



# Laser Florence

**A WINDOW ON THE LASER MEDICINE WORLD**

**Report on the LASER FLORENCE 2001 Conference**

**Florence 7 – 11 November 2001**

"Laser Florence 2001" has proved to be an international Conference full of new events. Approximately 300 people coming from different parts of the world have participated to this meeting, which has become one of the most outstanding scientific gatherings in the field of medical and surgical laser. Considerable interest has raised the proposed treatment of diabetes type 1 and 2 with non surgical laser to reduce glycaemia. Dr. Preditev Ramdawon, from Mauritius Islands, a Russia-trained physician (University of Moscow) has presented scientific communications on laser treatment of several metabolic and dysfunctional diseases and then has given practical demonstration on lowering glycaemia in diabetic patients.

The clinical evidence has shown an immediate reduction of glycaemia of over 20% for two days. However the scientific support for such result for the time being is still lacking. In other words there appears to be a classical episode of medicine based on evidence and not on scientific experimentation.

There is no doubt that this happening opens the door to an enormous field of scientific research in the direction of which future studies are justified in the near future.

For the time being it can be stated that laser effect on reducing glycaemia has been presented to a scientific community, composed of representatives of outstanding international institutions and of the mass media for the first time in the world. It is time now to perform a very careful evaluation of the proposition.

The session and the pre-congress course on laser in urology have been highlighted by the most outstanding authorities from various countries. Dr. Reza Malek, of the Mayo Clinic Foundation of Rochester, USA, has shown the state of art in the use of urological lasers in USA, as also witnessed by Dr. M.A. Hai (Westland, USA). Dr. Alfons Hofstetter and Dr. Raphaela Weidelich (University of Munchen, Bavaria, Germany) have shown the European experience focusing on the latest achievements of photodynamic therapy applied to Urology. Dr. Gaetano Bandieramonte (Tumors Institute, Milan, Italy) has listed laser uses in penis pathologies and Dr. G. Grifoni and Gian Battista Muraro (University of Ancona, Italy) have underlined the advantages of Olmium laser use in prostate pathology. In actual fact prostate adenoma and hypertrophy should always be treated with laser.

It is only question of choosing the right type of laser (Nd-YAG, Olmium, KTP, 810 nm diode) and to use it correctly. Cancer and chronic inflammatory processes of the bladder and of the low urinary tracts should be treated with photodynamic therapy, choosing adequate photosensitive substances and lasers of complementary wavelength, it being understood that it is essential to use such instruments correctly.

Dr. Wilhelm Waidelich (University of Munchen, Bavaria) has illustrated laser use in diagnosis, for the identification of pathological cells. Dr. Andreas Hielsher (Columbia University, New York, USA) has reviewed computerized Optical Tomography, where laser replaces X rays and offers tridimensional images of explored areas.

Laser diagnosis in cardiovascular diseases has been illustrated by Dr. Frits De Mul (Twente University, Enschede, NL) from laser Doppler to modern optical biopsy.

Dr. Aurelia Vaitkuviene has shown laser use in photodynamic diagnosis of gynaecological diseases, in particular as regards to the endometrium.

Dr. E.P. Tomasini (University of Ancona, Italy) has reviewed the latest information on laser vibrometry and on laser-mediated tissue measurement.

Dr. Vasant Oswal has reported on laser use in Otolaryngology, while Prof. A. Weiss (Cancer Institute Vancouver University, Canada) has shown laser endoscopic use at gastro-intestinal level.

Dr. Sergio Cavaliere (United Hospitals, Brescia, Italy) has brought to attention laser use in Bronchology.

Health policy and medico-legal aspects of laser use has been the subjects covered by Dr. P.G. Rocchi (University of Bologna).



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Dr. Isuf Kalo (World Health Organization, programme of quality evaluation of medical technology) has illustrated the fundamental rules to be followed by any instrument and/or method applied to the human body.

Dr. Mihail Pascu (European Community, Bruxelles, Belgium) has indicated the role of the European Community in the laser field and the procedures to follow in carrying out research according to the E.C. policy.

Dr. A. Spigulis (Riga University, Latvia) has spoken on a model of a course in laser technology for doctors and for all staff concerned with use of this technology in the human and animal body.

It has been decided to organize multidisciplinary specialized courses on medical-surgical laser technology accredited by the International Academy for Laser Medicine and Surgery, established in Florence on 19 October 2000 by 49 Founding Members chosen among pioneers of laser in different medical and biological sectors.

