

# **Influence of surface properties of resin-based composites on in vitro *Streptococcus mutans* biofilm development.**

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## **Source**

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## **Abstract**

The aim of this in vitro study was to evaluate the influence of physicochemical surface properties of resin-based composites on *Streptococcus mutans* biofilm formation. Specimens were prepared from each of four resin-based composites by polymerization against Mylar strips. Half of the number of specimens received no further surface treatment, whereas the other half were subjected to a polishing treatment. Surface roughness (SR) and topography were assessed using profilometry and atomic force microscopy. Surface free-energy (SFE) was determined, and the chemical surface composition was analysed by X-ray photoelectron spectroscopy (XPS). *S. mutans* biofilms were formed on the surface of the resin-based composite specimens for either 48 or 96 h using an artificial mouth system (AMS). Polishing caused a significant decrease in SFE, and XPS analysis indicated an increase of surface silicon and a decrease of surface carbon. Only for Grandio was a significant increase in SR identified after polishing, which was probably related to the higher concentration of filler particles on its surface. Significantly less *S. mutans* biofilm formation was observed on polished resin-based composites than on unpolished resin-based composites. These results indicate that the proportions of resin matrix and filler particles on the surface of resin-based composites strongly influence *S. mutans* biofilm formation in vitro, suggesting that minimization of resin matrix exposure might be useful to reduce biofilm formation on the surface of resin-based composites.