

Caries Inhibition of Sub-Ablative CO₂ Laser Irradiated Dentin

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Purpose: The demineralization of the dentin is initiated in the presence of a critical pH that is more than one unit higher than that for enamel. Since CO₂ laser is highly absorbed by the tooth mineral, there is a possibility that the laser irradiation promote phase changes that could make these surfaces less susceptible to acid dissolution. The objective of this study was to investigate whether sub-ablative pulsed CO₂ laser (10,6 μm) irradiation is capable of reducing the susceptibility of the dental dentin to demineralization. **Material and Methods:** 30 cubes of dentin obtained from bovine teeth were divided into three groups (n = 10): control group not irradiated (CG); group laser A (LA) irradiated with 7,8 J/cm², 10 ms, 383 mJ, 10 Hz and group laser B (LB) irradiated with 11 J/cm², 10 ms, 540 mJ, 10 Hz. The beam diameter at the site of the irradiations was 2,5 mm. After the laser irradiation the samples were submitted to artificial caries model (pH-cycling). Demineralization inhibition was assessed by cross-sectional microhardness analysis and the percentage of caries progression was calculated. **Results:** The data were submitted to ANOVA and Tukey statistical tests at 5% level of significance. According to the results the mineral loss from group LA was statistically lower than the other groups. Group LA promoted 21.36% of caries inhibition. **Conclusion:** The results suggests that the 7,8 J/cm², 50 ms pulsed CO₂ laser irradiation reduce dentin demineralization, however new studies should be carried out to find a higher percentage of caries inhibition.