

Bifix QM – Toothbrush abrasion

VOCO GmbH, Knowledge Communication Department

Anton-Flettner-Str. 1-3
27472 Cuxhaven, Germany

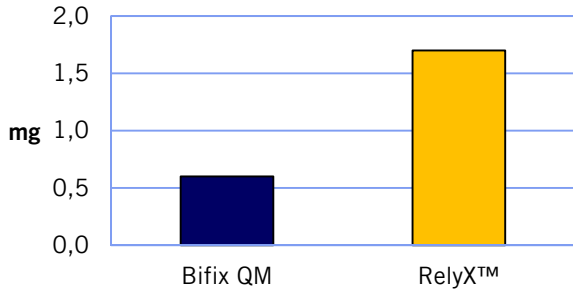
Tel.: +49 (0)4721-719-1111
Fax: +49 (0)4721-719-109

info@voco.de
www.voco.com



In addition to adhesion to enamel and dentine, the wear behaviour is an important criterion for the evaluation of the quality of dental luting cements. Bifix has already set standards for the bond strength on both sides of the heterogeneous bonding site.^[1] A higher amount of abrasion of the luting cement than with inlays or onlays, however, is often observed in the dental surgery, which can result in the formation of marginal leakage and secondary caries. In addition to excellent adhesion, the luting composite's resistance to abrasion is also of elementary importance for the longevity of a restoration.

Abrasion study at the University of Dresden



The abrasion resistance of Bifix QM and RelyX Unicem (3M ESPE) (both self-cured) was evaluated in a tooth-cleaning simulator under the most surgery-relevant conditions possible, in a study at the University Hospital Dresden by Prof. Reitemeyer. Figure 1 shows a significantly increased amount of material abrasion after loading for RelyX in comparison to Bifix. Bifix QM shows a low amount of abrasion equivalent to Arabesk Top, the posterior range composite.

Figure 1: Material abrasion on test specimens (cylinder 12 × 8 mm) in mg after 12,000 brush cycles

In addition to the material abrasion, the condition of the remaining surface was also profilometrically evaluated in the study.

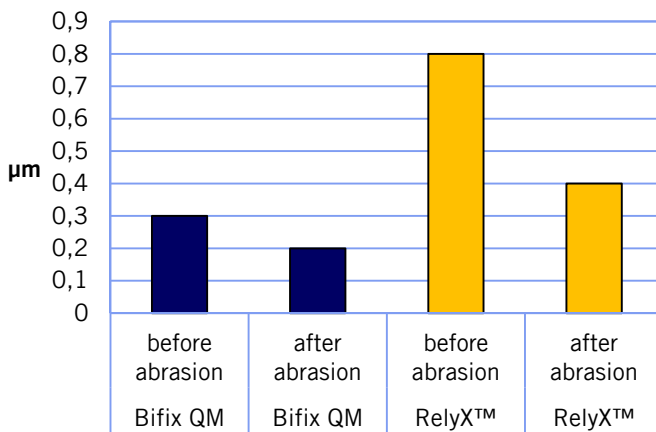


Figure 2: Average depth of roughness after abrasion, R_a

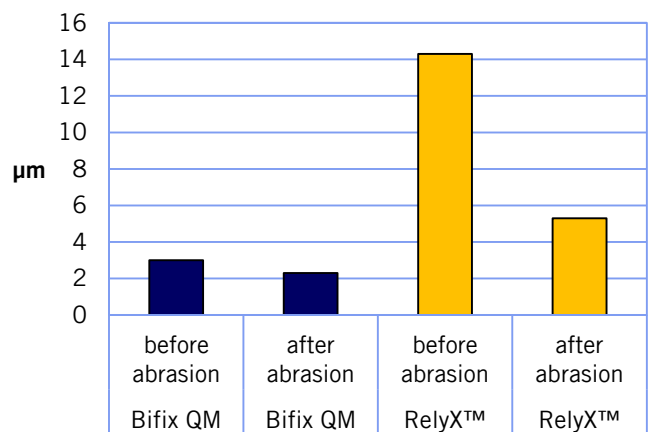


Figure 3: Maximum depth of roughness after abrasion, R_z

It is evident from Figures 2 and 3 that Bifix QM exhibits not only a more abrasion-resistant surface than RelyX, but also one that is smoother and consequently smaller. This surface - that is not sponge-like roughened - additionally counteracts permanent settlement of bacteria. The clinical significance of the profilometrical values becomes even more evident with SEM micrographs (Figure 4.). The observed material chipping in the 5-10 µm size range in the cement line can represent dentine-limited, preferred spots for caries due marginal leakage, which are not accessible with a toothbrush.

