

Low Level Laser Therapy for Hard-to-Heal Conditions

by Gill Jacobs MSc Dip Clin Hyp NLP Coach GQHP M.AMT

The power of light to heal has been known from ancient times.

- Ancient Egyptians are said to have built special temples for healing with sunlight and coloured light;
- Pythagoras used colour for healing 500 years before the birth of Christ;
- Reference to colour healing can be found in ancient Chinese and Indian texts.

Now in the 21st Century we have available a light source which, when applied with the correct frequency, can change biochemical reactions at the level of the cell. This has the potential to heal not just everyday burns, wounds and muscle aches, but also heal, or alleviate the symptoms of, more serious conditions that we have 'learnt to live with'. In many cases we have the additional burden of living with the side-effects of the only thing we are offered – drugs or procedures that are supposed to suppress symptoms or remove the problem, whilst generating others in their place.

Is the power of pulsing light an un-researched theory generated by complementary and alternative therapists working solely with intuitive guidance? The answer is a resounding No! This technology has been around for 30 years, and there are thousands of research papers from academic sources showing its efficacy.¹ For example, some drugs for rheumatoid arthritis give relief, but they are time-limited because of their long-term danger. Low level laser light in research trials helps rheumatoid arthritis, without side-effects or risk.² You may well ask, in that case, why you have not been prescribed light, specifically low level laser or LED (Light Emitting Diode) light, by your GP if you have painful joints from arthritis. Or if you are diabetic and suffering from loss of sensation in your legs and feet, which could eventually lead to gangrene if infection sets in, because there is not enough blood flow to reverse the damage. Or if you are

suffering from lymphoedema (excessive swelling of the extremities) after removal of lymph nodes because of breast cancer. All these problems, and more, have been shown to respond to Low Level Laser Therapy (LLLT).³ The irony is that if you were a sick or injured horse you probably would have received LLLT – it works, and investment in animals demands complete repair for injuries in order not to lose money.

Light from Within

In the 1930s the Russian scientist Gurwitsch hypothesized that all cells emitted light. He discovered the pivotal role of 'living light' (biophotons) for the execution of major living functions.⁴ It took until the late 70s before German biophysicists (Popp et al) provided evidence to show that he was right.⁵ Every cell emits at least 100,000 light impulses per second at a variety of frequencies.

Experimenting with differences in light between the healthy and the ill, Popp found that while the healthy had light emissions which followed set patterns, and biological rhythms, the sick did not. Thus cancer patients had lost the natural periodic rhythms, and their coherence. The means for the body to communicate with itself and the outside world was sabotaged because the light had become distorted.

When a cell is healthy, coherent light is emitted. When a cell is disturbed the light turns chaotic. These frequencies are probably what bioenergy healers pick up with their hands when they scan the body.

Popp demonstrated that weak light emissions of low intensity were able to control the body, and that light in the body may be the factor that determines health and illness. In other words the body's communication system is formed by complex pathways of resonance and frequency.⁵

