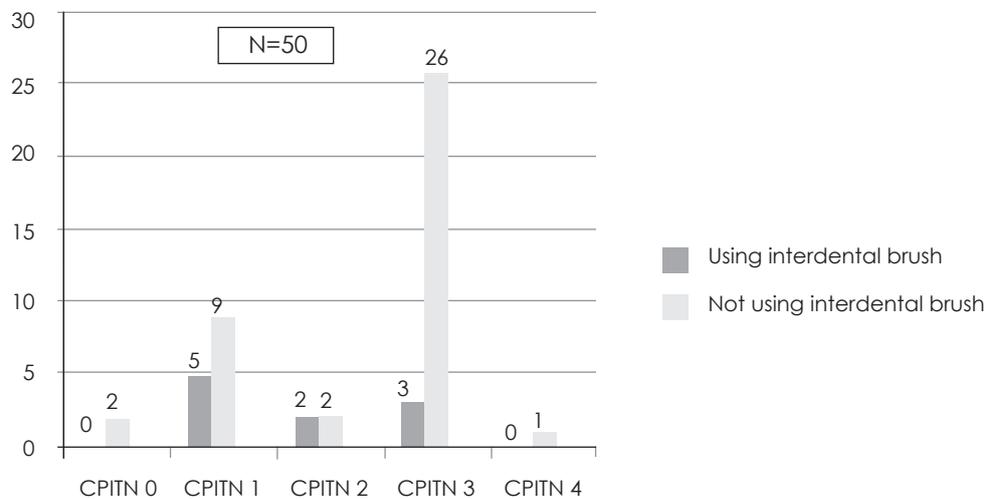


Figure 3: CPI scores among orthodontic patients using interdental aids

DISCUSSION

This study examined the periodontal status of orthodontic patients and non-orthodontic patients. The data of patients receiving fixed orthodontic treatment showed an increase in CPITN score. It agrees with the results of Naranjo *et al* who reported that the placement of brackets influenced the ecological environment of retentive sites by the accumulation of biofilm. There was a marked increase in Plaque and Gingival Index in the experimental group resulting in more bleeding and inflammation that deteriorated periodontal condition.⁹ Similar results were observed by Ristic *et al*, as there was a marked increase in both clinical and microbiological parameters in 3 months time after the fixed appliance was placed.¹⁰

There was a significant difference in the CPITN scores between ortho and non-ortho groups. Patients using interdental aids had significantly lower CPITN score while comparing with patient not using interdental aids. CPITN score was more in orthodontic patient who do not use interdental aids. The accumulation of dental plaque on orthodontic appliances cause difficulty for patients to maintain oral hygiene. Thus it may be believed that the placement of fixed orthodontic appliances can result in accumulation of plaque, increase in pocket depth leading to the increase of CPITN score.

Baer *et al*¹¹ suggested that interdental areas are especially more periodontally affected in orthodontic patients. It reflects and assures ability of fixed orthodontic appliance accumulates dental plaque which is the initiating factor for periodontal disease. These results agree with the results from other studies.¹² In clinically healthy human gingiva, a sulcus of some depth can be found. The depth of periodontal sulcus was determined differently, some studies reported the depth of 1.5 mm and others reported 1.8 mm.^{13,14} Radiographs indicate areas of bone loss where pockets may be suspected.¹⁵ Zachrisson *et al*¹⁶ reported an increase in probing depth and a slight loss of attachment around teeth of patients who underwent orthodontic treatment with fixed orthodontic appliances.

Plaque is the primary etiological agent in almost all periodontal and gingival conditions. Orthodontic appliances present a challenge to the proper removal of plaque from the tooth and gingival surfaces. Organisms commonly present in an early plaque are Gram-positive rods and cocci. Over time, these organisms are replaced by more Gram-negative and anaerobic organisms, which may initiate a periodontal reaction.¹⁷ Orthodontic appliances cause mechanical plaque traps where plaques may evolve into a pathological state, because adequate oral hygiene measures are more difficult to achieve during orthodontic treatment. Thus, plaque control must be emphasized as the most important factor in preserving periodontal health in patients undergoing orthodontic therapy. Motivating and making them to practice oral hygiene measures in young age groups will certainly enhance the levels of oral hygiene standards.^{18,19} Powered and inter-dental tooth brushes and special types of floss have been shown to improve plaque control in orthodontic patients.²⁰

CONCLUSION

During the orthodontic treatment, plaque score and pocket depth increases which results in periodontal destruction but it did not cause any severe bone loss, tooth mobility and tooth loss. The gingiva was in a relatively stable situation, and no remarkable recessions were reported. During orthodontic treatments the patient's oral hygiene should be maintained in high levels so that negative effects can be minimized. Patient motivation and oral hygiene education are essential elements for successful orthodontic outcome. Therefore, appropriate oral hygiene methods and interdental aids should be used to control plaque.

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