

ABSTRACT

Purpose: To investigate the efficacy of Fluor Protector S, compared to 5% Sodium Fluoride varnish and a control on the inhibition of enamel demineralization.

Methods: Extracted molars were painted with an acid-protective varnish, excluding a 2x6 mm window. The windows were divided into three separate groups (n= 8). Group 1, the control, was untreated. Group 2 received an 5% sodium fluoride varnish (NaF) application. Group 3 received an experimental Fluor Protector S varnish (FPS) application. The samples were cycled in an artificial caries challenge for 10 days. The teeth were sectioned and photographed under polarized light. Quantitatively, the areas of the lesions were measured with a computerized imaging system. A comparison was made between mean lesion sizes of the sample groups in order to determine their respective efficacy of enamel demineralization inhibition.

Results: The mean areas of the artificial lesions (+/- SD) were: control 2025 +156; 5% NaF varnish 1349 + 220; and FPS 1229 +173. ANOVA was performed and identified a significant variance ($p<0.001$). Tukey's multiple comparison test demonstrated that FPS and 5% NaF varnish had significantly less enamel demineralization than the control group, however, there was no statistically significant difference between FPS and 5% NaF varnish ($p=0.247$).

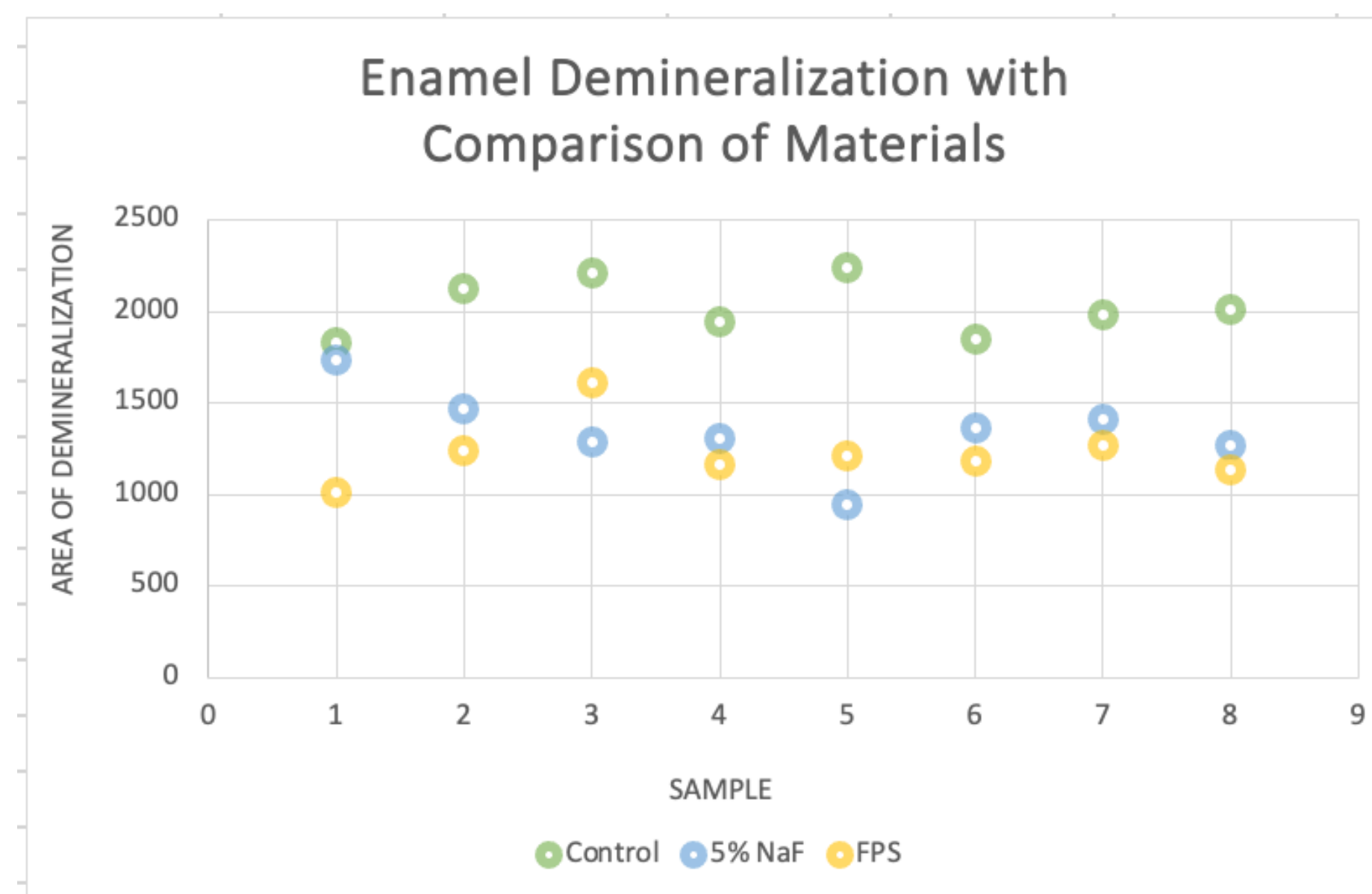
Conclusion: 5% NaF Varnish and FPS performed greater in the inhibition of enamel demineralization than the non-treated control. Further in-vivo research is needed to evaluate the efficiency of both of these materials clinically.

