



## Benefits of ACP

in vitro study

# Influence of Bioactive Materials on Whitened Human Enamel Surface

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### Objective

To investigate the influence of bioactive materials on whitened human enamel surface using Knoop hardness test.

### Materials

- Five human teeth
- 16% carbamide peroxide, potassium nitrate, fluoride (Opalescence PF, Ultradent)
- 16% carbamide peroxide 16%, potassium nitrate, fluoride, calcium, phosphate (NiteWhite ACP, Discus Dental)
- 15% carbamide peroxide 15%, potassium nitrate, fluoride + potassium nitrate, fluoride, calcium, phosphate (Opalescence PF, Ultradent + Relief ACP, Discus Dental)
- 15% carbamide peroxide, potassium nitrate, fluoride + potassium nitrate, fluoride, calcium, phosphate (Opalescence PF, Ultradent & Relief ACP, Discus Dental)

### Methodology

Five human teeth were sectioned into four slices per tooth. Whitening treatments were performed for 14 days according to manufacturers' instructions. Six Knoop hardness measures were taken for each specimen, three before and three after treatments. The data were compared by Student's t-test ( $\alpha=0.01$ ).

### Results

OPF and OPF + Relief ACP presented statistically significant hardness decrease; NiteWhite ACP and OPF & Relief ACP mixed at the time of application showed that enamel hardness was maintained.

### Conclusion

Whitening treatment can lead to alterations in the dental structure. Minimizing or eliminating the alterations in the whitened dental structure could bring benefits to patients. With the purpose of increasing the mineral deposition on the tooth, amorphous calcium phosphate (ACP) biomaterial has been added to toothpastes, mouth rinses, chewing gums, and more recently to whitening products. This study indicates that the use of ACP simultaneously with the whitening treatment is beneficial.

### Final Hardness Values

KHN

