

INTRODUCTION

Dental varnishes are generally comprised of natural gum rosin, sodium fluoride, solvents, flavor additives, sweetener and pigments. They are normally applied by a brush to seal dentinal tubules for the treatment of hypersensitive teeth, sensitive root surfaces and for cavity preparations. In addition to the resin and rosin, sodium fluoride may also occlude open tubules¹. One of the issues with dental varnishes is that the fluoride release tends to be slow, i.e., more than four hours. This slow fluoride release results from gum rosins being use as carriers, which are hydrophobic and do not dissolve in saliva. In order to solve this issue, a resin with hydrophilic functional groups was synthesized to facilitate fluoride release. NUPRO® White Varnish uses a mixture of synthetic resin and gum rosins which promotes greater fluoride release than market-leading products over the first two hours. The product continues to release fluoride for 6 hours after simulated application.

1. Dental Erosion: From Diagnosis to Therapy/Vol Ed. Adrian Lussi, pp181-182, 2006, Karger AG.

OBJECTIVE

The purpose of this study is to compare the rate of fluoride release from fluoride varnishes over a 6-hour period.

METHODS

The fluoride varnishes used in the experiment are: NUPRO® White Varnish (DENTSPLY); Vanish™ (3M); Clearshield™ (Kolorz); Vella™ (Preventech); Profluorid® (Voco) and Waterpik® Ultrathin (Waterpik). A varnish sample (between 0.02 to 0.05 grams) was applied on the bottom of a ¼ oz white polypropylene cup. Twenty-five ml of deionized water was then added into the cup and assayed after 2 hours of soaking at 37° C using a fluoride ion selective electrode (Figure 1 & 2). Fresh deionized water was then added into the cup and the same procedure was repeated to measure fluoride release after 4 hours and after 6 hours. Means comparisons for all pairs using one way ANOVA Tukey’s test were applied for data analysis at a confidence level of 95%.



Figure 1 Ion Selective Electrode Meter

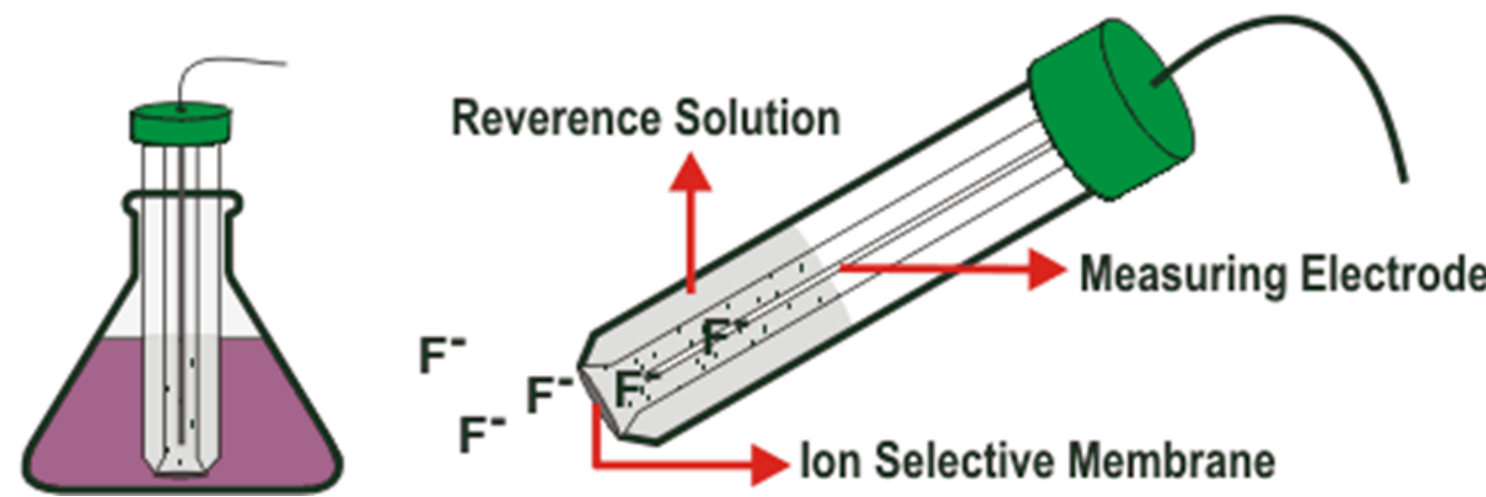


Figure 2 Fluoride Ion Selective Electrode probe (image courtesy of ETS laboratories ®)