MATERIALS and METHODS

A total of 24 caries-free teeth were gathered at the University of Texas Health Science Center at San Antonio and used for this in vitro investigation. Teeth were stored in a 0.1% Thymol solution to prevent dehydration and fungal growth until the experimental procedure began. The teeth were cleaned using a toothbrush to remove any biofilm. Using a 330 bur and a highspeed handpiece a hole was drilled through roots of the permanent molars in order to suspend the teeth in the artificial caries solution using floss. The teeth had their entire surface coated with an acid protective varnish excluding the enamel window of 2 x 6 mm on the buccal surface. The teeth were randomly divided into three groups (n=8). Group 1 was left untreated and acted as the control. Group 2 received an 5% NaF varnish application. Group 3 received an FPS varnish application.

MATERIALS and METHODS (cont)

The teeth were stored in artificial saliva and exposed to an artificial caries challenge (pH 4.5) for two hours per day for 10 days. Each day the teeth were brushed with no dentifrice and returned to the artificial saliva. After 10 days, sections of 100 microns were cut longitudinally along the enamel window of the teeth and images were obtained under polarized light microscopy. The demineralized areas adjacent to enamel were quantified using Image-Pro insight (Media Cybernetics; Rockville, MD, USA) software. Finally, a comparison was made between mean lesion sizes of the sample groups in order to determine their respective efficacy of enamel demineralization inhibition (Chart 1). One Way Analysis of Variance test was used to compare between the Control, 5% NaF Varnish and FPS (Ivoclar).



RESULTS:

The ANOVA test showed that the differences in the mean values among the treatment groups are greater than would be expected by chance and there was a statistically significant difference ($p<0.001$). Tukey's multiple comparison test demonstrated that FPS and 5% NaF varnish had significantly less enamel demineralization than the control group, however, there was no statistically significant difference between FPS and 5% NaF varnish ($p=0.247$). The control group had much more demineralization when compared to the other two groups treated with fluoride (Figures 1-3).

CONCLUSIONS

5% NaF Varnish and FPS performed greater in the inhibition of enamel demineralization than the non-treated control. Further in-vivo research is needed to evaluate the efficiency of both of these materials clinically.

RESULTS (cont.)



Figure 1: Control Group. The Enamel (E) margin adjacent to the lesion (L).

