

PERIODONTAL TREATMENT NEEDS OF PATIENTS UNDERGOING ORTHODONTIC TREATMENT IN COMPARISON TO NON-ORTHODONTIC TREATMENT PATIENTS: A COMPARATIVE STUDY

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ABSTRACT

OBJECTIVES

To determine the periodontal treatment needs of patients undergoing orthodontic treatment compared to those not undergoing the treatment.

METHODOLOGY

A cross-sectional comparative study was conducted on 100 patients visiting the Dental OPD of Sharif Medical and Dental College, Lahore, from June 2019 to July 2020. Clinical examination was done using the Community Periodontal index for treatment needs (CPITN) to assess the participants' periodontal health and treatment needs.

RESULTS

There was a statistically significant difference in the scores of CPITN across the treatment and control groups (≤ 0.001). The patients requiring scaling and prophylaxis and Oral hygiene instructions (TN 2) were more (94%) in the orthodontic treatment group in comparison to the non-orthodontic treatment group (62%). A higher percentage of patients (6%) requiring complex treatment (deep scaling, root planning and complex surgical procedures), scaling and prophylaxis and Oral hygiene instructions (TN3) belonged to the non-orthodontic treatment group, while only 4% required it from the orthodontic treatment group.

CONCLUSION

All orthodontic and non-orthodontic treatment group participants required oral hygiene instructions and had periodontal treatment needs (TN1). The patients requiring scaling and prophylaxis and Oral hygiene instructions (TN 2) were more in the orthodontic treatment group than the non-orthodontic treatment group. A higher percentage of patients requiring complex treatment (deep scaling, root planning and complex surgical procedures), scaling and prophylaxis and Oral hygiene instructions (TN3) belonged to the non-orthodontic treatment group.

KEYWORDS: Periodontal Treatment Needs, Orthodontic Treatment, Community Periodontal Index for Treatment Needs (CPITN)

INTRODUCTION

The proportion of adult orthodontic patients have significantly grown during the last three decades.¹ Current studies have shown that orthodontic therapy significantly enhances overall personal and professional life, particularly for adult patients who often have suffered severe deterioration of supporting structures, impairing functionality and appearance.² Most such individuals recommend orthodontic procedures to colleagues and family because of their newly gained confidence, and as a result, the integration of orthodontic treatment into a comprehensive oral treatment strategy appears to represent a potential developing strategy.³ Among the primary goals of orthodontic treatment is to improve and maintain periodontal wellness, create a functional

occlusion, and enhance dental & facial appearances.⁴

The decreased periodontal integrity in adults may lead to tooth loss, impaired function, and poor cosmetics.⁵ Numerous issues are found in most of these individuals, including supra-eruption of the tooth, migration, traumatized occlusion, abnormal interproximal spacing, devoured occlusal surface, aberrant occlusal planes, and decrease of vertical plane.⁵ A multidisciplinary approach is essential in such complicated clinical settings. Regrettably, full assessment before orthodontic treatment, with special emphasis on periodontal care and its maintenance and control throughout the treatment, is not given enough focus in regular orthodontic practise.⁶ Orthodontic therapy significantly impacts dentofacial structures and facilitates appropriate dental alignment through strategies for treating orthodontic issues, enhancing

alignment, and sustaining dental hygiene while improving aesthetics.⁷ The unusual characteristics of malocclusion include open bite, gaps, crossbite impacting teeth, overcrowding, short arches, and rotations of the teeth.⁸ Gingivitis is the early periodontal tissue disease that develops all around teeth and gums and, if left ignored, develops into periodontitis.⁹ On the contrary, food accumulation occurs whenever fixed orthodontic appliances cause plaque to build up within the gingival crevice.¹⁰ When cleaning, the food particles and orthodontic appliance become glued together, and it can be challenging to remove that deposit, significantly harming dental hygiene.¹¹ In order to prevent caries and also periodontal issues all through orthodontic therapy, patients must be trained on how to maintain good oral hygienic practices and how they can prevent calculus buildup.¹² This research aimed to determine the periodontal treatment needs of patients undergoing orthodontic treatment compared to those not undergoing the treatment.

METHODOLOGY

A cross-sectional comparative study was conducted on 100 patients visiting the Dental OPD of Sharif Medical and Dental College, Lahore, from June 2019 to July 2020. Keeping the precision at 5%, confidence level 95% and prevalence of periodontitis in orthodontic patients to be 3%, the sample size was calculated to be 50.¹³ Our study included 100 patients, of which 50 were patients undergoing orthodontic treatment and 50 were not. Ethical approval was obtained from the ethical committee of Sharif Medical Research Centre (No. SMDC/SMRC/195-21). The sampling method employed was convenient sampling. All the participants, irrespective of gender and those aged 12 to 17 years, were included in the study. Children with mixed dentition and those who refused to consent were excluded from the study.

