

A Comparison of Different Methods of Reducing White Spot Lesion Following Orthodontic Treatment

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ABSTRACT

Background: White spot lesion (WSL) is the earliest macroscopic evidence of enamel caries and is commonly seen during orthodontic therapy. The present study was conducted to compare GC tooth mousse (CPPACP), Colgate Phos-Flur mouthwash (fluoride and amulated phosphorus) and SHY-NM (calcium sodium phosphosilicate glass) in white spot lesion (WSL).

Materials & Methods: 60 patients undergoing orthodontic treatment were divided into 3 groups of 20 each. Group I were prescribed GC tooth mousse (CPPACP), group II were given Colgate Phos-Flur mouthwash (CPF) and group III were prescribed SHY-NM (CSPG) before starting the orthodontic treatment. Frontal intra-oral photographs were taken at the baseline, 3 months and 6 months for assessment of WSL (decalcification index).

Results: The mean WSL at baseline in group I was 1.04, in group II was 1.07 and in group III was 1.05, at 3 months was 0.79, 0.92 and 1.07 in group I, II and III respectively. At 6 months was 0.52, 0.74 and 0.82 in group I, II and III respectively. The difference was significant ($P < 0.05$).

Conclusion: GC tooth mousse proved to be the most effective means of treating WSL as compared to other methods.

Keywords: Calcium sodium phosphosilicate glass, GC tooth mousse, Orthodontic.

INTRODUCTION

Orthodontic treatment aims to improve functions and facial aesthetics by ensuring harmonious occlusal and jaw relationship; with beneficial effects on the oral health and quality of life of patients.¹ However, it also associates risks and complications. Enamel surface demineralization or white spots lesions (WSL) remain by far one of the major adverse sequelae of fixed orthodontic appliance therapy, despite techniques and materials advances in preventive dentistry and orthodontics.²

White spot lesion (WSL) is the earliest macroscopic evidence of enamel caries and is commonly seen during orthodontic therapy. Fejerskov et al³ defined WSLs as 'the first sign of a carious lesion on the

enamel that can be detected with naked eye'. After four weeks of orthodontic bonding, WSLs become noticeable and are commonly seen on tooth surface around the bracket, especially in the gingival areas. Patients treated orthodontically showed broadly about 2% to 96% of white spot lesions.⁴ This large range is thought to be mainly due to the difficulty in standardizing clinical examinations. They appear during and sometimes persist after orthodontic treatment; they can compromise the successful outcome of the treatment and result in the early termination of treatment. In severe cases of WSL, invasive interventions can be required and clinician responsibility may also be engaged.⁵ The present

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study was conducted to compare GC tooth mousse (CPPACP), Colgate Phos-Flur mouthwash (fluoride and amulated phosphorus) and SHY-NM (calcium sodium phosphosilicate glass) in white spot lesion (WSL).

MATERIALS & METHODS

The present study comprised of 60 patients undergoing orthodontic treatment of both genders. All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. Patients were divided into 3 groups of 20 each. Group I were prescribed GC tooth mousse (CPPACP), group II were given Colgate Phos-Flur mouthwash (CPF) and group III were prescribed SHY-NM (CSPG) before starting the orthodontic treatment. Frontal intra-oral photographs were taken at the baseline, 3 months and 6 months for assessment of WSL (decalcification index) in the maxillary and mandibular anterior teeth. Decalcification index was as follows: 0: absence of a WSL 1: visible white spots without any surface interruption (mild decalcification) 2: visible white spot lesion with a roughened surface that does not require a restoration (moderate decalcification) 3: visible white spot lesion with surface interruptions (severe decalcification) 4: cavitation. Results were compared statistically, where p value <0.05 was considered significant.

RESULTS

Table I: Distribution of patients.

Groups	Group I	Group II	Group III
Agent	GC tooth mousse (CPPACP)	Colgate Phos-Flur mouthwash (CPF)	SHY-NM (CSPG)
M:F	7:13	8:12	6:14

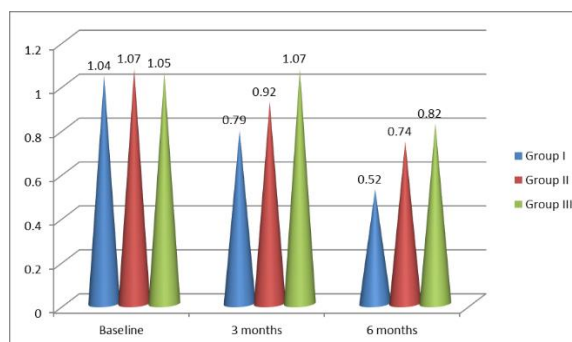
Table I shows that group I had 7 males and 13 females, group II had 8 males and 12 females and group III had 6 males and 14 females.

Table II: Comparison of mean WSL scores.

Duration	Group I	Group II	Group III	P value
Baseline	1.04	1.07	1.05	0.12
3 months	0.79	0.92	1.07	0.05
6 months	0.52	0.74	0.82	0.02

Table II, graph I shows that mean WSL at baseline in group I was 1.04, in group II was 1.07 and in group III was 1.05, at 3 months was 0.79, 0.92 and 1.07 in group I, II and III respectively. At 6 months was 0.52, 0.74 and 0.82 in group I, II and III respectively. The difference was significant ($P < 0.05$).

Graph I: Comparison of mean WSL scores.



