

Oral Hygiene status among patients treated with fixed orthodontic appliance in the Department of Orthodontics in BSMMU

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ABSTRACT

Background: Oral hygiene maintenance is difficult for patients who are receiving fixed orthodontic treatment.

Objective: The aim of the study was to find out deterioration of oral hygiene status during treatment of fixed orthodontic appliances in the Department of Orthodontics in BSMMU.

Methodology: This cross sectional study was carried out in the Department of Orthodontics at Bangabandhu Sheikh Mujib Medical University, Dhaka from July 2013 to July 2014. All the patients taking treatment with fixed orthodontic appliances for more than 6 months were included as study population. During treatment in the OPD all the information of the patients' oral hygiene maintenance like brushing, dental floss use, use of mouthwash, and history of sugar consumption, taking sticky food were recorded. The Orthodontic Plaque Index (OPI) was calculated and recorded. In addition to that frequency of brushing, type of tooth brush, technique of brushing and inter dental brush were also considered.

Result: A total number of 100 patients were studied. Mean OPI was 81.78 (22.97). Mean value of OPI was 86.35 (13.27) among patients who brushed their teeth once a day but it was decreased gradually as the patients increased frequency of toothbrush use per day and became 85.74 (± 26.12) among the patients who brushed their teeth thrice a day. Mean value of OPI was 81.98 (± 23.27) who did not use dental floss and 75.00 (± 7.00) who used dental floss once a day. Mean value of OPI was 84.65 (± 23.10) who used inter dental brush irregularly but 35.00 (± 0.00) who used it thrice a day. Mean value of OPI was 85.70 (± 22.43) who did not use mouth wash whereas it reduced to 46.00 (± 0.00) among them who used mouth wash thrice a day.

Conclusion: All the indexes of oral hygiene are increased in patients treated with fixed orthodontic appliances in the Department of Orthodontics in BSMMU.

Key Words: Orthodontic Plaque Index (OPI), oral hygiene, fixed orthodontic appliance.

INTRODUCTION

Oral hygiene maintenance becomes difficult during fixed orthodontic treatment. These create some stagnation area where chances of plaque accumulation is more. Patients who have poor oral hygiene have increase chance of development of gingivitis, which may lead to loss of gingival attachment. There are complications frequently encountered in orthodontic treatment like any treatment modality.¹ There are habits and techniques that can be utilized to minimize such complications in the course of orthodontic treatment. Dental decay usually occurs on smooth surfaces and is a common complication in orthodontics, affecting 2% to 96% of all orthodontic patients.² It has been also reported that there is an increase in stimulated salivary flow rate, pH, buffer capacity, Plaque Index (PI) scores, and the levels of lactobacilli after three months of active orthodontic treatment.³ During the first six months of treatment, a significant modification of oral microbial is found in subjects with fixed appliances. These

outcomes suggest that the risk of gingivitis during their months of therapy was high, and the risk of periodontitis could not be excluded.⁴

The margins of orthodontic bands usually run along proximal to the subgingival area. Plaque accumulation in the subgingival band margins can be a factor in the development of periodontal diseases.⁵ This periodontal condition may persist even after the orthodontic treatment has concluded.⁶ Orthodontists and dental hygienists are all too familiar with the oral hygiene problems that may be initiated by fixed appliances massive initial lesions and even more-advanced enamel loss following removal of the wires and brackets.⁷ Therefore, a high standard of oral hygiene is essential for patients undergoing orthodontic treatment.⁸ Effective oral hygiene programs are needed to help preventing periodontal diseases in orthodontic patients.

Increased risks of dental decay are due to several factors, the carious lesions are difficult to locate; the lowering of resting pH; increased volume of dental plaque; and rapid shift in bacterial flora.⁹

Most patients are able to prevent decay with a combination of proper diet, optimal self care such as tooth brushing and interdental cleaning, and regular checkups.¹⁰ Oral hygiene instruction is essential in all cases of orthodontic treatment, and the use of adjuncts such as power or electric toothbrushes, interproximal brushes, chlorhexidine mouthwashes, fluoride mouthwashes, and regular professional cleaning must be reinforced.¹¹ However, patient motivation and dexterity are vital in the success of oral hygiene.

In order to reduce these clinical problems, the effects of an oral hygiene instruction & intervention program for orthodontic patients are necessary to investigate. The aim of the present study was to find out the status of oral hygiene in orthodontic patients treated in the orthodontic department in BSMMU.

MATERIALS AND METHODS

This cross sectional study was carried out in the Department of Orthodontics at Bangabandhu Sheikh Mujib Medical University, Dhaka from July 2013 to June 2014 for a period of one year. Patients of any sex taking treatment with full mouth fixed orthodontic appliance for more than 6 months were selected for this study. Patients who were treated with removable appliance or under single arch treatment or had history of taking antibiotics in last 3 months or periodontal treatment within 1 month excluded from the study. Before taking consent, patients were explained the total procedure of the study, about the nature of the disease, possible options of treatment as well as its justification of treatment. A questionnaire was designed to collect data. During taking treatment in the OPD all the information of the patients like frequency of brushing, type of tooth brush used, use of inter dental brush dental floss use, mouthwash, sugar consumption, taking sticky food, were recorded. The Orthodontic Plaque Index was calculated and recorded.

RESULT

In our study, Female were predominant by male. Female were 76% where as male only 24%. Male female ratio was 1:3.16. Fifty two patients age was >20 years and 48% patients age was ≤20 years. Mean (SD) age of the patients was 20.49 (4.74) within the range of 12 – 30 years (Table 1). Mean (SD) OPI was 81.78 (22.97) (Table 2).