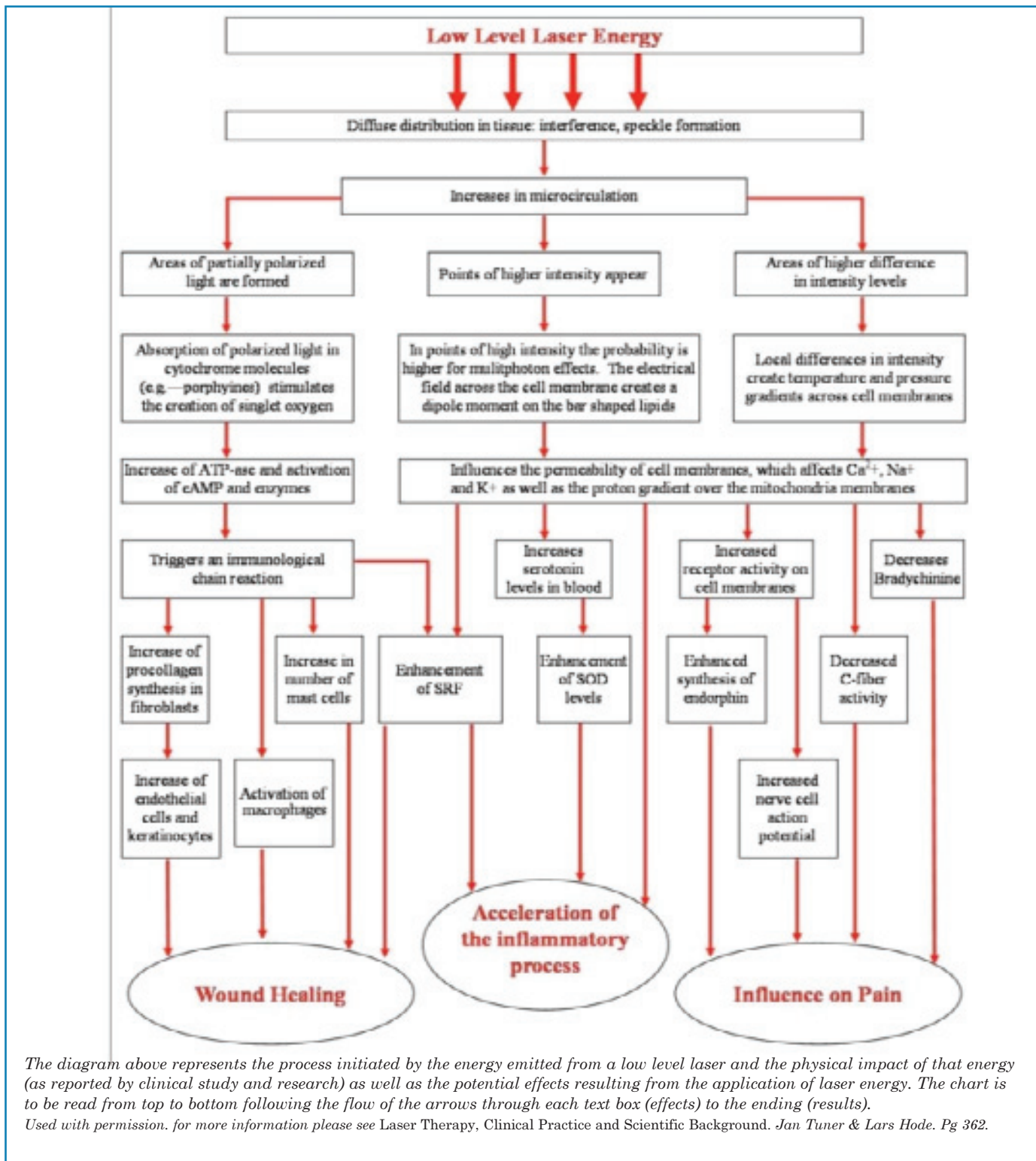


Q1000

The Discovery of Low Power Laser Light

LASER is an acronym that stands for Light Amplification by Stimulated Emission of Radiation. Early research only focused on high-powered lasers. They have a single wavelength of coloured light (monochromatic) or a narrow range of wavelengths. They can produce light (ultraviolet and infrared) that is invisible to the human eye. Because of their ability to destroy (as in weapons) and their extreme accuracy in cutting (medical use for operations), they are restricted in their use to highly trained professionals. But an experiment to assess the ability of 'high-power' lasers to destroy cancer tumours, accidentally paved the way to a greater appreciation of the role of low power light. The laser

The Physiology of Laser Energy



used in the experiment was not as powerful as it should have been. Instead of killing cancer cells, it healed the skin wounds that resulted from implanting the cancer cells in the animals used for the experiment.

Low Level Laser Therapy

Low Level Laser Therapy (LLLT) is the therapeutic application of laser light at low intensity. This non-invasive treatment uses a light source that generates extremely pure light of wavelengths that

are effective through photochemical reactions in cells, rather than through a thermal effect.

