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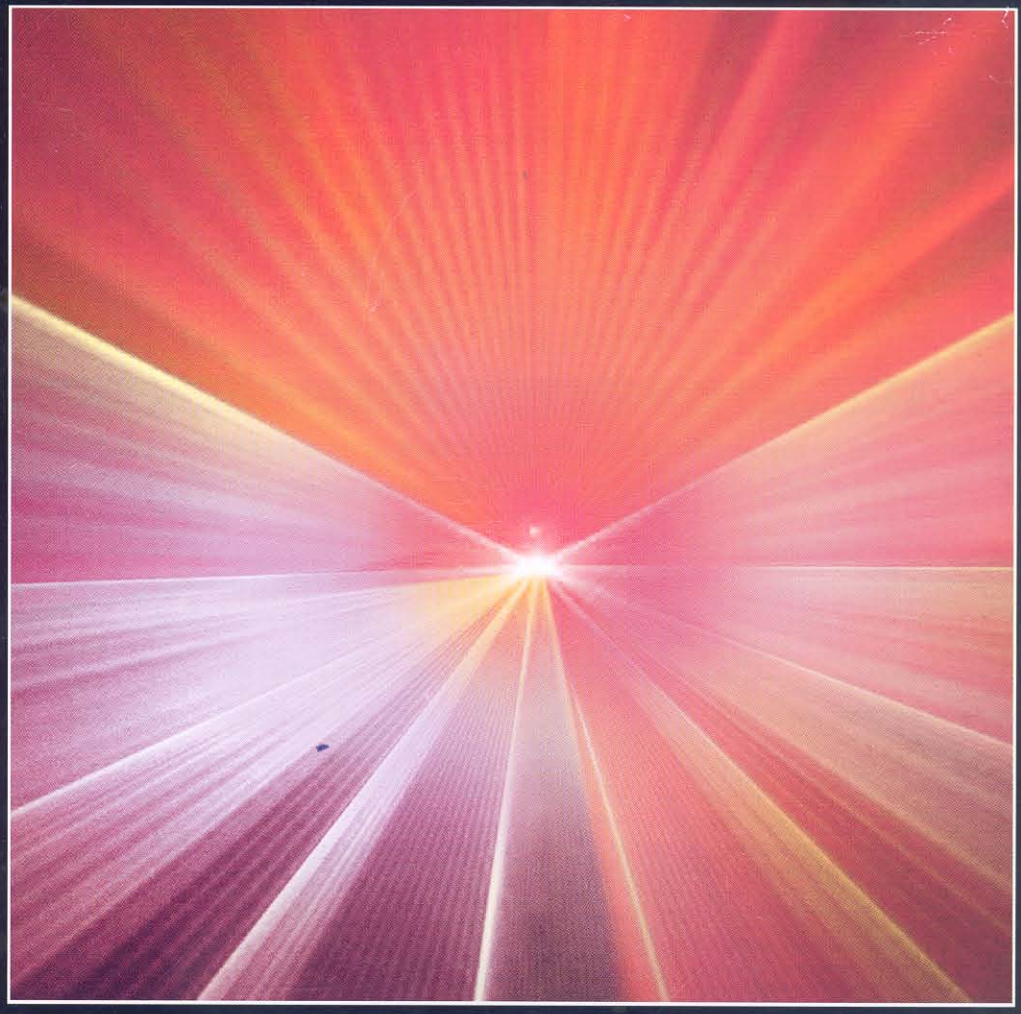

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phototherapy may involved effects of RANKL/OPG and IL-6/IL-8 ratios. However, several genes differentially expressed in our microarray data have not been well defined as LLLT-response molecules.

Conclusion: Our microarray is the first to show the gene profile in PDC caused by LLLT as well as the tight linkage between phototherapy and mediators of cellular immune response. However, further studies to clarify the physiological function of these molecules in PDC are required.

33a

Changes in the Infrared Absorption Bands(FTIR) due to Tubules Orientation

J.Quinto,P. A. Ana, F. G. Albero, D. M. Zezell
Center for Lasers and Applications- IPEN - CNEN/SP- São Paulo- Brazil

The purpose of this study was to evaluate the compositional changes at intracanal dentin after Er,Cr:YSGG laser irradiation, when the irradiation was performed orthogonally or parallel to the tubules. Intracanal dentin was obtained from single root teeth, splitted longitudinally in two samples, in a total of 6 samples. The control and the irradiated samples were obtained from the same root specimen at same region, but opposite sides. The irradiation was performed by an Er,Cr:YSGG (2.78μm, 20Hz, 600ìm diameter). The handpiece was fixed perpendicularly to the sample, with movement controlled by an X-Y motor, avoiding overlapping or unlased regions by irradiating each sample 3 times. Infrared absorption spectra were recorded by using a FTIR spectrometer (ThermoNicolet 6700) accomplished to a micro-Attenuated Total Reflection accessory, to analyze the compositional changes occurred. The phosphate, carbonate, amides, hydroxyl and water bands were monitored between 4000 cm-1 to 400 cm-1. Spectra of irradiated intracanal dentine showed changes regarding the control, as well as there were differences between the spectra of samples irradiated orthogonally or parallel regarding the direction of tubules. These results indicate that there are important differences in the way the laser beam hits the inner canal surface which can direct the choice of the best laser tip to be used.

34

Laser-Tissue Interaction in the Root Canal: Getting Rid of the Limitations of the Straight Forwarded Laser Beam

R.J.G. De Moor
Ghent University, Dental School, Dept. Operative Dentistry and Endodontology, Ghent Dental Laser Centre, Ghent, Belgium

A clear limitation of the use of a laser beam is its unilateral emission. In root canals there is the need to move the fiber in a spiral motion along the root canal wall and to repeat this procedure to expose the whole root canal wall to the energy of the laser.

A number of modifications for optical fibers have now been reported and introduced in dentistry e.g. hollow wave guide extensions to optical fibers for erbium lasers and hollow metal conical tips with slits for lateral emission. There is also the induction of cavitation in a liquid and hence the cleaning of the root canal wall thanks to acoustic streaming and/or shock induction. The idea of photoactivated disinfection is interesting, though PAD was not always efficient. New possibilities have now been created by the use of other photosensitizers and/or dyes with a better impregnation ability.

Where photodynamic therapy classically refers to activation of particles used to produce high energy oxygen molecules which will chemically react with and destroy most organic molecules that are next to them, newer approaches have been made possible by using nanoparticles in stead of dyes. This type of nanomedicine with nanoparticles being more reactive in this form than the macroparticle is not new and has opened new perspectives for therapy and has potential for a noninvasive procedure for dealing with diseases, growths, and tumors. The introduction of nanoparticles which can be activated, stimulated or energized by means of laser light can also open perspectives for a more efficient application of laser light in dentistry.