We are just starting to learn the potential of Low Level Laser Therapy (LLLT) in small animal medicine. While it has been used in human medicine for thirty years (FDA approval in the US is less than a decade old), we have very little experience on the veterinary side.

Lasers are classified based on power. LLLT is delivered by Class III lasers of less than 500 milliwatts (mW) power, usually much less. The wavelengths most beneficial to the tissues fall between 600 nanometers (nm) and 900 nm, with a window of poor response lying between 700 nm and 800 nm. The lower wavelengths have poor penetration and are good for superficial wounds. The higher wavelengths have good penetration and can treat deeper structures.

Class III laser light is potentially dangerous when viewed directly. This class is further subdivided into Class IIIa lasers, which are dangerous only when focused by an optical device (magnifying lens, binoculars), and Class IIIb lasers, which are dangerous even when not artificially focused. Class III lasers are low power and only have an output of 5-500 mW. Many of our therapeutic lasers fall into this category and, although some are designed so that the light dissipates within a few inches of the diode, they should be used carefully and with eye protection rated for that wavelength.

A Class IV laser is a high output instrument, greater than 500 milliwatts, often much higher. It poses potentially serious hazards to the skin and eyes. They may, on occasion, even pose a fire hazard. A log of usage must be maintained and a laser safety officer must be assigned. Surgical lasers and some therapeutic lasers (which generate heat and can cause thermal injury) fall within this category. A class IV therapeutic laser has the advantage of deeper penetration but the disadvantage of generating heat and potentially damaging tissues.


We use an ML 830 Laser (a Class IIIb) sold by Microlight Corporation of America. It is an 830 nm GaAlAs laser with three diodes in the hand piece, each putting out 30 mW. It is a timed laser which cycles for 33 seconds each time it is activated. Energy = Power x Time, therefore E = 30 x 33 sec, or 990 millijoules (mJ), or .99 Joules
(J). We round this off to 1 J and since there are three diodes, each cycle, or “click”, gives three J of energy to the tissue. This wavelength at this power has good penetration and can reach up to 5 cm deep, with a surface diameter of approximately 2.5 cm.

Within a few short months, with information from human and laboratory studies and our own trial and error, we have experimented and found some consistent results in a variety of conditions. We have intentionally kept it simple, as much of the available literature, in our opinion, unduly complicates things. The following is a brief summary of our protocols:

**Lick Granuloma:** Direct 6 J directly on the spot in light contact mode (barely touching). It is best to use a cover to protect the lenses from blood. Either a commercial plastic cap or simply cellophane wrap will work for this. Treat twice weekly until the licking stops, then as needed to control the behavior. Laser therapy has been shown to have biomodulatory effect on the repair of cutaneous wounds (J Clin Laser Med Surg. 2004 Feb;22(1):19-25). We have found it to be effective on the lick granulomas without the need for behavioral modifications or drugs. In our experience, licking stops after one or two treatments, but we continue until hair growth is evident. So far, three months out, there is no more licking. As the number of actual cases increases it will be interesting to see if this trend continues.

**Hip Dysplasia:** Osteoarticular pain has been successfully treated with LLLT in man (Radiol Med. 1998 Apr;95(4):303-9) for over a decade. We have used it in dogs of a variety of ages with painful hips and have found it to be very effective in most instances. Palpate the areas both cranial and caudal to the greater trochanter of the femur. With the laser probe directed toward the acetabulum and pressed down firmly, use 6 J on each spot for a total of 12 J per joint. Treat twice weekly until the improvement levels off (three to four weeks) and then as needed. As improvement is noted gradually wean from the NSAIDS but not from the chondroprotective products. Some patients will show clinical improvement with a single treatment. If there is no improvement within four weeks (a situation we have not yet seen) then there is likely to be none. Again, three months out from the series, we have yet seen one need another treatment.

**Oral Ulcers:** 6 J directly over the outside of the lips with light pressure (these areas are painful). If the patient is anesthetized use a light contact mode with one of the marked diodes directly to the ulcer. Repeat twice weekly until the ulcers heal, being sure to watch for positive results. If the cause of the ulcer (plaque, irritation, etc) is not removed, there is likely to be treatment failure (see out CUPS dog). It appears to be very good for chronic gingivitis-stomatitis cases in the feline without having to remove the teeth. More cases are needed to fully appreciate the potential.
Cranial Cruciate Strain (note, if it is torn then surgery is required): In man, the laser has been shown to be safe and effective in reducing knee pain (Photomed Laser Surg. 2009 Jun: 27(3)467-71), so we applied it to our patients with favorable results. We use 6 J to either side of the straight patellar ligament, directed into the joint with firm pressure. Treat twice weekly until lameness improves. If some improvement is not noticed within the first few treatments then reevaluate the cause of the lameness. As with other conditions, gradually reduce NSAIDS as improvement is noted. These typically have a good response in two to three weeks.

