IJBPAS, August, Special Issue, 2021, 10(8): 816-830

ISSN: 2277–4998

International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS)

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

PREVALENCE OF PATIENT WHO REQUIRE PROFESSIONAL ORAL PROPHYLAXIS WITHIN 6 MONTHS OF FIXED ORTHODONTIC TREATMENT IN THE CHENNAI POPULATION - A RETROSPECTIVE STUDY

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Received 19th March 2021; Revised 25th April. 2021; Accepted 20th May 2021; Available online 1st Aug. 2021

https://doi.org/10.31032/IJBPAS/2021/10.8.1054

ABSTRACT

The aim of the study was to determine the prevalence of the patients who require professional oral prophylaxis within 6 months of fixed orthodontic treatment in the Chennai population. This study was a single university based retrospective study where data collection was done from previous patient records after a thorough review. 221 participants who fulfilled the inclusion criteria were randomly selected for the study. Prevalence of need of oral prophylaxis was calculated according to data collected. According to the results obtained 4% of the total subjects screened required professional oral prophylaxis within 6 months of fixed orthodontic treatment. Within the limits of the study it can be concluded that high quality of patient motivation and education was done post treatment. It can also be stated that the patients in the study population were highly educated.

Keywords: Oral prophylaxis; orthodontic treatment; oral hygiene maintenance; Chennai

INTRODUCTION

Poor oral hygiene can affect one's lifestyle in a bad way, maintaining good oral hygiene is a challenging task normally which becomes even more challenging once the fixed orthodontic appliances are in place **[1-3]**. The wires and the brackets along with other components present is a favourable condition for plaque accumulation. Rapid plaque accumulation results in a shift in bacterial colonies from favourable to unfavourable bacteria which in-turn results in increased acid production , demineralisation and incipient carious lesions **[4-6]**.

Previous studies show that these incipient lesions can occur as early as 2-3 weeks post binding of the orthodontic brackets if proper oral hygiene is not maintained **[7]**. Studies have showed that minimal periodontal lesion, bone loss and caries has high chance of occurrence if proper oral hygiene is not maintained post treatment. A study done by shivesh acharya *et al* **[8]** he used 3 different techniques in three groups and their effectiveness on improving the gingival health during orthodontic treatment was assessed. Plaque accumulation not only affects the oral health but also causes periodontal conditions and pyorrhea which not only affects the oral health of the patient but also affects the social life of the individual as well **[9-11]**. The aim of the study was to evaluate the prevalence of the individuals who required oral prophylaxis within 6 months of fixed orthodontic treatment in the chennai population and correlating its effect with other causative factors.

MATERIAL AND METHODS

This was a retrospective analytical study carried out on Saveetha Dental College and Hospital. Patient records were reviewed from the database and study samples were selected. Study setting was selected considering the affordable treatment charges in the University for a larger sample size. Study was done only after acquiring all essential university and ethical clearance from the review board of saveetha dental college and hospital. Inclusion and exclusion criteria for the study were as follows: Inclusion criteria are Complete patient records, Ongoing orthodontic treatment (started within past 6 months), Absence of any systemic conditions that may limit patients ability to maintain oral hygiene (eg. cerebral palsy , motor neuron disease) and Patient with treatment consent forms; Exclusion criteria are Patients without consent forms, Presence of systemic conditions, Patients with treatment duration

of more than 6 months and Incomplete records. Patients who fulfilled these inclusion criteria were randomly selected to be included in the study by a third person who was not part of the study to minimise the selection bias.

Study parameters:

Present study includes 204 individuals who satisfied the inclusion criteria were checked for the following parameters:

1. Patient records of scaling done within 6 months of the fixed orthodontic treatment.
2. Demographic data (Age, medical and dental history)
3. Pre-treatment OHI-S score.
4. Dental Malocclusion.
5. Type of orthodontic bracket used.

Statistical Analysis: IBM SPSS version 20 was used to statistically analyse the collected data and the chi square test was used to analyse the data and to find out the possible correlations between the analysed variables.

