

## Bifix SE - Bacterial adhesion

VOCO GmbH, Department of Knowledge Communication

Anton-Flettner-Str. 1-3  
PO Box 767  
D-27472 Cuxhaven

Phone: +49 (0)4721-719-0  
Fax: +49 (0)4721-719-109

info@voco.de  
www.voco.de

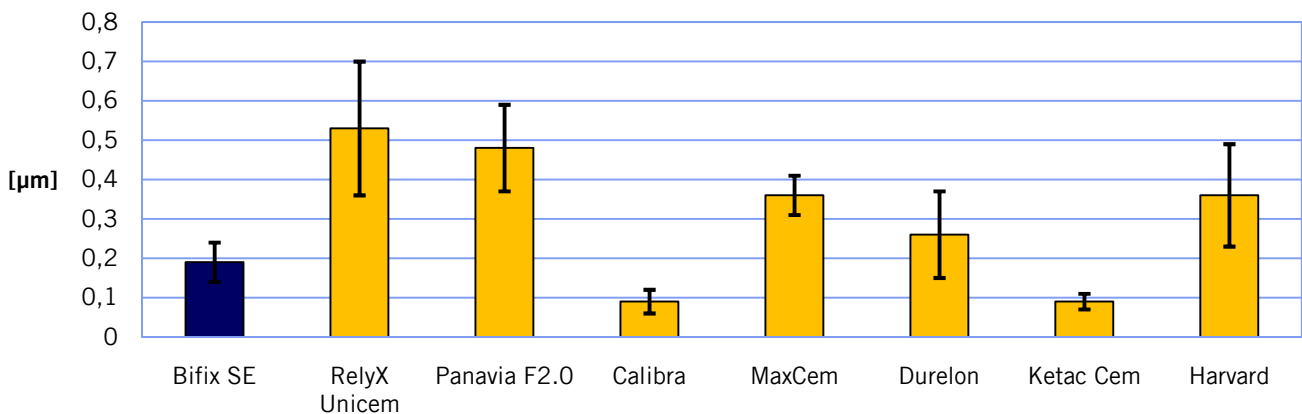


**The surface roughness and susceptibility to the adhesion of *Streptococcus mutans* of diverse luting materials were examined in a study at the University of Regensburg (Germany).<sup>[1]</sup>**

The cement lines of crowns and bridge are often in areas that are difficult to access in the scope of daily oral hygiene. Bacteria can accumulate at the edges of a crown and secondary caries can easily develop. According to several studies, secondary caries is responsible for approximately one-third of failures.<sup>[2]</sup> Luting cements should feature a smooth surface and be as resistant as possible to the adhesion of bacteria for this reason.

### Analysis of surface roughness

The test specimens were cured through a glass plate and subsequently polished using a polishing machine (Motopol 8, Buehler Coventry, UK) with damp, abrasive sandpaper (4000 grit). The surface roughness of the luting materials was determined first. The results are shown in Figure 1.

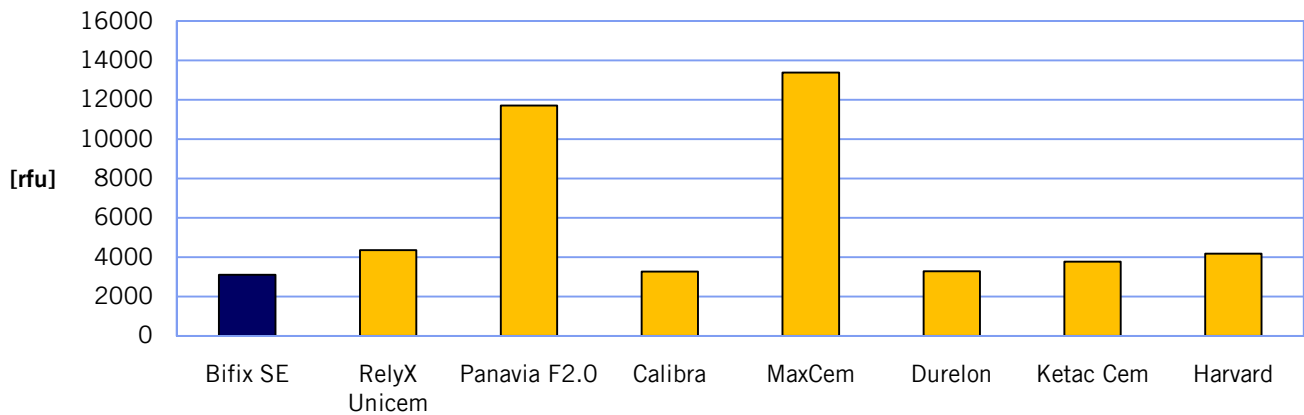


**Figure 1:** Surface roughness  $R_a$  [µm]

Bifix ES, Calibra and Ketac Cem exhibited the smoothest surfaces in the measurement. Another aspect of the study was the examination of the effect of mixing errors on the surface smoothness. There were clear differences in Harvard cement here. A roughness of 0.36 µm was measure with Harvard when the correct mixing ratio of 1.8:1 was used, but the value worsened to 0.45 µm with an incorrect mixing ratio of 1.8:0.75. The advantage of the Bifix SE Quickmix syringe was shown here, since mixing errors can be excluded from the beginning.

## Analysis of bacterial adhesion

For the examination of the bacterial adhesion, the test specimens were incubated with a suspension of *Streptococcus Mutans* at 37° C for 12 hours. The density of the bacteria was subsequently determined through fluorescence intensity. The results of this measurement are shown in Figure 2. The mean relative fluorescence intensity (rfu) is shown.



**Figure 2:** Bacteria density determined by the measurement of fluorescence [rfu]

Bifix SE exhibited the best values in this measurement. The values do not directly correlate to the surface roughness; apparently not only the topology of the surface is relevant for bacterial adhesion. As was found with the surface roughness, changes in the mixing ratio clearly caused different values. A change of 4:1 to 4:1.5 in MaxCem's mixing ratio resulted in bacterial colonization that was more than doubled.

**Conclusion: Bifix SE exhibits a very smooth surface after polishing. Bifix SE exhibited the lowest colonization of bacteria from the materials examined here. The risk of the development of secondary caries can thus be reduced with the use of Bifix SE.**

[1] R. Buergers, S. Hahnel, U. Reischl, R. Mueller, M. Rosentritt, G. Handel, M. Behr, *Acta Odontol. Scand.* **2009**, *67*, 139-145.

[2] C. Holm, G. Tidehag, A. Tillberg, M. Molin, *Int. J. Prosthodont.* **2003**, *16*, 283-289.