

White Spot Lesions during alignment and leveling in Orthodontic Patients - An Observational Study.

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Abstract

Introduction: WSL can be considered a precursor of carious lesions. These lesions are commonly associated with orthodontic treatment. Poor oral hygiene can result in increased risk of caries.

Material and methodology: The study involved clinical evaluation of carious lesions in 20 individuals. The control group included patients yet to start their orthodontic treatment; the other group consisted of patients undergoing fixed orthodontic treatment, with second premolar extraction. The armamentarium included mouth mirror, probe and a dental chair.. All the teeth from the central incisor to the first premolar were evaluated in all the four quadrants.

Results: The present short study showed that, Score I are most common type of WSL in both the groups. No significant difference in occurrence of WSL in orthodontic patients and control group.

Conclusion: Score I type of WSL was most common in the first six months of fixed orthodontic treatment. We found that Orthodontic treatment doesn't increase carious susceptibility.

Introduction

White spot lesions (WSL) are white opaque lesions found on the surface of teeth. WSL can be considered a precursor of carious lesions. These lesions are commonly associated with orthodontic treatment. The term WSL is defined as “the first sign of caries like lesion on enamel that can be detected with the naked eye.”Poor oral hygiene can result in increased risk of caries. Carious lesions are a result of multitude factors, such as carbohydrates, the duration of exposure and microorganisms. The greater the quantity and frequency of exposure, the higher is the risk of caries. Normal salivary pH is range of 6.2-7.6 with 6.7 being the average pH. Individuals with increased caries have shown an acidic pH, resulting in demineralization of tooth enamel. 5.5 is a critical level pH below which the hydroxyl apatite crystals begin to dissolve causing demineralization of teeth. During orthodontic treatment, particularly fixed orthodontics patients may find it hard to maintain their oral hygiene. This results in poor oral hygiene. As the duration of fixed orthodontic treatment is around 1.5 – 2 years, prolonged exposure to poor hygiene results in susceptibility to caries.

Material and Methodology

The study involved clinical evaluation of carious lesions. The study was carried out at the Department of Orthodontics and Dentofacial Orthopedics. The subjects included patients undergoing orthodontic treatment. These patients volunteered to appear for the study, while undergoing orthodontic treatment in our department. Our sample included 20 individuals undergoing orthodontic treatment. They were evaluated clinically for white spot lesions. The armamentarium included mouth mirror, probe and a dental chair. The entire study was carried out by a single examiner. Both the groups were given similar oral hygiene instructions. All the teeth from the central incisor to the first premolar were evaluated in all the four quadrants. The subjects divided into two groups.

Group 1 – The control group, which included patients yet to start their orthodontic treatment, no history of orthodontic treatment.

Group 2 – subjects already undergoing fixed orthodontic treatment for six months, with second premolar extraction.

The following scale was used for the visual examination:

Score 0 - No visible white spots or surface disruption (no demineralization)

Score I - Visible white spot without surface disruption (mild demineralization)

Score II - Visible white spot lesion having a roughened surface but not requiring a restoration (moderate demineralization)

Score III- Visible white spot lesion requiring restoration (severe demineralization)

The statistical evaluation was carried out using Chi square test.

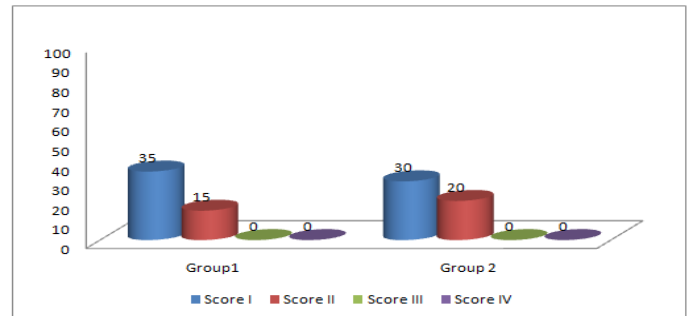
Result

Table 1: Comparison of the highest score between both groups

Scores	Group		*Chi- square	p
	1(Control)	2		
Score 0	35.0	30.0	0.220	0.63 Not significant
Score I	15.0	20.0		
Score II	0.0	0.0		
Score III	0.0	0.0		

*Chi square test, *Statistically significant, p<0.05

When the highest score was compared based on the number of lesions, majority of the study participants had score 0, that represents absence of white spot lesions in group I (35%) and II (30%). The commonest WSL were Score I, these lesions were highest in both groups. Group I (15%) and Group II (20%). Also, there was no significant difference between both the groups. (Table 3)