RESULTS AND DISCUSSION

Results from the analysis of the collected data were as follows: Higher incidence of oral prophylaxis amongst the individuals who had OHI-S scores in the range of 2.5-4 **(Table 1) (Figure 1)**. No significant correlation could be based on the type of pretreatment malocclusion with the need of oral prophylaxis **(Table 2) (Figure 2)**. According to results **(Table 3)** no incidence or need of professional oral prophylaxis in the patients where ceramic brackets were fixed **(Figure 3)**. Out of 221 candidates which were screened 4.1% of the individuals underwent professional oral prophylactic treatment within 6 months of the commencement of the orthodontic treatment **(Figure 4)**.

No significant association was found between pretreatment OHI-S score and the need for oral prophylaxis as the patients' education, motivation, periodic dental visits were enough to avoid the need of professional oral prophylactic treatment **[12]**. Orthodontic treatment is done to correct the malocclusion not only for aesthetic reasons but also for the functional benefit. Researchers have found that incidence of caries and ability to maintain proper oral hygiene also the periodontal condition depends on the type of malocclusion present, although not an absolute cause. No significant association could be found in the present study between pre-treatment malocclusion and need for professional oral prophylaxis **(Table 2) [13, 14]**. Study done on plaque accumulation and demineralization on different types of orthodontic brackets coincides with the results found in the current

study which states that plaque accumulation around ceramic brackets is significantly less that around conventional metal brackets which use the elastic rings also least amount of plaque accumulation is found in cases of self ligating orthodontic brackets as modules or ligature wire is not required **[15–17]**. As cost for ceramic as well as self ligating orthodontic treatment is considerably higher than that of the conventional metal brackets, so more cases are done using the conventional brackets. As an equal number of patients could not be included in all the three groups due to the trend of going for the economical conventional metal brackets, statistical significance cannot be found **(Table 3)**.

This topic was selected based on a study which stated that maintenance of oral hygiene amongst the patients undergoing orthodontic treatment possess a greater problem **[18-20]**. Most of the studies use some type of disclosing agent for patient motivation and education. In most of the studies published, erythrosin and 2% mercurochrome are used as disclosing agents the red colour of the dye is bright enough to motivate the patient and the areas where extra care has to be taken while brushing. This also elucidated the effectiveness of brushing technique in maintaining oral hygiene **[21, 22–25]**.

Boyd *et al.* conducted a study to evaluate the effects of the plaque control measures on gingivitis and found that structured plaque control programs only were effective in reducing the plaque and gingivitis provided there was a periodic reinforcement at 4-7 week intervals **[2]**. Principles and techniques demonstrated in this study are strictly followed in the department of orthodontics in saveetha dental college where high emphasis is given on periodic recall and reinforcement of oral hygiene instructions along with model demonstrations and audio visual aids for better patient understanding and to keep the patients motivated throughout the treatment duration **[9, 10, 26–39]**.

A study done by Shivesh Acharya *et al.* showed that use of phase contrast microscope as a patient motivational tool for oral hygiene, reduction in visible plaque can be achieved and maintained at significant levels for up to 7 months. In the same study three groups were given three different techniques to maintain oral hygiene (phase contrast microscope , conventional plaque control and chair side motivational test) it was found that all three of the techniques yielded similar effects when periodic

reinforcements were done **[8, 18,21,33,40–45]**.

Level of patients' education plays an important role in maintaining oral hygiene. Highly educated people tend to have a better attitude and perspective towards maintenance of oral hygiene during and post orthodontic treatment. Hence level of patient education may also plays a key role in the outcome and prognosis of the treatment **[2, 46, 47]**; **[8] [48–50]**. Study found that oral hygiene can be effectively maintained by patient education and periodic dental visits which was also found in the present study **[12]**.

