Effect of Take-Home Whitening Agent on Enamel Microhardness

*in vitro study*


**Objective:**

To evaluate the effect of remineralizing agents such as fluoride or amorphous calcium phosphate (ACP) during bleaching on surface enamel microhardness.

**Materials:**

- 16% carbamide peroxide with ACP (NiteWhite ACP, Discus Dental)
- 15% carbamide peroxide with fluoride (Opalescence PF, Ultradent)
- 9% hydrogen peroxide with fluoride (Tres White, Ultradent)

**Methodology:**

Nine human central incisors were cut in half longitudinally for a total of 18 surfaces. The sections were embedded into acrylic with the facial surfaces exposed. The prepared specimens were randomly divided into three groups (six specimens each), and assigned treatment with one of the three whitening agents being tested. Group 1 was treated with 16% carbamide peroxide with ACP (NiteWhite ACP); Group 2 was treated with 15% carbamide peroxide with fluoride (Opalescence PF); Group 3 was treated with 9% hydrogen peroxide with fluoride (Tres White).

Before bleaching was initiated, baseline data were collected on the Vickers surface hardness (VHN) of the enamel using a MicroMet 2100 series tester (Buehler, Lake Bluff, IL). Six hardness tests were conducted with 500 gm load for 15 seconds on each specimen for a total of 36 measurements per group. The specimens then underwent six consecutive one-hour cycles of bleaching with the assigned whitening agent. At the completion of the bleaching, another six enamel hardness readings were taken for each specimen. The data gathered were analyzed using ANOVA with p < 0.05 for significant differences.
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Results:
All whitening systems produced a decrease in enamel hardness after six bleaching cycles. The VHN of Group 1 (NiteWhite ACP) decreased by 5.57%, the VHN of Group 2 (Opalescence PF) decreased by 10.49% and the VHN of Group 3 (Tres White) decreased by 11.91%. The decrease in enamel hardness for Group 1 specimens treated with 16% carbamide peroxide with ACP (NiteWhite) was significantly less than the decrease seen in other groups.

Conclusion:
Bleaching with NiteWhite ACP resulted in the least decrease in hardness compared with Opalescence PF and Tres White under the conditions of this study.