

# SCIENTIFIC REPORT

## Futurabond U – tensile bond strength on enamel and dentine (self-etch and total-etch mode)

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Futurabond U offers the dentist the possibility of using one single bonding system for all clinical situations. The dentist can then decide for himself whether to use Futurabond U in self-etch, selective-etch or total-etch mode. This innovation allows the dentist to avoid the use of a number of different bonding systems. The advantages for the dentist are obvious: storage of the materials is simpler and there is no need to use a number of different application techniques. In addition, Futurabond U is compatible with all methacrylate-based composites and bonds reliably to metal and ceramics. The study by Torres et al outlined here investigated the influence of previous etching on the tensile bonding strength of the universal bonding systems **Futurabond U and Scotchbond Universal to enamel and dentine.**<sup>[1]</sup>

The innovative technology in Futurabond U makes it possible to employ the bonding system in a range of etch modes. The innovation is in the possibility of being able to use the actual self-etch bonding system with previous dentine etching too (total-etch mode). Earlier self-etch bonding systems of the 6<sup>th</sup> and 7<sup>th</sup> generations only permitted previous enamel etching, i.e., selective etching of the enamel with phosphoric acid.

The study investigated 112 freshly extracted, undamaged bovine teeth, which were divided into two groups (enamel and dentine). The test specimens were then in turn divided into two groups for each substrate (Futurabond U, Scotchbond Universal). Finally, each group was further divided into four subgroups (groups a-d) and the bonding system applied in accordance with the instructions for use. GrandioSO in A2 was employed as the composite, applied in a 2 mm coat and then light cured for 20 seconds. Following removal of the matrix, light curing was performed again from all sides.

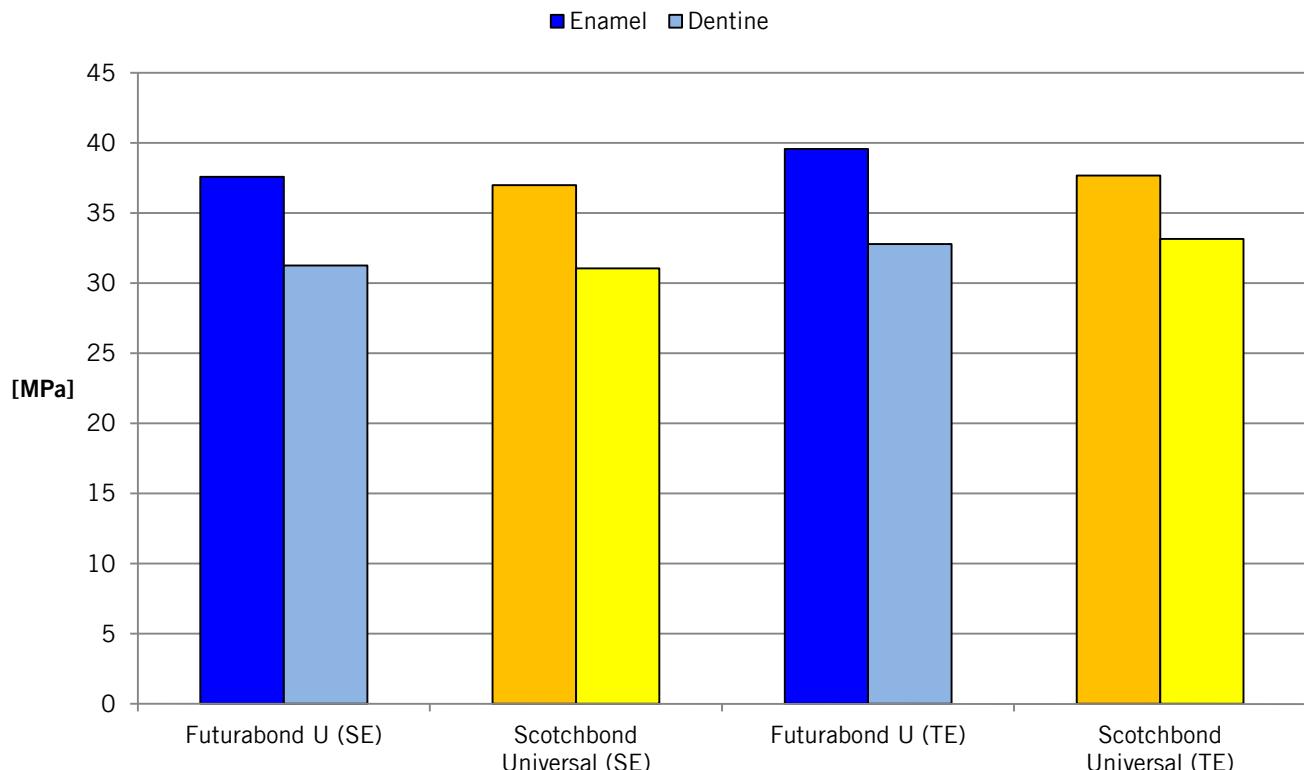
- Group a: Total-etch mode: Enamel
- Group b: Total-etch mode: Dentine
- Group c: Self-etch mode: Enamel
- Group d: Self-etch mode: Dentine

There were 14 teeth available for each subgroup.

### Study findings

Futurabond U achieves outstanding adhesion values on both enamel and dentine (see Fig. 1). In self-etch mode, the adhesion values on enamel (37.6 MPa) are even higher than on dentine (31.3 MPa), which is down to excellent formation of the etching pattern and penetration of the bonding agent liquid, despite Futurabond U's mild pH value of 2.3. Excellent adhesion values can also be achieved via additional etching with phosphoric acid (total-etch mode). Futurabond U displayed a tensile bond strength of 39.6 MPa on enamel and 32.8 MPa on dentine. The findings show clearly that previous etching of the dentine is also possible. Previous etching of the dentine with phosphoric acid was not possible with conventional self-etch bonding systems in the past.

The result was overetching of the dentine, which has a direct, negative consequence on the bonding strengths and causes postoperative hypersensitivity. With the new universal bonding systems available on the market it is now possible to guarantee the dentist freedom of choice in terms of the etching technique.



**Fig. 1:** Tensile bond strength values on enamel and dentine. The graph displays the self-etch mode and the total-etch mode of Futurabond U and Scotchbond Universal.

**Conclusion:** **Futurabond U is a universal bonding system, which can be used for all etching techniques. The high tensile bond strength values overall amaze across the board. It is possible to achieve outstanding adhesion values on enamel and dentine both in self-etch mode and in total-etch mode.**

[1] C. R. G. Torres, Influence of previous etching on bonding strength of self-etching adhesives to enamel and dentin, report to VOCO, 2013