Pilot Study to Measure Fluoride Ion Penetration of Hydrophilic Sealant

Saturday, March 6, 2010: 11:45 a.m. - 1 p.m.
Location: Exhibit Hall D (Walter E. Washington Convention Center)

M. CANNON1, A. POWELL2, J. KUTTAB2, and R. JURADO2, 1Grove Medical Center, Long Grove, IL, 2Northwestern University, Chicago, IL

Objectives: To determine if therapeutic (hydrophilic) sealant materials allow water absorption and subsequent fluoride ion diffusion due to concentration gradient.

Methods: Three disks of each of three different groups of resin based sealant/composite were fabricated 2mm's thick and 12mm's in diameter; Group A- Embrace (Pulpdent) hydrophilic acrylate sealant, Group B- ProSeal (Reliance) hydrophobic multi-functional acrylate sealant and Group C- Aeliteflo LV (Bisco) urethane dimethacrylate flowable composite. The disks were placed inside Sterlitech Stainless Steel inline filter devices and the system sealed with 0.5ml of 5% NaF in the upper chamber and 0.5ml of de-ionized water placed in the lower chamber. Samples were obtained by replacing the 0.5ml syringes of de-ionized water at 1,2,24, and 72 hours and at 1, 2 and 3 weeks. The 5% solution of NaF was replaced daily to maintain the concentration gradient. After dilution, the samples' fluoride concentrations were measured with a repeatedly calibrated (10ppm and 100ppm standards) Orion 720A meter with Fluoride electrode. Results: Median values of Fluoride Concentration (ppm) in Samples, Group A- Embrace: 1 hr-6140, 2 hrs-3990,24 hrs-68.4,72 hrs-5.82, 1 week-7.54 , 2 weeks- 78.0, 3 weeks-193.0 ,Group B- ProSeal: 1 hr-2.30, 2 hrs-1.54, 24 hrs-1.75, 72 hrs-1.37, 1 week-1.88, 2 weeks-1.99, 3 weeks-2.60, Group C- Aeliteflo LV: 1hr-1.38, 2 hrs-1.46, 24 hrs-1.95, 72 hrs-2.38, 1 week-2.88, 2 weeks-3.48, 3 weeks-4.88 . Statistical analysis revealed a significant difference (ANOVA, between DF-6, within DF- 12, p=0.05) between Group A and the Groups B and C . There was no significant difference between Group B and C (t=1.77 with 6 DF p=0.1272). Conclusions: The initially high fluoride levels of Group A may have been from fluoride released by the product. In addition, the escalating fluoride level of the samples after 72 hours may be the result of greater water diffusion.

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