

Enamel-Caries Prevention Using Two Applications of Fluoride-Laser Sequence

ABSTRACT

Studies demonstrated a significant synergism between fluoride and laser in reduction of enamel solubility. However, minimal research has focused on testing the sequence of their application and no other research investigated the preventive effect of repeated applications of a combined treatment. This study investigated the effect of two applications of fluoride-laser sequence on the resistance of sound enamel to cariogenic challenge compared to one-time application. Sixty enamel slabs were cut from 10 human incisors, ground flat, polished and coated with nail varnish except a 2x2mm window. Specimens were randomly assigned into five groups of 12 specimens; (CON-) negative-control received no treatment, (CON+) positive-control received pH challenge, (FV) treated with MI fluoride varnish, (F-L1) one-application fluoride-varnish followed by CO2 laser-treatment (short-pulsed 10.6 μ m, 2.4J/cm², 10HZ, 10sec), and (F-L2) two-applications of fluoride varnish-laser treatment. Specimens were left in distilled water for one day between applications. Except CON-, all groups were submitted to pH cycling for 9-days (8 demin/remin + 1 day remineralisation bath) at 37°C. Enamel demineralization was quantitatively evaluated by measurement of Knoop surface-microhardness (SMH) (50-grams/10 seconds). Data were analyzed using one-way ANOVA ($p < 0.05$) followed by Duncan's Multiple Range Test. Within the limitations of this study, it was found that one or two applications of fluoride-laser sequence significantly improved resistance of the sound enamel surface to acid attack compared to FV-treated group. Although the two applications of fluoride-laser sequence (F-L1 and F-L2) showed higher SMH values, significant resistance to demineralization was only obtained with repeated applications.

KEY WORDS

Fluoride, lasers, enamel caries, remineralization