Evaluation of Periodontal Status in Orthodontic Patients

Dr. Bashu Raj Pandey,[1] Dr. Shristi Kafle,[2] Dr. Smriti Narayan Thakur,[3]
Dr. Rajan Singh,[4] Dr. Neha Mishra[5]

[1,4]Department of Orthodontics and Dentofacial Orthopedics, [2]Department of Periodontology and Oral Implantology,

[3]Department of Prosthodontics and Maxillo-facial prosthesis, [5]Department of Oral Pathology and Microbiology

Chitwan Medical College, Bharatpur, Nepal

Correspondence:

Dr. Bashu Raj Pandey. Email: drpandeybr@gmail.com

ABSTRACT

Introduction: Orthodontic therapy causes improvement of periodontal health status on patient having malocclusion. During treatment it may cause periodontitis since the appliances provide platform for adherence of food debris. So it is essential to evaluate the periodontal status of orthodontic patients through CPI score and loss of attachment LOA.

Objective: The objectives of the study is to evaluate the periodontal status in patients undergoing the orthodontic therapy by using Community Periodontal Index (CPI) score and Loss of Attachment (LOA).

Materials and Method: Hundred orthodontic patients as case group from department of orthodontics and 100 patients as control group from other departments except Orthodontics and Periodontics with age ranging from 15-30 years of both genders were enrolled for the study. CPI score and LOA were taken with the help of CPITN-C probe. Data were analysed using SPSS software version 20. Chi- square and Student's t-test was used for statistical analysis.

Result: Eleven out of 100 orthodontic patients (11%) had developed pockets (score 3, 4) whereas only one out of 100 non-orthodontic patients (1%) showed pocket formation. On comparing the periodontal problems in orthodontic and non-orthodontic patients, statistical analysis showed significant difference (P=0.002). Evaluation of loss of attachment in orthodontic and non-orthodontic patients showed significant difference (P=0.001).

Conclusion: The present study found CPI and LOA scores were increased in orthodontic patients. Interdental brush user and non-user had equal impact on periodontal health status.

Keywords: Community periodontal index; loss of attachment; orthodontic therapy; periodontal health.

INTRODUCTION

The prospects of dentistry have changed gradually over the time with increasing awareness towards aesthetics. From being merely associated with treatment procedures, it is now more focused towards facial aesthetics.[1] A major role in facial aesthetic alteration procedures is performed in orthodontics.[2] Orthodontic treatment enhances aesthetic appearance as well as the overall oral health status of the patients. Sometimes it may have an adverse effect in periodontal health and appearance of patient during treatment course.[3]

Orthodontic treatments usually are lengthy procedures, frequently associated with pain and discomfort to the patient along with improper oral hygiene maintenance. Orthodontic appliances increase the surface area and create more retention spaces for the oral microbes and attachment of

microbial plaque, thereby enhancing the chances for periodontal diseases.[3-5]

In this study we aimed to evaluate the periodontal status in patients undergoing the orthodontic therapy by using Community Periodontal Index (CPI) score and Loss of Attachment (LOA).

MATERIALS AND METHOD

This was a cross-sectional analytical study conducted from Feb 2019 to April 2019, in the Department of Orthodontics and Dentofacial Orthopedics of Chitwan Medical College, Nepal after getting ethical approval. Among 200 study population, 100 patients were taken from Department of Orthodontics as Case group and 100 patients were taken from other departments except Orthodontics and Periodontics as Control group. Sample size was decided based on some previous studies conducted in Nepal and India.[3,5]

Patients were selected with inclusion criteria: Age ranging from 15-30 years of both gender, patients undergoing orthodontic treatment at least three months prior to sample collection patients should have presence of all index teeth compulsorily. For the patients between 15 to 19 years, six teeth (16,11,26,36,31,46) and for the patients of age group between 20 to 30 years, 10 teeth (17,16,11,26,27,37,36,31,46,47) were chosen as index teeth. Patients with deciduous and mixed dentition, severe periodontal problems for control group, history of orthodontic treatment, smokers, congenital malformations, cyst, tumour, orofacial infection, pulpitis and presence of any systemic illnesses were taken as exclusion criteria. Similarly, patients with a history of intake of any antibiotic or anti-inflammatory drugs at least one month prior to sample collection were also excluded. Written and verbal consents were taken on the day of examination. It took around 10 minutes to complete the examination.

