

Prevention of white spot lesion using Resin Modified Glass Ionomer cement varnish

Dr. Sujit Panda, Dr Karuna Singh Sawhny, Dr Zeba Siddiqui

Professor HOD, Department of Orthodontics and Dentofacial Orthopedics, Rama Dental College, Hospital and Research Centre, Faculty of Dental Sciences, Rama University, Kanpur
Address- Rama Dental College Hospital and Research Centre, Faculty of Dental sciences, Kanpur, Uttar Pradesh, Telephone- 9839138625
Email- drsujitpanda@yahoo.co.in

Professor, Department of Orthodontics and Dentofacial Orthopedics
Rama Dental College Hospital and Research Centre, Faculty of Dental Sciences, Rama University, Kanpur
Address- Rama Dental College Hospital and Research Centre, Faculty of Dental Sciences, Kanpur, Uttar Pradesh

Senior Lecturer, Department of Orthodontics and Dentofacial Orthopedics
Rama Dental College Hospital and Research Centre, Faculty of Dental Sciences, Rama University, Kanpur
Address- Rama Dental College Hospital and Research Centre, Faculty of Dental Sciences, Kanpur, Uttar Pradesh
Telephone- 9369389740
Email- lib8737@gmail.com

Abstract

Objective: To assess the efficacy of resin modified glass ionomer cement in prevention of white spot lesion during comprehensive Orthodontic treatment.

Material & Methods: A total of 240 (120 control & 120 experimental) maxillary and mandibular anterior teeth were studied. For each experimental quadrant in each patient, the varnish was applied to the labial surfaces of incisors and canines, from the gingival surface of the bracket to the free gingival margin. White spot lesions were observed before and 6 months following varnish application by DIAGNOdent and direct visual inspection.

Results: comparison of pre & post treatment of control & experimental teeth by visual examination showed statistically with respect to maxillary lateral & canine.

Conclusion: Resin Modified Glass Ionomer cement is effective in preventing white spot during Orthodontic treatment

Introduction

Occurrence of white spot lesions or enamel decalcification during & after Orthodontic treatment is a common problem. Light is reflected differently from demineralized enamel as compared to adjacent sound enamel giving rise to white chalky appearance.¹

Decalcification results from accumulation of plaque and subsequent acid production by the bacteria around Orthodontic attachments.²The prevalence is reported to vary from 4.9%-84% Of tooth surfaces.^{3,4} The labio-gingival area of the lateral incisors is the most common site for WSL and the maxillary posterior segments are the least common site with males affected more in comparison with females.⁵It has been shown that Streptococcus mutans prefers to colonize in retentive areas such as under the wings of a bracket and has been attributed to initiation of caries. After the initiation, progression is by Lactobacillus.

Several methods have been developed over the years for the prevention of WSLs, such as patient compliance dependent traditional approach of mechanical removal of plaque with a fluoridated dentifrice, and daily fluoridated mouthrinses implementing good oral hygiene.⁶

The purpose of the present article was to assess the efficacy of resin modified glass ionomer cement in prevention of white spot lesion during comprehensive Orthodontic treatment.

Material & methods.

In this study, we evaluated the in-vivo effectiveness of RMGI varnish in preventing WSLs surrounding orthodontic brackets, as measured via visual examination. Before starting with the research, the required approval was taken from the Institutional Ethical Committee, Rama Dental College and Hospital, Kanpur. Patients visiting Rama Dental College and Hospital for orthodontic treatment and whose orthodontic treatment have started (i.e. both arch banding and bonding) and is not older than a week, fulfilling the inclusion and exclusion criteria were selected for the study. A detailed medical history and an informed consent were obtained from the participants who agreed to undergo the study.

Inclusion Criteria

- Subjects in the age range of 12-40 years requiring comprehensive orthodontic treatment
- Fully erupted maxillary and mandibular anterior teeth
- Teeth with intact orthodontic bracket

Teeth with enamel hypoplasia, Severely malposed anterior teeth ,systemic disease and/or syndrome,allergic to Resin modified Glass Ionomer Varnish, Subject under medicaments that can cause initiation of caries, alter salivary flow rate etc were excluded from the study.

The Clinpro XT RMGI varnish was applied on the experimental teeth on the same day immediately after the initial bonding as per manufacturer's instructions.The polished tooth

surface was cleaned and then 37% orthophosphoric acid gel was applied for 15 s over the entire labial enamel surface extending from gingival surface of the bracket to the free gingival margin. Then, the surface was cleaned thoroughly by water spray and dried. The paste and liquid components of the varnish were mixed on a paper pad for 10-15s by a small plastic spatula. When the mix material appeared glossy and smooth in consistency, it was applied as a thin layer over the etched enamel surface by a ball applicator. Total 120 maxillary & 120 mandibular teeth were evaluated.

Teeth were evaluated after 6 months of varnish application through visual inspection & by DIAGNOdent.

Results

The results of the study are summarized in table 1 & 2.

Table 1. Showing the comparison of pre & post treatment of control & experimental teeth by DIAGNOdent.

Tooth	Pre-treatment comparison (p value)	Post treatment comparison(p value)
Maxillary central incisor	0.434	0.440
Maxillary lateral incisor	0.262	0.663
Maxillary canine	0.620	0.233
Total	0.426	0.433
Mand.central incisor	0.113	0.322
Mandibular lateral incisor	0.306	0.344
Mandibular canine	0.606	0.440
Total	0.343	0.454

Table 2. Showing the comparison of pre & post treatment of control & experimental teeth by visual examination

Tooth	Pre-treatment comparison (p value)	Post treatment comparison(p value)
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	value)	
Maxillary central incisor	0.267	0.342
Maxillary lateral incisor	0.176	0.023
Maxillary canine	0.465	0.032
Total	0.323	0.007
Mand.central incisor	0.257	0.672
Mandibular lateral incisor	0.323	0.523
Mandibular canine	0.534	0.453
Total	0.434	0.434

Table 1 shows the comparison of pre & post treatment of control & experimental teeth observations by DIAGNOdent.No statistically significant differences were found. Table 2 shows comparison of pre & post treatment of control & experimental teeth by visual examination.Statistically significant values were observed with respect to maxillary lateral & canine.

Statistical Analysis

Data were analyzed using SPSS software (Version 16). Frequency analysis and Chi square test were used to measure the percentage and proportions. Paired t-test and ANOVA tests were used for comparison and to determine statistical differences between experimental and control sides. A P-value of 0.05 was considered as a statistically significant.

Discussion

Occurrence of white spot lesions are common due to Orthodontic treatment.Various methods have been discussed in literature to prevent & treat these lesions.The present study was undertaken to assess the effectiveness of resin modified glass ionomer varnish in prevention of white spot lesions.

Castillo et al⁷ in their study have shown that fluoride varnish adheres to tooth surface in thin layers & releases fluoride gradually over a period of 5-6 months.

Similar to our study,Jena, et al⁸, conducted a study on 480 maxillary and mandibular anterior teeth by application of Resin-Modified Glass Ionomer (RMGI) cement varnish and concluded that it had a favourable effect in the prevention of WSLs during orthodontic treatment.Zhou et al⁹ their study on bovine incisors showed that Resin-Modified Glass Ionomer (RMGI) cement varnish had the potential more controlled & sustained release of remineralized agents.

Sohn et al¹⁰ in their study reported that the Clinpro XT varnish protected the exposed root surfaces from demineralization.

Conclusion

Resin Modified Glass Ionomer cement is effective in preventing white spot during Orthodontic treatment.

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