Limitations of the study were being a single university based sample predisposing to higher chances of screened patients belonging to a particular area of the city where the college is situated, convenience sampling bias and limited sample size. The future prospects of the study would be to take into consideration similar oral hygiene maintenance and motivation protocol that has to be followed in coming years to maintain the rate of the patients who require professional oral hygiene treatment as low as found in this study. It can be further reduced by studying and analysing the cases prospectively for better outcome.

Table 1: Comparison of Mean OHI-S in both groups

ORAL PROPHYLAXIS	N	Mean OHI-S Scores	Std. Deviation	Std. Error Mean	F*	Sig.
NOT REQUIRED	212	1.5996	1.22391	.08406	1.068	0.303
REQUIRED	9	1.7556	1.45698	.48566		

***Unpaired T-Test (p<0.05)**

Table 2: Distribution of Types of Malocclusion in both groups

			MALOCCLUSION			Total
			CLASS I	CLASS II	CLASS III	
ORAL PROPHYLAXIS	NOT REQUIRED	Count	107_a	99_a	6_a	212
		% within MALOCCLUSION	95.5%	96.1%	100.0%	95.9%
	REQUIRED	Count	5_a	4_a	0_a	9
		% within MALOCCLUSION	4.5%	3.9%	0.0%	4.1%
Total		Count	112	103	6	221
		% within MALOCCLUSION	100.0%	100.0%	100.0%	100.0%

($_a$ - Each subscript letter denotes a subset of MALOCCLUSION categories whose column proportions do not differ significantly from each other at the .05 level.)

Table 3: Distribution of individuals in different categories / types of orthodontic brackets used for the fixed orthodontic treatment

			BRACKETS			Total
			CERAMIC	METAL	SELF LIGATING	
ORAL PROPHYLAXIS	NOT REQUIRED	Count	10_a	184_a	18_a	212
		% within BRACKETS	90.9%	95.8%	100.0%	95.9%
	REQUIRED	Count	1_a	8_a	0_a	9
		% within BRACKETS	9.1%	4.2%	0.0%	4.1%
Total		Count	11	192	18	221
		% within BRACKETS	100.0%	100.0%	100.0%	100.0%

($_a$ - Each subscript letter denotes a subset of BRACKETS categories whose column proportions do not differ significantly from each other at the .05 level.)

