

TEN WATT LASER IN USE AT LOVELL EQUINE CLINIC

Over a year ago, Lovell Equine Clinic acquired a Class IV Therapy Laser for use on horses. It has been a wonderful addition to my practice and has been well worth the investment in terms of ability to affect outcome of clinical cases, ease of use, and affordability for clients. Recently I completed my certification by the American Institute of Medical Laser Applications. Certificates were received for the following topics:

- The Scientific Basis of Medical Lasers
- Introduction to Equine Laser Therapy
- Laser Therapy for the Equine Athlete
- Medical Laser Safety

I would like to share some of the highlights of the course.

The term LASER is easy to understand as Light Amplification by Stimulated Emission of Radiation. A laser is any device that produces or amplifies electromagnetic radiation in the wavelength range from 180 nanometers to one millimeter, primarily by the process of controlled stimulated emission. When a photon interacts with an energized atom, two photons result. Therefore, laser light produces a magnified effect.

Lasers are classified by their potential of damage to the eye. A Class I laser, i.e. laser printer or CD player, cannot cause damage to biological tissue. Class IV lasers include surgical lasers and therapeutic lasers greater than 500 mW. My 10-Watt therapy laser is 20 times stronger than a Class III 500 mW therapy laser. It produces 10 joules of light energy per second. Depending on the depth of tissue treated, I will figure a dosage of light between 5-10 Joules per square centimeter treated. Depth of penetration is also a function of wavelength. My 980 nanometer, 10,000 mW laser will penetrate several (up to 8-10) centimeters deep.

Enough about physics, what does the laser do to help the horse and what can it be used for? The effects of lasers on tissue lead to reductions in pain and swelling due to their anti-inflammatory effects. They are very beneficial in the treatment of wounds. They are useful in the stimulation of acupuncture points. They have several pre-performance and discipline specific functions. Their use leads to decreased recovery times, increased options for treatment when other treatment effects reach a plateau, faster returns to training, and an increased quality of life for our patients.

Clinical studies and trials of Laser Therapy technology indicate the following beneficial effects of laser therapy on tissues and cells.

- Anti-Inflammatory.

- Laser Therapy has an anti-edema effect as it causes vasodilation, but also it activates the lymphatic drainage system (drains swollen areas). As a result, there is a reduction in swelling caused by bruising or inflammation.
- Anti-Pain (Analgesic).
Laser Therapy has a highly beneficial effect on nerve cells which block pain transmitted by these cells to the brain and which decreases nerve sensitivity. Due to less inflammation, there is less edema and less pain. Another pain blocking mechanism involves the production of high levels of pain killing chemicals such as endorphins and enkephalins from the brain and adrenal gland. Stimulated cells also produce nitrous oxide (laughing gas).
 - Accelerated Tissue Repair and Cell Growth.
Photons of light from lasers penetrate deeply into tissue and accelerate cellular reproduction and growth. Laser light increases the energy available to the cell so it can take on nutrients faster and get rid of waste products. A result of exposure to light, the cells of tendons, ligaments and muscles repair faster.
 - Improved Vascular Activity.
Laser light will significantly increase the formation of new capillaries that speed up the healing process, close wounds quickly and reduce scar tissue. Additional benefits include acceleration of angiogenesis, which causes temporary vasodilation and an increase in the diameter of blood vessels.
 - Increased Metabolic Activity.
Laser Therapy creates higher outputs of specific enzymes, greater oxygen and food particle loads for blood cells.
 - Trigger Points and Acupuncture Points.
Laser Therapy stimulates muscle trigger points and acupuncture points on a non-invasive basis providing musculoskeletal pain relief.
 - Reduces Fibrous Tissue Formation.
Laser Therapy reduces the formation of scar tissue following tissue damage from cuts, scratches, burns or surgery.
 - Improved Nerve Function.
Slow recovery of nerve functions in damaged tissue can result in numbness and impaired limbs. Laser light will speed up the process of nerve cell reconnection and increase the amplitude of action potentials to optimize muscle action.
 - Immunoregulation.
Laser light has a direct effect on immunity status by stimulation of immunoglobins and lymphocytes. Chromophores (molecular enzymes) react to laser light. The enzyme flavomononucleotide starts the production of ATP (adenosine-tri-phosphate), which is the major carrier of cell energy and the energy source for all chemical reactions in the cells.
 - Faster Wound Healing.
Laser light stimulates the development of fibroblasts, the cells that manufacture collagen. Collagen is the essential protein required to replace old tissue or to

repair tissue injuries. As a result, Laser Therapy is effective on open wounds and burns.

