



Low Level Laser Therapy & Ears clinical research

Laser therapy in the combined treatment of hyperacusis, a prospective clinical study.

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Abstract

Patients suffering from hyperacusis were treated twice a week with a combination of therapeutic laser, pulsed electromagnetic field and the control and adjustment of Reactive Oxygen Species (ROS). 245 observations in 42 ears on 26 patients were measured before therapy and after 10-20 therapeutic sessions. One group was evaluated in short-term follow-up (immediately after therapy), another group was evaluated in long-term follow-up (4-6 months after therapy). The average improvement for the pain thresholds was 17.02 dB. An average improvement of 10 dB or more was obtained in 40 ears. In the long-term follow-up group the average result was 22.84 dB and in the short-time followup group it was 14.50 dB. All ears improved. Between 177-504 J of laser light was administered via meatus acusticus. The pulsed electromagnetic field applicator generated a magnetic field of a maximum of 100 μ T and it was placed behind the ear, over the area of the mastoid bone. ROS were measured and controlled by administering different sorts of antioxidants such as Ginkgo biloba. Report on more than eight years of low level laser therapy of chronic inner ear diseases.

Lutz Wilden, Sabine Schübel, Germany.

The IXX Annual Meeting of The American Society for Laser Medicine and Surgery, Lake Buena Vista, Florida. April 16-18, 1999. Lasers in Surgery and Medicine.

Supplement 11, 1999. 348 patients (402 ears) were treated with low level laser. Most patients had tinnitus. This study, however, only reports on the objective outcome of the audiometry, taken before and after therapy. The hearing capacity of the patients was improved in all frequency sectors (average value = 20.6%). The best db-reductions were obtained in the low frequency sector (11.7 db) and in the high frequency sector (14.6 db). There was a close correlation between the improvement of the hearing capacity and the age of the patients and the duration of their disease. In conclusion it can be stated that if LLLT is administered in sufficiently high dosages to the inner ear (cochlea), it is possible to obtain and document significant biostimulative effects.

ON THE EFFECTIVENESS OF LOW LEVEL LASER LIGHT (LLLL) IN THE INNER EAR

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Examined by pre- and posttherapeutical audiometry courses of air and bone conductions

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(db = decibel; j = joule; kc = kilocycle; nm = nanometer)

ABSTRACT

A) The objective of the study was the documentation of the biostimulative effects of LLLL in high energetical dosages (measured in j) by audiometry changes of a statistically relevant number of patients. B) The energy was transmitted with 3 laser diodes with a wave length of 830 nm and 3 diodes with a wave length of 635 nm; it was administered via meatus and mastoid. The examination and therapy included 348 patients and 215 right and 187 left inner ear organs (cochlea). 171 organs were female, 231 were male. Their average age at the beginning of the therapy was 56.9 years; the average duration of their disease was 5.9 years.

97.3 % suffered from tinnitus. The examination started on 24 June 1996 and ended on 9 February 1999. The average treatment phase lasted 61.5 days. The average duration of the therapy was 11.8 hours; the average quantity of the transmitted energy was 6732 j. Before every therapy series with LLLL the patients actual hearing capacity (air and bone conductions) was examined by audiometry. At the end of each therapy series their hearing capacity was examined by the same method for a second time. The statistical analysis consisted of the arithmetical evaluation of a mean value of all test data over 12 frequencies as far as air and bone conductions were concerned, the drawing up of frequency intervals (low = 0.125, 0.25, 0.5 and 0.75 kc, middle = 1, 1.5, 2 and 3 kc, and high = 4, 6, 8 and 12 kc) and the grouping of the patients according to age, duration of the disease, quantity of the transmitted energy and the relative total reduction of the necessary sound volume in db. In cases of deafness 125 db were used as an auxiliary numeric value. C) The hearing capacity of the patients was ameliorated in all frequency sectors (average value = 20.6 %). The best db-reductions were obtained in the low frequency sector (9.3 db) and in the high frequency sector (11.2 db). There was a close (and biologically plausible) correlation as far as the amelioration of the hearing capacity and the age of the patients and the duration of their disease were concerned; this correlation was the higher, the more energy was transferred on the whole. D) If LLLL is administered in sufficiently high dosages to the inner ear (cochlea), it is possible to obtain and document medicinally significant biostimulative effects.

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