ASSESSMENT OF ENAMEL DECALCIFICATION IN ORTHODONTIC PATIENTS.

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Research Article

ABSTRACT:

Introduction: Enamel decalcification in the form of white spot lesion is a common complication seen in patients with Fixed orthodontic appliances.

Aims and Objective: To determine the prevalence of white spot lesion among Fixed orthodontic patients, to compare the occurrence of WSL among the patients with lesser and greater duration of treatment, and to compare between the gender groups.

Materials & Method: A cross-sectional study was done to compare the prevalence of WSL between 300 orthodontic patients and 100 non-orthodontic subjects. Further comparison was done between the mean treatment duration between orthodontic subjects of 6-18 months and >18 months, and between male and female samples. Subjects were visually examined on second premolar to second premolar in both maxillary and mandibular arches using Gorelick's WSL index. Descriptive statistics were calculated and independent t-test was used to compare the difference between the groups. The p-value <0.05 was considered significant.

Result: The prevalence of WSL in orthodontic patients was 54.3%; among them prevalence was 40% in lesser treatment duration group and 68.7% in greater treatment duration group. The study found significant difference between untreated non-orthodontic group and orthodontically treated group with respect to the number of teeth affected with WSL. Also, there was significant difference between the categories of orthodontic treatment duration. There was no significant difference between male and female samples.

Conclusion: Fixed orthodontic treatment increase the risk of white spot lesion. Duration of orthodontic treatment also showed significant increase in the occurrence of WSL.

Key words:

Fixed orthodontic appliance, oral hygiene, plaque, white spot lesion.

Source of support : Nil

Conflict of interest: None

INTRODUCTION: Enamel decalcification in the form of white spot lesion (WSL) is a common side effect seen in patients with fixed orthodontic appliances. Review of literature on prevalence of WSL associated with orthodontic treatment showed various reports ranging from 2% to 97%. [1-3] The occurrence of white spot lesion is related to increased susceptibility of plaque accumulation and retention on tooth surface around the orthodontic brackets and auxiliaries of the fixed orthodontic appliance system. The cleansing of such areas requires extra time and effort by the patient using additional cleansing aids, frequent motivation and reinforcement by the orthodontist. The white spot lesion has been defined as the subsurface enamel porosity from carious demineralization that presents itself as a milky white opacity when located on smooth surfaces. [4] This surface retains its ability to be remineralized with the shift in environment to increase in fluoride availability and decrease in plaque accumulation.

When there is unfavorable condition of increased duration of plaque retention, such white lesions cause break in the enamel surface continuity leading to cavitation. [5-6]

The present study aims to determine the prevalence of white spot lesion among fixed orthodontic patients and compare with the untreated normal subjects. The study also attempts to compare the occurrence of WSL among the patients with lesser and higher duration of fixed orthodontic treatment and compare the occurrence of WSL between gender groups.

MATERIALS AND METHOD:

The cross sectional study was conducted at Vardhman Institute of Medical Sciences, Pawapuri, to determine the prevalence of white spot lesion among orthodontic patients and non-orthodontic subjects. The study was approved by the institutional research committee.

The purposive sampling was done to compare the prevalence of WSL of 100 orthodontic patients (study group) with 100 untreated subjects (control group). The study group was further divided into two categories based on the treatment duration of 6-18 months and more than 18 months to assess the occurrence of WSL between two categories. All subjects were within the age range of 13-30 years representing both genders. The study group comprised of orthodontic patients with fixed appliance of 0.018" MBT brackets in both arches. The subjects comprised of all types of malocclusions with more than 6 months of treatment duration. The control group comprised of similar age cohorts with normal occlusion or varying degree of malocclusion without the previous history of orthodontic treatment.

The teeth considered for examination were second premolar to second premolar in both maxillary and mandibular arches. Molars were excluded from the study as many molar teeth were banded obviating the visibility for WSL. The missing teeth were not considered in the study. The informed written consent was taken from the subjects before examination. The teeth were visually examined on the buccal surface after removing plaque with the help of instruments and air water spray drying. Gorelick's WSL index[1] was used to determine the white spot lesion. Examination was done in the dental chair with good illumination.

Data analysis was done using SPSS version 10.0 software program. Descriptive statistics were calculated and independent Student's t-test was used to compare the difference between the groups. The $p < 0.05$ was considered significant and confidence level was predetermined at 95%.

CONCLUSION:

The present study agrees with various other studies that the fixed orthodontic treatment increase the risk of white spot lesion in mild to moderate form, seldom leads to cavitations. The occurrence of WSL is significantly higher in fixed orthodontic patients as compared to non-treated subjects.

RESULT:

The samples comprised of 100 orthodontic patients and 100 untreated subjects. The orthodontic subjects with treatment duration 6-18 months were 50 and more than 18 months were 50 in number. The mean age of the orthodontic subjects was 19.19 years (SD 4.515) and the mean is of non-orthodontic subjects was 19.63 years (SD 4.069). The female subjects were 185 and male were 115 among the orthodontic subjects.

Descriptive statistics of mean, standard deviation and range of the number of teeth affected with white spot lesion among

non-orthodontic and orthodontic groups is given in Table 1.

Table 1: Descriptive Statistics of number of teeth involved with WSL.

Group	Number (n)	Mean	SD	Range
Untreated non-orthodontic	100	0.65	1.925	0 - 13
6-18 months orthodontic	50	1.04	1.621	0 - 9
> 18 months orthodontic	50	2.71	3.180	0 - 20
Total orthodontic	100	2.40	3.080	0 - 20

The prevalence of WSL in orthodontic patients was 54.3%; among them prevalence was 40% in 6-18 months treatment duration group and 68.7% in more than 18 months treatment duration group (Table 2). Table 2 also depicts the number of cases affected with WSL with respect to extent of teeth.

Table 2: Occurrence and extent of WSL

Group	n	Occurrence of WSL		Extent of WSL		
		n	%	1 tooth	2-4 teeth	>4 teeth
Untreated non-orthodontic	100	20	20	7(35%)	8(40%)	5(25%)
6-18 months orthodontic	150	60	60	15(25%)	38(63%)	7(11.21%)
>18 months orthodontic	150	103	68.7	16(15.5%)	55(53.39%)	32(31.06%)
Total orthodontic	300	163	54.3	31(19.01%)	93(57.05%)	39(23.92%)

The study found statistically significant difference between untreated group and orthodontically treated group with respect to the number of teeth affected with WSL (Table 3). Similarly, there was a significant difference between the categories of orthodontic patients of 6-18 months and more than 18 months duration (Table 4). However, there was no significant difference between male and female orthodontic patients with respect to the occurrence of WSL (Table 5).

Table 3: t-test for the difference between untreated subjects and orthodontic patients

Group	n	Mean	SD	SEM	p-Value
Untreated non-orthodontic	100	0.65	1.925	0.192	0.000*
Orthodontically treated	300	2.40	3.080	0.178	

*significant at $p < 0.05$

Table 4: t-test for the difference between orthodontic patients 6-18 months and >18 months

Group	n	Mean	SD	SEM	p-Value
6-18 mths	150	1.04	1.621	0.132	0.000*
>18 mths	150	3.75	3.563	0.291	

*significant at $p < 0.05$

Table 5: t-test for the difference between gender groups among orthodontic patients.

Group	n	Mean	SD	SEM	p-Value
Female	185	2.63	3.347	0.246	0.081
Male	115	2.03	2.563	0.239	

Not significant

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