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Comparative Evaluation of Fluoride Uptake Rate in the Enamel of Primary Teeth after Application of Two Pediatric Dentifrices

B. Malekafzali, N. Tadayon

Abstract:

Statement of problem: The effectiveness of fluoride dentifrices in reducing dental caries is well documented. However, not all fluoride dentifrices are equally effective Purpose: The objective of this experimental study was to compare fluoride uptake from Pooneh pediatric toothpaste and an ADA-approved pediatric dentifrice, in sound enamel of primary teeth. Materials and Methods: In an in vitro randomized controlled trial, 20 sound primary canines were divided into 2 groups according to the experimental dentifrices. Each tooth was sectioned longitudinally into experimental and control halves. The test groups were treated with dentifrice slurries for 1 hour. All specimens were then suspended in 5ml artificial saliva for 24 hours at 37˚C and were etched twice for 30 seconds with a 1ml solution of 0.5M percholoric acid. Fluoride and calcium concentrations were measured by a potentiometer and an atomic absorption spectrophotometer, respectively. The collected data were analyzed using repeated measurement ANOVA and Tukey's test. Results: The mean fluoride concentrations in the Aqua fresh group (4098.44 and 3755.25 ppm in first and both layers respectively) were higher than Pooneh (first layer 2420.51 ppm and both layers 2242.73 ppm), and both were higher than the controls ($P<0.05$). No significant difference was observed between the control groups. The enamel thickness in Aqua fresh cases was less than the teeth treated with Pooneh (first layer 3.09 vs. 3.85 µm, both layers 4.98 vs. 6.09 µm) and both were less than the controls ($P<0.05$). There was no significant difference between the control groups. Conclusion: Fluoride uptake was lower in Pooneh pediatric toothpaste as compared to the tested ADA-approved dentifrice, but considerably higher than the control group.

Keywords:

Pediatric dentifrice ، Primary tooth ، Potentiometry ، Enamel biopsy technique

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