THERMOGRAPHIC STUDIES ON LASER ACUPUNCTURE

KIYOO KAMIKAWA^{*}, MUNENORI TAWA^{*}, MASANE SUZUKI^{**},
MOTONORI KANAYA^{**} AND HIROSHI SHIBAMOTO^{**}.

MEIJI COLLEGE OF ORIENTAL MEDICINE^{*}
FUJI PHOTO-OPTICAL CO. LTD.^{**}

The laser scalpel and the laser coagulator are representative in laser medicine. However the biostimulative effect of laser with low power is getting the focus of attention, since acceleration of wound healing has been proved by laser radiation. Recently laser acupuncture was initiated as an unique therapeutic application in Europe and China. In Japan the authors have developed YAG laser acupuncture system with three channels and reported its clinical applications^{1,2)}. Soon after that Ga-Al-As semiconductor laser was introduced into this field. Clinical applications of laser acupuncture have been extended step by step, but basic studies on the laser acupuncture have not been developed. Plog³⁾ emphasized the effect of the pulsed beam was depending on the frequency, while the continuous beam was used practically. This fact indicates a clue to elucidate the biostimulative mechanisms of the laser therapy. The experiment was designed to test the thermographic changes by the laser stimulation on various conditions to the meridian points.

Usually the thermography was recorded from both hands of healthy adults and the laser stimulation was performed on the meridian points of hand or foot. Exit power of YAG laser was 15-300 mW; and both the continuous beam and the repetitive pulsed beam of 5Hz were tested. As a rule, the laser stimulation was given for three minutes. In some cases the standard needle acupuncture was tested to compare with the laser acupuncture. With the patient's consent, the thermographic studies were done during the treatment on multiple points. However these studies have not fully developed yet, the results obtained are described as preliminary report.

When Hegu on the hand was stimulated with laser of over 15 mW, the thermographic changes were always observed not only on the ipsilateral hand but also on the contralateral hand. They were mostly influenced by stimulation strength, but not influenced by stimulation modalities. The low power (15-50mW) stimulation caused initial drop of the temperature with following elevation. Most of these biphasic responses showed that the temperature slightly decreased

for a few minutes after the stimulation and then gradually increased for more several minutes. The high power (150-300mW) stimulation caused the temperature elevation soon after the stimulation, and the effect lasted for more than ten minutes. The temperature elevation started from the finger tips and the interdigital webbed portions on the thermographies recorded from the back of hand, while the temperature elevation on the lased spot disappeared soon after the radiation. Similar thermographic changes were observed by the laser stimulation to Taichong on the foot and Zusanli on the leg. The standard needle acupuncture and the transcutaneous electrical stimulation to Zusanli caused usually the biphasic responses, which were observed by the laser stimulation of low power.

In the practical laser therapy for stiff neck, back pain and frozen shoulder etc., multiple therapeutic points are stimulated simultaneously and the combination of the points varies case by case. Therefore, the data are not enough to conclude, however an increase of the topical blood flow is observed in the treated region and also a decrease of the blood flow is observed following the excessive treatment. Usually the laser stimulation does not evoke sensation in the topical region, while some patients recognize a feeble warmth in the treated region. It is the facts that the laser acupuncture is effective to stimulate the nerves and to cause the vasoreaction in the capillary. But it is not right to discuss the mechanisms of the laser acupuncture without the studies on the humoral factors. Although the difference between the continuous beam and the pulsed beam was not found on the thermographic studies, this is not a definite conclusion. There are still many problems to be explored in the laser acupuncture.

References

- 1) Kamikawa, K. et al.: Laser therapy for pain. Nippon Laser Igakkaishi. 3:345-348, 1982.
- 2) Kamikawa, K.: Development of laser acupuncture systems and their clinical applications. In: New frontiers laser medicine and surgery. ed. by Atsumi, K., Excerpta Medica, Amsterdam-Oxford-Princeton, 1983.
- 3) Plog, F.M.W.: Biophysical application of the laser beam. In: Lasers in medicine. ed. by Koebner, H.K., John Wiley and Sons, Chichester-New York-Brisbane-Tronto, 1980.