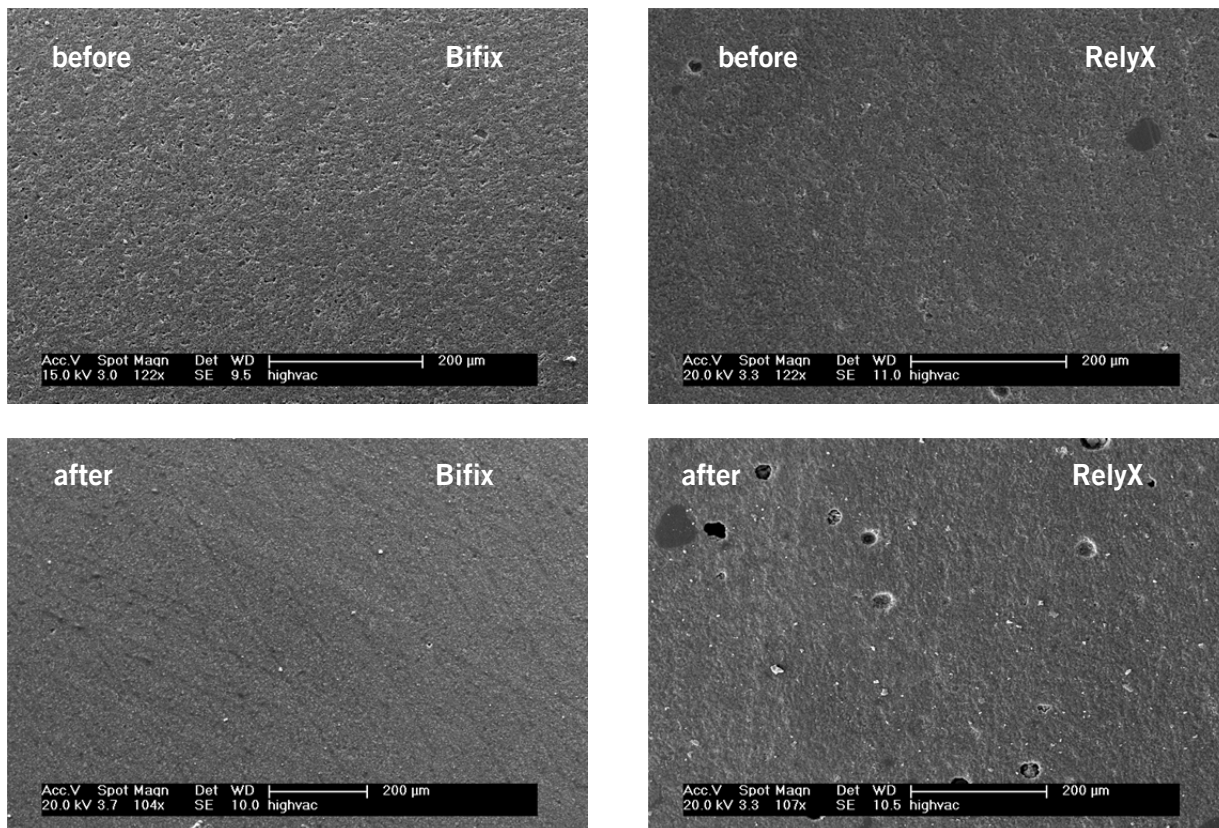


Figure 4: Material abrasion on test specimens

Conclusion: Bifix QM not only exhibits outstanding adhesion, but also simultaneously high abrasion resistance and a smooth surface. It thus offers increased security against caries due to marginal leakage.

[1] S. Preußker, H. W. Klimm, R. Koch, *DZZ* **2003**, 58, 570-578.