

Influence of Desensitising on Microtensile Bond Strength of Different Adhesives

Gernhardt C.R.* , Luellau B., Brandt K.V.

Martin-Luther-University Halle-Wittenberg

University Outpatient Clinic for Conservative Dentistry and Periodontology, Halle (Saale), Germany

Introduction

Studies on new desensitising agents have mainly focused on their tubular-occluding effects and effectiveness in decreasing pain.

In clinical practice, tooth sensitivity often occurs when the tooth has a defect and it needs subsequent resin restoration.

The desensitising agents could be used before bonding to reduce postoperative sensitivity. However, there is a concern that dentine desensitisers may change the properties of dentin, and such modification may have adverse effects on the bonding performance of adhesive systems. More information is required on the effect of these new desensitisers used immediately before adhesive bonding.

Aim of the study

The aim of the study was to evaluate microtensile bond strength of a universal adhesive (Futurabond U, Voco GmbH, Germany) in self-etch and etch-and-rinse mode on human enamel and dentin compared with established systems. Additionally, the influence of an oxalate-containing desensitiser was evaluated.

Material and Methods

180 human third molars were included. Standardised enamel and dentin specimens were prepared. 15 enamel and dentin samples each were assigned to one of the following experimental groups (Tab. 1): Enamel groups: 1: Futurabond U, etch & rinse; 2: Futurabond U, self-etch; 3: Futurabond® DC; 4: Solobond M. Dentin groups: 5: Futurabond U, etch & rinse; 6: Desensitiser, Futurabond U, etch & rinse; 7: Futurabond U, self-etch; 8: Desensitiser, Futurabond U, self-etch; 9: Futurabond DC; 10: Desensitiser, Futurabond® DC; 11: Solobond M; 12: Desensitiser, Solobond M. The oxalate-containing desensitiser was applied in advance to the dentin samples. The adhesives were applied according to the manufacturer's instructions. After polymerisation of the composite, microtensile bond strength values were determined using a universal testing machine.

	Desensitiser	Adhesive and application mode			
		Futurabond U		Futurabond DC	Solobond M
Enamel	no	1	2	3	4
Dentin	no	5	7	9	11
	yes	6	8	10	12

Table 1: Group classification



Fig. 1: Futurabond U



Fig. 2: Futurabond DC



Fig. 3: Solobond M

Results

Significantly higher values could be found for Futurabond U in the etch-and-rinse mode (21.45 MPa) compared to the self-etch mode (16.09 MPa) on enamel. Compared to the other two adhesives, no significant differences could be detected. The additional application of the oxalate-containing desensitiser in the case of dentin samples did not show any significant difference in the etch-and-rinse mode. For groups in self-etch mode, the desensitiser application resulted in significantly reduced tensile bond strength values compared to groups without desensitiser application.

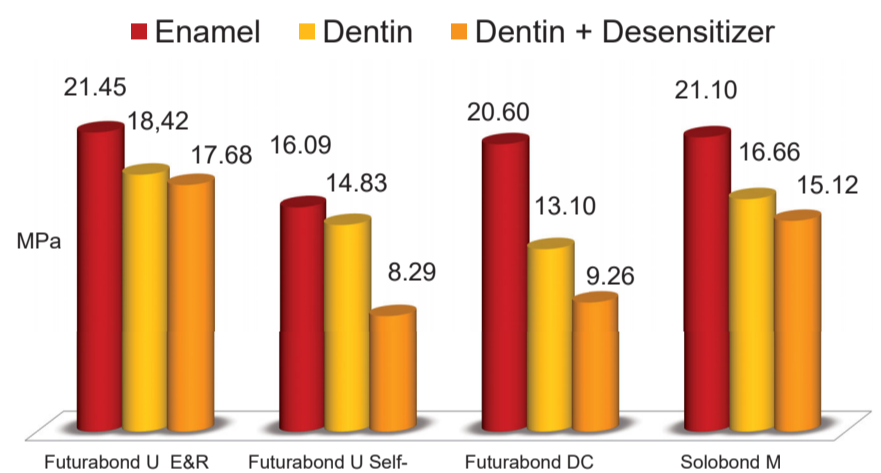


Fig. 4: The main results (in MPa)

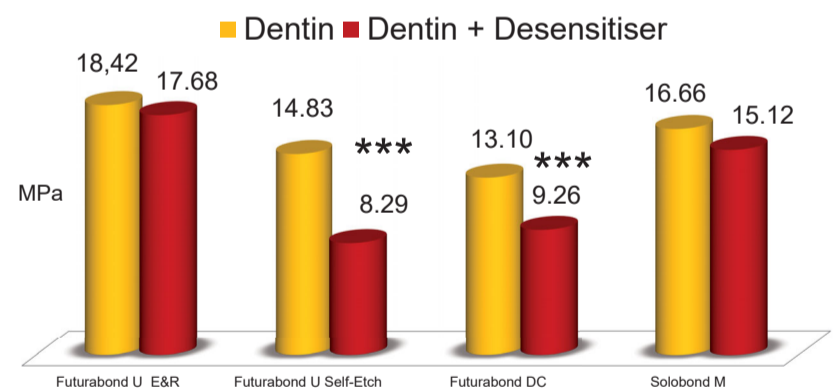


Fig. 5: The desensitizer groups (in MPa). *** significant difference $p < 0.05$.

Conclusion

Regarding the limitations of an in-vitro study, it can be concluded that Futurabond U has very promising results on enamel and dentin compared to the established adhesives. The influence of an oxalate-containing desensitiser on the adhesion is only visible in the case of the self-etch application mode.

References

- Pei, Dandan; Liu, Siying; Huang, Cui; Du, Xijin; Yang, Hongye; Wang, Yake; Deng, Donglai (2013): Effect of pretreatment with calcium-containing desensitizer on the dentine bonding of mild self-etch adhesives. In: Eur J Oral Sci 121 (3 Pt 1), S. 204–210. DOI: 10.1111/eos.12047
- Aranha, Ana Cecilia Correa; Siqueira Junior, Adonis De Santi; Cavalcante, Larissa Maria Assad; Pimenta, Luiz Andre Freire; Marchi, Giselle Maria (2006): Microtensile bond strengths of composite to dentin treated with desensitizer products. In: J Adhes Dent 8 (2), S. 85-90
- Seara, S. F.; Erthal, B. S.; Ribeiro, M.; Kroll, L.; Pereira, G D S (2002): The influence of a dentin desensitizer on the microtensile bond strength of two bonding systems. In: Oper Dent 27 (2), S. 154–160