Low level laser light has a variety of names and terminologies, which can be confusing. High-powered lasers are often

called hot lasers, and low level lasers are called 'cold' or 'soft' lasers (low power). Low Level Photo Therapy was introduced in the 1960s, and in the 1980s light emitting diode (LED) technology advanced to the point where the energy output equalled that of lasers for common therapeutic use, and became widely available.

An LED is a silicon microchip with various added substances, each of which releases a different wavelength (colour) of light when electrically stimulated. LEDs used to be used mainly as low-power indicator lights for electronic devices.

To understand laser energy you need to be familiar with the following terms:

- **Power density**, or light concentration (measured in watts per centimeter squared);
- **Wavelength** (measured in nanometres);
- **Frequency** (measured in Hertz);
- **Photons** – packets of light energy which travel in waveform at different frequencies.

When electrical current stimulates a specific medium or element, the atoms of that medium give off photons. Each photon, thus each waveform, is characterized by a different wavelength. Each wavelength interacts with a given substance in a different way, by altering the frequency of cells. Everything in nature, including tissue cells, bacteria and viruses, has a unique frequency. Biophotons are involved in cell communication through a process that is termed 'ultra-weak cell radiation'. The cellular source of radiation is DNA in the nucleus.⁶

An example of malfunctioning communication between cells is between malignant tumour cells. Mutual light contact is missing, resulting in increasing cellular disorder.

Red and Near Infrared Light

The high energy photons from gamma rays, X-rays, and UV rays tend to ionize matter and damage tissue. On the other hand, red (visible) and near infrared (invisible) light have therapeutic benefits, and it is this light that is most found in low level laser lights.

The visible light ranges, while quite beneficial, are limited by their shallow penetration of one to three millimeters. The invisible or infrared light range penetrates much deeper. Research documents infrared penetrations from ten to 15 mm, but clinical results indicate that

the infrared beam penetrates eight to ten centimeters. However, when soliton waves (a self-reinforcing solitary wave caused by nonlinear effects in the medium) are used, as in the Q1000 low level laser, energy is able to penetrate deeper into the body without changing or losing its wave form or the information it carries. This process enables lasers to carry electrons throughout the body to restore damaged cells.

Both coherent and non-coherent light with the same wavelength, intensity and dose provide the same biological response. What is more important for cell receptivity for healing is monochromatic light, or single colour light.

...an experiment to assess the ability of 'high-power' lasers to destroy cancer tumours, accidentally paved the way to a greater appreciation of the role of low power light. The laser used in the experiment was not as powerful as it should have been. Instead of killing cancer cells, it healed the skin wounds that resulted from implanting the cancer cells in the animals used for the experiment.

LEDs

Much of the early use of LEDs and incoherent light (spreading light) was in the veterinary field – in fact it was veterinary physicians with laser therapy experience who used the prototype units. But it was the space programme and NASA that prompted the interest in light therapy for humans. NASA originally developed LED technology to enhance the growth of plant tissue in space, as part of commercial experiments sponsored by industry. In space, the lack of gravity keeps cells from growing naturally. The result is slow-growing plant life, and for the astronauts, loss of bone mass, atrophied muscles and wounds that do not heal. LED lights were enough to help plants grow. By coincidence it was discovered that they also helped reduce gravity-induced symptoms in the astronauts.

Dr Harry Whelan of the Medical College of Wisconsin is a leading researcher in the field of LED technology.

In association with NASA, he studied the effects of LEDs on diabetic skin ulcers, serious burns and flesh wounds caused by radiation and chemotherapy treatments. Another area of success with LED light was with mucositis, which is an unpleasant side effect of most bone marrow transplants. Patients with mucositis get sores in the mouth and the esophagus, which can make it difficult to eat or even drink. It is normal for discharge from hospital to be one month ahead of schedule when mucositis is prevented with low level laser light.⁷

Whilst there are many advantages to LEDs as the carrier of light, it should not be forgotten that their use, on their own, is limited to surface problems, when not using energy channels. For healing to take place in deeper layers of bulk tissue, the additional therapeutic effects from coherent laser light and polarized radiation are needed. To give greater range and effectiveness, therefore, for deeper tissue repair, the best low level laser tool will combine both laser and LED light.