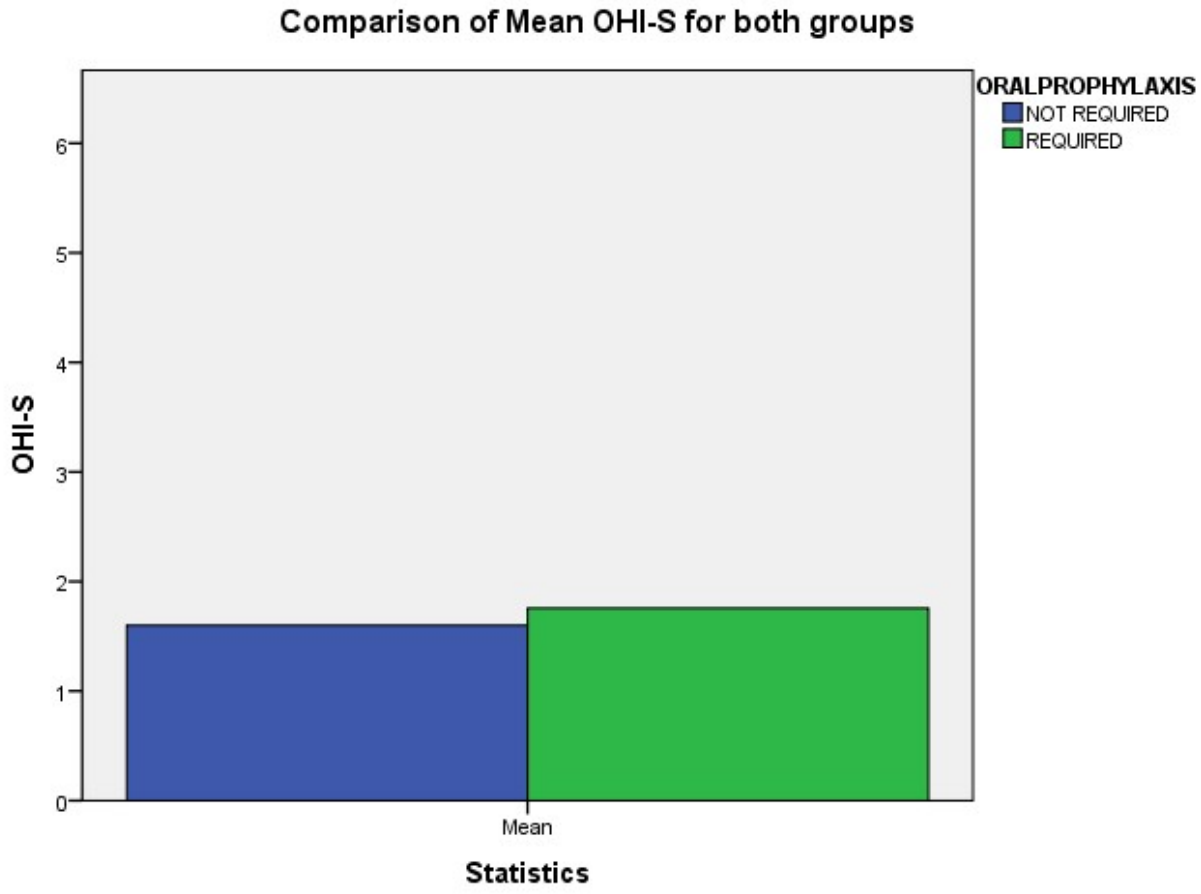

Figure 1: Bar chart showing correlation between mean pretreatment OHI-S (oral hygiene index simplified) and the need for professional oral prophylaxis. X axis represents the 2 groups depending on whether the professional oral prophylaxis was performed. Y axis represents the pre-treatment OHI-S values of the groups. The mean pretreatment OHI-S values did not differ significantly between the groups (T-Test F value: 1.068; p value: 0.303)

