

Futurabond DC – Long-term success

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Futurabond DC, the self-etch bond, has already proven its excellent properties in many studies. To what extent storage in water for two years affects the bonding strength has now been tested in an additional study.

Self-etch bonds have a higher pH-value in comparison to pure phosphoric acid. This fact is not relevant when bonding on dentine but the question arises, if a sufficient etching pattern can be ensured on enamel, which is more acid-resistant than dentine. To what extent the simpler handling of self-etch bonds is obtained at the expense of probable lower adhesion was analysed in a study at the University of Tanta (Egypt).^[1]

Study design

60 caries-free, human molars were prepared as test specimens. The adhesive surface of the specimens was subsequently roughened with a diamond drill (100 µm grain, Komet). Five groups were formed after randomly dividing the specimens: A = Futurabond DC / Grandio, B = Admira Bond / Grandio, C = Clearfil SE Bond / Clearfil APX, D = Clearfil S3 Bond / Clearfil APX, E = Hybrid Bond / Pecalux. A portion of the test specimens was stored in water for 24 hours and the remaining specimens were stored in water with 0.5% chloramine for two years (the solution was changed every 3 months.). After the storage period, the test specimens were subjected to a micro-shear test, with the fracture sites likewise being subsequently analysed.

Results of the study

The results of the micro-shear bonding strength test are summarized in Figure 1.

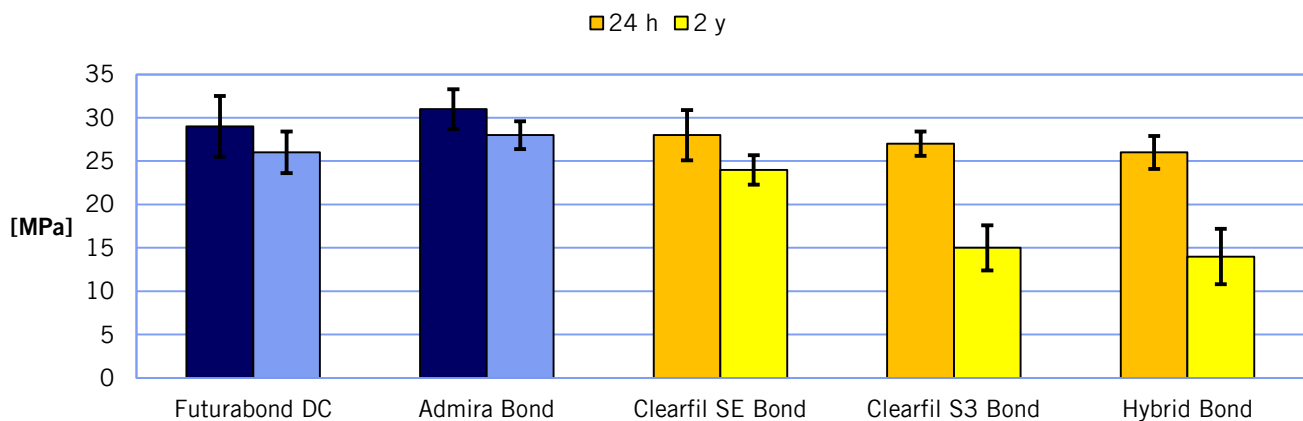


Figure 1: Shear bond strength [MPa] after storage in water

All of the bonds exhibited good adhesion values after 24 h of storage in water. The drop in the values after 2 years of storage in water was, however, interesting. Futurabond DC, Admira Bond and Clearfil SE Bond did exhibit a significant decrease, but this drop was still quite minimal with approx. 10 %.

Another picture emerged for Clearfil S3 Bond and Hybrid Bond, the one-bottle, self-etching bonds. The adhesion value for these bonds fell to almost half of the pre-storage value. It is interesting that there was not a significant difference between Admira Bond, the total-etch bond and the two self-etch bonds, Futurabond DC and Clearfil SE Bond. That shows the self-etch bonds are definitely able to provide sufficient conditioning of the enamel surface.

For the evaluation of the quality of a bond, it is equally interesting to inspect the fracture surfaces after shear bond strength measurements. Failure of the bond exists only if the fracture runs exclusively through the adhesive layer. The bond is no longer the weakest link in the chain in mixed and/or cohesive fractures. The result of the analysis of fracture surfaces is shown in Figure 2.

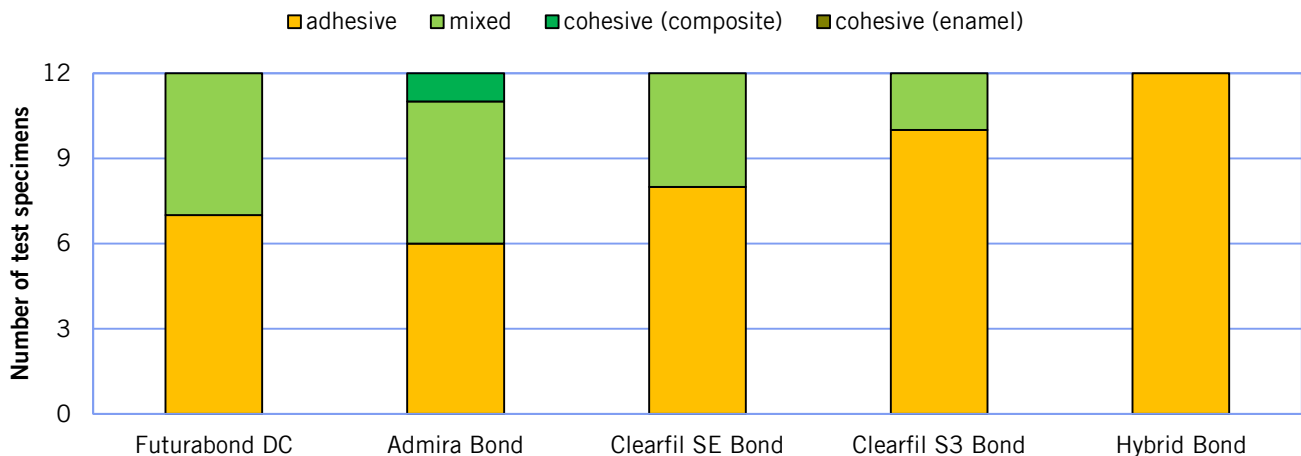


Figure 2: Result of the analysis of fracture surfaces

These results coincide with the adhesion value measurements. The bonds that achieved the highest adhesion values after 2 years of storage in water also exhibited significantly fewer pure adhesive fractures.

Conclusion: Futurabond DC and Admira Bond exhibited very good adhesion values even after 2 years of storage in water. They had the best performance of all of the bonds tested in this study. The study demonstrates that with the use of VOCO bonds, long-term successful treatment with composites is possible. Despite the simplification in the application of Futurabond DC, adhesion values are obtained that are just as high as those of total-etch bonds.

[1] A. I. Abdalla, A. J. Feilzer, *Oper. Dent.* **2009**, *34*, 732-740.