Potential for Dentifrice Protection Against Enamel Erosion in an In Vitro Model

A.K. Burwell and D.C. Greenspan
NovaMin Technology, Inc, Alachua, Florida, USA

ORCA Abstract

Originally Presented at
54th ORCA Congress
July 2007, Helsignor Denmark
Abstract # 116

Objective: To evaluate the potential of calcium sodium phosphosilicate (NovaMin®) and fluoride-containing dentifrices to prevent enamel erosion in an *in vitro* model. NovaMin® releases calcium, phosphorus, and sodium ions thereby triggering a modest local pH rise and increasing the remineralization potential of aqueous solutions.

Methods: Bovine enamel samples were subjected to a 5-day erosion cycle that consisted of alternating acid challenges (six 5-minute soaks in citric acid, pH=2.50), remineralization periods in artificial saliva (1.5 hours between each acid challenge and 16 hours overnight, pH=7.00), and two dentifrice treatments (1:3 slurry in DI water) before the first and after the last acid challenges. Dentifrice formulations were: A) DI water only, negative control, B) 1500ppm F as MFP, positive control, C) 7.5% NovaMin®, and D) 7.5% NovaMin® + 1500ppm F as MFP. Surface microhardness (Knoop, HK) was measured on all samples using a load of 50 grams for 15 seconds.

Results: Data were not normally distributed and so were analyzed using the appropriate non-parametric statistical tests (ANOVA on Ranks and Student-Newman-Keuls Method). All HK data are presented as median (mean±S.E.M.) with n=25. Results were: A) 19.10 (18.83±0.76), B) 31.40 (31.99±1.41), C) 46.60 (49.54±2.47), D) 39.50 (38.34±1.76) with C > D > B > A ($p<0.01$).

Conclusion: This aggressive *in vitro* erosion model was validated by the ability of fluoride-containing dentifrices to temper decreases in enamel surface microhardness. The preliminary results also indicate that NovaMin®-containing dentifrices have the potential to protect against enamel erosion both with and without fluoride. These results will need to be confirmed by clinical studies. Further studies will also be required to elucidate the exact mechanisms of the protection afforded by the NovaMin® material.

Caries Res 2007;41:268-334