Enamel Protection from Acid Challenge - Benefits of Marketed Fluoride Dentifrices

R.V. Faller, BS
Maurice H. Kornberg School of Dentistry
Philadelphia, PA, USA

S.L. Eversole, AAS
Procter & Gamble
Cincinnati, OH, USA

Abstract

• Objective: To determine the ability of various marketed dentifrices containing stabilized stannous fluoride (SnF₂), sodium fluoride (NaF), or sodium monofluorophosphate (SMFP) to protect enamel against the earliest stages of erosive dietary acid damage using an in vitro enamel protection model.

• Methods: Acid-challenged, extracted human teeth were treated with a 1:3 dilution of dentifrice, rinsed, and then challenged in a controlled series of tests using four dietary acids considered potentially erosive to teeth. Each acid was collected and analyzed to determine the level of mineral (phosphorous) removed from the teeth during the challenge. Post-treatment results were compared to baseline values for each acid. Results for the four acids were averaged and reported as an average percent protection value for each of the dentifrices tested, with higher values representing greater acid protection. The study included six dentifrices formulated with (A) sodium fluoride (NaF), (B) stabilized stannous fluoride (SnF₂), (C,D) NaF plus 5% potassium nitrate (KNO₃), (E) sodium monofluorophosphate (SMFP), or (F) SMFP plus 8% arginine bicarbonate.

• Results: The stabilized SnF₂ dentifrice demonstrated an average protection score of 39.3%, while products formulated with NaF resulted in protection scores between 11 and 13%. The SMFP dentifrice was rated at -3.5%, and the SMFP + arginine bicarbonate dentifrice resulted in a net average score of -5.0%. Results of this test were statistically significant (p < 0.05, ANOVA: B > A = C = D > E = F), in favor of the stabilized SnF₂ dentifrice.

• Conclusions: These results suggest the stabilized SnF₂ dentifrice has the potential to provide significantly better overall acid protection versus any of the other dentifrices included in the study.

(J Clin Dent 2013;24:25-30)