Demographical data of the participants, like name, age, and gender, were recorded in a Proforma. The duration of orthodontic treatment of patients undergoing orthodontic treatment was also recorded. Clinical examination was done using the Community Periodontal index for treatment needs (CPITN) to assess the participants periodontal health. The Community Periodontal Index of Treatment Need was recorded using a specially designed lightweight Community periodontal index for treatment needs (CPITN) probe with a 0.5-mm ball tip, with a black band between 3.5 and 5.5 mm and rings at 8.5 and 11.5 mm from the ball tip. The index teeth (all remaining teeth in a sextant with no index tooth) were probed, and the highest score was recorded. Recorded data were coded, entered and analyzed using SPSS statistical Package version 23.0. A p-value of 0.05 or less was considered significant. Numerical data like age and CPITN score were presented as mean and standard deviation. Nominal data like gender, periodontal health status as determined Community Periodontal index for treatment needs (CPITN) and duration of orthodontic treatment were recorded as frequency and percentage. Mann-Whitney U test was used to find the difference in the scores of the Community Periodontal index for treatment needs (CPITN) across orthodontic and non-orthodontic treatment groups.

RESULT

A total of 100 patients, 50 controls and 50 cases of orthodontic treatment following the inclusion and exclusion criteria were assessed for oral health. The mean age of the participants was 15±1.798 years, out of which 54% were males while 46% were females. Table 1 shows a statistically significant difference in the scores of CPITN across treatment and control groups, with the mean rank score for the orthodontic treatment group being higher in comparison to non-orthodontic treatment group.

Table 1: Difference in the CPITN Scores of the Orthodontic Treatment Group In Comparison To the Non-Orthodontic Treatment Group

Periodontal Health	Status of Treatment	N	Mean Rank	Sum of Ranks	Mann Whitney U	Z	P-Value	Eta Square
Community periodontal index for treatment needs (CPITN) score	Orthodontic treatment group	50	60.61	3030.50	744.500	-3.741	≤0.001	0.14
	Non-orthodontic treatment group	50	40.39	2019.50				

Table 2 shows that the percent persons affected with bleeding and pocket depth 6mm and above were higher in the non-orthodontic treatment group compared to the orthodontic treatment group. It was

also seen that the per cent persons affected with calculus and pocket depth 4-5mm were higher in the orthodontic treatment group than in the non-orthodontic treatment group, as shown in Table 2.

Table 2: Difference in the CPITN Scores of the Orthodontic Treatment Group in Comparison to the Non-Orthodontic Treatment Group

Age	No of the Patients Examined	No Dentate Patients	Group	Percent Person Affected				
				Healthy	Bleeding	Calculus	Pocket Depth (4-5 mm)	Pocket Depth (6 mm or more)
12-17 years	50	50	Orthodontic treatment group	0%	06%	50%	40%	04%
	50	50	Non- orthodontic treatment group	0%	38%	44%	12%	06%

Table 3 shows that all participants from the orthodontic treatment group and non-orthodontic treatment group required oral hygiene instructions and had periodontal treatment needs (TN1). It was also seen that the patients requiring scaling and prophylaxis, and Oral hygiene instructions (TN 2) were more in the orthodontic treatment group than the

non-orthodontic treatment group. Furthermore, a higher percentage of patients requiring complex treatment (deep scaling, root planning and complex surgical procedures), scaling and prophylaxis and Oral hygiene instructions (TN3) belonged to the non-orthodontic treatment group, compared to the orthodontic treatment group, as shown in Table 3.

Table 3: Periodontal Treatment Needs of Patients Undergoing Orthodontic Treatment

Age	No. of Dentate Persons	Group	Periodontal Treatment Needs			
			%TN 0	% TN 1	% TN 2	%TN 3
12-17 Years	50	Orthodontic treatment group	0%	100%	94%	04%
	50	Non- orthodontic treatment group	0%	100%	62%	06%