For the patients between 15 to 19 years, six teeth (16,11,26,36,31,46) and for the patients of age group between 20 to 30 years, 10 teeth (17,16,11,26,27,37,36,31,46,47) were chosen as index teeth. The armamentarium used was mouth mirror and CPITN-C probe to detect the pocket depth and loss of attachment. Six points (mesio-buccal, mid-buccal, disto-buccal and the corresponding sites on lingual surface) of each index tooth were probed with force not more than 20 gm which is equivalent to the maximum force beyond which it will cause pain on pressing the nail bed with CPITN probe. CPI scoring was assigned according to modified criteria of CPITN (WHO/FDI-1982) with inclusion of measurement of loss of attachment and exclusion of treatment needs category.[6] Data were analysed using SPSS software version 20. Chi-square test and Student's t-test was used for the statistical analysis. Level of significance was checked with $P \leq 0.05$.

RESULT

Out of the 100 orthodontic patients (case group) 63 (63%) were females and 37 (37%) were males while, among 100 non-orthodontic patients (control group) 65(65%) were females and 35 (35%) were males (Figure 1).
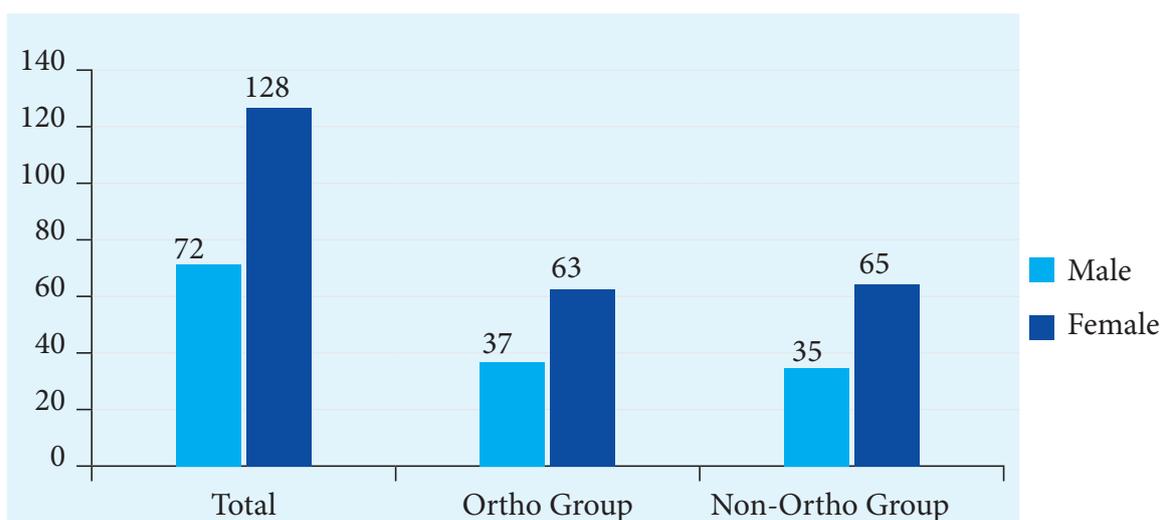

Figure 1: Gender distribution among the subjects.

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

CPITN Score	Score 0	Score 1	Score 2	Score 3	Score 4	Total
Orthodontic Patients	5	46	38	8	3	100
Non orthodontic Patients	37	41	21	1	0	100

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

CPITN Score	Score 0,1,2	Score 3,4	P value
Orthodontic Patients	89	11	0.002*
Non orthodontic Patients	99	1	
Chi-square test			

Statistically significant

Table 3: Comparison of CPITN Score between interdental aids uses and non users in orthodontic patients.

