

Effect of Demineralisation on Bond Strengths of Self-conditioning Dentin Adhesives

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Introduction

A number of new self-etch adhesives have been developed to simplify clinical bonding procedure. The efficiency of these simplified bonding systems is still controversial (1). Most of the published reports used normal dentine as the bonding substrate. Carious dentin is partially demineralized and previous studies have reported that the bond strengths of self-conditioning systems seems to be markedly reduced on demineralized dentin (2,3). However, the adhesive properties of the new, all-in-one systems to demineralized dentin have not yet been extensively reported.

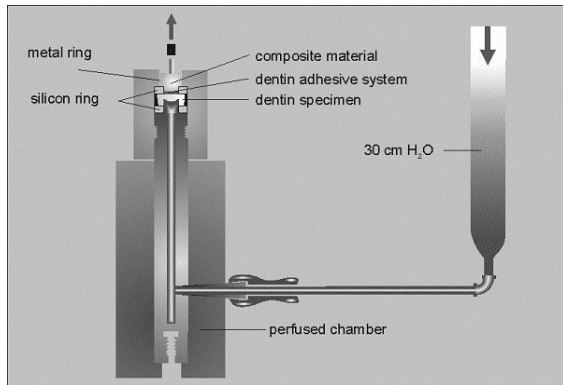


Fig. 1: Special designed apparatus to test tensile bond strength under permanent dentin perfusion.

Fig. 2: : Experimental device after loading until fracture.

Objectives

The aim of the present study was to evaluate the microtensile bond strenght of three self-etching adhesive systems to normal and demineralized dentin.

Material and Methods

Seventy-two freshly extracted third molars were included. All teeth were specially prepared allowing the simulation of dentin perfusion(Fig.1). Dentin specimens with a total thickness of 3.5 mm were obtained under standardized conditions. The specimens were randomly assigned to six experimental groups. In three groups (AD, BD, CD) the prepared dentin surface was demineralized using acidified gel technique (HEC, pH 4.8, 37°C) for 14 days. Group A, AD: Adper; group B, BD: AdheSE; group C, CD: Clearfil Protect Bond. All materials were applied on a standardized surface area as recommended by the manufacturer. Microtensile bond strength (μ -TBS) of the above mentioned adhesive systems was measured 15 minutes after application and light curing of the composite material (Clearfil APX, colour A2) using an universal testing machine. Statistical analysis was performed using SPSS 10.0.

Results

For the six test series following microtensile bond strengths were evaluated (mean value and standard deviation in MPa): group A 21.93 (\pm 3.19), group AD 11.39 (\pm 5.58), group B 17.65(\pm 5.50), group BD 5.75 (\pm 2.35), group C 21.99 (\pm 3.56) and group CD 15.09 (\pm 7.26). Statistical analysis showed a significant influence of the used dentin bonding agent on tensile bond strength ($p < 0.001$, ANOVA). In vitro demineralization of dentin decreased bond strength significantly in all groups ($p < 0.05$, Tukey's test).

	Group A	Group AD	Group B	Group BD	Group C	Group CD
Mean	31.93	11.39	17.65	5.75	21.99	15.09
+/-	3.19	5.38	5.50	2.35	3.56	7.26

Tab. 1: Meanvalue and standarddeviation within the different groups in Mpa.

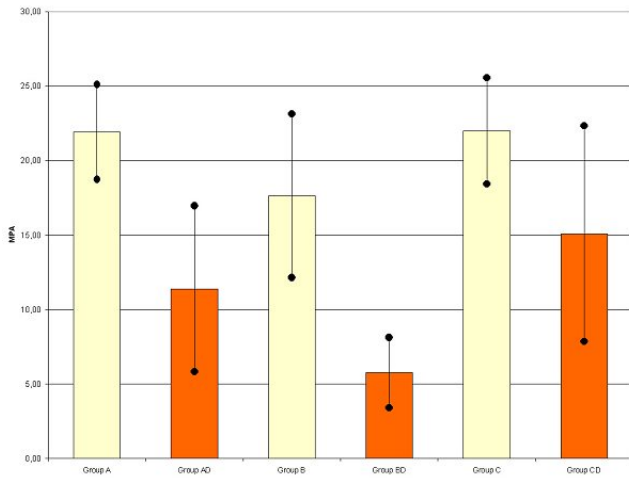


Fig. 7: Meanvalue and standard deviation within the different groups.



Fig. 3: The self-etch adhesive Clearfil Protect.



Fig. 4: The self-etch adhesive AdheSE.



Fig. 5: The self-etch adhesive Adper Prompt L-Pop.



Fig. 6: The light curing composite Clearfil AP-X.

Conclusions

Regarding the limitations of an in vitro study it can be concluded that demineralization of dentin might decrease bond strength of self-conditioning dentin adhesives.

Literature

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Abbreviations

MPa = Megapascals

This Poster was submitted by [Dr. Katrin Bekes](#).

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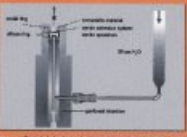


Fig. 1: Special designed apparatus to test tensile bond strength under permanent dentin perfusion.

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	Group A	Group AD	Group B	Group BD	Group C	Group CD
Mean value	21.93	11.39	17.65	5.75	21.99	15.09
+/-	3.19	5.58	5.50	2.35	3.95	7.26

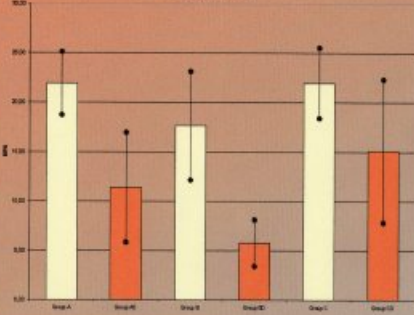


Fig. 2: Mean values and standard deviation within the different groups in MPa.

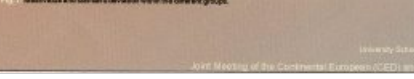


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Fig. 7: The light curing composite Clearfil AP-X.

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References

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