SCIENTIFIC REPORT

Solobond M – Sealing tubules

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In adhesive filling therapy, the bonding material used simultaneously acts as a desensitizer. To what extent the different bonds can reliably seal dentine tubules was examined in a study at the Zhejiang University (China).

55 caries-free teeth were included in the examination; lingual and buccal class V cavities were prepared in each at the enamel-cement junction. The teeth were then cut longitudinally, so that 110 test specimens were available. Those were further divided into 11 groups with 10 test specimens each. One group served as the control group and was thus not further processed. The remaining 10 groups were treated with different adhesive systems according to the respective manufacturer's instructions.

Scanning electron microscope analysis of the adhesive layer

An impression of the treated cavities was taken with an A-silicone from two test specimens in each group. A replica of each was then fabricated with epoxy resin using the impressions. These were subjected to scanning electron microscope analysis. While the cavity surface hardly differed from the morphology of the smear layer in some of the examined adhesive systems, a sealed bonding layer was observed, however, with the use of Solobond M.

Penetration of the dye

The cavities in the test specimens were filled with a 0.5% methylene blue solution and stored for 24 hours. Longitudinal cuts in the cavities were subsequently made and the penetration depth of the dye was determined with the assistance of a microscope. The penetration depth was defined through a total of 5 classes:

0: No penetration of the dye through the bonding layer into the dentine
1: Penetration through less than a quarter of the bonding surface and less than a quarter of the distance to the pulp chamber
2: Penetration through less than half of the bonding surface and less than half of the distance to the pulp chamber
3: Penetration through less than three-quarters of the bonding surface and less than three-quarters of the distance to the pulp chamber
4: Penetration through more than three-quarters of the bonding surface and more than three-quarters of the distance to the pulp chamber

The results of the analysis are summarised in Figure 1

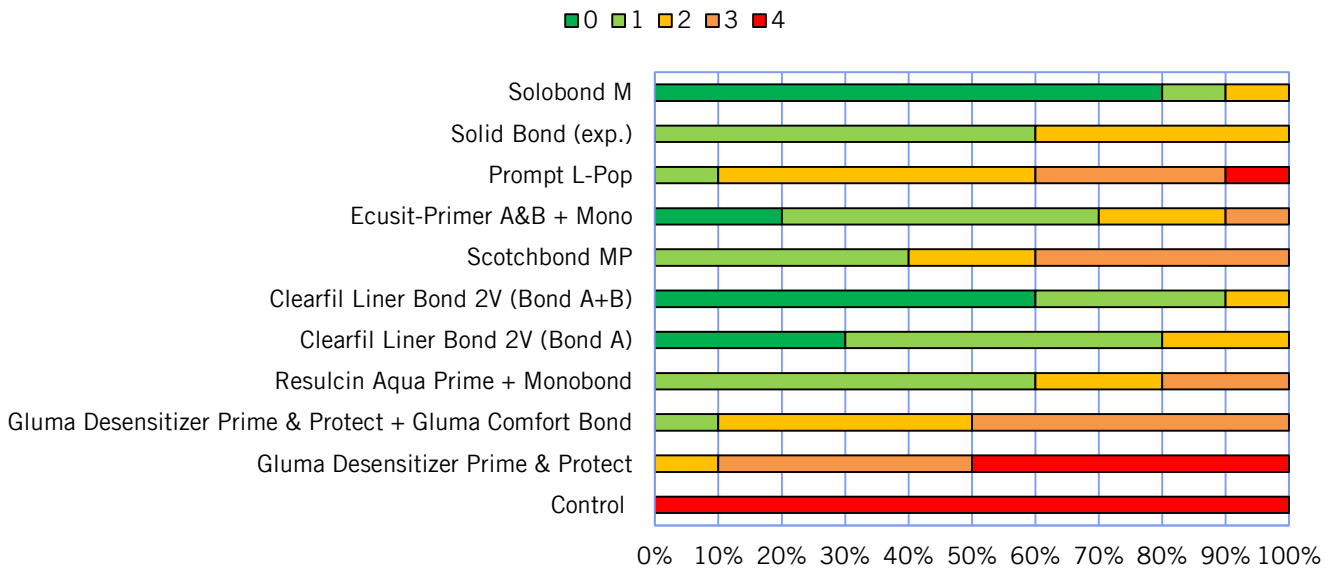

Figure 1: Results of the dye penetration test

Solobond M delivered the best results in this analysis. The dye did not penetrate the bonding layer in 80 % of the test specimens. Sealing the dentine tubules extremely well is a prerequisite for preventing post-operative sensitivities and it also secures an intact hybrid layer in the long-term. Furthermore, it could be determined that the observed behaviour of the different adhesive systems cannot be attributed to which category or generation the system belongs. The quality of the individual adhesive system alone is decisive.

Conclusion: Through the formation of a homogeneous bonding layer, Solobond M reliably seals the dentine tubules.

[1] B. Fu, Y. Shen, H. Wang, M. Hannig, *Oper. Dent.* **2007**, *32*, 496-503.