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Beaming with health – Class IV Therapy Lasers **Linda Aronson, DVM**

Medical lasers are cropping up more and more often in the veterinary field whether in the vet office itself, as part of rehabilitation therapy or as an adjunct to chiropractic and /or acupuncture. They have a wide range of therapeutic applications although they are most commonly used to relieve acute or chronic pain, reduce inflammation, and promote tissue repair and wound healing.

Lasers stimulate photoreceptors causing cells to absorb energy. Light in the visible (red) and near infrared wavelengths is preferentially absorbed into mitochondria – the energy powerhouses of the cell – as well as the cell membrane. There it sets off a number of biological reactions – increasing synthesis of both DNA and RNA (and thereby proteins), increasing cAMP levels (which is an integral part of lipid, glycogen and sugar metabolism), increasing adenosine tri-phosphate (ATP) levels (providing more energy for cellular activity), increasing synthesis of proteins and collagen, increasing cell membrane permeability, blood and lymphatic vessel vasodilation, and cellular proliferation. This results in a rapid regeneration, normalization, and healing of damaged cellular tissue. The light triggers the rearrangement of cellular metabolism and sets off a cascade of beneficial effects increasing cellular energy and health.

While therapeutic lasers have been in use for 35 years, until recently they were generally limited in efficacy. Class III Low Power Lasers did not generate the longer wavelengths of light or power output necessary to deeply penetrate tissue to produce significant results. The need for deeper penetration with less superficial absorption of laser energy coupled with the need for higher energy output levels has led to the development of Class IV, or “high-power” therapeutic lasers now gaining in popularity since being approved by the FDA in 2007.

Cells and tissues that are poorly perfused as a result of inflammation, edema, and acute or chronic injury have been shown to have a significantly higher response to laser therapy irradiation than normal healthy structures. The delivery of a high amount of laser energy and its ability to penetrate deep enough to stimulate these target tissues is the primary reason why Class IV laser therapy has been associated with much more positive therapeutic outcomes than the previously available Class III lasers. The



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introduction of a significant amount of energy into tissue and articular structures within a short period of time leads to optimal cellular stimulation, enhancing wound healing and penetrating deep within the tissues to encourage healing within tendons, ligaments, muscles, nerves, layers of the skin, joints, and even the outer (periosteal) layer of bone. Circulation to the area increases bringing in more water, oxygen and nutrients. There is a reduction in inflammation, muscle spasms, stiffness, and pain.

The biologic effects of Class IV laser therapy include:

- * Increased Circulation (angiogenesis): vasodilation and the formation of new capillaries within damaged tissues.
- * Immune Stimulation: increased production of immunoglobulins(antibodies) and lymphocytes (B and T cells) and delivery to the area.
- * Reduction of inflammation: improved removal of damaged cells.
- * Pain relief: stimulate the production of endorphins, the body's own natural morphine-like substance which increases the threshold of pain perception.
- * Accelerated Cell Reproduction and Growth: tendons, ligaments, bone and muscle heal at an accelerated rate.
- * Stimulation of Nerve Regeneration
- * Increased Cellular Metabolic Activity
- * Reduced Fibrous Tissue Formation: collagen fibers align themselves in a more linear, uniform, fashion, reducing scarring and improving the strength of newly healed wounds.
- * Accelerated Wound Healing: Bacterial growth and probably viral reproduction are inhibited by exposure to laser light, making laser treatment helpful in treating non-healing wounds, contaminated wounds and burns.
- * Stimulation of Acupuncture Trigger Points

When treating acute injuries, the aggressive application of laser therapy will speed healing and reduce complications. Chronic conditions may require frequent (daily) treatment initially followed by a tapering maintenance schedule. Complete healing may not always be possible, and for chronic pain relief the use of laser therapy may replace treatment with steroidal and nonsteroidal pain medications which can have serious deleterious effects on organ function when used chronically. The effect is cumulative however, so that the interval between treatments can often be extended.



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Treatments are painless, although the animal will experience a warming sensation. Animals usually relax and may even fall asleep during sessions. Anxiety and aggression resulting from pain will be relieved.

Applications for Class IV Laser Therapy include wound care (surgical incisions, contaminated wounds and abrasions, burns, chronic anal sac infection, perianal fistulas), dermatologic conditions (acral lick dermatitis, pyoderma (hot spots), allergies, acute and chronic ear infections), musculoskeletal disorders (degenerative joint disease, intervertebral disc disease, hip and elbow dysplasia, tendon and ligament injuries, trauma, fractures, arthritis), neurologic disorders (peripheral nerve injuries, paralysis, degenerative myelopathy), gingivitis, ulcerated mucous membranes, and pain management. It should not be used to treat animals with cancer as it can promote conditions in which the cancer could grow or spread, and should not be used around the eyes.

Laser therapy can improve the quality of life for animals with chronic pain, and can give senior pets a new lease on life and delay euthanasia. They may begin to offer puppy like behaviors again. It can also be used to treat subtle lameness for improved performance in working and show dogs.

Reported success rates seem to be about 90% with the most dramatic cases going from complete immobility to being able to function normally and free of pain. In most cases the first session will tell you whether laser treatment will be successful in chronic cases, but further improvement is to be expected with subsequent sessions. Veterinarians using lasers report finding more and more cases that respond positively, so the list of uses is constantly expanding. I also know of some owners who were so impressed with the difference laser treatment made for their Beardies that they have sought laser treatment for themselves!