CPITN Score	Score 0,1,2	Score 3,4	P value
Using Interdental Aids (29)	26	3	0.941*
Non using interdental aids (71)	64	7	
Chi-square test			

Statistically significant

Table 4: Comparison of CPITN Score between male and female in orthodontic patients.

CPITN Score	Score 0,1,2	Score 3,4	Score 3,4
Male (37)	34	3	0.478*
Female (63)	55	8	
Chi-square test			

Statistically significant

Table 5: Comparison of CPITN Score between male and female in non-orthodontic patients.

CPITN Score	Score 0,1,2	Score 3,4	P value
Male (35)	34	1	0.170*
Female (65)	65	0	
T-test			

Statistically significant

Mean age of the patients enrolled in the present study was 21.64 years. The distribution of CPI score of orthodontic and non-orthodontic patients is given in Table 1.

Eleven percent of patients undergoing orthodontic treatment had developed pocket (score 3, 4) whereas only 1% of non-orthodontic patients showed pocket development. Remaining 89% of patients under the case group had CPI score 0, 1, and 2 and 99% subjects under the control group had CPI score 0, 1, and 2.

On comparing the periodontal problems in orthodontic and non-orthodontic patients, statistical analysis showed significant difference (P=0.002, Table 2).

Evaluation of effect of interdental brush among the users and non-users in orthodontic patients showed statistically non- significant result (Table 3).

Both male and female orthodontic and non-orthodontic patients had almost same level of awareness regarding oral hygiene, so no such difference was found (case group: p=0.478 and control group p=0.170, Table 4).

Evaluation of Loss of attachment in orthodontic and non-orthodontic patients showed significant difference between them with P value 0.001 (Table 5).

DISCUSSION

There are various consequences of malocclusion and among them periodontal problem is the most frequently encountered finding. A number of studies have been published in the past with conclusion of reduction in periodontitis after orthodontic treatment.[7,8] It has been seen that orthodontic treatment induces inflammatory changes within the periodontium which in turn facilitates the process of tooth movement.[9,10] On the other hand, during the treatment use of bands, brackets, elastics and ligature wires provide a platform for bacteria and cause periodontitis and dental caries.[11] Not only localised infection even odontogenic bacteraemia can be caused due to some orthodontic procedures like in case of separator placement.[12]

The present study aimed at the evaluation of periodontal health status in orthodontic and non-orthodontic patient. After examination of total number of 200 subjects, it was seen that the patients with fixed appliance showed an increase in the CPI score when compared to the non- orthodontic patients. The result was in accordance to many other similar studies that were performed earlier and had also shown an increase in CPI score.[5,13,14] This study was conducted in different region with people having different level of awareness regarding oral hygiene than that of previous study. Similarly, Zachrisson et al. found increase in pocket depth and slight change in loss of attachment in orthodontic patients.[15] The present study also showed significant difference in loss of attachment in the case group. Contrary to this, Thilagrani et al. in their study reported no such significant difference between loss of attachment in orthodontic patients and non- orthodontic patients.[3]

So it is always advisable to provide different types of oral hygiene aids like interdental brush, modified orthodontic brush, intermittent use of mouth rinse as safety measures for patients undergoing orthodontic treatments. Authorsalso attempted to analyse the effect of interdental brush in orthodontic groups. Twenty nine patients out of 100 orthodontic patients were found as regular users of interdental brush but CPI score was not significant ininterdental brush users and non- users. However, Dhami et al. found statistically significant difference on use of interdental brush in terms of periodontitis in their study population.[5] Reason behind it might be use of other oral hygiene measures which had not been investigated and was the limitation of present study. In future comparison of effects of different oral hygiene aids in orthodontic patients using CPI score is needed.

CONCLUSION

Community periodontal index and loss of attachment scores were increased in orthodontic patients. Interdental brush users and non-users had equal impact on periodontal health status. Male and female both patients had same level of awareness in oral hygiene.

ACKNOWLEDGEMENT

Conflict of Interest: None

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