Assessment of Efficacy of Different Home Prophylactic Plaque Control Methods in Orthodontic Patients

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ABSTRACT

OBJECTIVE: The objective of the study is to determine the efficacy of different home prophylactic plaque control methods in patients undergoing orthodontic treatment.

MATERIAL AND METHODS: A cross sectional study was conducted at the Department of Orthodontics, Liaquat University of Medical & Health Sciences, Jamshoro and private orthodontic clinics in Hyderabad. The patients fulfilling the inclusion criteria were asked to chew the plaque disclosing tablet (EviplacPastilhas), swish it for 30 seconds, then asked to spit out and asked to wash once with drinking water, plaque score was calculated by using Turesky Modification of Quigley Hein plaque index. Selected patients were given a self-administered questionnaire regarding mechanical means of plaque control.

RESULTS: In this study 42% were male and 58% females. The mean age was 19.1 $\pm$ 2.47 years. The mean plaque score was 4.29$\pm$ 1.58 in this study. 62.9% patients were using regular tooth brush and 34.3% were using orthodontic tooth brush. 18.8%, 6.9%, and 3.7% patients were using inter-dental brush, tooth picks and dental floss respectively. The analysis of variance (ANOVA) test revealed no significant differences in different type of brush.

CONCLUSION: It is concluded that majority of orthodontic patients were cleaning their teeth either with orthodontic brush or regular tooth brush and very few patients were using interdental aids to control plaque. Both regular and orthodontic brushes were effective in controlling plaque with is statistically insignificant difference.

KEY WORDS: Interdental aids, Orthodontic fixed appliances, Oral hygiene, Plaque index, Tooth brush.

INTRODUCTION

Dental plaque is to be considered the main causative factor in dental caries and periodontal disease. Food stagnation increases the chances of plaque formation. Orthodontic treatment with fixed appliances is a high risk factor for plaque formation because there is more food stagnation areas.[1] Objectives of orthodontic treatment are to improve facial profile, align teeth and create better occlusion. This may lead to easing the task of maintaining oral hygiene for better dental health and prolong the life of the dentition.[2] Maintenance of oral hygiene is extremely important in orthodontic patients to control the plaque.[3]

Orthodontic treatment gadgets cover the more tooth surface which makes it difficult for patient to maintain oral hygiene. Poor oral hygiene increases the risk of plaque formation which may lead to chronic ailments and increases the chances of increased pocket depths and loss of periodontal support.[4] Mechanical cleansing of teeth is very essential for patients wearing fixed orthodontic appliances. Malocclusions and orthodontic appliances make it difficult and inconvenient in brushing. This in turn, creates the favorable environment for dental caries with deterioration of the ecologic balance of the oral flora.[5]

Orthodontic appliances alter the oral environment and increases levels of S mutansand lactobacilli.[5] Enamel decalcification around fixed appliances are frequent side effect of Orthodontic treatment if proper preventive measures have not been implemented. Thus plaque control is the main target to prevent the problems.[6, 7]

Some orthodontic patients are comfortable with regular brush and maintain oral hygiene properly. Inter-dental brushes are effective inter-proximally but inter-dental cleansing is difficult for orthodontic patients. Depending on the inter-dental space, some patients

may find this easier than using floss.[4] Assessment of dental plaque and effect of different mechanical aids to control plaque is essential in evaluation of oral hygiene of patients undergoing Orthodontics treatment. The purpose of this study was to assess the effect of different mechanical aids for plaque control in orthodontic patients.

METHODOLOGY

A cross sectional study was conducted from 19th September 2013 to 18th March 2014 at the Department of Orthodontics, Liaquat University of Medical & Health Sciences, Jamshoro and private orthodontic clinics in Hyderabad. Approval was sought from the ethical committee of university and informed written consent was taken from all patients.

The patients were selected with non-probability purposive sampling technique. Patients' with13-25 years age of either gender, permanent dentition up to 2nd molar, having no enamel defects or restorations involving the buccal surface, no remarkable periodontal problems, and good general health were included in the study. The exclusion criteria were the patients with crown, bridge and those who used mouth washes in the previous 4 weeks.