General Laser Therapy principles include proper dosage, frequency, setting, times and method of application of light. Simple trauma often responds very quickly. Chronic or deep injuries may require more treatments. Acute and chronic conditions are treated aggressively initially. After a few treatments, re-evaluation of the injury occurs and new treatment goals are established. Depending on the size and depth of an area, a dosage of 5-10 Joules per square centimeters is calculated. This is equivalent to about 500 Joules per playing card sized area (about 1 minute with continuous wave setting at 10 Watts power).

Laser Therapy is performed in a calm environment on a calm horse. Sedation is usually not necessary or recommended due to the vascular effects of sedation. Long or dark hair can be wet down so the light can penetrate and not become too warm. Protective eyewear is worn by all, including the horse if working around its face. The light is applied perpendicular to the skin surface. The entire circumference of the area of interest is treated. Often the area is put through a range of motion or a massage ball is used. Records are kept on treatments given and the area of injury is worked up as needed for a diagnosis and response to treatment.

Many different parts and conditions of the horse are treated with the therapy laser. Conditions of these areas follow:

- Head-Trauma, TMJ joint dysfunction, fractures, pharyngeal lymphoid hyperplasia, guttural pouch disorders.
- Neck-Myositis, trauma, wobblers, jugular vein infections, arthritis, jugular thrombosis (blockage).
- Shoulder-Arthritis, trauma, OCD, tendonitis/bursitis, bicipital tenosynovitis.
- Knee-Trauma, fracture, arthritis, carpal tunnel syndrome.
- Metacarpus (cannon bone area)-Bucked shins, saucer fractures, suspensory and flexor tendon conditions (bowed tendons, etc.), check ligaments areas.
- Fetlocks-Fractures, sesamoiditis, osselets, OCD, arthritis, trauma.
- Hoof-The hoof capsule itself inhibits the penetration into some areas but many areas can be reached through the coronary band and heel. These include portions of the soft tissue structures in the foot, portions of the navicular bursa and heel.
 - Acute or chronic laminitis.
 - Navicular syndrome.
 - Coronary band injuries.
 - Lower joint arthritis.
- Back-Primary or secondary back pain, myositis, tying up, arthritis, poor saddle fit issues.

- Hip-Myositis, trochanteric bursitis, fibrotic myopathy, almost always need to do the back (secondary pain) in addition to the hip.
- Stifle-OCD, arthritis, upward fixation, trauma, fractures, soft tissue injuries.
- Hock-Cunean tendonitis/bursitis, curbs, bone spavin, capped hocks, OCD, arthritis of upper hock as well as lower.

The 10-Watt Laser is a very efficient device for stimulation of acupuncture points. Only 4-6 Joules of energy is needed per acupuncture point. Often local points are stimulated when treating specific disorders.

Laser Therapy does not numb areas for prolonged periods like some other treatment modalities (i.e. shock wave). Laser Therapy helps control pain by treating the inflammation that causes it as well as its stimulation of naturally beneficial pain controlling substances. There are very few contraindications for Laser Therapy. The number one concern is exposure to the eye. All other contra-indications are based on prudence, not scientific fact. Some areas we avoid using laser are:

- Abdomen or lower back of pregnant mares
- Growth plates of young animals
- Testicles of stallions
- Dark skinned horses on photosensitive medications
- Over suspected tumors (i.e. sarcoids or melanomas)
- Actively bleeding areas

The cost of Laser Therapy is relatively inexpensive and depends on the size of the area and the time it takes to treat. For example, a large area like the back requires more Joules than say a wound. Sedation is usually not necessary. Effects are often immediate. The fact that repeat visits are sometimes necessary allows one to monitor healing or pain relief closely.

Laser Therapy can be very beneficial for certain disciplines. Western pleasure horses tend to get sore backed as do some other disciplines. The calming effect of Laser Therapy relaxes them, and used close to a show might actually enhance performance. On the other hand one might not want to use it on race day on a horse that runs long distances.

We have successfully treated fractures, numerous wounds, multiple suspensory and tendon/ligament injuries, many sore joints, primary and secondary back pain, etc. One of the most impressive results was my own mare who had a non-healing open splint bone fracture of several weeks duration. The wound closed after one treatment and radiographic evidence of healing was quickly apparent. The bone healed completely and without arthritis in her hock even though the fracture was articular. We even treated a donkey with a broken pelvis who had suffered from several fecal impactions, due to pain and inflammation. The laser sales person said she could make that donkey poop and I sarcastically thought, "Sure you can." Several BM's later that day, I bought the laser.

Laser therapy in the Equine is scientifically based, safe, versatile, effective, and the only modality that accelerates the body to heal allowing faster recoveries and a higher quality of life for the patient.

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