

Futurabond NR – Micro-tensile bond strength

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The self-etching Futurabond NR is one of the very few bonding systems to have had the advantages of nanotechnology integrated in its development. The positive effects of the use of nanoparticles become evident in a current study at Tanta University (Egypt).

Self-etch bonds of the 6th generation now hold a large share of the market and are increasingly replacing the classical total-etch procedure. Yet self-etch bonds are still rumoured to have poorer adhesion values than the 4th and 5th generation bonds. A current study examines the micro-tensile bond strength of modern self-etch bonds. The main focus of attention in this has been placed on the influence of the hydrostatic pressure of the dentinal fluid. This pressure can cause dentinal fluid to enter the hybrid layer of the bond and have a negative effect on the bonding strength. The extent of this effect was examined in more detail by Dr. A. I. Abdalla et al.

Dentine test specimens with different bonds were prepared for this experiment. Grandio was the only composite material used in this study. In a first tensile test, the adhesion values for all bonds used were determined without hydrostatic pressure. The values here were between 36 and 41 MPa (Futurabond NR: 39 MPa). Even after 24 h of simulated hydrostatic pressure, the variation in the adhesion values of the different bonds was not significant (34-39 MPa, Futurabond NR: 38 MPa). However, significant differences were found after 6 months of retention. The adhesion values of various bonds significantly collapsed at that point, with only Futurabond NR and Hybrid Bond continuing to achieve stable adhesion values (see Figure 1).

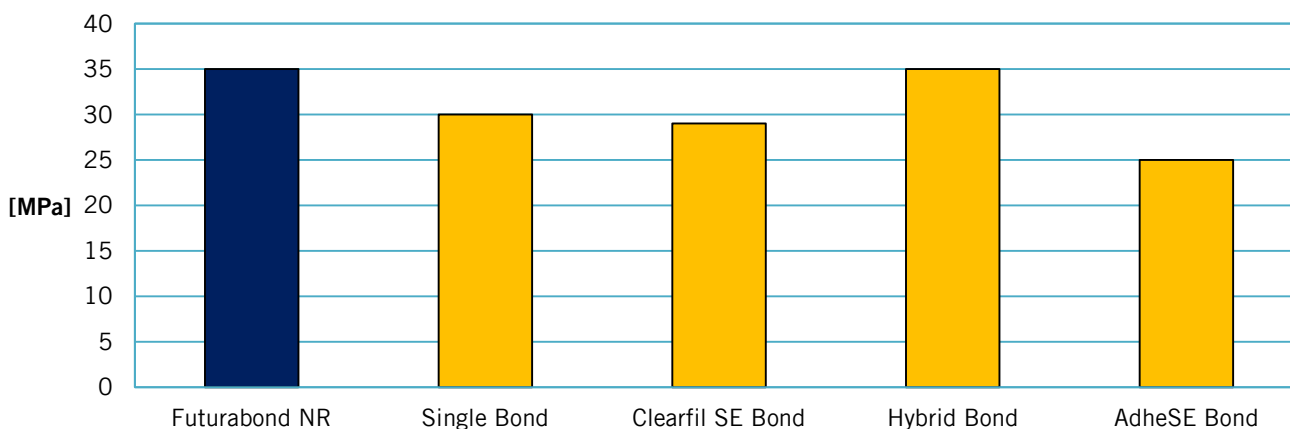


Figure 1: Micro-tensile bond strength after 6 months

The authors of the study explain the good bonding of Futurabond NR, even after 6 months, with the positive effects of the nanoparticles. The adhesive, including nanoparticles, penetrates into the dentinal tubules and cures there. The additional stability due to the integration of the filler ensures reduced hydrostatic pressure on the hybrid layer outside the tubules, and thereby a more durable adhesive bond.

Conclusion: Futurabond NR shows unchanged high values of micro-tensile bond strength, even after 6 months under simulated hydrostatic pressure in the tubules. This study shows that Futurabond NR, a 6th generation self-etch bond, provides outstanding adhesion values and mediates a long-term, strong adhesive bond between the tooth and the restoration.

[1] A. I. Abdalla, H. Y. ElSayed, F. Garcia-Godoy, *Am. J. Dent.* **2008**, *21*, 233-238.