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Influence of Different Sealants on Root Dentin Demineralization in Situ

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Introduction

Following the improved caries-prophylactic developments, tooth loss even in elderly patients is often avoidable. Therefore, it can be assumed that due to prophylactic treatment and the above mentioned factor the number of exposed and denuded dentin surfaces susceptible for dental caries and dentin hypersensitivity might increase in the future. To avoid these consequences, various prophylactic treatment possibilities are described. It is known that the application of fluoride or fluoride containing solution might prevent root caries development (1). Similar effects have been described after the application of dentin adhesive systems on exposed root surfaces. Furthermore, in the treatment of hypersensitive dentin surfaces numerous desensitizing agents are available. Former investigations have shown that some of them can prevent root surface caries in vitro (2).

Objectives

The objective of this study was to evaluate the influence of four desensitizers (Seal&Protect, Admira Protect, VivaSens, Hyposen (Fig. 1-4)) in situ.

Fig. 1-4: Sealants used in the study: Seal&Protect (Dentsply Detrey), Admira Protect (Voco), VivaSens (Vivadent), Hyposen (Lege artis).

Material and Methods

The root surfaces of freshly extracted human molars were thoroughly cleaned, thereby removing the cementum. From each tooth root dentin specimens were prepared (Fig. 5). After sterilisation the ninety specimens were distributed among the following experimental groups: A: Seal&Protect, B: Admira Protect, C: VivaSens, D: Hyposen, E: control group, untreated. Two dentin specimens of each group were inserted into two buccal aspects of nine intraoral mandibular appliances. The samples were positioned in the regions of P2-M2, and about 1 mm lower than the surface of the removable appliance (Fig. 6). The appliances were worn by nine persons for five weeks day and night. One side was brushed daily with a fluoride-containing toothpaste (Aronal). On the other side, plaque was allowed to grow. Individual oral hygiene techniques were performed without any fluorides. During meals, the appliance was stored in 10% sucrose solution. After the in situ period, two slabs (150 microns) were ground. The depth of the demineralized areas was determined using a polarized light microscope (Fig. 8-11). For each group mean value and standard deviation were calculated. Statistical analysis was performed using ANOVA and Tukey's test.

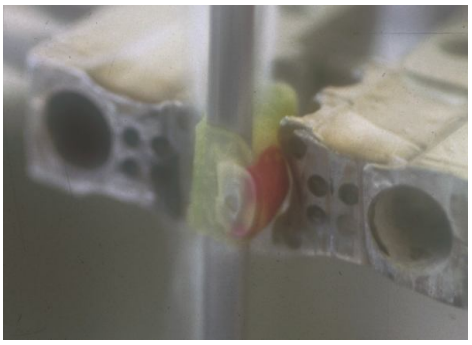

Fig. 5: Cutting a dentinal slab from a specimen.

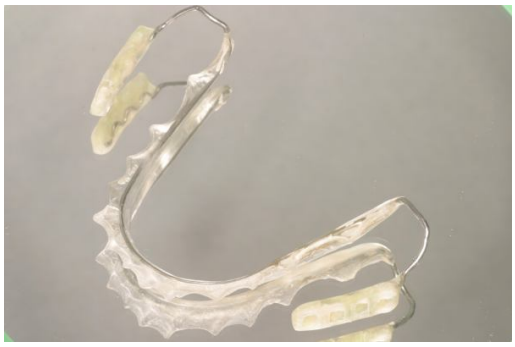

Fig. 6: One dentin specimen of each group mounted in the buccal aspects of this intraoral mandibular appliances.

Results

Concerning lesion depth, ANOVA revealed significant differences between brushed (b) and non-brushed (nb) specimens. Evaluated lesion depths (mean values and standard deviation in microns) are shown in Table 1 and Fig. 7. The highest lesion depth were measured in the control group (group E). Compared to the untreated control, lesion depths in groups A-D were significantly decreased in the brushed and also in the non-brushed subgroups ($p<0.05$, Tukey's test). Brushed specimens treated with Admira Protect showed the lowest lesion depths.

Group	A		B		C		D		E	
	b	nb	b	nb	b	nb	b	nb	b	nb
Mean	23.86	27.49	11.68	28.34	13.57	31.85	19.45	45.90	51.28	69.53
+/-	4.85	9.53	8.54	3.45	2.62	6.72	7.48	11.75	5.3	18.43

Tab. 1: Mean lesion depths and standard deviations within the different groups (in microns).

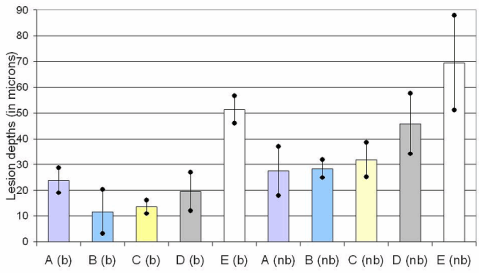

Fig. 7: Mean values and standard deviations within the different groups (in microns).