DISCUSSION

The periodontal health of the individual before and after effective orthodontic treatment affects both short- and long-term achievement of orthodontic therapy.¹⁴ The long-term outcome of natural teeth greatly relies on the patient's systemic susceptibility to various clinical manifestations of periodontal disorders and their optimal responses to treatment.¹⁵ All clinical staff personnel must be aware of the diagnostic manifestations of inflammatory periodontal disorders since periodontal pathophysiology is a multifaceted aetiology event.¹⁶ Once teeth become movable due to orthodontic forces, the patients are more susceptible to attachment disruption. According to a new analysis, an elevated subgingival incidence of particular periodontopathogens raises the possibility that tooth movement may be a potential risk for periodontal disintegration.¹⁷ According to our study a statistically significant difference in the scores of CPITN across the treatment and control groups (≤ 0.001), with the mean rank score for the orthodontic treatment group (60.61) being higher in comparison to non-orthodontic treatment group. It has been demonstrated that increasing probing depths may suggest greater periodontal risks in a patient vulnerable to developing periodontal disease.¹⁸ A study was done by Natasha et al. to assess the differences in periodontal health of patients who seek orthodontic treatment.¹⁹ In this

research, patients undergoing orthodontic therapy had higher CPITN scores. The placement of brackets creates retaining surfaces and a bionomic environment for the buildup of biofilm.²⁰ According to results similar to those reported by other studies, the periodontal condition of the study population is worsened by heavy haemorrhage and inflammation, which is responsible for a discernible increase in plaque and gingival indices.²¹ The interdental region is the orthodontic patient's most severely impacted periodontal zone.²² This establishes that orthodontic devices are vulnerable to plaque buildup, which can ultimately result in periodontal issues.²³ These findings agreed with those of prior research. Healthy gingiva has been measured at depths between 1.5 mm and 1.8 mm using various methods.²⁴ The investigation supports the findings of another study, which showed that orthodontic patients wearing fixed devices have minor attachment losses with increasing pocket depths.²⁵ Radiological findings showed the regions of bone loss indicating the creation of pockets.²⁵ Plaque is the main cause and initiating reason for any gingival and periodontal recession, and using fixed prostheses makes it more difficult to keep cleaned.²⁶ Gram-positive rods & cocci, which initially create the plaque, are replaced by anaerobic bacteria and aerobic microorganisms that cause periodontal abnormalities. Orthodontic procedures make it difficult for the patient to maintain proper oral hygiene throughout the

treatments.²⁷ Our study reported that the per cent of persons affected with bleeding (38%) and pocket depth 6mm and above (6%) were higher in the non-orthodontic treatment group than in the orthodontic treatment group. It was also seen that the per cent persons affected with calculus (50%) and pocket depth 4-5mm (40%) were higher in the orthodontic treatment group than in the non-orthodontic treatment group. It has been reported previously that as orthodontic devices act as physical plaque traps, this leads to plaque deposition, which could also lead to pathological disorders.²⁶ According to our study, all participants from the orthodontic treatment group and non-orthodontic treatment group required oral hygiene instructions and had periodontal treatment needs (TN1). It was also seen that the patients requiring Scaling and prophylaxis Oral hygiene instructions (TN 2) were more (94%) in the orthodontic treatment group in comparison to the non-orthodontic treatment group (62%). Furthermore, a higher percentage of patients (6%) requiring complex treatment (deep scaling, root planning and complex surgical procedures), scaling and prophylaxis and Oral hygiene instructions (TN3) belonged to the non-orthodontic treatment group, while only 4% required it from the orthodontic treatment group. Compared to the non-orthodontic treatment group, the orthodontic treatment group showed a lesser incidence of periodontitis. Sim et al. They reported that when numerous interfering factors were taken into account, the modified risk ratios for periodontitis in participants with a background of orthodontic therapy vs to those without were 0.553, 0.614, and 0.624.²⁸ Natasha Zaidi also reported that the difference in CPITN ratings among orthodontic versus non-orthodontic patients was statically important. More plaque buildup and deeper probing caused periodontal tissue damage in patients receiving orthodontic therapy.¹⁹ With a surge in adolescent orthodontic patients lately, the significance of periodontal hygiene has grown.²⁹ Numerous studies have been conducted on the connection between orthodontic therapy and periodontitis.³⁰ Numerous clinical investigations have revealed increased gingivitis and plaque buildup following orthodontic therapy.³¹ Periodontal treatment and better plaque control practices prior to orthodontic therapy may have a good long-term impact on the maintenance of periodontium.¹

LIMITATIONS

A multicenter study and a larger sample size would have helped us unravel more findings.

CONCLUSION

All participants from the orthodontic and non-orthodontic treatment groups required oral hygiene instructions and had periodontal treatment needs (TN1). The patients requiring scaling and prophylaxis and Oral hygiene instructions (TN 2) were more in the orthodontic treatment group than the non-orthodontic treatment group. A higher percentage of patients requiring complex treatment (deep scaling, root planning and complex surgical procedures), scaling and prophylaxis and Oral hygiene instructions (TN3) belonged to the non-orthodontic treatment group.

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