



Efficacy of Three Different Fluoride Varnishes on Incipient Carious Lesions



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Abstract:

Aim: To evaluate the efficacy of three commercially available fluoride varnishes on the artificially induced carious lesion of the permanent premolars teeth and their resistance to further demineralization.

Material and Methods: Sixty extracted permanent premolars were divided mesiodistally into two halves (n=120). The samples were divided into two equal groups (n=60); GI and GII, each main group was divided randomly into three subgroups according to the type of fluoride varnish. Subgroup a (MI varnish), subgroup b (Enamel Pro varnish) and subgroup c (Clinpro White varnish). The samples of GII only were immersed in demineralizing solution for 96h to create artificial caries. Application of fluoride varnishes respectively to all samples of GI and GII. The samples were examined by using Stereomicroscope, SEM and Vickers' microhardness test. The samples of two groups were immersed again in demineralizing solution for 96h to evaluate the resistance to carious lesion. Examination tests were used again.

Results: All remineralizing agents increased VMH values, Clinpro White varnish was better in GI than other types but in GII, Enamel Pro was better in VMH values and structurally.

Conclusions: All of the three fluoride varnishes are capable to remineralize early carious lesions.

Keywords: remineralization, demineralization, fluoride varnish.

Introduction

Because of dental hard tissues are continuously undergoing cycles of demineralization and remineralization. A drop in pH of oral cavity results in demineralization which if continued leads to loss of minerals from tooth structure resulting in dental caries. The reversal can occur if pH rises resulting in deposition of calcium, phosphate and fluoride. ^{(1), (2)} Remineralization of white spot lesions rather than restoring such lesions is considered one of the important elements of minimal intervention in modern dentistry. ^(3,4)

Methodology

This in vitro study protocol was approved by Ethical committee of the Faculty of Dentistry, Mansoura University. Sixty extracted human premolars teeth were divided mesiodistally into two halves (n=120). The samples were divided into two main groups; GI: intact group, GII: demineralized group, each main group was divided into three subgroups according to the type of fluoride varnish used; subgroup a: MI varnish, subgroup b: Enamel Pro varnish and subgroup c: Clinpro White varnish. All samples were covered by acid resistant nail varnish except window 2x 3 mm on buccal or lingual surface. GII samples were immersed in demineralizing solution for 96h to create artificial carious lesion. The fluoride varnishes were applied to all samples of GI and GII. The samples were examined by Stereomicroscope, SEM and Vicker's microhardness

test. All samples then were immersed again in demineralizing solution for 96h to evaluate the efficacy of the remineralizing agent. The samples were examined again. ^(5,6)

Result

Our study showed that all remineralizing agents increased VMH values, Clinpro White varnish and Enamel Pro varnish (P>0.05) were better than MI varnish in remineralization and resistance to further demineralization (P<0.05) in GI. In GII the results showed that Enamel Pro was better in remineralization of demineralized samples and resistance to 2nd cycle of demineralization followed by MI varnish and Clinpro White varnish (P>0.05). By examination by Stereomicroscope and SEM, there was a restoration of enamel surface for GI and GII with the appearance of minerals precipitations. These minerals depositions were highly observed in Clinpro White varnish in GI and Enamel Pro varnish in GII.

Table : Comparison between the mean Values of surface microhardness in GI and GII subgroups after remineralization.

	subgroup a Mean ± sd	subgroup b Mean ± sd	subgroup c Mean ± sd
Group I	234.8 ± 27.3	342.6 ± 41.6	374.8 ± 65.8
Group II	128.8 ± 14.3	182.8 ± 58.6	120.1 ± 7.8
Test of significance	<i>G Ia r vs G IIa r</i> t= 14.6 P ≤ 0.001*	<i>G Ib r vs G IIb r</i> t= 9.4 P ≤ 0.001*	<i>G Ic r vs G IIc r</i> t= 24.3 P ≤ 0.001*

Data expressed as mean ± SD. *: significant $p \leq 0.05$. F: One-way ANOVA test.
t: independent samples -t- test. p: significant difference between group I & group II.
Significant difference between groups (p_1, p_2, p_3) done by Post Hoc LSD test.

Discussion

Bennett T. Amaechi found that there is continuous needing for strategies of treatment to increase non restorative technique for white spot lesions (remineralization). The new strategies should make fluoride action easier or better working with fluoride to give better remineralization for the lesions.⁽⁷⁾ The current study findings in GI was in acceptance with **AlAmoudi et al.**,⁽⁸⁾ concluded that when 5% Naf added to fTCP significantly enhance remineralization and had the higher microhardness reading. The results in GII were accepted with **Skrtec et al.**,⁽⁹⁾ who concluded that Enamel Pro recovered about 71% of minerals that lost during demineralization. On the other hand, **Cochrane et al.**,⁽¹⁰⁾ and **Varma, et al.**,⁽¹¹⁾ concluded that MI varnish containing fluoride and CPP-ACP was better than other varnishes in preventing subsurface enamel demineralization. Their explanation was that MI varnish had the highest release of calcium, phosphate and fluoride ions from the varnish that diffuse through intraprismatic spaces of the enamel subsurface.

Conclusion

Clinpro White varnish had the best efficacy in protecting intact enamel surface against white spot lesions followed by Enamel Pro and MI varnishes and the three remineralizing agents remineralize the intact and demineralized enamel surface structurally.

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