

Laser Therapy for the Canine Athlete: Where's the Evidence?

By Brittany Jean Carr, DVM, CCRT; Debra A. Canapp, DVM, DACVSMR, CCRT, CVA. Photos courtesy of VOSM.

Just as soft tissue injuries have been reported to be the most common injury seen in human general practices and are estimated to account for over 30% of injuries seen in a typical human sports medicine practice, they are also a commonly found injury among performance animals.¹⁻³ A previous survey with agility dogs found that 32% of the population had some degree of orthopedic lameness during training, and that 53% of those evaluated by a veterinarian were due to muscle or tendon injury.² When left untreated, this persistent or recurrent inflammation can predispose canine athletes to degenerative changes in their joints thus resulting in premature arthritis. Rehabilitation therapy of soft tissue injuries in both the human and canine athlete involve returning to sport as quickly and efficiently as possible while providing the most optimal outcome for the injured tissue.

Rehabilitation therapy is frequently incorporated into the treatment of performance-related injuries. Recently, many therapeutic modalities have become available for veterinary use, including low level laser therapy (LLLT). LLLT is an FDA-approved therapeutic modality that uses light energy to reduce inflammation. LLLT accomplishes this by a process called photobiomodulation, which is the use of light energy to stimulate cellular functions that lead to beneficial clinical effects. Every cell in a dog's body has one or many thousand cellular power plants called mitochondrion. These

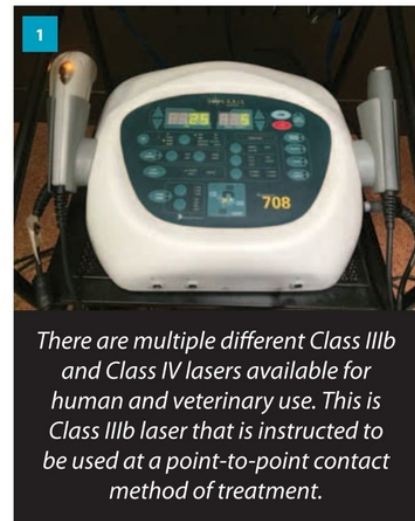
mitochondria are responsible for providing most of the required energy for cells. When a cell is damaged through injury or trauma, energy production in the mitochondrion is significantly reduced. As a result, the rate of healing slows dramatically. Studies have found that LLLT at a therapeutic frequency (600-1000nm wavelength) stimulates the mitochondrion to produce energy. Thus, the premise of LLLT is that by increasing cellular energy production, healing is subsequently stimulated.

Types of Lasers

There are multiple types of lasers commercially available, and lasers are grouped into classes based on their wattage or "power"—Class I lasers having the lowest (<0.5mW) and Class IV having the highest (>500mW).

Laser Class	Wattage	Example
Class I	<0.5mW	Garage door opener
Class II	<1mW	Barcode scanner
Class IIIa	1mW-5mW	Laser pointer
Class IIIb	5mW-500mW	Therapeutic laser
Class IV	>500mW	Therapeutic laser; Surgical laser

Class IIIb and IV are the most commonly used therapeutic lasers. See **Figure 1**. Any therapeutic laser should always be used by a trained rehabilitation therapist who has been properly educated on laser therapy to avoid misuse or adverse effect (such as burns). Class IV lasers have a higher power or wattage than Class IIIb lasers. The main advantage of a Class IV laser is that it takes less time to administer a therapeutic dosage of laser therapy. However, the main disadvantage is that when used by an inexperienced or inappropriately educated user, there is a greater risk for burns. Regardless of the laser chosen, it is important to note that with laser therapy certain safety precautions should be taken. It is recommended with most Class IIIb



There are multiple different Class IIIb and Class IV lasers available for human and veterinary use. This is Class IIIb laser that is instructed to be used at a point-to-point contact method of treatment.

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and Class IV lasers that protective eyewear is worn by the patient, therapist, and any other observers (such as the owner/handler or a rehabilitation therapy assistant) as lasers can damage the retina if directly pointed into the eye. Regardless of the class of laser used, it is imperative to be properly educated on laser therapy and the particular laser being used to minimize the risk of adverse effects or poor outcome.