Discussion

WSL can be diagnosed on clinical examination under natural day light. Some authors have used fluorescence light for the same. Al khateeb et al did a longitudinal study with laser fluorescence of white spot lesions in orthodontic patients on 7 young orthodontic patients following debonding. The lesions were evaluated after debonding and a year after, was re- evaluated. Fluorescence light helped in evaluating the demineralized lesions. AmalSadeq et al used Quantitative Light-induced Fluorescence (QLF) to identify red fluorescent plaque. WSL development is not associated with RFP bacteria P. gingivalis presence. Differences in RFP bacteria P. gingivalis presence with S. mutans and S. gordonii, were observed before and after appliance placement. Fixed orthodontics in adolescents may play a role in altering

bacterial composition during orthodontic treatment. *S. gordonii* may have a role in human enamel demineralization. During the initial 6 months of orthodontic treatment represents alignment and leveling. In the present study the WSL lesions elaborate the carious tendencies during this stage. In a similar study during alignment and leveling (within first 6 months of treatment) Korkut et al assessed demineralization and remineralization of WSL around orthodontic brackets using. They were evaluated at 1 week, 2 week and 3 week. Three groups using different commercially available tooth paste and materials for the management of the WSL were compared to the control group of remineralization, the study group that used experimental remineralizing cream per day for 3 weeks, was lesser than the 1st and 2nd study groups that used MI Paste Plus and Remin Pro respectively. The remineralization amounts for the 1st and 2nd study groups were determined to be identical. The control group showed significant healing despite no specific intervention. Dmitry Shungin et al calculated WSL on scans of standardized photos of the vestibular surfaces of 4 teeth in consecutive orthodontic patients. The lesions were followed up over 12 years. The lesions reduced during follow-up and were significantly lower with the GIC than the acrylic material at bonding. A drawback of photographs based study is the increase in technical errors, hence decreasing the overall reliability of the results. In the present study the bonding material used for brackets were composites. Jason L. Schmit et al evaluated the influence of bonding materials on WSL. They concluded that the fluoride varnish cannot prevent demineralization; it appears to be beneficial in reducing lesion formation. They bonded brackets to 48 extracted human third molars. Half were bonded with a composite resin and the other half with an RMGI. Each of this group was further divided into 2, with half receiving an

application of fluoride-releasing varnish. They were treated with an artificial caries solution for an hour twice daily for 31 days, followed by cleaning with tooth brush. Teeth were sectioned longitudinally and photographed under polarized light microscopy. Teeth bonded with composite resin showed a 35% reduction in mean lesion depth when fluoride varnish was applied. In another study, Jasmine Gorton et al, bonded brackets on 2 first premolars in 21 randomized, selected patients between 11-12 years of age. Eleven test-group subjects were bonded with fluoride-releasing glass ionomer cement, and 10 control subjects were bonded with composite resin (no fluoride). After 4 weeks the teeth were extracted, sectioned, and evaluated by cross-sectional microhardness testing. The Taves diffusion method was used to check fluoride samples taken at days 0 (baseline), 1, 2, 3, 7, 14, 21, and 28. They concluded that fluoride-releasing Glass Ionomer Cement (GIC) for bonding orthodontic brackets inhibited caries in vivo without additional varnish. This cariostatic effect was localized to the area around the brackets. Michael A. Robertson et al used, MI Paste Plus helped prevent the development of new white spot lesions during orthodontic treatment and decreased the number of white spot lesions already present. MI Paste Plus reduced white spots on the gingival surfaces; the placebo paste had the opposite effect. The incisal enamel decalcification index scores were consistently higher than the other surfaces. Greg J. Huang carried out randomized control trial, with MI Paste Plus and PreviDent fluoride varnish for treatment of white spot lesions over an 8-week period. MI Paste Plus and PreviDent fluoride varnish do not appear to be more effective than normal oral care measures. The evaluation was based on photographs collected before and after 8 weeks. The judgment was blind, carried out by two panels consisting of dentist and laymen. Similarly in the present study, no additional

means of caries protection was used. Hence, no particular method can provide complete protection against caries. Mechanical methods of caries prevention are highly essential irrespective of the type of brackets used or fluoride application.

Conclusion

From our study we concluded that Score I type of WSL are most common in both the groups (Figure 1). Although the control group wore no appliances they also showed signs of caries. There is no significant difference in the occurrence of WSL between the two groups. Hence fixed orthodontic patients can avoid caries if they maintain good oral hygiene. Perhaps a larger sample size will help confirm our findings.

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