

Remineralization of Decalcified Enamel in vivo Using Daily Fluoride Mouthrinse

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This investigation was performed to evaluate in vivo effects of a 0.02% APF mouthrinse upon decalcified enamel. Bovine enamel slabs (3x3x2mm) were prepared, polished to a smooth, flat surface, and acid softened with 0.1M lactate buffer for 16 hrs at pH=4. Prior to mounting with beeswax into the lingual acrylic of a removable orthodontic appliance, microhardness testing was performed on the slabs. Six adult males each wore 12 control slabs for 96 hrs and brushed 4x daily with a nonfluoride dentifrice. Subsequently 12 experimental slabs were rinsed intraorally 4x daily for 1 min with a 0.02% APF mouthrinse (PhosFlur). Each slab was tested for microhardness and then resistance to acid (ART) following immersion in 0.01M lactate buffer for 24 hrs at pH=4. Twelve additional control and test slabs were worn and tested to measure F- uptake using perchloric acid for 15-60 sec. The F- concentration was measured using a fluoride specific electrode and PO₄= content was measured by spectrophotometry for calculation of the depth of each etch. F- content (ng) was also compared to the PO₄=level (ug) of each etch. Recovery of microhardness following intraoral exposure was 25.3% for control slabs and 45.7% for the test slabs.

Following ART, control slabs retained >6.0% resistance to acid compared to 27.5% for the test slabs. Results for micohardness was significantly higher for test compared to control slabs. The fluoride content in controls was >500ppm at 5um and gradually decreased to 100ppm by 50um. The test slabs showed 4500ppm at 5um, increased slightly to 5000ppm at 15um, slowly decreased to 1500ppm by 50um, and to 100ppm by 100um. Significantly greater F- content was observed in test slabs at all levels compared to controls (p>0.01). Acid softened enamel treated with 0.02% APF mouthrinse exhibited significant rehardending, increased resistance to acid, and higher levels of F content in the outer 90um. This research was supported by NIDR Grant #DE02731.

J. Dent. Res. 64:273, 1985