

# PBM Laser Therapy- Oedema, Lymphoedema

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Lymphedema develops in people who were born with an inadequate lymphatic system and who have difficulty moving lymphatic fluid. This may be from hypoplasia (not enough vessels or lumps), and what they have isn't working very well. It is a primary lymphedema that is usually genetically inherited. A secondary form of lymphedema is more common, where the lymphatic system has been damaged by surgery, radiation therapy, or other trauma. The trauma of removing varicose veins or other veins for heart surgery can overload the previously normal lymphatic system. Spider bites from multiple spiders can lead to lymphedema.

Lymphedema is a progressive disease with four main characteristics (1):

Excess protein in the tissues.

Excessive fluid in the tissues (both intra- and extracellular fluid).

Excessive deposition of fibrous tissue.

Chronic inflammatory reactions.

The excess fluid and fiber are just under the skin and within reach of the laser beam. New lymph vessels cannot grow through scar tissue or fibrous tissue. After the laser therapy, the tissue is softened and the fluid is reduced. New lymph vessels can grow (2). The limbs do not shrink until softening occurs.

A pilot study was conducted in 1993 to determine the effect of laser therapy on large arms after mastectomy of 4 years or more. (3). This study found that the arms responded well to laser therapy - there was a decrease in the amount of edema and volume of extracellular fluid as measured by bioimpedance, the tissues softened as measured by tonometry, and patients experienced improvement in symptoms from bursting Pain, tightness, heaviness, cramps, pinpricks, range of motion and limb girth are true. The arms lost an average of 19.7% overall over the 16 treatments and we then continued to measure them and another 7% loss occurred over the following 6 months. During these 6 months there was no treatment and no support sleeves were worn.

With improved measurement techniques (perometry, tonometry and bioimpedance and sometimes lymphoscintigraphy) we can identify areas of fibrosis and blockages and target these areas with the laser for better results. In the study, all patients were treated identically.

The current assessment and treatment performed at the Mitcham Rehab Clinic and the Lymphedema Assessment Clinic of the Surgical Oncology Clinic at Flinders Medical Center is a complete assessment of external measurements, volume and girth at 200 positions with the perometer. The compression resistance of the tissue is measured with a tonometer. Bioimpedance indicates the fat, fluid (intra- and extracellular) and fibers in the tissues. Measurements are taken on both arms or both legs. Subjective information about severity, cramps, pinpricks and range of

motion are recorded.

Laser therapy then targets the areas of blockage or fibrosis that start over the chest wall and armpit and move distally in the arm, or on the legs, lymphedema abdominal scars and groin are treated first, which then progress distally. Fifty minutes of laser scanning precede an hour of complex physiotherapy - massage.

The laser with a power of 9 mW He Ne at 832.8 nm and a peak power of 4 x 27 mW GaAs at 904 nm scanning laser, which covers an area of 20 x 30 cm. The energy density was 2-4 J per cm<sup>2</sup>.

#### Interesting observations

Most patients with lymphedema will feel the laser working at the time of treatment - they will feel a pulsation in the limb distal to where the laser is shining. Several people with whole body primary lymphedema may feel the pulsation in their face or arms while the laser is on their leg, demonstrating the general stimulating effect on the entire lymphatic system in an underactive lymphatic system.

Lymphedema patients are prone to skin infections such as cellulite, which often require hospitalization, but after the laser and massage, their tissues become healthier (fewer fibers and fluids) and the infection rate drops dramatically.

A few people - about 7 out of 700 people who have received laser treatment for lymphedema - have had a reaction - an overdose. They all describe themselves as sensitive and cannot take any medication, even non-prescription ones. Several had drastic reactions to radiation therapy. The reaction from these people is that they feel very tired and sleepy 24 hours after the laser. In the following treatments, the laser power was significantly reduced and they have a normal treatment effect without drowsiness. Could this effect come from stimulating light-sensitive areas that regulate the body's clock, as described in New Scientist (5).

We found an exciting reaction in a 43-year-old woman who developed lymphedema of the face, neck, and left arm 9 years earlier after surgery and two radiation therapies for thyroid cancer (6). Her vocal cords were badly affected by radiation therapy, and for 9 years she could not speak, only whisper. She couldn't make phone calls and working in a whisper was tiring and difficult. After the first treatment with the laser on her neck, she was able to speak !! After 10 treatments she was able to start speech therapy and sing a little. She now speaks normally and her lymphedema has decreased significantly.

#### Bibliography

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