

Effect of hydroxyapatite toothpaste on vital tooth color

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Objectives: Hydroxyapatite (HAP) adsorbs cariogenic bacteria and remineralizes subsurface demineralized areas of tooth enamel, and is a registered anticaries toothpaste ingredient in Japan. We examined its effect on tooth color, which reportedly changes up to 2 Lumin shades when treated with bleaches like hydrogen peroxide.

Method: Two 6-person groups brushed their teeth 5 minutes 3 times daily for 30 days, one using HAP toothpaste (Aparard, Sangi Co., Ltd.) and the other an identical toothpaste without HAP. The color of subjects' central incisors was measured initially, then every 2-3 days (3 measurements each at the center of the labial surface) using a Photoresearch Spectra-Scan PR-650 photocolormeter. The difference between initial and final average CIE L*a*b* values (ΔE) was calculated for each subject and compared with the average ΔE for reddish brown tabs (A1 through A4) and reddish yellow tabs (B1 through B4) on the Lumin Vacuum guide, calculated using a Murakami CMS-35FS spectrophotometer. Two groups of extracted human teeth were brushed 5 minutes 3 times daily for 7 days using the same toothpastes respectively, then examined by SEM (Hitachi S-4500).

Results: Vital teeth in the HAP group showed increased L* and an average ΔE of 3.48, against 1.45 and no change in L* for the non-HAP group. Comparison with Lumin average ΔE values (2.52 for A tabs and 3.55 for B tabs) showed the HAP group color change was equivalent to 1.4 shades on the reddish brown scale and 1.0 shade for reddish yellow. SEM observation showed a fine particle coating on extracted teeth in the HAP group, but not in the non-HAP group.

Conclusion: Though less powerful than harmful bleaches, the results suggest HAP toothpaste can alter tooth color by at least one shade with daily brushing, and this effect may be related to its plaque-adsorption and enamel remineralization properties.



Fig.1 被験者の歯の測色

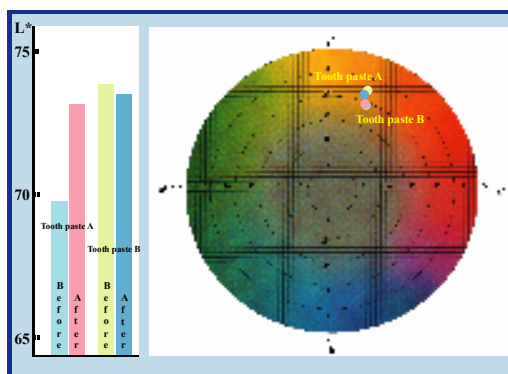


Fig.2 異なる歯磨剤の使用による色調変化
Toothpaste A(HAP 配合), Toothpaste B(HAP 無し)