What Low Level Laser does

Worldwide studies have shown that laser energy is accumulative as well as cascading and reduces pain and inflammation via:

1. Bio-stimulation and photo-stimulation;
2. Endogenous opiate production;
3. Slowing sensory nerve production;
4. Restoring cellular resonant energy;
5. Stimulating the Na/K pump mechanism in the cell membrane;
6. Inhibiting bradykinin and leukotriene production.

Osmosis dictates that no nutrient can transfer across the depolarized membrane of an injured cell. One of the most important functions of low level laser therapy is to re-polarize sick and injured cellular membranes. This allows for essential nutrients to transfer from the blood into the cell. In summary, outside light energy impacts in the respiratory chain within cellular mitochondria. Laser photons are taken up and transformed into cellular energy within the mitochondria when there is a deficiency. This added energy causes therapeutic change.

Research has shown that low level laser therapy can increase cellular ATP (body fuel) by as much as 150%.



Light Boot used for Peripheral Neuropathy

Light seems to be a primary intervention, upon which secondary ones, such as nutrition, depend!

Low level laser therapy has no effect on normal tissue. Photons are only taken up by cells that need them. However, caution should be used not to overuse low level laser light. Over-stimulation, whilst not having the potential to cause harm, can undo the good that the correct dose would have achieved. Excessive bio-stimulation is not beneficial. Kinesiology, or muscle testing, is an excellent way of determining how much the body requires. Another way, if pain is involved, is to note improvement in pain level as a guide to dosage.

The debate now is no longer whether light has biological effects, but rather how radiation from therapeutic lasers and LEDs works at the cellular and organism levels, and what are the most effective wavelengths and frequencies for their different uses.

Hard-to-Heal Conditions (or Symptoms)

Because of the LLLT's action at the cellular level, the number of applications of LLLT are extensive and impressive. Finding treatment in this country is another matter. The case study below

When a cell is healthy, coherent light is emitted. When a cell is disturbed the light turns chaotic. These frequencies are probably what bioenergy healers pick up with their hands when they scan the body.

Popp demonstrated that weak light emissions of low intensity were able to control the body, and that light in the body may be the factor that determines health and illness. In other words the body's communication system is formed by complex pathways of resonance and frequency.⁵

illustrates how far you have to travel in some instances. Alternatively, there are user-friendly devices now which can be used in the home. Of course professional support is the better option.

Case Studies

Breast Cancer and Lymphoedema – have you exchanged a death sentence for a life sentence?

Lymphoedema is a progressive condition with four main characteristics: excessive protein in the tissues, excessive fluid in the tissues, both intra- and extracellular fluid, excessive deposition of fibrous tissue, and chronic inflammatory reactions. Laser therapy acts as a stimulant on the lymphatic system as a whole; not just the area subjected to the laser. The laser beam encourages healing and re-growth of damaged lymph vessels. It also softens and breaks down fibrotic tissue, making subsequent massage much more effective. Until there is softening, the limbs do not reduce in size. Maintaining the massage routine improves and prolongs the non-permanent effects of the laser.

Searching for help via the internet, Sara flew out to Adelaide, Australia, from England, in 2002, to have treatment in the Lymphoedema and Laser Therapy Clinic at the Flinders Medical Centre. She had not found a similar clinic nearer to home. She received laser therapy over nine days, each time followed by massage.

"The treatment is painless but not without sensation. I experienced a gentle tingling sensation, considerably milder than pins and needles, and not unpleasant. It was explained that ...it was a sign that the lymphatic system had been stimulated and that fluid was starting to move. ...After just one session my arm felt and looked different and continued to do so. I went about sleeve-

less for most of the rest of my stay in Adelaide. I noticed other healing effects of the laser, too. My bright red raised reconstruction scar flattened and faded to white. Some sensation developed in my reconstructed breast and a little feeling to my armpit. My shoulder blade, totally numb since the mastectomy in 1993 has, in my estimation, 85% of the feeling back. At my last treatment session Robyn measured my arm and told me that for all intents and purposes, I had a 'matched pair'."

