

Scientific evidence of long-term dentin desensitization when using a dimethicone-based carrier system

Profisil® Fluoride Varnish delivering therapeutic agents to the oral cavity is challenging due to the presence of wet surfaces, the nature of the mucosa, and the potential for saliva washout.

The standard treatment for dentin hypersensitivity is to occlude the dentin tubules, but toothpastes and gels provide only temporary relief.

A study conducted at Creighton University in Omaha, Nebraska¹ has demonstrated that a dimethicone-based delivery system effectively addresses the issue of hard tissue and mucosal adhesion. Dimethicone-based materials serve as mucoadhesive therapeutic delivery systems in the oral environment.

Kettenbach Dental employs this innovative mucoadhesive carrier system in its novel fluoride varnish **Profisil®** Fluoride Varnish to desensitize dentin tubules.

Dimethicone is the carrier in **Profisil®** Fluoride Varnish and acts as a solvent-free system. Dimethicone is utilized in numerous medical and cosmetic, oral and dermal applications. Dimethicone has exceptional binding properties; it is lubricant and easy to spread.

Unlike other delivery systems, a dimethicone polymer blend ensures that the product does not slide from the surface as a result of saliva washout and cannot be pushed away with the tongue.

The study evaluated a mixture of low-viscosity dimethicone with substantive high-viscosity dimethicone. The low-viscosity dimethicone allows for good spreadability; while the high-viscosity dimethicone provides a firm, adhesive consistency. The formulation has been prepared with a small amount of edible wax, which increases mucoadhesion and peak tack force while facilitating the release of active ingredients. In addition, calcium, phosphate or fluoride-containing salts were included to remineralize tooth enamel or dentin.

To evaluate the mucoadhesive properties in terms of peak tack force and adhesion, the dimethicone blend was spread across the surface of teeth using an applicator brush. Scanning electron microscopy was employed to determine whether the dimethicone could occlude exposed tubules and to visualize mineral deposition on the surface of the teeth from added calcium and phosphate, or fluoride sources.

Studies have demonstrated that dimethicone formulations remain intact on the surface of the dentin and occlude the tubules even after soaking in artificial saliva for 24 hours. When exposed dentin was treated with 850 ppm sodium fluoride and soaked in artificial saliva for 24 hours, precipitated mineral was observed within the tubules.

These findings demonstrate the effectiveness of the dimethicone formulation in covering the exposed dentin tubules, while micronized sodium fluoride also penetrates these tubules.

The effective mineral deposits are a result of the long-term adhesion of the dimethicone.

The **Profisil®** Fluoride Varnish carrier system creates a barrier between the hard tissue surface and the pulp chamber and can deposit minerals in the tubules. This provides long-term relief from symptoms and pain.

A 2-component dimethicone provides a coating of the dentin tubules and can carry mineral active substances to the surface of the exposed dentin. The study confirms the effectiveness of this material in the long-term occlusion of painful dentin tubules, offering a valuable solution for patients experiencing dentin hypersensitivity.

Profisil® Fluoride Varnish from Kettenbach Dental is a novel fluoride varnish with 5% sodium fluoride. It securely adheres to the tooth surface for several hours and releases fluoride ions for up to 24 hours.



¹⁾ Substantive Dimethicone-Based Mucoadhesive Coatings

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