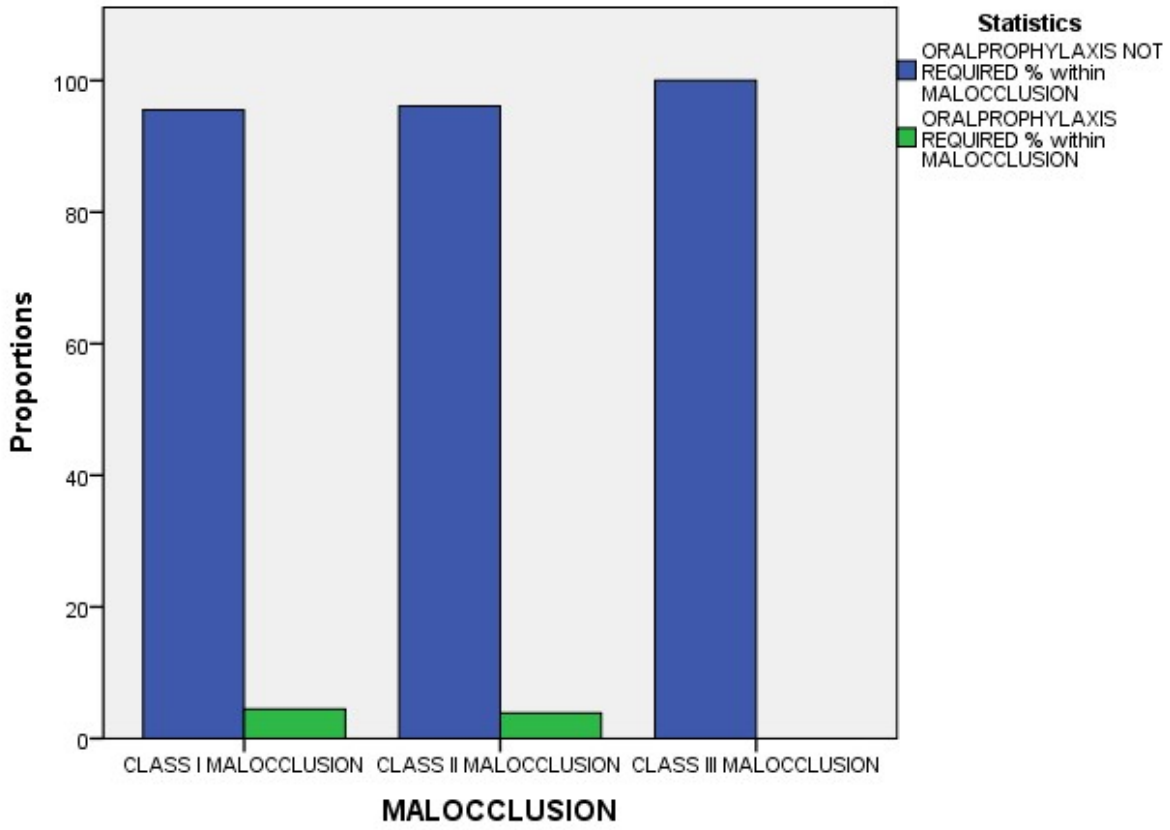

Figure 2: Bar chart showing distribution of the type of Dental malocclusion present in both the groups. X axis represents the 3 groups based on the type of malocclusion. Y axis represents the proportions of cases included in each group based on the oral prophylaxis required.
Oral prophylaxis requirement did not depend on the classes of malocclusion which could be inferred from the figure. The subsets of MALOCCLUSION categories and their proportions do not differ significantly from each other at the .05 level (Pearson Chi-Square Value - 0.308).

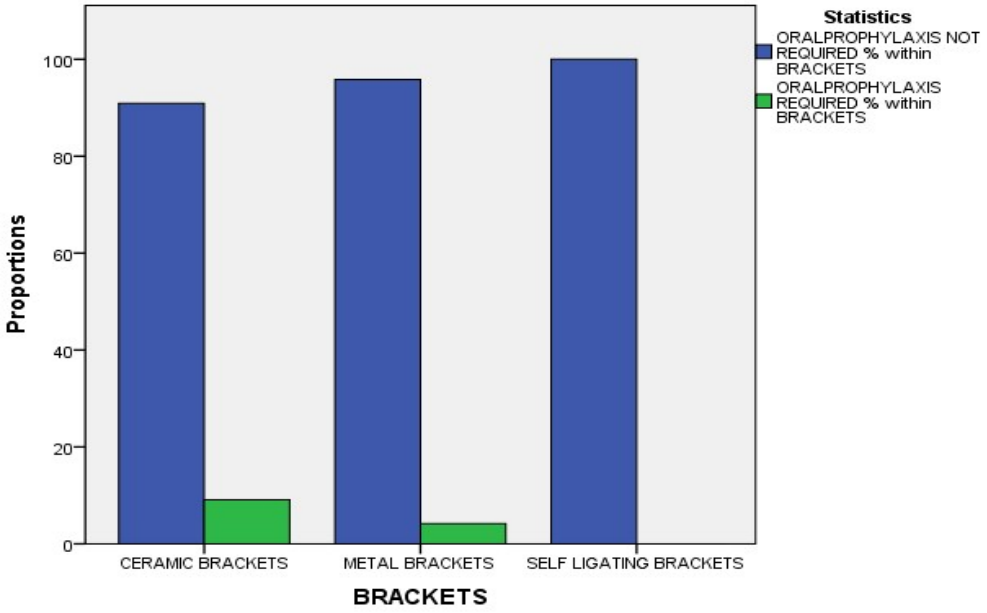

Figure 3: Bar chart showing correlation between type of orthodontic bracket used and the need of oral prophylaxis within 6 months of orthodontic treatment. X axis represents the 3 groups based on the type of orthodontic brackets. Blue color bar indicates the proportions of the cases where oral prophylaxis was not required in each Bracket group; Green color bar indicates the proportions of the cases where oral prophylaxis was required in each Bracket group. Y axis represents the proportions of cases included in each group based on the oral prophylaxis requirement. Cases with self ligating brackets did not have a single incidence for oral prophylaxis requirement was the only inference from this graph but the subsets of BRACKETS categories and their proportions do not differ significantly from each other at the .05 level (Pearson Chi-Square Value - 1.478).