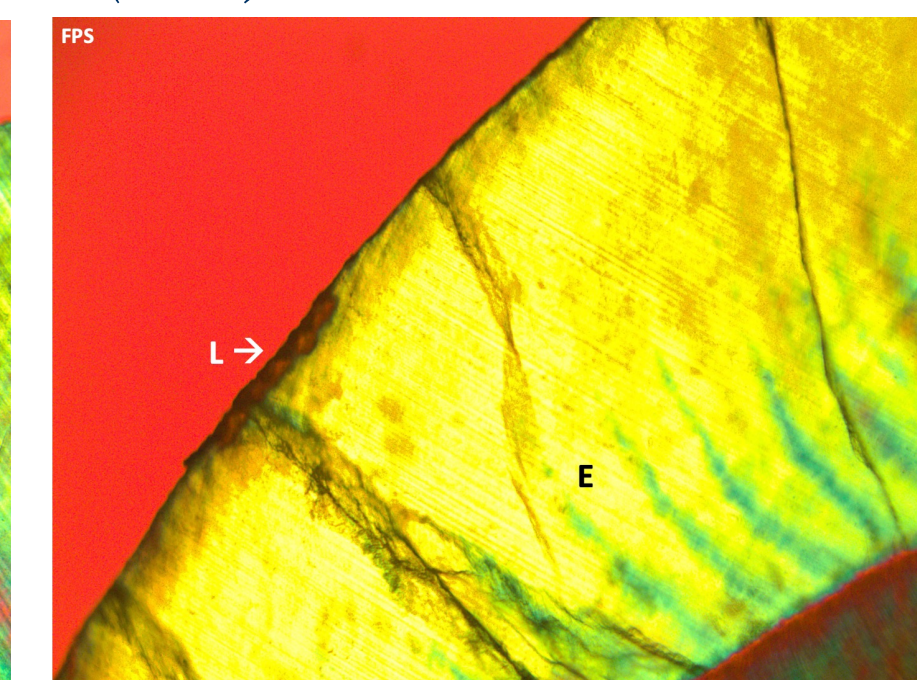


Figure 2: Fluor Protector S. The Enamel (E) margin adjacent to the shallow Lesion (L)



Figure 3: 5% Sodium Fluoride. The Enamel (E) margin adjacent to the shallow Lesion (L)

REFERENCES

- National Institute of Dental and Craniofacial Research Dental Caries. [(accessed on 24 September 2022)]; Available online: <https://www.nidcr.nih.gov/research/data-statistics/dental-caries>
- Weyant, R. J., Tracy, S. L., Anselmo, T. T., Beltrán-Aguilar, E. D., Donly, K. J., Frese, W. A., Hujoel, P. P., Iafolla, T., Kohn, W., Kumar, J., Levy, S. M., Tinanoff, N., Wright, J. T., Zero, D., Aravamudhan, K., Frantsve-Hawley, J., Meyer, D. M., & American Dental Association Council on Scientific Affairs Expert Panel on Topical Fluoride Caries Preventive Agents (2013). Topical fluoride for caries prevention: executive summary of the updated clinical recommendations and supporting systematic review. *Journal of the American Dental Association (1939)*, 144(11), 1279–1291. <https://doi.org/10.14219/jada.archive.2013.0057>
- Bagramian RA, Garcia-Godoy F, Volpe AR. The global increase in dental caries. A pending public health crisis. *Am J Dent.* 2009;22(1):3–8. [PubMed] [Google Scholar] [Ref list]
- Chu C, Mei ML, Lo E. Use of fluorides in dental caries management. *Gen Dent.* 2009, 58(1):37-43; quiz 44-35, 79-80. [PubMed] [Ref list]
- Mei ML, Chu CH, Low KH, Che CM, Lo EC. Caries arresting effect of silver diamine fluoride on dentine carious lesion with *S. mutans* and *L. acidophilus* dual-species cariogenic biofilm. *Med Oral Patol Oral Cir Bucal.* 2013;18(6):e824. doi: 10.4317/medoral.18831.
- Gao, S. S., Zhang, S., Mei, M. L., Lo, E. C., & Chu, C. H. (2016). Caries remineralization and arresting effect in children by professionally applied fluoride treatment - a systematic review. *BMC oral health*, 16, 12. <https://doi.org/10.1186/s12903-016-0171-6>
- Weyant RJ, Tracy SL, Anselmo T, et al. Topical fluoride for caries prevention: Executive summary of the updated clinical recommendations and supporting systematic review. *J Amer Dent Assoc* 2013;144(11):1279-91.
- Lenzi TL, Montagner A, Soares FLM, et al. Are topical fluorides effective for treating incipient carious lesions: A systematic review and meta-analysis. *J Am Dent Assoc* 2016;147(2):84-92.e1.
- Fischer, D. K. (2015). Introduction. *Scientific Documentation Fluor Protector S*, 3-5.
- Fischer, D. K. (2015). In Vitro Investigations. *Scientific Documentation Fluor Protector S*, 6-11.