

Additional Information on Low-Level Laser Therapy

History

- The concept of low-level laser therapy was first espoused by Endre Mester in 1967. Mester wanted to see if exposing low-level laser radiation induced cancer in mice. He conducted an experiment in which he separated a group of mice into two groups, shaving the hair off the backs of every mouse. The treatment group received low levels of laser radiation, while the control group received no such treatment. What Mester found from this experiment was that the treatment group did **not** get cancer, and the hair that had been removed actually grew back quicker in the group receiving the laser therapy. He called this effect “laser biostimulation” (Huang, 2009).

Brief Introduction

- Low-level laser therapy involves “the application of light (usually a low power laser or LED in the range of 1 mW-500 mW) to a pathology to promote tissue regeneration, reduce inflammation, and relieve pain” (Huang, 2009).
- LLLT is used to relieve pain, resolve inflammation, improve function of damaged neurological tissue, and as an alternative to acupuncture (<http://www.thorlaser.com/LLLT/>).
- The mechanism of action for low-level laser therapy can be compared to photosynthesis in plants, through which the light is absorbed and employs a chemical change (referred to as a photochemical effect) (Huang, 2009).

Evidence of Effectiveness of LLLT

- Since 1967, over 100 randomized, double-blind, placebo-controlled clinical trials have taken place studying the effects of LLLT (Huang, 2009).
- Positive outcomes have been reported on conditions ranging from osteoarthritis, wounds, back pain, neck pain, muscle fatigue, and peripheral nerve injuries (Huang, 2009)

Mechanism of Action

- Current findings concerning the mechanism of action for LLLT invariably involve the **mitochondria** (Huang, 2009).
- Mitochondria generate most of a cell's supply of ATP, an important source of chemical energy.
- The way LLLT works at the cellular level is due to the absorption of visible and near infrared radiation by parts of the respiratory chain. Mitochondria then act to absorb photons, which stimulate more ATP production and low levels of ROS (reactive oxygen species) (Huang, 2009). These ROS trigger transcription factors, which activate many gene transcript products that ultimately lead to the many beneficial effects of LLLT (Huang, 2009).
- Phototherapy has been shown to affect cellular activity in the following ways (Kneebone,2006)
 - Stimulates cell growth
 - Increases cell metabolism
 - Improves cell regeneration
 - Generates an anti-inflammatory response
 - Helps reduce edema
 - Decreases fibrous tissue formation
 - Energizes nerve function
 - Helps encourage the production of endorphins
- These cellular effects are what ultimately results in the therapeutic value of using laser therapy. Cells in the body are energized and strengthened and therefore are able to help the body heal itself more effectively. (Kneebone, 2006).

Mode of Delivery

- Several different modes of delivery are utilized for administration of LLLT (Kneebone, 2006).
 - First, there is the approach of saturating the tissues of the affected area with the emitter. This would involve placing the emitter over the specific body location for a certain time period, then moving it to a nearby area, and continuing this pattern until the area is covered (Kneebone, 2006).
 - Second, the practitioner can treat trigger points by placing firm contact of the emitter on the trigger point (Kneebone, 2006).

- Third, the practitioner uses acupressure point stimulation (Kneebone, 2006).
- At a Better Way Hypnotherapy, we primarily use acupressure point stimulation as our mode of delivery to aid in our Stop-Smoking and Weight Management programs. This involves placing the emitter over a number of different acupressure points on the ears, face, and hands/wrist.

LLLT for Smoking Cessation/Weight Management

- When used as part of a smoking cessation program, lasers are believed to stimulate cells in the body in the same manner that acupuncture points stimulate the body, except without the needles (<http://www.medicalnewstoday.com/articles/89522.php>).
- A recent double-blind, randomized controlled study showed that treating acupressure points with low-level laser therapy was effective in reducing the withdrawal symptoms associated with trying to quit smoking and therefore can be an effective tool in the stop-smoking process (Kerr, 2008).
- The study involved three groups of participants, one receiving four sessions of laser treatment with an active probe, another receiving three sessions of laser treatment with an active probe and one with an inactive probe, while the last group received treatment with the inactive probe all 4 sessions. None of the participants knew which treatment they were receiving, and none of the practitioners knew whether they were administering the active or inactive treatment. (Kerr, 2008). The results of the study showed overwhelmingly that those participants who received the real treatment had much greater success in terms of non-smoking behavior after the treatment and subjectively reported less severe withdrawal symptoms than the control group (Kerr, 2008).
- During the few days after quitting smoking, the level of **endorphins** in the body is extremely depleted (Kerr, 2008). Endorphins are natural substances that help to inhibit the feeling of pain, so with a depleted amount of these substances, it is easy to see how withdrawal symptoms develop (Kerr, 2008). Thus, the use of low-level laser radiation on specific points of the body, including the ears and hands, helps to “impart responsiveness in otherwise unresponsive tissue”, activating release of endorphins and helping to alleviate symptoms of withdrawal (Kerr, 2008).

- The use of low-level therapy as an aid in weight management also involves the all-important natural pain-suppressor-**endorphins**. In the case of weight reduction, use of LLLT on various acupuncture points helps to reduce food cravings and also helps to increase metabolism, so the body can store food more efficiently instead of storing it as fat (http://www.lasertherapystoppainquitsmoking.com/Lose_Weight_Diet.html).

Sources

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