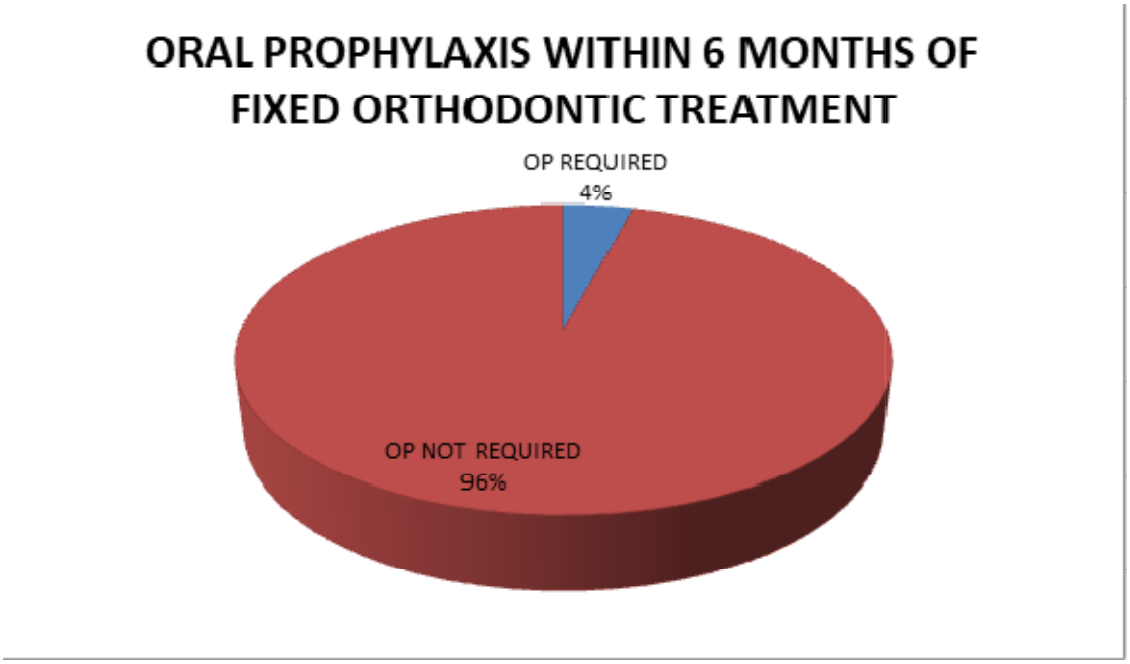

Figure 4: Pie chart depicts the Prevalence of Professional Oral Prophylaxis (OP) performed accounting for 4.1% in the selected population.

CONCLUSION

Pre-treatment oral hygiene index, type of malocclusion and the type of orthodontic bracket used to treat the case were found to be insignificant when compared with the primary variable. Although evidence showed least amount of plaque accumulation in cases of self ligating brackets it was found to be insignificant in this study as the proportions did not differ significantly between the oral prophylaxis groups. Periodic reinforcement and implementation of various motivational and educational techniques to maintain oral hygiene post fixed orthodontic treatment has certainly affected the number of people who require the professional oral prophylactic treatment in the selected population which was 4.1% of the total sample in saveetha dental college and hospital. This result may be attributed to the highly skilled clinicians, periodic recall and oral hygiene reinforcement also to the majority of highly educated and motivated patients.

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