



Benefits of ACP

in vitro study

Microhardness and Ultramorphological Changes after Whitening: Calcium and Phosphate Benefits

Pinheiro HB, Cardoso PEC. Microhardness and Ultramorphological Changes after Whitening: Calcium and Phosphate Benefits. J Dent Res 89 (Spec Iss A), 0839, 2010.

Objective

To investigate the influence of home bleaching agents with and without calcium and phosphate on human enamel and dentin surface microhardness and ultramorphology.

Materials

- Five human molars
- 15% carbamide peroxide with potassium nitrate and fluoride (Opalescence PF, Ultradent)
- 16% carbamide peroxide with potassium nitrate and fluoride (Whiteness Perfect, FGM)
- 16% carbamide peroxide with potassium nitrate and ACP (NiteWhite ACP, Discus Dental)
- 7.5% hydrogen peroxide with potassium nitrate and ACP (DayWhite ACP, Discus Dental)
- 7.5% hydrogen peroxide with potassium nitrate, fluoride, and calcium (White Class Ca, FGM)

Methodology

Five intact human third molars were sectioned into five wafers. All wafers had their baseline Knoop Hardness Number (KHN) of the enamel (E0) and dentin (D0) measured. Each wafer of the tooth was assigned to a group (n=5). G1=15% carbamide peroxide (CP) (Opalescence PF-Ultradent) applied for four hours per day; G2=16% CP (Whiteness Perfect, FGM), G3=16% CP with Ca and PO4 (NiteWhite ACP-Discus Dental), G2 and G3 followed same application time of group 1; G4=7.5% hydrogen peroxide (HP) with Ca and PO4 (Day White ACP-Discus Dental); G5=7.5% HP with Ca (White Class Ca-FGM), G4 and G5 were applied for one hour per day. After each session of bleaching treatment, specimens were stored in distilled water (37°C). The products were applied for two weeks, according to manufacturers' instructions. Subsequent measurements of KHN were taken in the enamel (E1) and dentin (D1). Two specimens from each group were selected for ultramorphological investigation after final tests.

Results

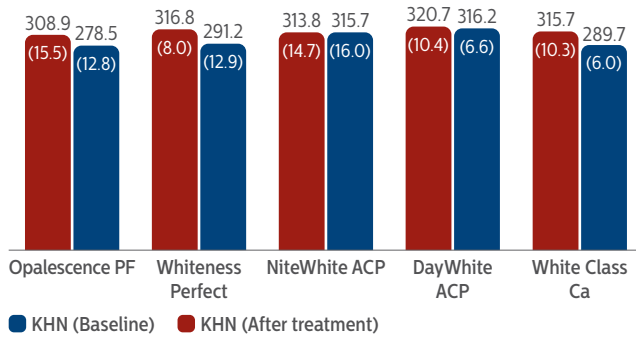
Conventional bleaching agents and the gel with calcium (Group 1 and Group 2) caused KHN decrease. Bleaching agents with calcium and PO4 (Group 3 and Group 4) did not change KHN. The obvious change of morphology was observed on enamel and dentin surfaces in Group 1, Group 2 and Group 5.

Conclusion

The bleaching agents with calcium and ACP did not change the superficial enamel and dentin microhardness and ultramorphology. Conventional bleaching agents and the gel with calcium caused microhardness decrease and ultramorphology changes on enamel and dentin.

