International Poster Journal IPJ of Dentistry and Oral Medicine

Int Poster J Dent Oral Med 2011, Vol 13 No 1, Poster 516

Influence of Pro-Argin Desensitizing Paste on Bond Strength After Aging

Language: English

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Date/Event/Venue:
July 14th-17th, 2009
88th General Session of the IADR
Bareclona, Spain

Introduction

One minimal invasive approach for the treatment of hypersensitiv dentin (Fig. 1) involves sealing of dentinal tubules or application of sedative agents and promotion of dentin remineralization (1,3). Usually, potassium nitrate, oxalate, fluoride, and bonding based dentin desensitizers are used immediately after tooth preparation (2). Furthermore, the new desensitizing paste (Elmex Sensitive Professional Desensitizing Paste; GABA International, Fig. 2) could also be used to seal hypersensitive dentin surfaces (3). The use of such barriers to seal the dentinal tubules prior to cementation has been advocated in order to reduce the effect of external stimuli on hypersensitivity. Some ingredients present in dentin desensitizers may induce chemical interaction with organic substances of the dentin that may consequently affect the bonding ability of adhesive cement systems (4,5).

Objectives

Therefore, the aim of this study was to evaluate the effect of a recently introduced desensitizing paste (Elmex Sensitive Professional Desensitizing Paste, GABA Int.) based on Pro-Argin technology (Colgate-Palomolive, USA) on microtensile bond strength of a resin cement system (Futurabond DC, Bifix QM) after artificial aging using water storage and application of provisional cement (Provicol QM).

Material and Methods

60 freshly extracted third molars were included. All teeth were specially prepared allowing the simulation of dentin perfusion and standardized conditions. The specimens were randomly assigned to four experimental groups of fifteen each: group 1: control without desensitizer; group 2: desensitizing paste application; group 3: desensitizing paste, water storage; group 4: desensitizing paste, application of Provicol QM, water storage. Group 3 and 4 were stored in water for one week. In group 3 Provicol QM was additionally applied after desensitizer application. All specimens were mounted to a experimental apparatus, where a physiological intrapulpal pressure (30cm water) could be established and maintained during the experimental period (Fig. 3). A metal ring (diameter: 2.0 mm) was positioned, thereby the desensitizers, the dentin bonding agents and the resin material could be applied on a standardized surface area of 0.785 mm² (Ø 1 mm). Microtensile bond strength was measured using an universal testing machine.

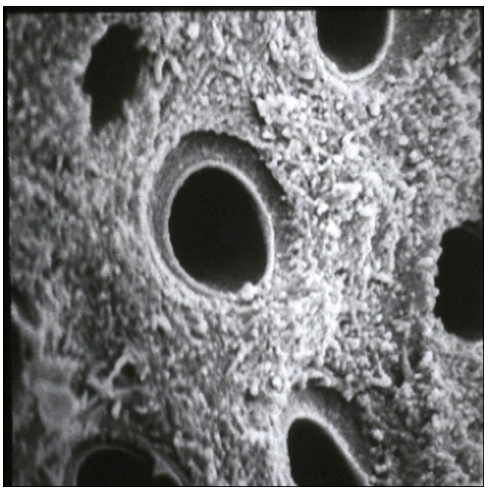

Fig. 1: Exposed dentin surface showing open tubules.

Fig. 2: Elmex Sensitive Professional Desensitizing Paste (GABA Int.) containing 8% Arginine for in office use.

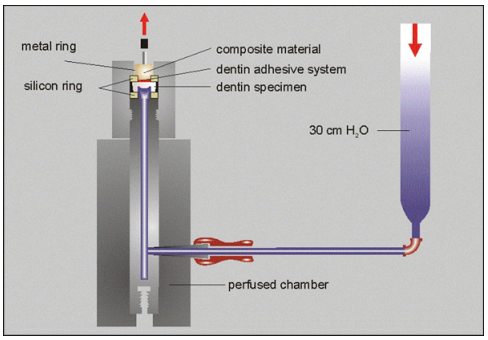

Fig. 3: Experimental device used for the present bond strength investigation. It allows the simulation of dentin perfusion over the exerimental period.