Mean value of OPI was 87.35 ± 25.49 among the patients who used medium soft and 77.74 ± 20.23 who used soft tooth brush. Difference was statistically significant. Mean value of OPI was 86.35 ± 13.27 among patients who brushed their teeth once a day and it was decreased gradually as the patients increased frequency of toothbrush use per day. The

difference between the frequencies of toothbrush use per day in OPI was statistically significant (Table 3).

Mean value of OPI was 81.98 ± 23.27 who did not use dental floss and 75.00 ± 7.00 who used dental floss once a day. Difference was not statistically significant (Table 4).

Mean value of OPI was 84.65 ± 23.10 who used inter dental brush irregularly, it was decreased gradually as the patients increased frequency of use of inter dental brush per day and it was followed by 82.14 ± 14.61, 65.66 ± 6.34 and 35.00 ± 0.00 who used inter dental brush once, twice and thrice a day. The difference was statistically significant (p<0.05) (Table 4).

Mean value of OPI was 85.70 ± 22.43 who used mouth wash irregularly, it was decreased gradually as the patients increased frequency of mouthwash per day and it was followed by 66.33 ± 2.50, 51.00 ± 5.77 and 46.00 ± 0.00 who used mouthwash once, twice and thrice a day. The difference was statistically significant (p<0.05) (Table 4).

Table 1: Distribution of patients by age (n=100)

	Frequency	Percent
Gender		
•Male	24	24.0
•Female	76	76.0
Age		
•≤20	48	48
•>20	52	52
Mean ± SD (Min – Max)	20.49 ± 4.74 (12 - 30)	

Table 2: OPI score of the patients

	Mean ± SD	Min - Max
OPI	81.78 ± 22.97	35.00 - 126.00

Table 3: OPI according to type and frequency of toothbrush use per day

	OPI
Type of brush used by patients	
Medium soft (n=42)	87.35 ± 25.49
Soft (n=58)	77.74 ± 20.23
p value	0.038
Frequency of toothbrush use per day	
Once a day (n=17)	86.35 ± 13.27
Twice a day (n=54)	85.14 ± 22.58
Thrice a day (n=23)	61.78 ± 16.88
p value	0.001

Table 4: OPI according to use of dental floss, inter dental brush and mouth wash by patients

	OPI
Use of dental floss	
Never (n=97)	81.98 ± 23.27
Once a day (n=3)	75.00 ± 7.00
p value	0.606
Use of inter dental brush	
Irregular (n=82)	84.65 ± 23.10
Once a day (n=7)	82.14 ± 14.61
Twice a day (n=9)	65.66 ± 6.34
Thrice a day (n=2)	35.00 ± 0.00
p value	0.004
Use of mouth wash	
Irregular (n=85)	85.70 ± 22.43
Once a day (n=9)	66.33 ± 2.50
Twice a day (n=4)	51.00 ± 5.77
Thrice a day (n=2)	46.00 ± 0.00
p value	0.001

DISCUSSION

Orthodontic treatment is a great extent dependent on the biological response of the periodontal tissues.¹² An important factor which contributes to periodontal disease is plaque formation. Plaque is a dynamic entity being constantly removed by brushing and it builds up in areas of stagnation.

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In our study mean (SD) of OPI was 81.78 (22.97) whereas it was 53 (8.74) in the study of Atassi and Awartani.¹⁴ Our OPI was higher considering their results; this may be due to the variation of socioeconomic status of two countries.

In our study majority of the patients' are in the age group of more than 20 years. Since abnormal bites, or malocclusion, are first noticed between the ages of 6–12 years as the permanent teeth erupt, most orthodontic treatments occur between 8 and 14 years old.¹⁵ However, it is possible for orthodontic treatment to be carried out at any age if the mouth and teeth are healthy.¹⁶

In this study female were predominant than male which clearly indicates that female are more commonly treated with orthodontics appliances. The reason may be due to the cosmetic purposes which have been more adopted by the female.

Mean value of OPI decreased gradually as the patients increased frequency of toothbrush use per day. The differences between the frequencies of toothbrush use per day in OPI was statistically significant. Similar result has been reported

by Atassi and Awartani.¹⁴ Furthermore, tooth brushing is the first line of defense for most patients but unless there is attention to placement and positioning of the bristles, plaque may remain on the teeth, especially around the brackets or bands.¹⁷ A systematic review on non-orthodontic individuals showed that a single brushing produced an average of 43% plaque removal.¹⁸

OPI was less among the patients who used soft toothbrush comparing among the patients who used medium soft toothbrush. Gradual decrease of OPI value indicates that the use of soft tooth brush is better than the medium soft brush among the orthodontic patients.^{14,19}

Mean value of OPI was higher among them who did not use dental floss comparing them who used dental floss once a day. Similar to the present study result Cutler et al have reported that OPI value decrease due to use of dental floss which is consistent with the present study result.²⁰

Mean value of OPI decreased gradually as the patients increased frequency of inter dental brush use per day. Similarly Slot et al have reported that inter dental brushes are often recommended to clean around orthodontic appliances, as well as, open inter dental spaces which gives the removal of dental plaques among the orthodontic patients and this is consistent with the present study result.²¹

Mean value of OPI decreased gradually as the patients increased frequency of mouthwash per day. Similar to the present study Atassi and Awartani have reported that regular use of mouth wash decrease the OPI value.¹⁴

Conclusion:

Orthodontic Plaque Index of oral hygiene is increased in patients treated with fixed orthodontic appliances in the Department of Orthodontics in BSMMU. Use of soft tooth brush, frequent use of mouth wash, use of dental floss, regular cleaning of teeth by inter dental brushes decreased OPI index significantly.

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