RESULTS AND DISCUSSIONS

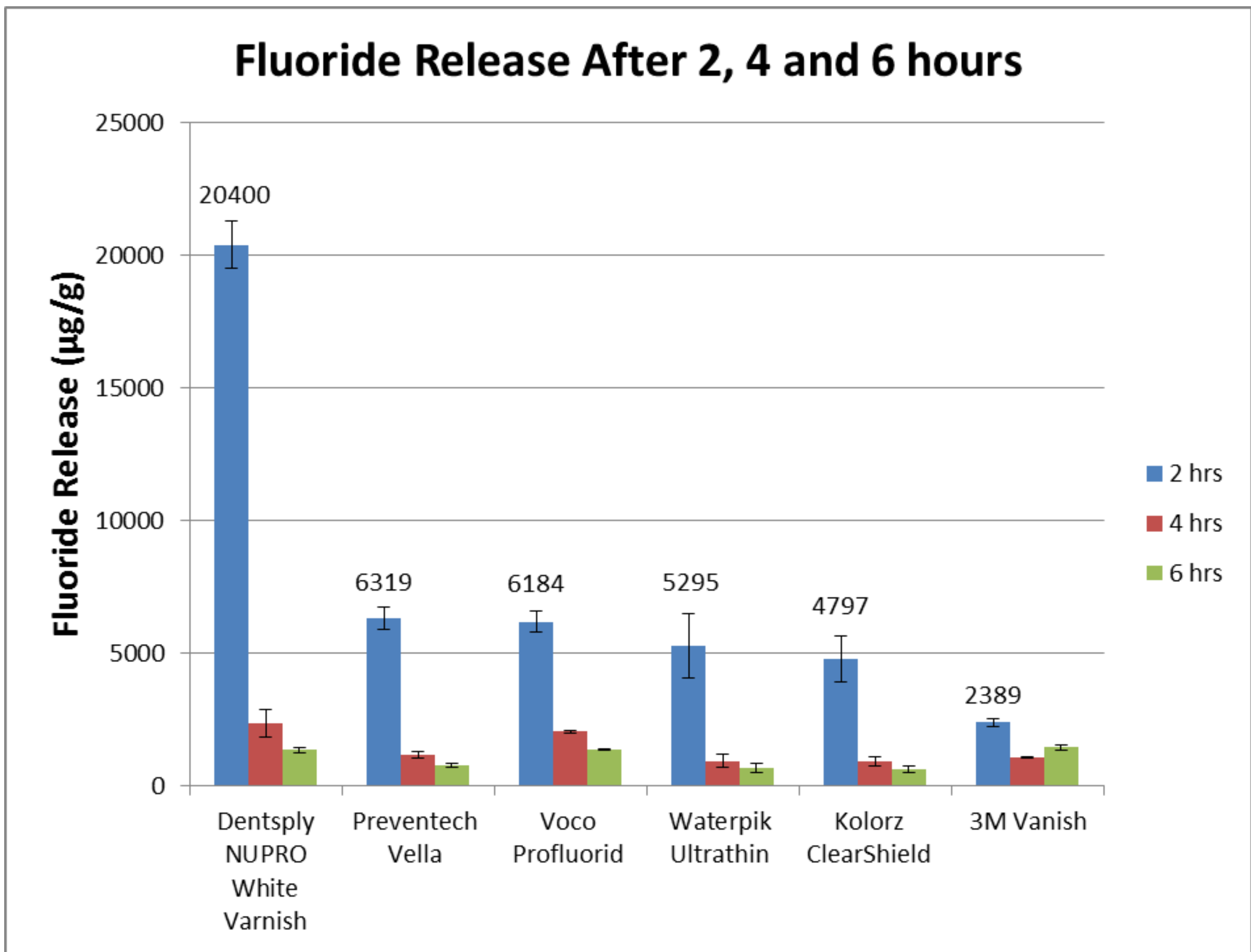


Figure 3. Incremental Fluoride Release of Fluoride Varnishes after 2, 4 and 6 hours

The results of fluoride release for six varnish products are shown in Figure 3. It was found that NUPRO® White Varnish released 20,400 µg/g of fluoride in the first two hours, which was significantly higher than the other varnish products. The high release rate was achieved through the use of a synthetic resin with hydrophilic functional groups, which have more affinity to water and saliva than standard hydrophobic rosins. It can also be seen that the fluoride release rate of all varnish products decreased (Figure 3) after the first two hours, but all products continued to release fluoride. NUPRO® White Varnish and Profluorid® released more fluoride than the others between 2 and 4 hours. After six hours, additional fluoride release was minimal for all products tested.

CONCLUSIONS

NUPRO® White Varnish released the most fluoride in first two hours compared to conventional products. NUPRO® White Varnish and Profluorid® released more fluoride than the others between 2 and 4 hours. After six hours, additional fluoride release was minimal for all products tested. Only NUPRO® White Varnish released fluoride ions comparable to the product label claim of 22,600 ppm.

