Fluoride Release of Bioactive Restoratives with Bonding Agents
University Testing 2015 – Accepted for Publication

Objectives: Fluoride is frequently added to dental restorative materials for release into the oral cavity since it is known to inhibit caries progression. The purpose of this study was to determine if the fluoride ions from a bioactive fluoride-releasing restorative material can penetrate through an adhesive bonding agent.

Methods: A total of 40 samples of ACTIVA™ BioActive Restorative (Pulpdent) were prepared. To prepare the samples, a glass plate was placed on the bottom of a mold holder to serve as a base. Next, ACTIVA material was placed in the plastic mold 5mm in diameter by 2mm deep. Samples were coated with: Group 1: N=10 with no coating - control, Group 2: N=10 with Clearfil™ SE (Kuraray), Group 3: N=10 with Scotchbond™ UNIVERSAL (3M ESPE), and Group 4: N=10 with DenTASTIC™ UNO™ (Pulpdent). A fluoride ion analyzer (Thermo Scientific Orion™ Star A214) was pre-calibrated with 1 and 10 ppm buffer solutions prior to all measurements and fluoride release was measured at 1, 5, 10, 15, and 20 days.

Results: Data was analyzed using a one-way ANOVA model and comparisons were considered to be significant at p<0.05. All groups showed significant fluoride release on day 1 (Fig. 1). Group 1 and Group 4 showed significantly more fluoride release over 20 days. Group 2 and Group 3 showed significantly equivalent fluoride release with each other that was significantly less over 20 days than the other groups. By day 20, all samples exhibited very low levels of fluoride release as compared to earlier days.

![Graph showing fluoride release](image)

Figure 1: Mean fluoride release for 4 different coatings.

Conclusions: This study demonstrated that fluoride ions from a restorative material are able to penetrate through the adhesive bonding agents tested.