The Academy has already seven hundred members after its first year of activity. Furthermore it has a library open to the public in the seat of Spadolini Foundation (Biblioteca Nuova Antologia, Firenze, Italy).

Drs. E. Collinder (Malaren Equine Hospital, Sweden) and Damiano Fortuna (University of Pisa, Italy) have illustrated interesting results obtained in veterinary medicine and surgery. These authors have shown positive results obtained on animals where non surgical Nd-YAG, CO<sub>2</sub>, Diode lasers have been used on acute inflammation of tendons and soft tissue of animals of various sizes as well as effects on wound healing. Surgical technique with laser CO<sub>2</sub> has also been shown on small-size animals.

Interesting new achievements have also been obtained in the sector of non surgical laser and pulsed intense light, particularly as regards mechanisms of action of these instruments on pain control and on inflammation. The argument has been extensively covered by: G.David Baxter (Head School of Rehabilitation Sciences-University of Ulster at Jordanstown, U.K.), Wilma Campana (Cordoba University, Argentina), Yashar Fathi (Teheran University, Iran), Roberto Carniel (Chieti University, Italy), Giuseppe Tam (Udine, Italy), Marcello D'Ovidio (Rome, Italy).

Regarding the laser therapy of the wound healing, seven lectures were presented dealing with the effects of light on wound healing (Chairs Dr. J. Anders, USHUS Bethesda, USA; G. Calderhead, Tokyo, Japan; and L. Navratil, Prague University, Czech. Rep.).

Several interesting and unique *in vitro* and *in vivo* experimental models were discussed. The clinical cases presented were well controlled and documented and complemented the results of the tissue culture and animal model experiments. The presentations addressed critical issues facing the field of light therapy for wound healing including:

- Identification of the most effective wavelength for a particular tissue type.
- The need for optimization of treatment parameters for a specific wound type.
- Whether the effects of light on wound healing occur locally or systemically.

Dr. Anders (USHUS, Bethesda, USA), presented data on the effects of low power laser irradiation on full-thickness cutaneous wound healing using an animal model for type II diabetes, the Fat Sand Rat. Her data illustrated the necessity for optimization of laser treatment parameters for different animal models. She also showed that low power laser therapy significantly increased bFGF expression in diabetic Fat Sand Rats at 36 hours post-injury and that the change in protein expression was confined to the irradiated site. This result suggests that the mechanism that triggers the expression of genes involved in the healing process is confined to the wound site and not a systemic event. E.Vinck (Gent University, Belgium) presented a very interesting clinical case in which a 6 cm surgical incision on the lateral side of the right foot of a male patient was treated with an infrared light emitting diode (950 nm, power output of 160mW, 5 treatments). The interesting feature of this clinical case was that only the lower portion of the wound (3.4 cm) was treated. Improved healing, based on contraction, coloration and scar formation, was seen in the treated area of the scar only. The remaining 2.6 cm of the scar did not show accelerated healing. This clinical observation complemented the animal model data presented by Dr. Anders in that the effect of the light therapy was restricted to the irradiated area.



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Syllen V. Nunes (San Paolo University, Brasil) presented very interesting and convincing data that examined the effects of treating hair plugs on the backs of mice (C57BL/6, 9-11 weeks old) with a copper vapor laser with low energy and short pulse widths. Her data showed that a specific set of laser parameters (510nm, 13 KHz, pulse width of 20ms and spot size of 0.8cm, .5W, 2 laser exposures separated by 24 hrs) increased the density of pilosebaceous structures. Changing the treatment parameters to a lower power (.25W) and increasing the number of laser exposures resulted in destruction of the pilosebaceous units, morphological evidence of apoptosis and increased melanin concentration in the region of the hair plugs. This report again emphasized the critical need for optimization of laser parameters. Also, this model will be extremely valuable in future studies for investigating the damaging effects of light that can lead to apoptosis (genetic cell death).

Drs. Afsharpad and Esmaeeli Djavid (Teheran University, Iran), presented data on the effects of low power laser therapy on two different animal wound models: acute mucosal ulceration in rats induced by indomethacin and contact hypersensitivity in 21 BALB/c mice induced by epicutaneous application of dinitrochlorobenzene. In the acute mucosal gastric ulceration study, it was found that the laser parameters used (He-Ne laser, 30J) intensified the acute mucosal ulcer formation induced by indomethacin and that the prostoglandin content of the stomach may be involved. In the contact hypersensitivity study, it was found the both the use of a He-Ne laser and a GaAlAs laser reduced the hypersensitivity as measured by morphological change and increment ear swelling. This series of studies again emphasizes the need for optimization and standardization (if possible) of laser treatment parameters. It would be interesting to know if another set of laser parameters would indeed result in a decrease in ulceration.