Sara has not found a way of getting laser therapy for lymphoedema in this country – her local NHS physiotherapy department had a low level laser instrument, but they admitted to not using it much. There was no system and no funding in place for anyone to treat her arm with it.

Because LLLT is neither a medicine nor a new surgical technique, it slips through the net of interest from pharmaceutical companies and has no effect on waiting lists. The benefit goes mainly to the patient, although the frequency of hospital admissions of lymphoedema sufferers would be reduced.⁸

Diabetes

Diabetes is the seventh leading cause of death in the United States. In 2002, there were 224,092 deaths directly related to complications from diabetes. When you have diabetes, your body either doesn't make enough insulin or can't use its own insulin as well as it should – the receptor cells for insulin attachment in the pancreas are malfunctioning. This causes sugars to build up in your blood. Diabetes can cause serious health complications including heart disease, stroke, blindness, kidney failure, sexual dysfunction and lower-extremity amputations.

The reality of this was brought home recently when a friend of a friend rang with intense leg pain and swelling. Jane has Type 11 diabetes with no feeling in her feet up to her ankles. Two visits to her GP, and a private consultant, merely provided her with painkillers. No-one examined her foot, ankle or leg with touch. In pain and in desperation, she visited her acupuncturist and osteopath. He was the first health professional to suggest an X-ray. It revealed that she had been walking around on a broken ankle, probably after a fall three weeks previously! Threatened with amputation, she had an operation to put right the

damage she had caused by weight bearing all that time.

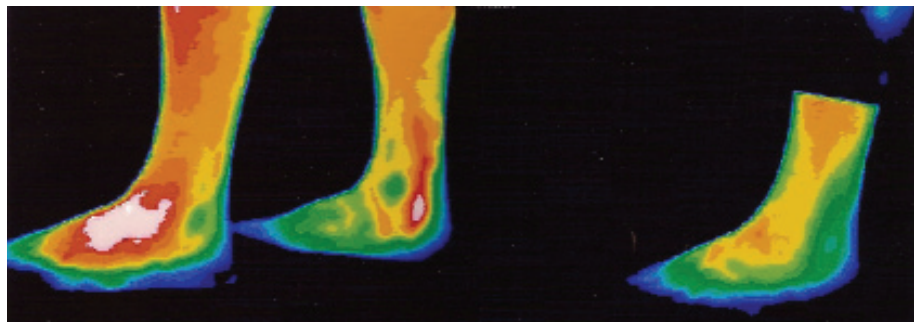
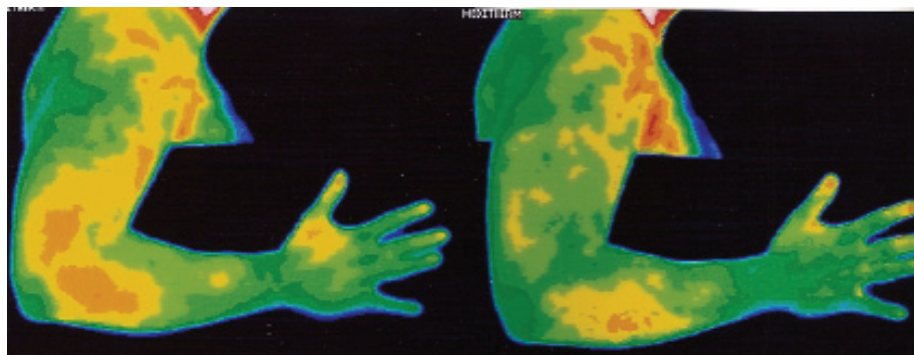
Unfortunately for Jane, none of her health care professionals had been able to tell her before her fall about the beneficial effects of low level laser therapy for loss of feeling in hands, feet and legs, caused by diabetes. If they had, she might have been spared the distress of threatened amputation.

Jane's loss of feeling is caused by reduced blood flow, and damage to the nerve endings, leading to loss of feeling and slow wound healing. This makes falling and injuries more likely, because of loss of balance and less feedback of injury through pain. Diabetes is the underlying cause.

