



Benefits of ACP
in vitro study

Fluoride and Potassium Nitrate-Fluoride Whitening Agents: in vitro Caries Study

Hicks J and Flaitz C. Effects of Whitening Agents with ACP-Fluoride and Potassium Nitrate-Fluoride on In Vitro Enamel Caries Initiation and Progression. J Dent Res 86 (Spec Iss A), 0497, 2007.

Objective

To evaluate the effects of whitening agents containing amorphous calcium phosphate with fluoride (ACP-FI) and potassium nitrate with fluoride (KN-FI) on enamel caries initiation and progression

Materials

- 15 human teeth
- 16% carbamide peroxide, ACP and fluoride (NiteWhite, ACP-FI, Discus Dental)
- 15% carbamide peroxide with potassium nitrate and fluoride (Opalescence, KN-FI, Ultradent)

Methodology

Fifteen human teeth with sound enamel surfaces were divided into three portions. Each tooth portion was assigned to a treatment group: Group 1) No Treatment Control; Group 2) NiteWhite 16% carbamide peroxide, ACP and fluoride (ACP-FI, Discus Dental); Group 3) Opalescence 15% carbamide peroxide with potassium nitrate and fluoride (KN-FI, Ultradent Products). The teeth were treated according to the manufacturer's guidelines followed by synthetic saliva rinsing on a daily basis for 14 days. Control tooth portions were exposed only to synthetic saliva rinsing. A modified ten Cate solution was used for in vitro enamel caries initiation and progression. The teeth were treated prior to lesion initiation and before lesion progression. Longitudinal sections were taken after the lesion initiation period and the lesion progression period for polarized light study and statistical analysis (ANOVA, DMR).

Results

For both the lesion initiation and progression periods, significant differences were found between ACP-FI and KN-FI.

Mean lesion depths:

- Lesion Initiation Period: Control 156±17um; KN-FI 95±12um (P<.05); ACP-FI 72±14um (P<.05)
- Progression Period: Control 306±29um; KN-FI 172±18um (P<.05); ACP-FI 108±14um (P<.05).

Conclusion

Fluoride-containing whitening agents significantly reduce the susceptibility of enamel surfaces to in vitro caries initiation and progression compared with matched no treatment controls. When both ACP and fluoride (ACP-FI) are present in the whitening agents, caries resistance was markedly improved over the whitening agent containing fluoride, but lacking ACP.

Mean Lesion Depths

	Group 1: Control	Group 2: Nite White — 16% carbamide peroxide, ACP and fluoride	Group 3: Opalescence — 15% carbamide peroxide with potassium nitrate and fluoride
Lesion initiation period	156±17um	72±14um (P<.05)	95±12um (P<.05)
Lesion progression period	306±29um	108±14um (P<.05)	172±18um (P<.05)