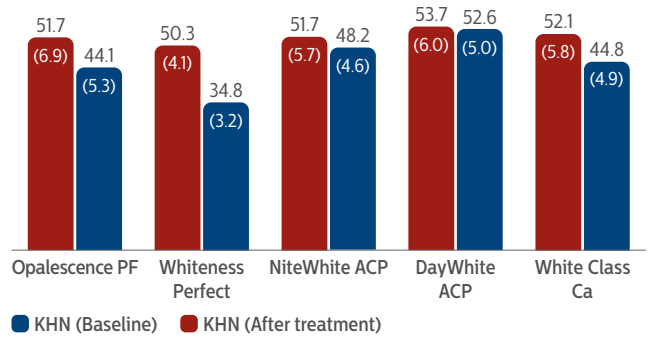
Enamel

KHN



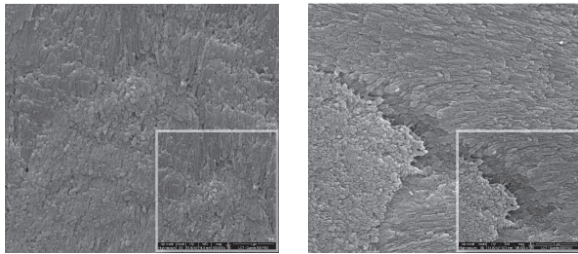
Dentin

KHN



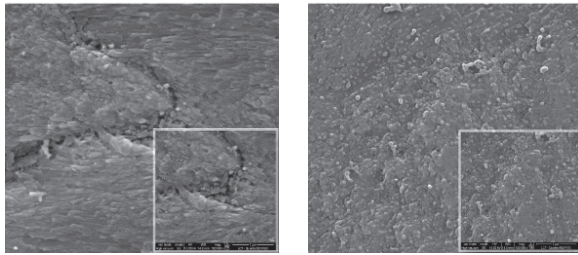
Enamel

Original magnification: 50,000X
 Insets: 100,000X



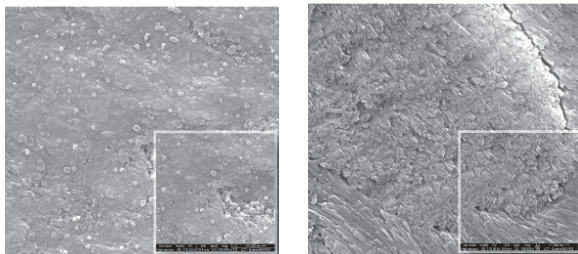
Control

Opalescence PF



Whiteness Perfect

NiteWhite ACP

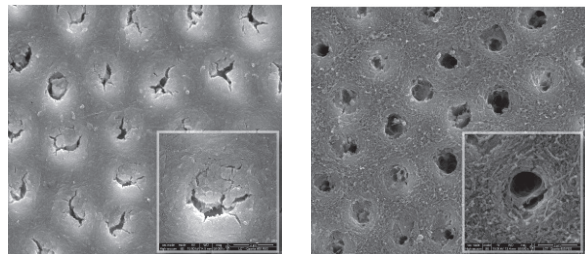


DayWhite ACP

White Class Ca

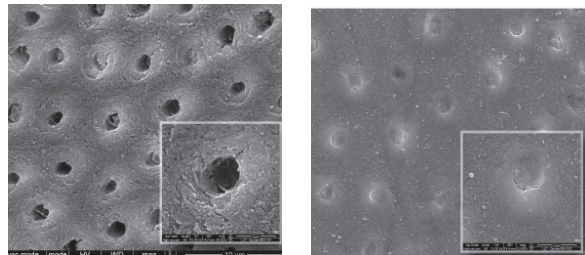
Dentin

Original magnification: 10,000X
 Insets: 20,000X



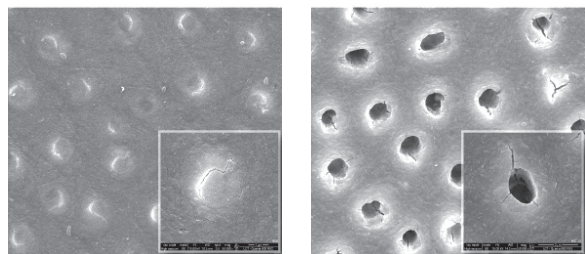
Control

Opalescence PF



Whiteness Perfect

NiteWhite ACP



DayWhite ACP

White Class Ca