Light mediated vasodilation (increased blood flow) was first described by RF Furchgott, in his nitric oxide (NO) research that led to his Nobel Prize in 1998. Later studies conducted by other researchers confirm and extend Furchgott's early work, and demonstrate the ability of light or photo energy to influence the localized production or release of NO, which increases blood flow. Since the half life of the NO released under the area of illumination is only two to three seconds, NO release is very local, preventing increased NO elsewhere in the body.

Diabetes and Peripheral Neuropathy

In America most insurance companies cover the cost of LLLT for peripheral neuropathy. Bill Ludwig, a Type 1 diabetic suffered pain (he described it as worse than hitting a hammer on your thumb) and lack of sleep for 20 of his 35 years taking insulin. Powerful pain



Thermal Imaging. Severe foot and elbow pain using thermographic imaging, with pain denoted by the red colour in the 'before' photo of the left leg and right elbow. After twenty minutes using LLLT red, infrared and blue light, the pain was gone, indicated by the less heat (red) in the 'after' photo.

medication did not always work, and he was reluctant to take it because of the way it made him feel. Finally he heard about LLLT given at a medical centre near his home.

At the start of therapy he only had sensation to one inch below the knee joint in his right leg, and six inches below the knee in his left leg. Treatment pads containing numerous LED pulsing infrared lights were placed against the skin. After 18 treatments he gained sensation down to 14½ inches in the right

leg, and to 12½ inches in his left. More importantly, he had none of the 24 hour pain attacks, until he suspended his treatments for a holiday. With a home unit he was able to carry on treating himself, working on alternate legs each day.

Typically, his physical therapist admitted that he had been skeptical at first, but after so many successes he had become a firm advocate of LLLT for these problems. In one study 98% exhibited improved sensation after six treatments, and all subjects had improved sensation after 12 treatments.

These results, and the numerous case study reports, suggest that LLLT is a potentially effective therapy that will, at least temporarily, reverse diabetic peripheral neuropathy in the majority of cases.^{9,10} As with everything, LLLT is no panacea, and not everyone will respond. But why are diabetics in this country unaware of something so effective which could help with their life-threatening symptoms? Home treatment light pads are available, but without professional involvement, many are going to be cautious about investing in their use. How many double blind placebo controlled studies do we need before we take on board this powerful healing modality? What diabetic with the threat

Case Study

Laser and Plaquex treatment on cryoglobolic vasculitis on diabetic foot

This case-study involves a 53 year-old male patient with non-insulin-dependent diabetes, diagnosed with vasculitis due to cryoglobulins caused by hepatitis C infection. He was treated by the head of the dermatological outpatient clinic at the University Hospital of Basel, Switzerland, when he developed inflamed and swollen blisters on the first and second toes of his right foot overnight. Within a few days the tips of the toes turned purple, and the danger of an amputation increased due to the reduced capillary blood flow caused by diabetes. The patient was treated locally with Low Level Laser Therapy to promote wound healing, and intravenously with Plaquex infusions to improve capillary blood circulation. After three weeks of treatment with ten Plaquex infusions and daily application of laser therapy (in-office and with home-care laser), the wounds healed completely and amputation was avoided.

LaserWorld Guest Editorial, Nr 10 – 2000. www.laser.nu/lllt/lllt_editorial5.htm

HEALING LIGHT SEMINAR

Saturday October 21st, School of
Pharmacy, London WC1

LOW LEVEL LASERS FOR CELLULAR HEALING

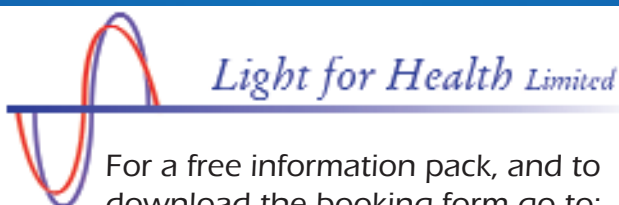
PAIN FREE, SAFE AND NON INVASIVE

DR LARRY LYTLE, DDS PHD
introduces this proven healing modality



From minor symptoms to health conditions that rob you of any quality of life, you could be helped by low level laser light, absorbed at the cellular level, affecting organs, glands, muscles, tissues, blood flow, nerve regeneration, immune and inflammatory response.