The online Epi calculator was used to calculate sample size. The sample size was calculated at a 95% confidence interval, with 0.3% estimated proportion of plaque and 0.05 desired precision of estimate from the 1000 population size. The required sample size was 245.[8]

Each patient was examined visually using adequate light and mouth mirror. The patients fulfilling the inclusion criteria were asked to chew the plaque disclosing tablet (EviplacPastilhas)[9],swish it for 30 seconds, spit out and wash once with drinking water as per manufacturer's instructions to decrease the false positive results. The plaque score was calculated by using Turesky Modification of Quigley Hein plaque index[10]. Selected patients were given a self-administered questionnaire regarding mechanical means of plaque control.

The data was analyzed by SPSS version 16. Categorical variables like gender, type of tooth brushes and Interdental aids were presented as simple descriptive statistics. Continuous variables like age, plaque score were recorded as mean and SD. One way ANOVA test was applied to assess the plaque score in different type of tooth brushes. The level of significance was set to < 0.05 at 95% Confidence Interval.

RESULTS

The descriptive statistics are given in Table I for gender, type of tooth brushes and Interdental aids. 42% patients were male and 58% female with mean age 19.1 ± 2.47 years, participated in the study. 62.9% and 34.3% patients were using regular tooth brush and orthodontic tooth brush respectively while 2.9% patients were not using any brush. For cleaning interdental areas of teeth 18.8%, 6.9%, and 3.7% patients were using interdental brush, tooth picks, dental floss respectively

The mean plaque score was 4.29 ± 1.58 in this study. The analysis of variance (ANOVA) test revealed no significant differences in different type of brush (Table II). The level of significant was set to > 0.05.

TABLE I: BASE LINE CHARECTERISTICS OF ORTHODONTICS FIXED APPLIANCE PATIENTS

Base Line Characteristics of Patients	N (%) / 245
GENDER Male Female	102 (41.5) 143 (58.4)
TYPE OF TOOTH BRUSH Regular tooth brush Orthodontic tooth brush No brush	154 (62.9) 84 (34.3) 7 (2.9)
INTERDENTAL AIDS Interdental Brush (IB) Tooth Picks (TP) Dental Floss (DF) Combine (IB,TP and DF) NONE	46 (18.8) 17 (6.9) 9 (3.7) 29 (11.8) 144 (58.8)

TABLE II: ASSESSMENT OF PLAQUE LEVEL WITH TYPE OF BRUSHES AND NOT BRUSHING

	N	Mean	Std. Deviation	P-Value
Regular brush	154	2.531	1.9152	
Orthodontic brush	84	2.279	.6192	
No brushing	7	3.686	1.1582	0.062
Total	245	2.477	1.5877	

DISCUSSION

Many types of cleansing tools are used for maintenance of oral hygiene across the globe; tooth brush is most commonly used device. Da`aeh MD[11] reported

that 97% of subjects used the regular tooth brush. Present study has found that 63% of the patients used regular tooth brush and 34% used orthodontic brush. This is might be the effect of instructions given to control plaque at each assessment time which may have motivated the patients. Attasi and Awartani[12] accredited in their study that most of the orthodontic patients were using regular tooth brush.

In present study 2.9% of the patients were identified as poor compliers that reflect the lack of awareness and ignorance of treatment need. Beside the regular toothbrushes, a considerable number of subjects were using additional means like Interdental toothbrush 19%, tooth picks 07% and dental floss 07% to clean their teeth inter-dentally. In a study of Da`aeh MD[11] 14.4% of the subjects used inter-dental brush while 18.1% used the dental floss as an additional measure to remove plaque. In other studies, patients reported that the use of brushes was easier than the use of dental floss.[13-15]

There was an insignificant difference in reducing plaque score between different types of tooth brushes. This finding does not support our hypothesis. Our study confirms previous studies that no evidence has shown that a specific type of tooth brush are superior to each other. [16,17]

Williams P[18] concluded in his study that orthodontic tooth brush is better in removing plaque. Research conducted by Reitman WR[15] was unable to verify the superiority of orthodontic tooth brush. This study was conducted on those patients who were wearing orthodontic brackets and braces therefore the results of this research may not be valid for those patients who are using clear aligners and removable appliances. However it has been tried to provide information regarding the mechanical aids used by fixed orthodontic patients to control the plaque.

CONCLUSION

Patient with orthodontic fixed appliance either using regular tooth or orthodontic brush effectively control plaque and deference if any is insignificant.

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