DISCUSSION

White spots lesion seem to be related to the interaction of several factors including inadequate elimination of dental plaque due to intrabuccal appliances that limit the self-cleansing mechanism of the oral musculature and saliva, patient's modifying factors and change in bacterial flora during fixed appliances wear.^{6,7} Considering how quickly these lesions can develop, prevention, early diagnosis and treatment remain one of the greatest challenges facing orthodontists and requires a thorough knowledge of the caries disease and the risk factors specific to each patient.⁸ These risk factors should be accurately evaluated before and during any orthodontic treatment in order to minimize tooth decay and discoloration that could compromise the aesthetic of smile. Early detection of WSL during orthodontic treatment would allow clinicians to implement preventive measures to control the demineralization process before lesions progress.⁹ The present study was conducted to

compare GC tooth mousse (CPPACP), Colgate Phos-Flur mouthwash (fluoride and amulated phosphorus) and SHY-NM (calcium sodium phosphosilicate glass) in white spot lesion (WSL).

In present study, group I had 7 males and 13 females, group II had 8 males and 12 females and group III had 6 males and 14 females. Bangi et al¹⁰ conducted a single-blinded randomized prospective clinical trial, comprising 80 patients categorized into four groups (one control group and three experimental groups, with 20 subjects per group) using block randomization, was conducted. Group A (control group): Colgate strong toothpaste; and experiments groups were Group B: GC tooth mousse, Group C: Phos-Flur mouthwash and Group D: SHY-NM. Subjects were instructed to use the designated dentifrice/mouthwash and photographs were taken at baseline, third and sixth months, and white spot lesions were reassessed in the maxilla-mandibular anterior teeth. All the three groups had shown an improvement in WSL. But Group B has shown the greatest difference in mean values of decalcification index (DI) scores.

We found that mean WSL at baseline in group I was 1.04, in group II was 1.07 and in group III was 1.05, at 3 months was 0.79, 0.92 and 1.07 in group I, II and III respectively. At 6 months was 0.52, 0.74 and 0.82 in group I, II and III respectively. Du et al¹¹ reported that a high concentration of fluoride varnish reversed WSLs at the third- and sixth-month follow-ups following de-bonding. Use of fluoridated chewing sticks has shown a greater remineralization effect on the white spot lesions. Anderson et al reported that a combination of CPPACP with 0.05% sodium mouthwash and fluoridated dentifrice demonstrated a significant improvement in WSLs. However, the authors reported that the CPPACP group was associated with a greater number of WSLs that totally disappeared over the period of 12 months compared to 0.05% sodium fluoride mouthwash and fluoridated dentifrice combination.

Brochner et al¹² conducted a study in which 60 adolescents were given daily application of either CPPACP (tooth mousse) or standard fluoride toothpaste to treat WSL. The study was carried out for a period of 1 month, then the results were analyzed by laser fluorescence and visual scoring (Gorelick scale) from the digital photographs. The

results showed 26–58% reduction in the mean area of the lesion, but no significant differences were found between the CPPACP and the control groups.

CONCLUSION

Authors found that GC tooth mousse proved to be the most effective means of treating WSL as compared to other methods.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

REFERENCES

1. Hoffman DA, Clark AE, Rody Jr WJ, McGorray SP, Wheeler T. A prospective randomized clinical trial into the capacity of a toothpaste containing NovaMin to prevent white spot lesions and gingivitis during orthodontic treatment. *Prog Orthod.* 2015;16:25.
2. Tufekci E, Dixon JS, Gunsolley JC, Lindauer SJ. Prevalence of white spot lesions during orthodontic treatment with fixed appliances. *Angle Orthod.* 2011;81:206–210.
3. Fejerskov O, Kidd E, Nyvad B, Baelum V. 2008. *Dental Caries: The Disease and Its Clinical Management.* Victoria, Australia: Blackwell Publishing Asia Pty Ltd. 3.
4. Boersma JG, van der Veen MH, Lagerweij MD, Bokhout B, Prahl-Andersen B. Caries prevalence measured with QLF after treatment with fixed orthodontic appliances influencing factors. *Caries Res.* 2005;39:41–47.
5. O'Reilly MM, Featherstone JDB. Demineralization and remineralization around orthodontic appliances: An in vivo study. *Am J Orthod Dentofac Orthop.* 1987;92:33–40.
6. Ogaard B, Rolla G, Arends J. Orthodontic appliances and enamel demineralization: Part 1. Lesion development. *Am J Orthod Dentofacial Orthop.* 1988;94:68–73.
7. Gorelick L, Geiger AM, Gwinnet AJ. Incidence of white spot formation after bonding and banding. *Am J Orthod.* 1982;81:93–98.

8. Schmidlin PR, Gohring TN, Schug J, Lutz F. Histological, morphological, profilometric and optical changes of human tooth enamel after microabrasion. *Am J Dent*. 2003;16(Spec no):4A–8A.
9. Murphy TC, Willmot DR, Rodd HD. Management of post orthodontic demineralized white lesions with microabrasion: a quantitative assessment. *Am J Orthod Dentofacial Orthop*. 2007;131:27–33
10. Bangi SL, Mohd MU, Konda P, Talapaneni AK, Fatima A, Hussain A. Evaluation of Three Commercially Available Materials in Reducing the White Spot Lesions During Fixed Orthodontic Treatment: A Prospective Randomized Controlled Trial. *Journal of Indian Orthodontic Society*. 2020 Apr;54(2):100-5.
11. Du M, Cheng N, Tai B, Jiang H, Li J, Bian Z. Randomized controlled trial on fluoride varnish application for treatment of white spot lesion after fixed orthodontic treatment. *Clin Oral Investig*. 2012;16(2):463–468.
12. Brochner A, Christensen C, Kristensen B, Tranæus S, Karlsson L, Sonnesen L, et al. Treatment of post-orthodontic white spot lesions with casein phosphopeptide-stabilized amorphous calcium phosphate. *Clin Oral Investig*. 2011;15:369–373.