

In vitro biological and adhesive properties of universal adhesive systems on sound and caries-affected dentine: 18 months

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Abstract

The present study aims to evaluate antimicrobial activity, cytotoxicity, as well as resin-dentine microtensile bond strength, nanoleakage and degree of conversion of six universal adhesives, on sound and caries-affected dentine after 18 months. The adhesives Prime&Bond Active (PBA), Scotchbond Universal (SBU), Tetric N-Bond Universal (TNU), Ambar Universal (AMU), Clearfil Universal Bond Quick (CUQ) and One Coat 7 Universal (OCU) were used. Antimicrobial activity was evaluated against *Streptococcus mutans*. For cytotoxicity, methyltetrazolium assay was used, after 24 h exposure of osteoblast-like cells line to the adhesive's dilution of 1, 0.1, and 0.01 v/v%. After, the adhesives were applied in etch-and-rinse or self-etch strategies on sound or caries-affected dentine surfaces, resin composites restorations were constructed. Then, the specimens were sectioned to obtain sticks to be evaluated in microtensile bond strength and nanoleakage after 24 h and 18 months, and degree of conversion after 24 h. ANOVA and Tukey's test were applied ($\alpha = 0.05$). For antimicrobial activity, CUQ showed higher values than all adhesives. For cytotoxicity, the PBA, AMU, CUQ and OCU adhesives presented cytotoxicity in different dilutions. For microtensile bond strength, OCU presented the lowest values, regardless of time, dentine or strategy. For nanoleakage, differences were observed among adhesives depending on time, dentine or strategy. For degree of conversion, TNU presented the highest values, while PBA and OCU presented the lowest values. Worst values of microtensile bond strength and nanoleakage were always obtained in caries-affected dentine after 18 months. Thus, not all universal adhesives behave the same in terms of antimicrobial activity and cytotoxicity. However, the majority showed worst results when applied in caries-affected dentine, mainly after 18 months. Clinical relevance. Universal adhesive systems may have differences in their biological and adhesive properties, both on sound, but mainly in caries-affected dentine after 18 months. © 2022

Author keywords

Dentine; Hybrid layer; Mechanical properties of adhesives; Nanoleakage; Universal adhesive system