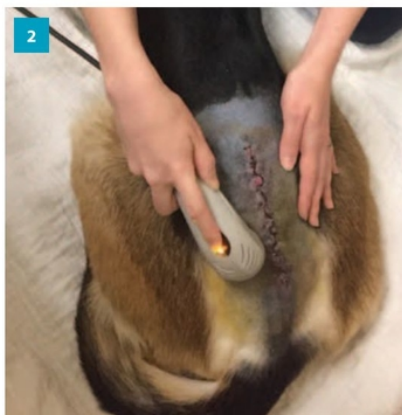
Studies on Laser Therapy

Numerous studies have been conducted to confirm the mechanism of action and support the use of laser therapy for sports related injuries. Multiple recent studies have shown that LLLT reduces inflammation associated with both soft tissue injury and osteoarthritis.^{4,5} Furthermore, in 2006 a meta-analysis that surveyed all studies performed to date revealed that LLLT can reduce edema, post-injury bleeding, inflammatory cell influx, and cell death and can also improved in circulation.⁶ Another recent in vitro study looked directly at tendon healing and laser therapy and showed that the use of 660nm at 1-2J/cm² stimulates tendon healing.⁷ However, more clinically applicable in vitro animal studies have also supported the use of laser therapy. One recent study in sheep with partial tendon injuries revealed that a combination of kinesio therapy and laser therapy were effective in fully healing tendons and returning the sheep back to function, without lameness.⁸ From the results of these and other similar studies, basic parameters and dosing guidelines have been extrapolated to clinical use in the canine athlete.

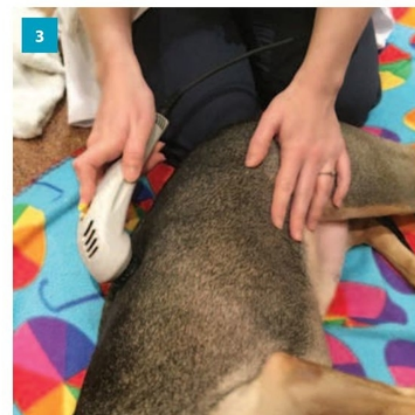
Integrating Laser Therapy into a Treatment Plan

Prior to initiating laser therapy, a patient should be fully evaluated by a certified canine rehabilitation veterinarian. A complete history, physical examination, and indicated diagnostics should be performed to confirm a definitive diagnosis, identify secondary compensatory issues, and establish baseline objective data to monitor the patient's progress through recovery. While there are many indications for the use of laser therapy, there are also contraindications, such as neoplasia. A certified canine rehabilitation veterinarian will determine if laser therapy is safe for each patient.

Once a rehabilitation therapy plan has been initiated, it is important to reassess the patient and repeat objective data measures every four weeks to confirm that the patient is progressing well and ready to move on to the next phase of rehabilitation therapy. At VOSM, weekly to twice weekly laser therapy is often incorporated into a multimodal, dynamic rehabilitation therapy plan. Other commonly used therapeutic modalities that are concurrently incorporated into the rehabilitation therapy plan include manual therapy with soft tissue and joint mobilizations, massage therapy, magnetic field therapy, therapeutic exercise, and hydrotherapy (see **Figures 2 and 3**). Each rehabilitation therapy plan is tailored for the patient and the stage of recovery.



A postoperative patient receiving laser therapy to support incisional healing, decrease inflammation, and reduce pain.



Laser therapy can be incorporated into manual therapy to aid in soft tissue tension (or trigger point) release by stimulating circulation to the tissues.

For a video simulation of how photobiomodulation helps stimulate recovery on a cellular level, please see Companion Therapy Laser's animation at <https://www.youtube.com/watch?v=g1Jek7bLOM4> or go to the Clean Run magazine YouTube channel (<http://www.youtube.com/user/CleanRunMagazine>) and select the September 2016 play list.

While it is acceptable to treat with laser therapy every day, it is often not realistic for the owner, therapist, and patient due to time obligations and financial constraints. A certified canine rehabilitation therapist will be able to determine an appropriate and realistic dosing schedule that will yield the optimal results. Most often this is accomplished initially on a weekly or twice weekly treatment plan for the acute phase. As the patient progresses through the rehabilitation therapy plan, the dosing of laser therapy is adjusted accordingly. Typically, the time between laser treatments is gradually lengthened as the patient progresses through the rehabilitative process. However, supportive maintenance laser therapy is usually recommended on a monthly basis or when sporting events/trials occur.

Conclusion

There are numerous studies documenting the cellular response to laser therapy as well as clinical studies supporting the use of laser therapy for performance-

related injuries. These results have formed the foundation of laser therapy in canine athletes. Further randomized, double-blinded, controlled studies with objective outcome measures are needed to fully elucidate the indications, applications, and efficacy of laser therapy in dogs. Thus, laser therapy has been widely received and practiced in the realm of canine sports medicine and rehabilitation. 🐾

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