Drs. Zubanova and Kira Samoilova (St. Petersburg University, Russia) presented data from their continuing series of studies exploring the effects of light on changes in the blood and the possibility of a systemic effect of light therapy acting through blood. In this study, they cultured UV-C irradiation (150 J/cm<sup>2</sup>) autologous lymphocytes with plasma from non-irradiated or irradiated (infrared polarized light, 12 J/m<sup>2</sup>) volunteers. They found that there was not statistically significant change in DNA synthesis as measured by autoradiographic methods.

The last presentation of the session was by Dr. O. Marangoni (Gluco Bassi Foundation, Trieste, Italy) This clinical study effectively illustrated the critical need for determination of the optimal wavelength of light and treatment parameters not only in tissue culture and animal model experiments but also in clinical treatment. Dr. Marangoni investigated the effectiveness of 808nm diode laser (6J/cm<sup>2</sup>) with a defocused hand piece (Defocalized Laser Therapy) and compared these results to previous experience of treating heel spur with a CO<sub>2</sub> (1060 nm) defocused laser with the same fluence. It was found that the defocused 808nm laser was an effective treatment for heel spur and that this therapy required fewer applications (6-8) than the CO<sub>2</sub> laser that required 10 to 12 applications.

In dermatology plastic surgery, Dr. A. Baruchin (Askelon, Isreal) has pointed out the limitations of laser resurfacing. Dr. M. A. Trelles (Cambrils, Spain) and Tokuya Omi (Tokyo University, Japan) have covered histological mechanisms of rejuvenation with laser and intense pulsed light rays.

New types of laser have been proposed (N. Fournier, France; L. Mazzi, Italy) as well as new indications, like Kaposi Sarcoma (G. Orsbarski, Rome, Italy) and new treatments post-laser (A. Tenenbaum, Austria; M. Palombo, Rome).

Dr. Khalil Khatri (MGM, Boston, USA) has shown the ablative effects of Erbium Laser, while Dr. Eliot Battle (Harvard Medical School, Boston, USA) has illustrated the latest developments in laser depilation, as well as its advantages and limitations. Dr. C. de Lorenzi (Ontario, Canada) has shown the correct use of Botulism toxin in association with laser resurfacing.

Laser effects on vascular tissues have been summarized in the session coordinated by Dr. Roberto Simkin (Buenos Aires University, Argentina) and by Dr. Leonardo Corcos (Sassari University, Italy) with the participation of Dr. O. Marangoni (Trieste, Italy) and Dr. P. Bezzola (Milano, Italy).



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The role of laser and of photodynamic therapy in degeneration of retinic macula has been discussed by Dr. A. La Torre and Drs. G. Virgili (University of Florence, Italy), V. Pustovalov (University of Minsk, Belarus) and E. Fisher (University of Munchen, Bavaria). Whereas Dr. H. Jelinkova (Prague University) has shown the use of Erbium-Yag in ophthalmology.

The state of art in laser odontology has been illustrated by G. Lynn-Powell (Salt Lake City, Utah, USA).

The poster session has been particularly appreciated and authors have had the opportunity to discuss adequately and to explain the experience presented.

Prices for the best presentations have been awarded to E. Vink (Belgium), N. Fournier (France), T. Omi (Japan), whereas special prizes for research have been presented to J. Anders (USA), R. Weidelich (Germany) and G. D. Baxter (U.K.).

The splendid atmosphere of Villa Viviani, Florence, seat of the congress, has provided ideal conditions to the approximately three hundred participants who have expressed their satisfaction and the desire to return.

The report on Laser Florence 2001 is printed by SPIE (Society of Photo-Optical Instrumentation Engineering) of Bellingham (USA). Video- tapes and CD-ROM are also available.

Laser Florence 2002 will be held again at Villa Viviani, from 28 to 31 October 2002. The international Academy for Laser Medicine and Surgery will again sponsor this Congress which constitutes a unique opportunity of scientific review in a friendly and pleasant atmosphere. Authors wishing to participate are invited to send abstracts within 30 June 2002.