Ageing behaviour of a silorane-based composite regarding streptococcal adhesion

Sebastian Hahnel, Martin Rosentritt, Anne Henrich, Gerhard Handel, Ralf Bürgers

Introduction: The aim of this *in vitro* study was to investigate the influence of artificial ageing on streptococcal adhesion to a silorane-based composite.

Methods: Standardized specimens (diameter 10mm, height 2mm) of a silorane-based composite (*Filtek Silorane*, 3M Espe, Seefeld, G) were prepared, and polished to high gloss using grinding paper and polishing paste. A nano-filled methacrylate-based composite was used as control (*Filtek Supreme XT*, 3M Espe). After assessment of surface roughness, specimens (n=15 for each treatment) were stored in ethanol for 7, 90 or 365 days, or thermally cycled (6000 cycles 5/55°C, 5min). Specimens were incubated either with phosphate buffered saline or natural whole saliva for 2h for pellicle formation, and subsequently with *Streptococcus mutans* suspension (2.5h, 37°C). Adherent bacteria were quantified using a fluorometric assay. Statistics: One-way ANOVA, Tukey-test (α=.05).

Results:

Ageing protocol	***Filtek Silorane***	***Filtek Supreme XT***	***Filtek Silorane***	***Filtek Supreme XT***
	Uncoated (Mean, SD)		**Saliva-coated (Mean, SD)**	
0 days	2409.1 (1834.5)	4478.9 (2415.2)	4338.1 (2014.9)	9605.9 (2569.5)
7 days	608.4 (454.2)	2355.8 (1937.6)	1503.8 (1030.1)	2125.8 (1625.8)
90 days	1658.9 (1296.6)	3531.2 (1002.5)	1016.5 (615.6)	3655.8 (1448.7)
365 days	3240.1 (1432.8)	7099.1 (2726.6)	720.6 (615.9)	3777.8 (2542.7)
Thermal cycling	4275.4 (4093.4)	3281.6 (1711.7)	5899.1 (1878.13)	11983.6 (7924.9)

Relative fluorescence intensities showed a decrease after storage in ethanol for 7 days, indicating a decrease in streptococcal adhesion. With the exception of uncoated *Filtek Supreme XT*, thermal cycling caused a significant increase in fluorescence intensities,

suggesting higher adhesion of streptococci. Prolonged alcohol storage caused a significant increase of fluorescence intensities with the exception of saliva-coated *Filtek Silorane*. **Conclusion:** Within the limitations of an *in vitro* study it can be concluded that ageing influences microbial adhesion to composite materials decisively. The silorane-based composite features promising results for streptococcal adhesion after artificial ageing in ethanol and thermal cycling.