

IN VITRO STUDY OF Er,Cr:YSGG LASER EFFECTS IN BONE TISSUE BY ATR-FTIR SPECTROSCOPY

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Laser proves to be more and more, an effective tool for helping health professionals, being intensively used in ophthalmological and odontological procedures. In particular high-density infrared emitting lasers have great potential in cutting mineralized biological hard tissues. In comparison to mechanical instruments, laser presents a series of advantages, namely, smaller damage to the remaining tissue and promotion of homeostatic effect, apart from making it possible to perform procedures in areas with difficult access. However, for an efficient and safe use of this technique, it is necessary to know the physical and chemical effects of the laser irradiation on the tissue. The Fourier transform infrared (FTIR) technique is heavily used in the study of organic materials, because apart from making it possible to identify the materials components, it also allows to obtain a semi quantitative analysis. This work aims to establish the ATR-FTIR technique in the characterization of natural and irradiated osseous tissue, and to verify the possible chemical and structural changes caused by irradiation. Then, bone samples, irradiated with the Er,Cr:YSGG (2.78 μm) infrared emitting laser (adjusted with five different energy densities) were analyzed alongside with natural bone samples. It has been verified that the technique is effective in bone tissue characterization, and that it is possible to observe the chemical changes caused by the temperature rise due to laser irradiation. It has been observed a gradual organic material loss as the energy density increases. These results are important for a clinical application of the Er,Cr:YSGG laser like a cutting tool.

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