Use of Nano-hydroxyapatite Crystals to Improve Surface Smoothness During Bleaching

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Objective: Microscopic enamel defects and sub-surface pores are believed to result in dull looking teeth following bleaching. We investigated the ability of a paste containing nano-sized hydroxyapatite (nHAP) crystals [Renamel AfterBleach® (RAB); Sangi] to repair these defects, and improve surface smoothness.
Methods: A randomized double-blind clinical trial was conducted. 42 people were randomly assigned to use either a placebo without nHAP, G-zeroHAP, or the commercial product, G-RAB. Over 14 days, participants used 7% HP w/o desensitizer twice daily for 30 minutes and then applied RAB or zeroHAP for 5 minutes. Maxillary central incisors were impressed before (V3) and one week following the end (V6) of bleaching. Impressions were scanned using an optical scanner (Proscan 2000). Average roughness (Ra) was recorded in microns. The outcome of interest was change in Ra, V6 minus V3. Negative numbers indicate decreased roughness (increased smoothness). An ordinal scale, Luster Guide, consisting of four composite tabs with different finishes was created. Tabs #1 to #4 were rated smoothest to roughest. Right central incisor was assessed visually at V3 and V6.
Results: A preponderance of participants rated Tab#1 at baseline and throughout the study. For G-zeroHAP and G-RAB respectively the mean (SD) change in average Ra was 0.06 (0.22) and -0.07 (0.01), and the mean change in Luster Guide was 0.0 and -0.3. Average Ra decreased significantly (t-test; $p = 0.02$), but the difference in Luster Guide scores was not significant (Mann-Whitney Rank Sum Test; $p = 0.14$).
Conclusion: For G-zeroHAP, the Ra data indicate roughness increased. The less precise Luster Guide measurements noted no change. For G-RAB both measures indicated increased smoothness. As measured with optical scanning, participants in G-RAB had significantly smoother teeth at V6 versus baseline, and the Luster Guide data are supportive. Study supported by Sangi Co., Ltd.; Tokyo; Japan.
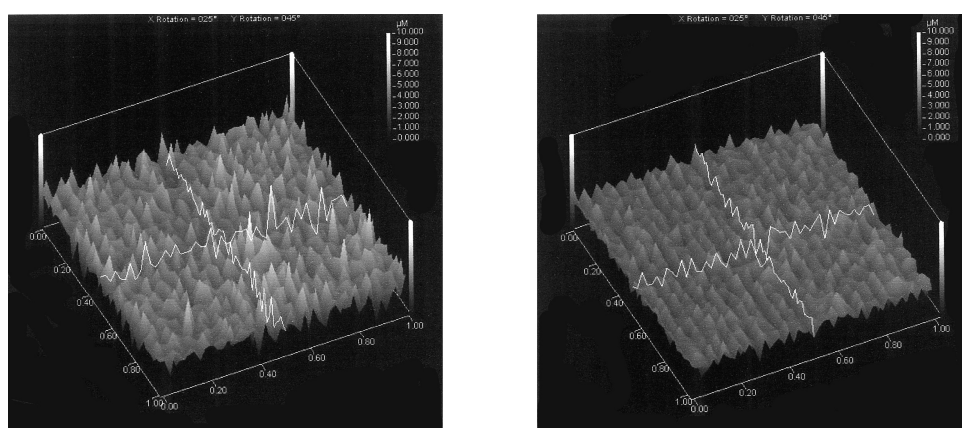
Fig. Improvement of surface smoothness by use of nano-hydroxyapatite