

**Influence of artificial ageing on surface properties and Streptococcus mutans adhesion to dental composite materials.**

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The aim of this in vitro study was to investigate the influence of artificial ageing on the surface properties and early Streptococcus mutans adhesion to current dental composites for the direct restoration of class II defects. Three hundred and thirty specimens each were prepared from five dental composites, and were randomly allotted to various artificial ageing protocols (storage in distilled water/ethanol/artificial saliva for 7/90/365 days; thermal cycling, 6,000 cycles 5/55 degrees C). Prior and after each treatment, surface roughness (R(a)) and hydrophobicity were determined, and S. mutans adhesion (ATCC 25175; 2.5 h, 37 degrees C) was simulated with and without prior exposition to human whole saliva (2 h, 37 degrees C). Adherence of S. mutans was determined fluorometrically. Means and standard deviations were calculated, and analyzed using three-way ANOVA and post-hoc analysis (alpha = 0.05). For both R(a) and S. mutans adherence to uncoated and saliva-coated specimens, significant influences of the composite material, the ageing medium and the ageing duration have been observed; for surface hydrophobicity, significant influences of the composite material and the ageing duration were found. For uncoated specimens, significant increases in S. mutans adhesion were observed with prolonged artificial ageing, whereas significant decreases in S. mutans adhesion were found for the saliva-coated specimens. The data indicate influences of the artificial ageing method on surface parameters such as R(a) and hydrophobicity as well as microbial adhesion. The results underline the relevance of saliva coating on the outcome of studies simulating microbial adhesion, and highlight differences in the susceptibility of dental composites for the adhesion of oral bacteria.