Original Article

Interdental Brushes, Periodontal Status

Orthodontic Treatment and Periodontal Health Status in Pakistani Orthodontic Patients

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ABSTRACT

Objective: To determine the effect of duration of orthodontic treatment among orthodontic patients. To determine the efficacy of orthodontic brushes among orthodontic patients.
Study Design: Randomized clinical trial study
Place and Duration of Study: This study was conducted at Liaquat College of Medicine and Dentistry, Darul Sehat Hospital, Karachi from December 2013 till April 2014.
Materials and Methods: In this study 148 males and 267 female were recruited on the basis of non-probability convenient sampling to access the efficacy of orthodontic brushes and compare the effect with the duration of orthodontic treatment on periodontal health. We analysed the Community Periodontal Index Treatment Need (CPITN) Index and Plaque Index on participants.
Results: Results have shown that at the end of first year treatment most of the patients have high score of calculus ($x2= 137.9$, df=20, $p<0.001$). Likewise at the end of first year treatment plaque score is high too ($x2= 95.76$, df=12, $p<0.001$). Orthodontic brushes have remarkable effect on periodontal health and both calculus and plaque scores are reduced with the usage of the orthodontic brushes ($x2= 12.16$, df= 5, $p= 0.033$) ($x2= 23.78$, df= 3, $p<0.001$)
Conclusion: The study concludes that Orthodontic brushes are very useful to control plaque and calculus among orthodontic patients. During first year most of the patients neglect their oral health therefore their CPITN and Plaque Index are high.
Key Words: Periodontal Index, Plaque Index, Bleeding on Probing, Plaque

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INTRODUCTION

Anterior cross bites often result in stripping of the oral epithelium of lower incisors, and severe interrupt increased over bite may lead to destruction of the palatal. Orthodontic braces may correct these issues, or at least avoid them from progressing. It seems logical that straighter teeth are easier to maintain, and possibly having all the teeth centered in the alveolar housing and biting properly may support a periodontium. Orthodontic therapy may help periodontal health in these situations, but it also holds some potential to harm the periodontal tissues. Oral health may be more difficult to maintain during treatment, which may cause plaque formation and inflammatory reaction. Orthodontic bands placed subgingivally may encroach on alveolar bone. Soft- or hard-tissue defects may be present in extraction sites. As a result, periodontal results seem possible after orthodontic treatment [1].

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It has been shown that adverse changes in microflora occur shortly after placement of orthodontic appliances, and these are mirrored by increased plaque, bleeding, and probing depth [1-2]. These problems have been related to difficulties in maintaining oral hygiene, caused by the presence of orthodontic appliances, which can cause accumulation of bacterial plaque [3-4]. Some studies have reported that the placement of orthodontic appliances affects the subgingival microbial composition, thereby increasing the prevalence of periodontal pathogens [5-6].
Oral health maintenance during orthodontic treatment will help in good periodontal health status, which replicates in final orthodontic treatment results. But the level of oral health status among orthodontic patients is not sufficient as mostly they should not know about proper methods of orthodontic or regular brushes. Improper oral health is due to may be lack of knowledge or carelessness by patients themselves. Furthermore, Patients are not given proper instructions, which may be one strong reason for patient's non-cooperation [7].
Rationale: Importance of oral hygiene in orthodontic patients is always intensified to prevent any further periodontal disease.
The purpose of the study was to evaluate periodontal status of the patients during orthodontic treatment from the start of the treatment (0 to four month), at the eight months of the treatment (five to eight month

orthodontic treatment), at the end of one year treatment (nine month to one year orthodontic treatment), at the end of sixteen month treatment (thirteen month to sixteen month orthodontic treatment) and at the treatment end (16 months/post-ortho). In this study we authors also check the efficacy of orthodontic brushes in orthodontic patient.

MATERIALS AND METHODS

A randomized clinical trial / study were done from December 2013 to April 2014 at Liaquat College of Medicine and Dentistry (LCMD). The study protocol was approved by Ethical and Research committee of LCMD and written informed consent was collected from all the participants. The sample population includes randomly selected individuals, 415 in number among whom, 148 (35.7%) male and 267 (64.3%) female. All participants were between 20-30yrs of age and orthodontic patients in regular OPD. There was no exclusion criterion for this study.

All the participants undergone the self-administered questionnaire survey followed by a dental checkup to assess the periodontal status.

The study population were divided into groups as different groups according to receiving orthodontic treatment and use of orthodontic brushes to evaluate respective to their duration and use of brushes and then compared to assess difference of periodontal health status among them.

The clinical examination was performed at the orthodontic department in dental block of Liaquat College of Medicine and Dentistry under standardized condition; good equipment and illumination were provided. Before the examination of periodontal health status no dental prophylaxis was performed. All examinations were carried out using CPITN and Plaque index as an assessment tool. The study groups were assessed with CPITN and reported as healthy, bleeding, calculus or pocket as per the signs seen during clinical examination. With plaque index all participants were reported as **NO** (in absence of plaque), **1/3** (involving 1/3 surface of the crown), **>1/3** (involving more than 1/3 surface of crown), **>2/3** (when a more than 2/3 surface of crown was covered in plaque).

As per Statistical analysis, we used SPSS version 19 for statistical Analysis. We calculated mean value, standard deviation, standard error of mean, and χ^2

Ethical Considerations: The study protocol was approved by the Research and Ethical committee of the Liaquat College of Medicine & Dentistry Karachi and written informed consent was done by each participant.

RESULTS

The results were subjected to a clinical based trial analysis and presented in tables in which differences were considered statically significant for $p<0.001$, although chi-square test with (k) degree of freedom for the goodness of fit.

