The purpose of this experiment was to demonstrate the anticaries efficacy of a new whitening/tartar control dentifrice formulation relative to the appropriate, clinically proven USP Reference Toothpaste (NaF/Silica). The profile test chosen was an in vitro fluoride uptake model. The fluoride uptake experiment made use of 4mm enamel cores removed from central maxillary incisors using a diamond hollow-core bit. The core was removed relative to the appropriate, clinically proven USP Reference Toothpaste (NaF/Silica). The profile test chosen was an in vitro fluoride uptake model. The fluoride uptake experiment made use of 4mm enamel disks containing 24 hour MHDP/Lactic Acid (2.0 x 10^-4 mol/L disodium dihydrogen methanederxhydroxydiphosphonate, 2.5 x 10^-2 mol/L lactic acid, pH = 4.5) lesions (White DJ; American Journal of Dentistry, Vol. 2, No. 2, April, 1989). Specimens were treated for 30 minutes with the supernatant of a 1:3 slurry of dentifrice and water, then thoroughly rinsed with ultra-pure water. Fluoride uptake was measured by the microdrill biopsy technique. Products compared were: a) USP Reference Toothpaste: 1100ppm F (NaF), Silica; b) new whitening toothpaste, 1100ppm F (NaF), 3.3% pyrophosphate, Silica; and c) placebo: 0ppm F (NaF), Silica. Fluoride uptake results [µg/cm^2 (SD)] from the in vitro fluoride uptake model were: a) 10.86 (0.90); b) 9.23 (1.57); c) 0.84 (<0.01), with a=b>c (p<0.05 ANOVA). The anticaries efficacy of the new whitening toothpaste has been demonstrated in an in vitro fluoride uptake model.

INTRODUCTION

The focus of current research and marketing is in the development of multiaction dentifrices - including combinations of therapeutic and cosmetic benefits to patients. The addition of new additives and improved therapeutic and excipient ingredients must be carried out carefully - since some ingredients may influence potential anticaries actions of fluoride.

Recently, our laboratory was successful in developing a novel silica abrasive technology which shows significant clinical efficacy in the removal of tooth stains and in tooth whitening. This dentifrice, commercially marketed as Crest Extra Whitening (and now also available in Crest MultiCare Whitening) includes sodium fluoride as the anticaries source - combined with clinically proven pyrophosphate as a tartar control ingredient.

OBJECTIVE

The purpose of this research was to demonstrate the fluoridating efficiency of a new whitening/tartar control dentifrice formulation relative to the appropriate, clinically proven USP Reference Toothpaste (NaF/Silica).

RESULTS

Text 4 mm enamel cores were removed from central maxillary incisors using a diamond hollow-core bit. The core was removed under water to prevent heating. The cores were mounted on Lucite rods, ground with 600 grit silicon carbide sandpaper (to remove approximately 50 microns of surface enamel), and polished to a high luster with 5 micron gamma alumina.

The enamel cores were then demineralized for 24 hours using 0.025M lactic acid plus 0.0002M MHDP (disodium dihydrogen methanederxhydroxydiphosphonate) at room temperature.

After demineralization, the cores were rinsed with deionized water, then thoroughly rinsed with ultra-pure water. Fluoride uptake was measured by the microdrill biopsy technique. Products compared were: a) USP Reference Toothpaste: 1100ppm F (NaF), Silica; b) new whitening toothpaste, 1100ppm F (NaF), 3.3% pyrophosphate, Silica; and c) placebo: 0ppm F (NaF), Silica. Fluoride uptake results [µg/cm^2 (SD)] from the in vitro fluoride uptake model were: a) 10.86 (0.90); b) 9.23 (1.57); c) 0.84 (<0.01), with a=b>c (p<0.05 ANOVA). The anticaries efficacy of the new whitening toothpaste has been demonstrated in an in vitro fluoride uptake model.

The table below shows the results of the caries profile testing.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Fluoride Uptake (mg/cm^2)* (mean ± standard deviation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>USP Reference, 1100 ppm NaF, Silica</td>
<td>10.8 ± 80.90</td>
</tr>
<tr>
<td>Crest MultiCare Whitening</td>
<td>9.23 ± 1.57</td>
</tr>
<tr>
<td>Placebo</td>
<td>0.84 ± 0.00</td>
</tr>
</tbody>
</table>

* Means within brackets are not significantly different (p<0.05)

CONCLUSION

This measure provides useful data to insure a product is not at a disadvantage to clinically proven formulations using the same fluoride source.

The results of this profile test confirm the anticaries effectiveness of the Crest MultiCare Whitening dentifrice formulated with 'Stain Specific Soft Silica' in a pyrophosphate base tartar control system. The positive control which produced equal efficacy was the USP NaF/Silica Reference Standard. Crest MultiCare Whitening was recently granted an ADA seal supporting both anticaries and whitening efficacy.