

# L.A.S.E.R. Option in Treatment

by Christine Woodford, DVM

As both a veterinarian and an animal owner, I have had very positive effects using a cold laser to treat dogs and horses. I especially like to use the cold laser at horse shows on my own horse to help him perform the best that he can. At a typical show I compete in several classes and my horse works much harder than he does at home. Therefore, he is more likely to experience muscle, soft tissue and joint soreness from the work that I ask him to do. I use the laser because it is safe, fast and effective. I treat tender, sore body areas for about 3-5 minutes; the typical response is a very relaxed horse. This is evident by the horse licking his lips, yawning and taking deep breaths. After the treatment he seems much more flexible and free moving.

I am often asked by my clients, "What are lasers, how do they work, and what conditions can they treat?" The goal of this paper is to answer those questions.

**LASER** stands for Light Amplification by Stimulated Emission of Radiation. The radiation that is emitted is in the safe, low energy, long wave length part of the electromagnetic spectrum of light. Depending on the type of energy source, the light can penetrate through skin two inches deep or more and will increase cellular metabolism without damaging the tissue. Research is still ongoing to determine the optimal wavelength, power density, length of treatment, and intervals between laser treatments for specific conditions.

There are two types of lasers used for medical purposes: high power and low power. High power lasers (3000-10,000 milliwatts) can cut through tissue and produce heat. High power lasers are used in surgical procedures and can be dangerous if they are not used by a licensed professional. Low level, or cold lasers, (1-500 mW) are much safer. They stimulate tissue repair through a photochemical process to promote natural healing and pain relief. The benefits of cold lasers were first noticed in wound healing of lab rats in the early 1970's. The US Food and Drug Administration approved the use of low level lasers as an effective for treatment of lymphedema in November, 2006, and for osteoarthritis and chronic pain in March of 2009. Lasers have been used for clinical applications of soft tissue injuries, chronic pain and wound healing.

So how do lasers work? Research has shown that the low-level lasers produce positive cellular results in a combination of

three different mechanisms:

1. **Energizing:** Transforming the light energy into cell energy
2. **Circulation:** Increasing blood and lymph circulation
3. **Vibration:** Resonating cells into vibrative harmony

**Energizing:** If we remember from our school days of studying chemistry and physics, light has energy properties ( $E=hc/\lambda$ ). Various wavelengths of light have different energy levels. The specific wavelength of light ( $\lambda$ ) produced by the laser at various intensities, can affect tissue at the cellular level. The energy from the light source affects the cell's mitochondria and the use of ATP, oxygen, and nitric oxide. Cells are damaged when they are not regulating their energy metabolism. Lasers stimulate the cells' mitochondria to produce more ATP and fuel the cells' energy production. This will affect the tissue's ability to regenerate, control inflammation and control pain.



**Circulation:** Inflammation and swelling reduces the blood vessels ability to deliver oxygen and nutrients to the cells and carry away the byproducts and carbon dioxide molecules. Studies have shown that the laser light reduces the circulation of inflammatory mediators such as PGE-2, TNF- $\alpha$ , IL-6, substance P, histamine, and acetylcholine. Lasers also stimulate enzymes to release nitric oxide, ATP, and good endorphins to improve cell function. These effects help to reduce the pain of the patient.

**Vibration:** Cells emit a low level infrared light called biophotons. These biophotons vibrate at a specific rate (sympathetic vibration) and help regulate the cellular processes. Pulsed energy instruments such as lasers induce healing by exposing the damaged tissues to their normal resonance frequency. The low level lasers help to regulate the release of the biophotons and

affect cells' regulation of calcium uptake, release of cellular enzymes, and release of vasodilators to increase circulation.

Cold laser therapy is still being studied. Current research is showing that cold lasers are effective for treating arthritic conditions and are much safer as compared to other more dangerous or invasive procedures. Experiments show that light therapy can stimulate cell growth, increase cell metabolism, improve cell regeneration, induce an anti-inflammatory response, reduce swelling, and reduce fibrous scar tissue formation. In addition, studies have shown benefits in a number of animal studies as a possible tool for cartilage regeneration and healing.

Lasers have been used for a variety of applications:

- Arthritis
- Stimulation of Acupuncture points
- Increase in Lymph Drainage
- Release of Tight Muscles
- Soft Tissue Injuries- Sprained/Strained Tendons/Ligaments
- Decrease in Swelling of Hematomas
- Speed Wound Healing
- Pain Relief

I have also used the cold laser to stimulate acupuncture points on animals that were too sensitive for the acupuncture needles. Acupuncture points can be stimulated with the laser, which is a non-painful, less invasive method. The model of laser that I have has two settings, a blue light for acute injuries and a red light for chronic conditions. Last fall, I personally felt the difference between the effects of the two different lights. I had been bitten in the shoulder by one of our young horses. Immediately, a large, hot, painful hematoma (bruise) formed on my left shoulder. I could barely lift my arm. I went into the house and started to use the red light laser on my shoulder. The red light setting was too intense for my acute injury so I switched the laser to the blue light setting which has more cooling effects. Within five minutes, my shoulder was no longer painful and the bruising in the hematoma had decreased by 50%.

My personal experience with the pain relieving, healing effects of the laser therapy that I offer to my animal patients made me even more of a believer in its benefits. As a horse owner who likes to show, and a veterinarian who wants to make animals feel the best that they can, I am glad that I have access to, and can offer safe means, of cold laser therapy to my animals and my patients.