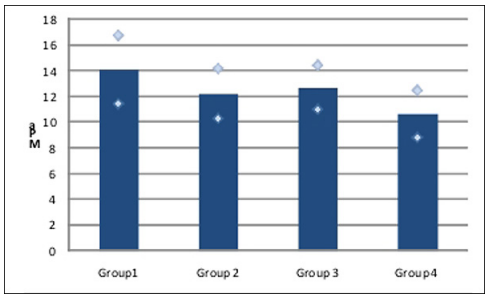

Fig. 4: Graphically expression of the results (mean values and standard deviation in MPa).

Results

For the test series following tensile bond strengths were evaluated (mean values and standard deviations in Mpa, Tab. 1, Fig. 4): Group 1: 14.04 (±2.64), group 2: 12.20 (±1.94), group 3: 12.68 (± 1.72), group 4: 10.61 (± 1.85). Statistical analysis showed a significant influence of the different aging procedures on microtensile bond strength ($p < 0.001$, ANOVA). After application of the desensitizing paste no significant reduction of bond strength could be observed compared with the untreated control. Pairwise comparison showed no significant reduction of bond strength in specimen after water storage. Compared to the untreated control, the additional application of the provisional cement bond strength reduced bond strength significantly ($p < 0.05$, Tukey's test) (Tab.1, Fig. 4).

Group	1	2	3	4
Desensitizer	-	Elmex Sensitive Professional Desensitizing Paste		
Mode of aging	-	-	1 week NaCl	Provicol QM 1 week NaCl
Mean	14.04	12.20	12.68	10.61
+ / -	2.64	1.94	1.72	1.85

Table 1: Bond Strength (in MPa) and standard deviation within the different groups.

Conclusions

Within the limitations of an in vitro investigation it can be concluded that application of the desensitizing paste based on Pro-Argin technology might not affect microtensile bond strength of the used self-etch adhesive system. However, the additional use of provisional cement decreased bond strength significantly.

Literature

1. El Zohairy AA, De Gee AJ, Mohsen MM, Feilzer AJ (2003) Microtensile bond strength testing of luting cements to prefabricated CAD/CAM ceramic and composite blocks. Dent Mater 19:575-583.
2. Featherstone JD, Glena R, Shariati M, Shields CP (1990) Dependence of in vitro demineralization of apatite and remineralization of dental enamel on fluoride concentration. J Dent Res 69:620-625.
3. Schiff T, Delgado E, Zhang YP, DeVizio W, Cummins D, Mateo LR (2009) The clinical effect of a single direct topical application of a dentifrice containing 8.0% arginine, calcium carbonate, and 1450 ppm fluoride on dentin hypersensitivity: the use of a cotton swab applicator versus the use of a fingertip. J Clin Dent 20:131-136.
4. Gürgan S, Bolay S, Kiremitçi A (1999) Effect of disinfectant application methods on the bond strength of composite to dentin. J Oral Rehabil 26:836-840.
5. Kobler A, Schaller HG, Gernhardt CR (2008) Effects of the desensitizing agents Gluma and Hyposen on the tensile bond strength of dentin adhesives. Am J Dent 21:388-392.

Abbreviations

MPa = megapascals
Tab. = table
Fig. = figure
mm^2 = square millimeter
mm = millimeter

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Influence of Pro-Argin Desensitizing Paste on Bond Strength After Aging

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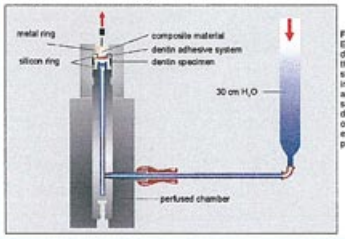

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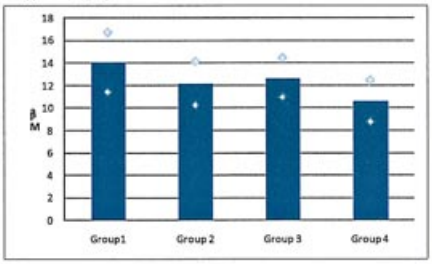

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3. Schiff T, Delgado E, Zhang YP, DeVizio W, Cummins D, Mateo LR (2009) The clinical effect of a single direct topical application of a dentifrice containing 8.0% arginine, calcium carbonate, and 1450 ppm fluoride on dentin hypersensitivity: the use of a cotton swab applicator versus the use of a fingertip. J Clin Dent 20:131-6.
4. Görgan S, Bolay S, Kiremitçi A (1999) Effect of disinfectant application methods on the bond strength of composite to dentin. J Oral Rehabil 26:836–840.
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IADR 88th General Session July 14th-17th, 2010 Barcelona, Spain