

iBOND® Universal

Bond strength to primary teeth – Justus Liebig University of Giessen, Germany
 μ -tensile bond strength for iBOND Universal

Modern all-in-one adhesives offer practitioners the choice of using their preferred etching technique to bond to tooth substrates. In pediatric dentistry, where clinicians are working with limited compliance and time is of the essence, the self-etch technique suggests itself, in order to reduce chair-side time and possible handling errors. Universal adhesives following self-etch strategy therefore seem a practical solution for use in primary teeth, reducing steps and minimizing the risk of over-etching or over-drying of dentine. However, considering that deciduous dentine differs from permanent teeth in micro- and macromorphology, the mechanical performance of these systems must be evaluated on this particular substrate. The following study of the Justus Liebig University of Giessen compares the micro-tensile bond strength of iBOND Universal (Kulzer) in self-etch mode on deciduous dentine with a well-established adhesive. High bond strength indicates effective adhesion between dental hard tissue and resin composite. The results show that iBOND Universal in self-etch mode is also suitable for adhesive restorations in pediatric dentistry.

Giving a hand to oral health.



KULZER
MITSUI CHEMICALS GROUP

Bond strength to primary teeth – Justus Liebig University of Giessen, Germany

μ -tensile bond strength for iBOND Universal

Objective

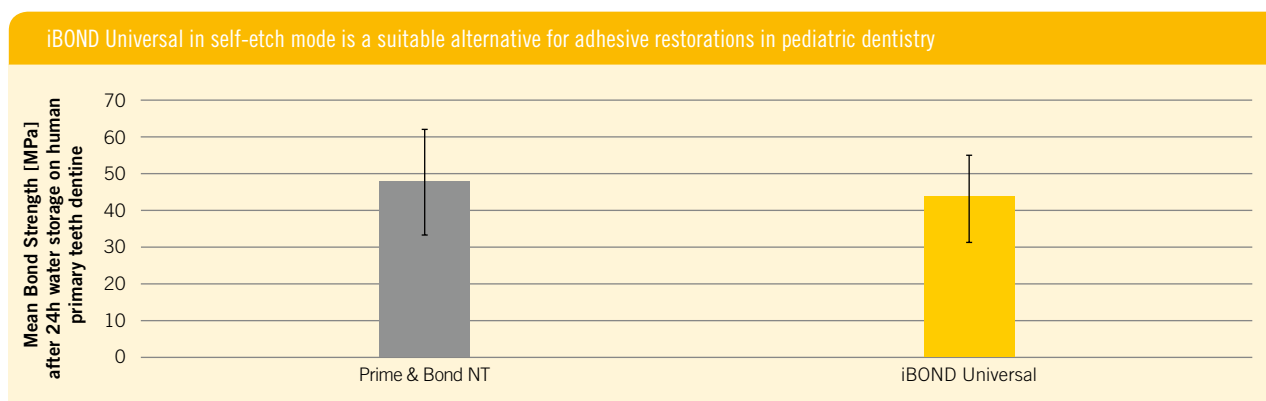
The aim of this study was to compare the bonding efficiency of iBOND Universal on primary tooth dentine with a well-established reference adhesive.

Materials & Methods

The tested bonding materials were Prime & Bond NT (Dentsply Sirona) and iBOND Universal (Kulzer). Each bonding was applied in self-etch-mode to 5 recently extracted deciduous molars, that had been occlusally shortened until a flat uniform dentine layer was exposed. Afterwards the adhesives were light cured for 20s (Bluephase, Ivoclar Vivadent, >800mW/cm² light intensity). A 5–6mm thick layer of composite resin (Filtek Z250, 3M ESPE) was incrementally applied and photopolymerized (20s/increment). After 24-hour water storage at 37 °C, specimens were cut into dentine-composite beams. (0,61 mm x 0,61 mm, total adhesive interface 0,37 mm²).

The beams were then separated from the tooth and subjected to μ -tensile bond strength testing (Syndicat TC-550; max tensile force: 40N, speed: 1 mm/min) by fixing the ends to separate plates set 1 mm apart using Dyract Flow (Dentsply) with the adhesive interface suspended in the gap. Beams that did not meet the required dimensions or lacked material integrity were excluded from the study, while bond failure during sectioning was counted as pre-test failure (OMPa). Maximum force was recorded electronically and mode of fracture (adhesive, cohesive, mixed) was evaluated microscopically. Statistical analyses were performed using the Kolmogorov-Smirnov test and 1-way ANOVA ($p=0.05$).

Results



There was no statistically significant difference in the mean bond strength between both groups ($p>0.05$). In both groups occurred more adhesive fractures (Prime & Bond NT: 50%, iBOND Universal 73.7%) than cohesive or mixed fractures. There were no pre-test failures in either group.

Conclusion

iBOND Universal performed similarly well compared to the reference adhesive in terms of bond strength and can therefore be regarded as a viable alternative in the restorative treatment of primary teeth.

Comment

Especially in pediatric dentistry, the self-etch technique entails many advantages over other etching techniques, like reduced technique sensitivity and handling time. Both is from main importance as treatments in pediatric dentistry need to be short and restorations should be long-lasting. Additionally, the acidic monomers in self-etch adhesives are less aggressive than the phosphoric acid used in etch and rinse systems and are accordingly gentler on the lower mineralized primary teeth dentine, preventing over-etching.

iBOND Universal combines these benefits with the advantages of a universal adhesive, showing high bond strength in deciduous teeth using self-etch mode while still allowing clinicians to adapt their etching technique on a case-by-case basis.

Source

Boutsiouki C & Kraemer N: Test report 2018 “ μ -tensile bond strength for i-Bond Universal”. University of Giessen, Germany. Unpublished data. Data on file. The study was abbreviated, summarized and commented and all diagrams and titles have been established by Kulzer.