Prevention Of Enamel Demineralization By Fluoride Containing Home Bleaching Agents

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Objective:
Tooth bleaching is a common esthetic dental treatment. We evaluated the efficacy of fluoride containing home bleaching agents as caries prevention products in preventing enamel demineralization.

Methods:
Enamel specimens from bovine incisors, with 2×3mm experimental surfaces made by acid resistant varnish, were divided into four treatment groups: 1. CONT (Control: no treatment), 2. HSU (Shofu HiLite Shade up: 10% carbamide peroxide), 3. OER (Ultradent Opalescence Regular: 10% carbamide peroxide, 2.45ppmF), 4. OPF (Ultradent Opalescence PF: 10% carbamide peroxide 1,100ppmF, potassium nitrate). Over four days, bleaching agent was applied and specimens stored under 100% humidity (37°C, 2h) then rinsed with tap water (30s) and toothbrush followed with deionized water (30s). Specimens were then immersed in demineralization solution (1.5mM Ca, 0.9mM PO_4, 50mM acetic acid, 0.1ppmF, pH4.6) at 37°C for 22h and the cycle was repeated another 3 times. Finally, 150µm-thick sections were cut perpendicularly to the experimental surface from each specimen, and mineral profile and integrated mineral loss (IML) determined from radiographic images obtained by transversal microradiography.

Results:
CONT showed severely demineralized subsurface lesions, and IML was 9,662vol%×µm (n=5). HSU also revealed subsurface demineralization, however IML was 8,063vol%×µm (n=6). OER showed subsurface lesions with four distinct mineral peaks and IML was 7,872vol%×µm (n=6). IML of HSU and OER were significantly less than that of CONT (ANOVA, Tukey's, $p<0.05$). OPF showed slightly demineralized mineral profiles and IML of 2,940vol%×µm (n=6). There was a significant difference between OPF and the other treatments.

Conclusion:
Fluoride containing home bleaching agents can prevent enamel demineralization and may act as caries prevention products.

Keywords:

Bleach, Cariology, Demineralization, Fluoride and Preventive dentistry