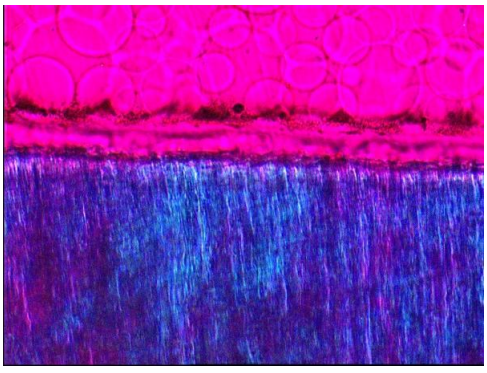

Fig. 8: Brushed specimen treated with VivaSens imbibed in water (20x).

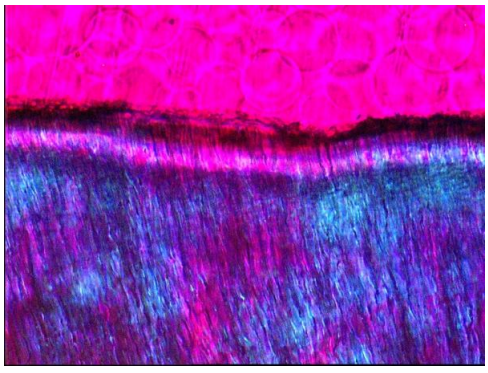

Fig. 9: Non-brushed specimen treated with VivaSens imbibed in water (20x).

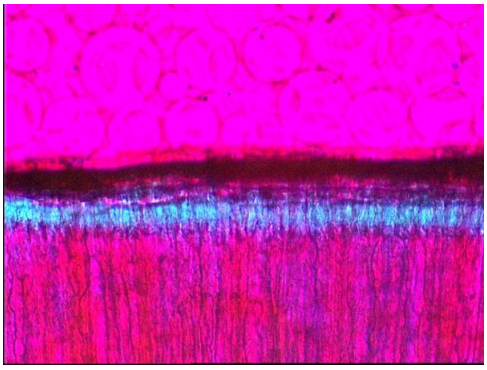

Fig. 10: Control group: brushed specimen imbibed in water (20x).

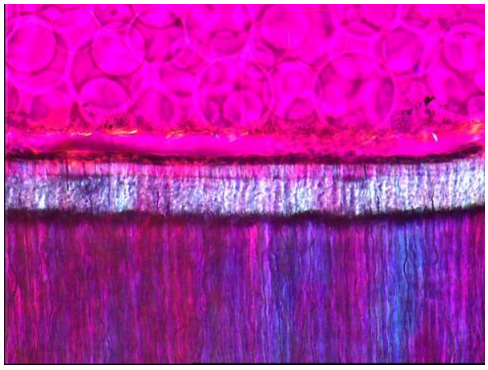

Fig. 11: Control group: non-brushed specimen imbibed in water (20x).

Conclusions

Within the limitations of an in situ study it can be concluded that the demineralization of the root surface can be hampered by application of desensitizers under different oral hygiene conditions. The application of clinical proven desensitizing agents might have a caries-protective effect on exposed root surfaces.

Literature

1. Almqvist H, Lagerlöf F (1993): Effect of intermittent delivery of fuoride to solution on root hard-tissue de- and remineralization measured by 125I absorptiometry. J Dent Res 72: 1593-1598.
2. Grogono A, Mayo J (1994): Prevention of root caries with dentin adhesives. J Am Dent 7: 89-90.

This Poster was submitted by Dr. Christian R. Gernhardt.

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Influence of Different Sealants on Root Dentin Demineralization in Situ

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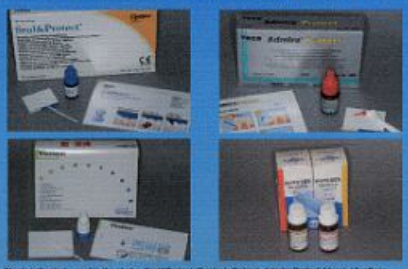

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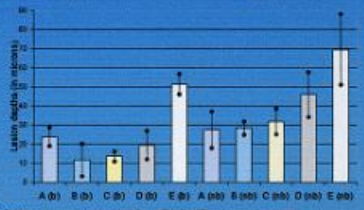

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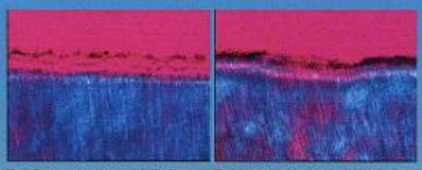

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Fig. 9: Non-brushed specimen treated with VivaSens imbibed in water (20x).

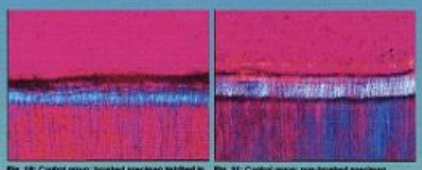

Fig. 10: Control group: brushed specimen imbibed in water (20x).

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References

[1]Ainpetal H, Lagerlöf F (1993) Effect of intermittent delivery of fluoride to solution on root hard-tissue de- and remineralization measured by 125I absorptiometry. J Dent Res 72: 1583-1588
[2]Ongena A, Mayo J (1994) Prevention of root caries with dentin adhesives. J Am Dent 7: 89-90.

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