£65 to include lunch (early bird £55) Bring a friend and get one place for half price.



For a free information pack, and to download the booking form go to:

www.lightforhealth.co.uk
Tel/fax: +44 (0)20 7428 3368
info@lightforhealth.co.uk

of amputation would volunteer for a placebo study, if it risked a loss of a limb because of not being in the LLLT treatment group?

Fortunately a few forward thinking doctors and therapists in the UK are seeing the light and applying LLLT because they know it has the potential to work. Fortunately, too, we have a government desperate to cut health bills and find solutions that are practical and cost-effective. It may take a while, but eventually LLLT, and its many applications from wound healing to photodynamic therapy for cancer, will be part of our treatment choices nationally. In the meantime it is up to us to educate ourselves, and refuse to accept that all difficult to heal conditions necessarily have to remain so. LLLT has the potential to transform the suffering and clinical outcome of many patients with hard-to-heal conditions.

References

1. Go to www.laser.nu the Swedish Laser Medical Society website, for the latest research and debate on low level laser therapy.
2. Asada K, Yutani Y, Sakawa A and Shimazu A. Clinical application of GaAlAs 830 NM diode laser in treatment of rheumatoid arthritis. *Laser Therapy*. Volume 3. No. 2. pp.77-82. 1991.
3. Whelan HT et al. Effect of NASA Light-Emitting Diode Irradiation on Molecular Changes for Wound Healing in Diabetic Mice. *Journal of Clinical Laser Medicine and Surgery*. Volume 21. No. 2. p67-74. DOI: 10.1089/104454703765035484.
4. Gurwitsch AG. *Principles of Analytical Biology and of the Theory of Cellular Fields*. Moscow. Nauka. 1991.
5. Dürr HP, Popp FA and Schommers W (eds). *What is Life?* World Scientific, Hongkong-London. 2002. www.lifescientists.de/history.htm
6. Popp FA and Nagl W. Biophoton Emission: New evidence for coherence and DNA as source. *Cell Biophysics*. Volume 6: 33-52. 1984.
7. Whelan HT et al. NASA Light-Emitting Diodes for the Prevention of Oral Mucositis in Paediatric Bone Marrow Transplant Patients. *J. Clin. Laser Med. Surg.* 20: 319-324. 2002.
8. Piller NB and Thelander A. Treating Chronic Post Mastectomy Lymphoedema with LLLT: a Cost Effective Strategy to Reduce Severity and Improve the Quality of Survival. *Laser Therapy*. Volume 7. No. 4. p163-168. 1995.
9. Kochman AB, Carnegie DH and Burke TJ. Symptomatic Reversal of Peripheral Neuropathy in Patients with Diabetes. *Journal of the American Podiatric Medical Association*. Volume 92. No.3. 125-130. March 2002.
10. Latram P. Healing Light. *Diabetes Health Magazine*. November 2001. www.diabeteshealth.com/print,article,3427.html

About the Author

Gill Jacobs MSc Dip Clin Hyp NLP Coach GQHP M.AMT is a Health Writer and Hypnotherapist/EFT Practitioner. She discovered the power of pulsing light when searching for help for her mother's symptoms from MS. Frustrated at the negative response of others in need when she attempted to share this technology, she decided to tackle the problem head on by setting up a company committed to changing attitudes to light and its ability to heal, through product sales and education.

As a pioneering Health Writer on medical conditions which were initially misunderstood and ignored by mainstream medicine (Candidiasis and Chronic Fatigue Syndrome), she is motivated by the potential of low level laser energy to bridge the gap between complementary and alternative and conventional drug-based medicine. In addition to workshops on the general applications of LLLT, she is looking forward to exploring the role of low level laser light within Energy Psychology and trauma resolution.

Her next Healing Light workshop will be on October 21, 2006 in London. She can be contacted via gill@lightforhealth.co.uk; www.lightforhealth.co.uk