Livro de Programa
Program Book

II ENCONTRO DA DIVISÃO SUL AMERICANA DA FEDERAÇÃO MUNDIAL DE LASER EM ODONTOLOGIA
II Meeting of the South American Division of WFLD

VI CONGRESSO BRASILEIRO DE LASERS EM ODONTOLOGIA
VI Congress of the Brazilian Association for Lasers in Dentistry - ABLO

Belo Horizonte
O3 e 04 de Junho de 2011

WFLD
The World Federation for Laser Dentistry

ABLO
desde 1991

ABCM
ASSOCIAÇÃO BRASILEIRA DE ENGENHARIA E CIÊNCIAS MECÂNICAS

VI Congresso da Associação Brasileira de Lasers em Odontologia (ABLO)
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MECHANISMS OF HIGH INTENSITY LASERS FOR CARIES PREVENTION AND EROSION

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High intensity laser irradiation can be used for preventing dental caries; however, the mechanisms of its interaction with hard dental tissue and its synergism with fluoride, responsible for the preventive effects, were not completely explained. During the last eighteen years, systematic studies using several laser wavelengths, such asNd:YAG, Ho:YLF, Er:YAG and Er,Cr:YSGG were developed at Center for Lasers and Applications (IPEN-CNEN/SP) in order to explain how the heat produced by laser absorption modify the crystalline structure of enamel and dentine and in what conditions it can reduce demineralization, useful for preventing dental caries and erosion. For that, changes in chemical and crystalline properties of enamel and dentin were assessed by Fourier Transform Infrared Spectroscopy and X-ray diffraction. The mechanisms of interaction of laser irradiation with fluoride application on enamel and dentin were studied after *in vitro* cariogenic challenge simulations. It was evidenced that infrared laser irradiation changes the composition of dental hard tissues, indicating that the irradiated tissues are composed of tetracalcium phosphate and/or tricalcium phosphate phases embedded in the hydroxyapatite. Also, laser irradiation decreases the organic and carbonate contents of dental hard tissues. When associated with topical fluoride application, laser irradiation decreases the mineral loss after demineralization and promotes higher formation and retention of calcium fluoride-like material. In this way, it was demonstrated that the crystalline and chemical changes promoted by laser irradiation contribute to an improved overall resistance of dental hard tissue to demineralization, and the association with fluoride suggests a long lasting cariostatic effect. One clinical trial with 100 children and teenagers was developed in cooperation with School of Dentistry-USP, in which after 1 year, an overall reduction of 60.2% in caries incidence in (lased group + APF) when compared with control (no treatment) and 39,2% of reduction when compared with only fluoride group, was measured, confirming the in vitro results.