



Low Level Laser Therapy & Alzheimer's Diseases

clinical research

The Efficacy of 904 nm Laser Therapy for

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Preface

Although we had reported about the possible efficacy of low power laser therapy (LPLT) for Senile Dementia(S D) 3 times from 1993 at the annual meetings of Japan Society for Laser Medicine, there was no practically useful treatment found for Alzheimer's disease(AD) and Parkinson disease and other Senile Dementia even after the start of elderly-care-insurance system in Japan. As we have continued above said laser therapy for SD at home care visit of elderly persons and felt very useful and effective, we would like to report about recent situation of laser therapy for AD patients.

Especially recently, the number of Alzheimer's disease patients is increasing by the arrival of super-aged world in Japan. However the cause of this disease is not known and there is no effective treatment established at present. As to the mechanism of LPLT, its main mechanism is mostly elucidated by the progress in the field of Molecular biology and widely used for the removal of pain, decrease of swelling and treatment of wound. However its application for the treatment of Brain diseases is hardly practiced.

We have continued the treatment of Senile Dementia patients by LPL considering it as to be one of practical and effective treatment of this disease LPLT is very useful for the medical treatment of the senile dementia patients at home for the expansion of ADL, pain relief, mitigation of inflammation, prevention of bed sore, the treatment of hemiplegia in a brain blood vessel obstacle and the braking of aggravation of Alzheimer's disease without any fear of side effects by the irradiation of LPL to the head of patients. It will be not to exaggerate to say LPLT can be one of main treatments of senior patients at home in near future.

(Object of study)

To study the practical usefulness of LPLT for the treatment of Alzheimer's disease patients at home in terms of improvement of ADL and QOL and also for the reduction of burden of families of the care of patients.

(Method of treatment)

15 Alzheimer's disease patients, 5 male and 10 female, received irradiation of LPL for 2 minutes at each points, 2-3 times a week for one year. Laser irradiation points were as follows. Acupuncture points established as effective based on long history of Oriental medicine . (1) Acupuncture point to improve blood circulation (2) Acupuncture point for the treatment of stroke (3) Acupuncture point for adjustment of blood pressure (4) Acupuncture point for adjustment of balance of autonomous nerve.(the forehead, the right and left temple, occiput).

In addition, the method (based on papers in Russia and Armenia that intravenous LPL irradiation improved the viscosity of blood) of irradiating LPL to the place which touches the pulse of an artery under collarbone was used as an additional medical treatment point.

(LPL instrument)

LTU-904H made by RianCorp Pty Ltd in Australia.
Laser Type: Gallium Arsenide Laser diode (Ga-As)
Laser Wavelength: 904nm
Peak Power: 5W
Pulse frequency: Low 2500 Hz, High 5000Hz
Pulse duration: 200 nanoseconds
Average power: Low 2.5mW, High 5mW

(The evaluation method)

Since the improvement and maintenance of Alzheimer patients in the care at home was the major subject of this study, the impression by care workers about the situation of patients was recorded as data of patients. Evaluation items were orientation, conversation capability, cooperativeness, the lack of composure, social role and activity, clothes and dress and leisure activities. Completely no change was 0 point, slight effective was 1 point and clearly effective was evaluated as 2 points. Summed up values were used for the judgment of the efficacy of LPL treatment for each patient and total evaluation of usefulness of LPL therapy for Alzheimer's disease.

[Result]

Among evaluation items, cooperativeness and the lack of composure were observed as useful as an effect, the effect appeared half a year after and continued after one year and later on.

It was suggested that LPLT was useful for the improvement of orientation disturbance, normalization of clothing and the dress. Because, many families and the care workers talked us LPL was very helpful since the present condition could be maintained, without getting worse.

After the start of LPL treatment, It was reported that the coldness of hands and legs of patients vanished and joints and muscular stiffness were also mitigated. Therefore, the joint movable region was also secured comparatively. Also in excretion care, it became very easy to carry out the care of patients. It was able to say about all patients that their expression became quiet and came to show understanding to directions of a care worker. It is suggested by this that LPLT as one of practical treatment of patients at home by the improvement of care power at home.

(Discussion)

Since the senile-dementia-of-Alzheimer-type has a feature of advance of condition and it was said that condition became gradually critical, we tried this treatment expecting the maintenance of condition, and examination whether there was any delay effect. It is considered to have been suggested at least there was an effect of maintaining present condition in a certain field.

About the effect over the brain of laser irradiation, it was reported at the annual meeting of Japan Society for Laser Surgery and Medicine meeting in 1991 by Jun-Ichi Nishimura et al., of Department of Physiology, Yokohama City University School of Medicine. The 780 nm wavelength and 1mW laser irradiation to the inner core of rats made the increase of cerebral blood flows at hippocampus by the amount of about 20% in average (control:15, laser:15). Although after 30 minute it was confirmed having maintained the increase of 10%.

In 1992 at the same medical conference, Takayuki Obata et. al., of the same University reported that laser irradiation of 780nm wavelength 10mW to the head surface of rats activated cranial nerves activities (control:16, laser:15).

These reports suggested the possible usefulness of LPL treatment to Senile Dementia and other brain diseases patients. Unfortunately these findings did not much attention of medical world In Japan. However, recently a possibility that ATP and cellmembrane potential of brain neuron could be controlled specifically by the irradiation of near infrared lasers (830nm

wavelength) on the surface of heads of rats was reported by Oda-Mochizuki etc.al.□CRitsumeikan University, Synchrotron Light Life Science Center. It was suggested by this research center that the condition of Epilepsy could be stabilized by Irradiating infrared laser from out side of heads of patients and decreasing the unusual excitement of cerebral neurons and in case of cerebral infarction, the aggravation of progress of Necrosis and Apotosis of cerebral neurons could be stopped by making stabilize the electric potential of cell membrane of cerebral neurons.

Development of future research in this field is expected as what supports scientifically the medical treatment of LPL and the result of condition improvements, such as Senile Dementia, brain blood vessel obstacles, hemiplegia and Parkinson patients. Although the wavelength of LPL used for "Examination of the validity of LPL to Senile Dementia Patients" which we announced at the annual meetings of Japan Society for Laser Surgery and Medicine meeting over three years from 1993, was 780nm and out put was 10mW, and 1mw. The LPL used for this examination was of the wavelength of 904nm and the peak value of a pulse was 5W and the average output was 5mW. However, the same medical treatment effect was confirmed. Although it is thought that there was no wavelength dependability of laser to the efficacy over the Alzheimer's diseases of LPL(780,830,904nm lasers are equally effective for pain removal and wound healing), how is it sure enough? A question remains.

By this examination, at least following effects were confirmed. Namely (1) the advance of condition of Alzheimer's diseases has been blocked (2) and the expression of patients changed to smiling from disinterestedness, cooperativeness came out , an understanding came to be shown to a partner (3) We received comments from many families that the care of patients became much easier than before. It is considered that the head irradiation of near infrared laser light makes the cerebral blood flow improve, activates nerve activities and have applied brakes to the advance of the apotosis of brain cells as animal experiments are proving. Since the medical treatment efficacy is seldom acknowledged to middle degree class and a serious patient, although it is hard to call it the fundamental cure for Alzheimer's disease by the present method, if medical a treatment is started in early stage and continued, it may be possible to call it one of practical cures which can stop subsequent advance of disease.

Based on this experience, collecting newest information overseas, research results in the biology field, we will continue to study the possible LPL method for the dramatic cure of Alzheimer's diseases by changing the wavelength of laser, the output and the irradiation method and also combination with other

therapies.

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