Lipoma: LLLT has been shown to form transitory pores in adipose cell membranes followed by the collapse of adipocytes (Lasers in Surgery and Medicine 2009 Dec: 41 (10):799-809). It is being explored for body contouring by plastic surgeons. For our purposes we wished to explore the effect on lipomas. Using firm pressure and 6 J over the mass, repeating twice weekly is flattening and dispersing the fat within a couple of weeks. So far we are very encouraged with the results. It appears that the lipomas don’t completely go away; rather they shrink to a much smaller firmer mass. We don’t know if growth will resume as we are in the beginning stages of our trials.

Acute Shoulder Lameness: From traumatic injury, without radiographic changes: We have had many of these and one treatment of 6 J firmly pressed over both the medial and lateral glenohumeral ligaments has resulted in a normal gait within minutes of walking around in about half the cases. The others have required only one or two more treatments. We have not used any NSAIDS with these cases. So far, none have had the lameness return.

Otitis Externa: In cases with the canals too narrow to get in with an otoscope, we flush as well as we can and treat the horizontal and vertical canal with 6 J and firm pressure over the outside of the ear, just caudal to the temporomandibular joint. On occasion we treat only with the laser and then return to flush and examine in two to three days. Within three days we can visualize the canals and tympanum and finish flushing if needed. We then give an additional 6 J of therapy. This allows whatever medication we deem appropriate (based on cytology) to be delivered according to our standard protocols. Canals with severe hyperplasia or polyps from chronic otitis may need surgical intervention with the surgical laser concurrent with therapeutic laser. The therapeutic laser will help prevent discomfort and speed the post-operative healing.

Post-Operative Incision Treatment: A single treatment over the incision site is delivered using 3 J of energy, “painting” along the site, with gentle contact. The site heals in less time and with less suture reaction.

Post Laser Declaw: The CO2 laser is a fantastic tool for declawing and makes for a much more comfortable recovery over the older methods. When we treat both paws post-operatively (held together under the beam) with 3 J we are seeing
almost no tenderness when they recover from anesthesia. No other pain medication has been necessary, although it is made available.

**Lumbar Pain:** On those typical animals presenting with a “tucked under” gait, reluctant to jump or climb, we treat directly over the spine at the level of the narrowing intervertebral spaces, or if radiographs are not a possibility, the level of the tense epaxial musculature. Treatment is 6 J each over the space(s). We also treat directly over those tense muscles, using firm contact and 6 J each area. Laser irradiation has been shown to aid in disc regeneration and healing following trauma (Biomed Sci Instrum. 2008;44:34-40).

**Hot Spots:** As laser irradiation has shown increased collagen production and organization when compared to non-irradiated controls (J Clin Laser Med Surg. 2004 Feb;22(1):19-25), we have used it with a number of cutaneous wounds, including hot spots. We have had good results with a single treatment of 3-9 J (depending on the size of the lesion) in soft contact mode painting the area. A cap or cellophane wrapper may be used to protect the laser from contamination.

**Pyoderma:** We have had only a few such cases to date. One was a 9 week old Siberian husky with severe staph pyoderma of the ventral thoracic region. It covered the entire chest area extending onto the abdomen. The skin was very thickened and painful. We treated it with a total of 9 J, painting the area in soft contact mode and gave a Convenia injection. No other treatment was done. The owner called back three days later to report the lesion had completely resolved. In other cases we have found it beneficial to use our standard topical therapies along with laser therapy, as we have found they augment each other. As noted elsewhere, laser therapy has been shown to have biomodulatory effect on the repair of cutaneous wounds (J Clin Laser Med Surg. 2004 Feb;22(1):19-25).

**Chronic renal failure:** LLLT suppresses pathological processes in nephrocytes, and can stimulate compensatory processes in the contralateral kidney in experimental models (Urologiaiia. 2006 May-Jun: (3): 47-50). With this in mind we treat each kidney with 6 J of energy, as well as the standard therapy, using the laser to compliment our established protocols. To date, we have treated one dog and one cat. Both have had improvement clinically, and the dog has shown laboratory improvement as well (as confirmed with consecutive chemistry profiles at two week intervals).

Other conditions we are experimenting with include hormonal and psychogenic alopecia (so far, results have been disappointing), sinusitis, cystitis, and anything else that comes along. We set our laser up in the treatment area each morning so that it is always on our minds. With every patient that comes in our door we ask ourselves, “Is there an inflammatory condition in this patient?” If the answer is, “Yes” then we try to decide how the laser might help in our treatment.
As steroids tend to counter the benefits of the laser, we rarely use them. Opiates or opioids (e.g. tramadol) may be used without detracting from the favorable effect of the laser. NSAIDS may be used if needed but we try to wean off them as soon as possible.

We look forward to collaborating with others as we learn more about what we can and cannot achieve with this tool. Keep in mind that neither this, nor any other single modality, is intended to replace proper diagnostics and established treatments. It is merely another tool to add to our growing armamentarium of therapies.