The study reports that total participants were 415, including 148(35.7%) male with cumulative percent of (35.7%) and females with cumulative percent of 267(64.3%). (Table 1)

In table 2 author analysed the duration of orthodontic treatment and periodontal health among orthodontic patients with the help of CPITN indexes which shows that most of the patients havehealthy periodontal health on the other hand calculus score is higher at the end of first year treatment. Statistical analysis were significant with $x2=137.9$, $df=20$, $p<0.001$ (Table 2).

Authors analysed plaque index reports plaque accumulation started from the bigening of treatment and gradually score were going to high in first year of treatment. Statistical analysis were significant with $x2=95.67$, $df=12$, $p<0.001$ (Table 3).

Orthodontic brushes play a significant role in orthodontic patient's periodontal health. Most of the patients who are using orthodontic brushes have healthy gums on the other hand calculus reports high in those who are not using orthodontic brushes. Statistical analysis were significant with $x2=12.16$, $df=5$, $p=0.033$ (Table 4).

Table No.1: Gender in Ortho Treatment

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	male	148	35.7	35.7	35.7
	female	267	64.3	64.3	100.0
	Total	415	100.0	100.0	

Table No.2: Duration in Ortho treatment and CPITN Depth Duration * CPITN Crosstabulation

Count		CPITN						Total
		healthy	bleeding	calculus	pocket 4 to 5	pocket 6	X:	
Duration	0 to 4 month	25	23	8	5	0	0	61
	5 to 8 month	10	31	65	6	2	0	114
	9 to 12 month	18	12	97	27	2	0	156
	13 to 16 month	4	6	25	17	0	0	52
	above 16 month	2	11	11	6	0	2	32
Total		59	83	206	61	4	2	415

($x2= 137.9$, $df=20$, $p<0.001$).

Table No.3: Duration and plaque index Duration * Plaqueindex Crosstabulation

Count		Plaqueindex				Total
		no	1/3	> 1/3	> 2/3	
Duration	0 to 4 month	8	47	2	4	61
	5 to 8 month	4	69	32	9	114
	9 to 12 month	0	63	60	33	156
	13 to 16 month	2	31	14	5	52
	above 16 month	0	8	8	16	32
Total		14	218	116	67	415

(x2= 95.76, df=12, p<0.001)

Table No.4: Ortho Brush and CPITN Relation OrthoBrush * CPITN Crosstabulation

Count		CPITN						Total
		Healthy	bleeding	calculus	pocket 4 to 5	pocket 6	X:	
OrthoBrush	Yes	49	32	74	18	0	0	173
	No	10	51	132	43	4	2	242
Total		59	83	206	61	4	2	415

(x2= 12.16, df= 5, p= 0.033)

Table No.5 : Ortho Brush and Plaque Index ratio
OrthoBrush * Plaqueindex Crosstabulation

Count		Plaqueindex				Total
		no	1/3	> 1/3	> 2/3	
OrthoBrush	Yes	0	92	27	15	134
	No	14	126	89	52	281
Total		14	218	116	67	415

(x2= 23.78, df= 3, p<0.001)

Authors analysed the uses of orthodontic brushes and plaque score. Reports between ortho brush and plaque index suggested that NO or less plaque seen in orthodontic brush user while most of the patients have plaque score those who are not using orthodontic brushes. Statistical analysis were significant with x2=23.78, df=3 and p<0.001. (Table 5).

DISCUSSION

The theory of study was that there is an effect in the periodontal health of the patients during fixed orthodontic therapy and using orthodontic brushes. The study results propped up the theory and showed a significant change in periodontal health of the patients.

A research was conducted at a private college hospital in Karachi, Pakistan that analyzed the periodontal health concerning the orthodontic male and female patients in order to determine the effectiveness of orthodontic brushes. According to the mathematical calculations the CPITN and Plaque index are high because the patients neglected to maintain their oral health. However, once the patients used the orthodontic brushes the CPITN and Plaque Index reduced significantly.

Though, Orthodontic treatment may improve periodontal health, it may also potentially harm periodontal tissues as oral hygiene is made more difficult to maintain resulting in plaque accumulation and thus gingival inflammation. The orthodontic appliances may affect the subgingival microbial composition and may also result in unfavorable changes in micro-flora which causes increased plaque, bleeding and probing depth.

If oral hygiene is well sustained during orthodontic treatment, a healthy gingiva will be persevered. But unfortunately, due to lack of adequate knowledge and improper use of orthodontic brushes, the orthodontic patients suffer periodontal diseases.

In anterior and posterior teeth quadrants showed different in the CPI score (p<0.05). As a result it was found that not only the brackets but also the bands control the oral health status. Similar observations were reported by different researches [8, 9, 10]. Mostly teenager patients are referred for orthodontic treatment and they often experience from plaque induce periodontal diseases. Obvious signs of periodontal disease in adults are a hindrance to being referred for orthodontic treatment. Almost every fixed orthodontic patient develops gingival disease at some time during treatment[11]. Gingivitis is mostly transient and resolves within weeks of removal of orthodontic braces. Contemporary bonded orthodontic appliances cause less gingival inflammation than banded appliances [12].

Mostly patients do not accurately know how to retain their good oral health which may be helpful to excellent orthodontic treatment results [13]. Regular brushing with

Orthodontic brushing is the best for healthy oral hygiene, while make longer brushing may twist the periodontal health. Abrasion are mostly caused by hard brushing. On awareness of oral hygiene, comparatively very few are having awareness while most of them are not aware of that.

CONCLUSION

The study concludes that Orthodontic brushes are very useful to control plaque and calculus among orthodontic patients. During first year most of the patients neglect their oral health therefore their CPITN and Plaque Index are high.

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Author's Contribution:

Concept & Design of Study:	Naheed Najmi
Drafting:	Naheed Najmi
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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