Photodiagnosis and Photodynamic Therapy

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NEW MEDICAL TECHNOLOGY OF THE BASAL CELL CARCINOMA TREATMENT BY MEANS OF PDT
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Introduction: Development of new low toxic pharmaceutical agents as a complex technology for PDT is evidently quite important along with appropriate laser source. The present work cumulates the results of successful medical technology as complete medical-and technical solution.

Materials and Methods: Novel chlorin E6 based water-soluble preparation for the medical purposes has been developed by "RADA-PHARMA" Co. Ltd., Russia. Radachlorin®, solution for Intravenous infusions 0.35% 10 ml, is a photosensitizing medicinal agent permitted for clinical trials in Russia. It has passed through the 1st (July 2002–March 2003) and the 2nd (August–December 2003, skin BCC treatment research protocol) clinical trial phases in Russia.

Results: Clinical applications of Radachlorin® have revealed its high efficiency at the treatment of BCC (basal cell carcinoma of the skin). Together with its high efficiency, a rapid clearance from the organism and a low affinity to the skin completely solved the problem of skin phototoxicity. Results of the 2nd phase of clinical trials of the two drug formulations will be summarized during presentation.

The medicines were phototreated using laser "LAHTA-MILONR" with 662 nm lasing wavelength and 2.5 W power (MILON Group, Russia, St.-Petersburg).

Conclusion: As a result, new medical technology for skin BCC treatment within 2-years 100% full remission was registered by Russian Ministry of Health.

Lasers in Dentistry

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FULL LASER IMPLANT SURGERY
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Purpose: To show, with practical cases, the alternative soft and hard tissue preparation with lasers for implants, in different indications like one-stage, two-stage, upper jaw, lower jaw, flap, flapless, bone splitting, bone scoring, sinus lift, autogenic bone transfer, implant decontamination, implant removal and soft tissue management.

Material and Methods: The Er,Cr:YSGG (2780 nm, 20Hz, 140 µm, 6 W) laser with different tips was used on patients in own private practice. Inserted implants: Tapered Screwwent, Reuters One Day and Bauer-Screw. Removed implants: Linkow blades. A split mouth investigation shows the differences between conventional and laser surgery.

Results: Sufficient primer stability can be achieved, also for direct loading. Quick wound healing and hardly any pain or swelling post OP are seen. Osseointegration on x-rays show similar pictures.

Conclusion: Soft and hard tissue cuts are easily done with the Er,Cr:YSGG laser using the appropriate parameters. There is less bleeding, no smear layer and always a clear operation field. Preparing a congruent hole for the Tapered Screwwent needs some skill and takes time. To all implant types it is important that the neck sits well in the cortical bone to get it seated and sink properly. Preparing the spongiosa needs attention for not overheating in the depths. Water must be around the laser tip always. No drilling means patients comfort. Laser means a 'sterile' operation and no need for antibiotics. Laser application in the posterior lower region is limited due to space problems, shortness of the laser tips and lack of guiding systems. Especially in the lower jaw bone preparations are much more time consuming. Bone condensation with hand instruments helps achieving more round cavities. Although the laser is not yet a total replacement for the scalpel and bur, it is already a valuable and useful instrument in all parts of implant surgery.

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EXPRESSION OF RANKL AND OPG mRNA IN PERIODONTAL DISEASE: EFFECT OF LLLT USING SIMULTANEOUSLY THREE DIFFERENT WAVELENGHTS
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Purpose: Given receptor activator of NF-kB ligand (RANKL) osteolysis by osteoclast has been demonstrated, we used a semi-quantitative reverse-transcribed polymerase chain reaction (RT-PCR) and in situ hybridization, to observe the impact of LLLT treated gingival tissues on the RANKL, and its decoy receptor osteoprotegerin (OPG) in sites with periodontitis.

Material and Methods: A total of 49 subjects (20-59 years old, mean age 35±14) were investigated. Their gingival biopsies were divided into three groups: group I patients (n=15) with the moderately advanced periodontitis (CPITN ≥ 4); group II patients (n=15) which received LLLT prior to study with periodontitis activity almost identical to periodontal disease as group I patients; and group III (n=15) healthy volunteers (CPITN=0). Gingival biopsies taken from each subject were quantified for RANKL and OPG mRNA using semi-quantitative RT-PCR (Taq Polymerase, Boehringer, Germany). Furthermore, in situ hybridization was performed using digoxigenin-labeled specific riboprobes (TA CLoning Kit, Invitrogen, US) to determine the localization of RANKL gene transcripts at the cellular level. LLLT in group II was done with simultaneous application of three different wavelengths: 662 nm, 875 nm and 904 nm (protocol of treatment is developed by the author).

Results: The highest RANKL mRNA was observed in group I, and the lowest was measured in group III. In contrast, OPG mRNA was lowest in group I and highest in group III. In situ hybridization revealed that cellular level that strong signalling of RANKL mRNA was observed in inflammatory cells (notably lymphocytes), and their number was lower after LLLT.

Conclusion: Our data suggest that LLLT interference with the upregulation of RANKL mRNA in inflammatory cells may be associated with the amelioration of periodontitis after LLLT. Moreover, RANKL play a key role in periodontal disease progression, and could be considered as a biomarker of progression the disease.

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STATUS AFTER MULTIPLE TOOTH EXTRACTIONS - TREATMENT WITH LOW LEVEL LASER THERAPY: A RANDOMISED CLINICAL STUDY WITH CONTROL GROUP
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Introduction: Multiple tooth extraction is a dental surgical procedure, which is sometimes followed by complications like haemorrhage, oedema, pain and inflammation, leading to intake of related drugs, usually analgesics.

There is no more doubt that athermal laser or LLLT is a very useful associated therapeutic procedure for the restoration of the balance between harmful and protective factors, which exist in a biological system. Oral cavity is a specific region with more than 37 various types of bacteria isolated in it.

The current clinical study was conducted in order to observe the efficacy of LLLT applied during and immediately after multiple tooth extractions.

Materials and Methods: Total number of patients: 60, randomly allocated to two groups (30 p. – irradiated; 30 p. – control group). Age range was 40–70 (mean age: 50.8) with group female ratio 1:1. Exclusion criteria: blood clotting disorders, anticoagulation ther-