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In-vitro study summary

The relevance of soluble fluoride

3M™ Clinpro™ Clear Fluoride Treatment



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Introduction

Fluoride varnishes are used for professional fluoride application with the goal of increasing intraoral fluoride availability. The chemical composition of a fluoride varnish will influence its interaction with the tooth structure. It is expected that those with a higher free fluoride concentration would have greater benefits.

Fluoride solubility

Objectives

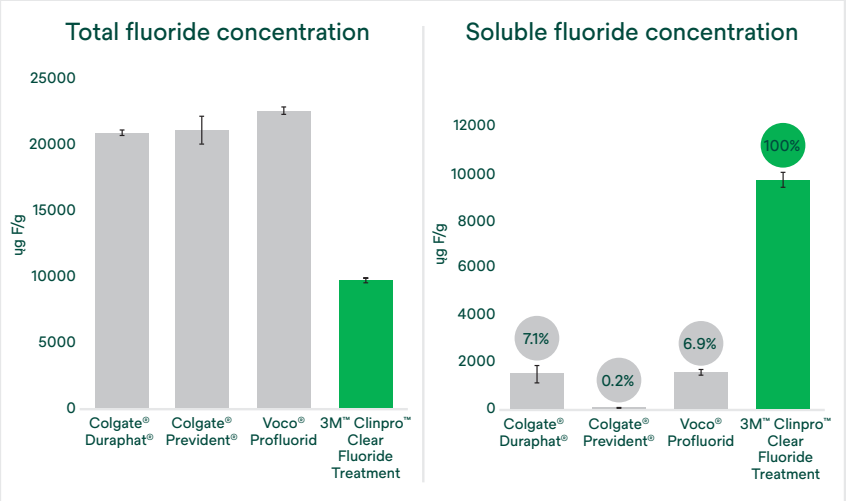
To determine the concentration of total and soluble fluoride of a new fluoride treatment (Clinpro Clear Fluoride Treatment), in comparison with commercially available varnishes (Colgate® Duraphat, Colgate® Prevident and Voco® Profluorid).

Materials & methods

Total fluoride and soluble fluoride were extracted using whole product or supernatant collected by centrifugation, respectively. After extraction, the fluoride was dissolved in 100% ethanol and diluted in deionized water. The fluoride concentration in the extracts was determined using a fluoride-specific electrode.

Results & discussion

- Clinpro Clear Fluoride Treatment showed a total fluoride concentration of around 9,500 µg F/g versus a total fluoride concentration close to 22,600 µg F/g for all other varnishes.
- Results showed that 100% of the total fluoride concentration in Clinpro Clear Fluoride Treatment is soluble.
- Measured fluoride concentrations ranged from 0.2% – 7.1% for all other fluoride varnishes.



Fluoride deposition

In-vitro study summary

Objectives

To determine the concentration of deposited fluoride from application of a new fluoride treatment (3M™ Clinpro™ Clear Fluoride Treatment) on sound and demineralized enamel, in comparison with commercially available varnishes (Colgate® Duraphat®, Colgate® PreviDent® and Voco Profluorid®).

Materials & methods

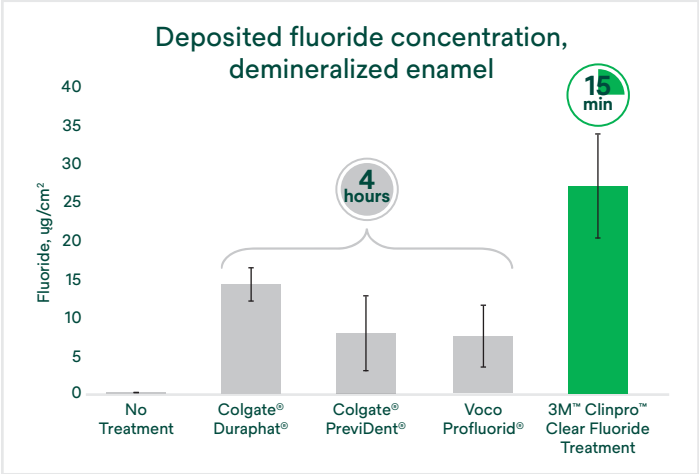
The surface of sound and demineralized enamel slabs was treated with fluoride and immersed in continuously renewed artificial saliva, simulating normal salivary flow. Colgate Duraphat, Colgate PreviDent, and Voco Profluorid were left to interact with the surface for four hours, whereas Clinpro Clear Fluoride Treatment was left for a period of 15 minutes, per the manufacturer's instructions for use.

Deposited fluoride was extracted from the slabs using room-temperature potassium hydroxide solution. After 24 hours, the solution was neutralized, and the fluoride concentration was determined using a fluoride-specific electrode.

Results & discussion

Fluoride deposition is expected to reflect the amount of free fluoride in the varnish formulation.

In demineralized enamel, Clinpro Clear Fluoride Treatment resulted in the highest deposited fluoride compared with all other products.



Conclusion

Even with a lower overall fluoride concentration, Clinpro Clear Fluoride Treatment provides a greater quantity of available fluoride to the tooth compared to rosin-based varnishes. The quick reactivity with sound and demineralized enamel confirms the potential of this formulation to help deposit fluoride onto the tooth. This improved behavior is explained by the freely available soluble fluoride in the formulation. With its 15-minute contact time, Clinpro Clear Fluoride Treatment provides a similar or better performance than rosin-based fluoride varnishes applied for longer periods. The ability of the other varnishes to react with sound and demineralized enamel seems to be affected by the limited quantity of initially available soluble fluoride or their capacity to release fluoride in an aqueous environment, such as saliva.



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