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Fluoride Varnishes: Efficacy to Deposit Fluoride Into Dental Enamel

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Objectives The in-vitro study estimated the fraction of the total applied fluoride (TAF) that is taken up by enamel (FU, fluoride uptake) when using varnishes for caries prevention.

Methods TAF: Varnishes were applied with the applicators provided by the manufacturer or a microbrush on defined areas of tared glass slides and dried. The applied dry varnish (ADV) was weighed with an analytical balance. The applied wet varnish (AWV) was estimated from volatile matter (VM) and ADV. TAF was calculated from the AWV and the labelled fluoride concentration (LFC) of the products.

FU: Varnishes were applied on bovine enamel, dried, and incubated in artificial saliva for 4h. After varnish removal, loosely-bound fluoride was dissolved by soaking 24h in 1M KOH and measured with an ion-selective electrode. Structurally-bound fluoride was etched from the same specimens with 0.1M HClO₄ for 15 minutes. FU is the sum of loosely and structurally-bound fluoride.

The fraction of deposited fluoride (FDF) is the percentage of FU from TAF.

Results TAF in varnish layers varied from 94 to 1100 $\mu\text{g}/\text{cm}^2$. Between 8.6 and 21.6 $\mu\text{g}/\text{cm}^2$ FU was found in bovine enamel after 4 h.

Conclusions Large differences in the total applied fluoride quantities for the different varnishes were measured. From 1 to 23% of the TAF was taken up by the enamel.