

Enamel Protection: Comparison of Marketed Dentifrice Performance–Erosion Cycling

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ABSTRACT

Tooth health can be measured not only by prevention against subsurface damage (caries) but also by assessing the ability of products to strengthen and protect enamel against the initial enamel softening that can lead to irreversible damage.

Objectives: Purpose of this study was to determine the relative ability of various fluoride containing, marketed toothpastes to protect human enamel against the initiation and progression of damage due to dietary acid attack.

Methods: Cores of extracted, human enamel were cleaned, ground and polished, providing a virgin enamel surface, soaked in pooled saliva (pellicle formation), and treated with a 1:3 slurry (product: saliva) of toothpaste. Marketed toothpastes included in this study were: 1) Crest Pro-Health (1100ppm F as stabilized SnF₂); 2) Colgate Total (1100ppm F as NaF + triclosan/gantrez); 3) Sensodyne Pronamel (1150ppm F as NaF + KNO₃); 4) A&H Age Defying Enamel Care (1100ppm F as NaF + liquid calcium) and 5) Crest Cavity Protection (1100ppm F as NaF), which served as the reference control. Specimens were subjected to erosion cycling conditions (5 day model: Faller et al., Poster #3368, IADR 2009) that included daily challenges using 1% citric acid, representing a potentially damaging acid found in common food and drinks.

Results: Specimens from Group 1 demonstrated an average of 65% reduction in enamel surface loss, relative to the reference control. Group 2, 3 and 4 resulted in a net loss of -13%, -21% and +1%, respectively, relative to this same control. Groups 2, 3 and 4 were not significantly different from the reference control (p<0.05, ANOVA), while Group 1 demonstrated a highly significant level of protection compared to all other test groups included in this study.

Conclusions: These results clearly demonstrate Crest Pro-Health toothpaste, with 1100ppm F as stabilized SnF₂, provides superior protection to the tooth enamel against dietary, erosive acid attack.

MATERIALS AND METHODS

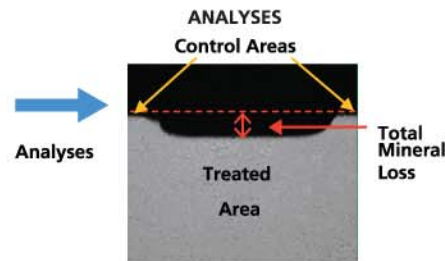
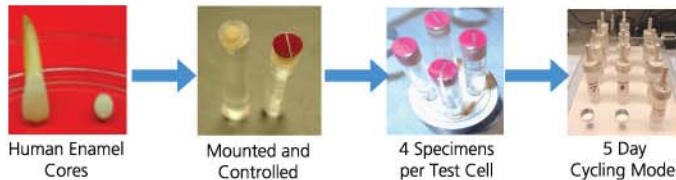
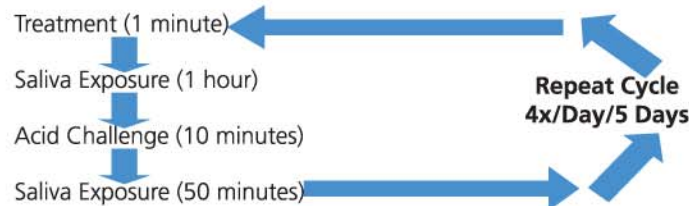
PRODUCTS TESTED

Fluoride (ppm)	Fluoride Source	Abrasive	Other Key Dentifrice Components
1100	SnF ₂	silica	Sodium hexametaphosphate
1100	NaF	silica	Triclosan, gantrez
1150	NaF	silica	KNO ₃
1100	NaF	silica	Liquid calcium
1100	NaF	silica	-----

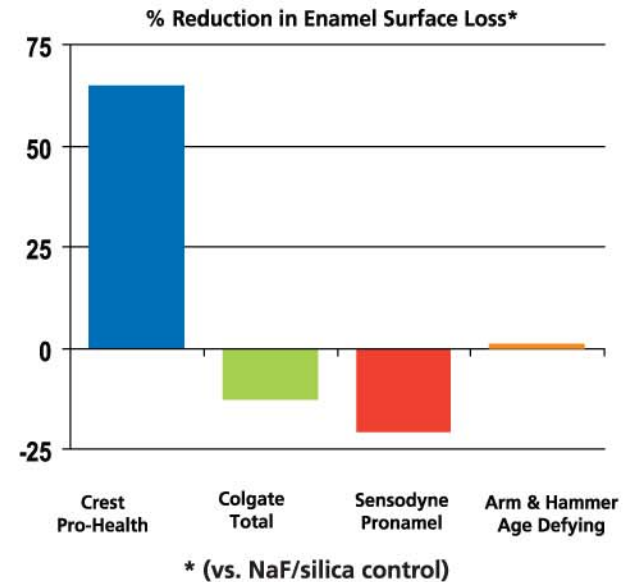
SUBSTRATE

Cores of sound, human enamel, removed from extracted teeth (incisors, premolars) were ground and polished to produce a flattened surface, placed into groups (n = 4) and exposed to saliva to initiate pellicle formation.

CYCLING PROTOCOL



RESULTS



* (vs. NaF/silica control)

CONCLUSIONS

These results clearly demonstrate Crest Pro-Health toothpaste, with 1100ppm fluoride as stabilized SnF₂, provides superior protection to the tooth enamel against dietary, erosive acid attack.