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Applications of Therapeutic Laser in Everyday Practice

Advancements in technology provide practices with the versatility of laser therapy, which can relieve pain, reduce inflammation and increase microcirculation in tissues.

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For Veterinary Practice News

Adding a therapeutic laser to the practice armamentarium provides an extremely effective and versatile modality that benefits many patients. Understanding and expanding the potential clinical applications within the practice is the key to providing the highest standard of care for your patients.

Advanced engineering has allowed therapeutic lasers to accomplish relief of pain, a reduction of inflammation and an increase in the microcirculation within the tissues. The clinical outcome of this deep penetrating photobiomodulation is an accelerated healing time within the target tissues.

Laser therapy, therefore, is a healing modality that can benefit a large and varied number of patients on a daily basis.

Therapeutic Dosage

The World Association of Laser Therapy (2002) and a consensus of the literature have established that cells need 4 to 10 joules/cm² to stimulate a positive photobiochemical response. Penetration through skin, hair, water and blood requires the right combination of power, wavelength and treatment time to achieve favorable clinical results.

Superficial target cells require a lesser dose than target cells deep within the tissues.

Laser therapy is cumulative in effect. Each case is unique, but regardless of whether the condition is acute or chronic, laser therapy should be applied in three phases. These are:

- * Aggressive
- * Transitional
- * Maintenance

The aggressive phase is similar to a loading dose of a pharmacological agent. Therapy would be administered daily or at least



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Laser therapy can help pets in any number of ways.

every other day for a short period of time. Clinical evaluations are made after each treatment and adjustments can be made to dosages as needed. Typically, this phase lasts three to seven days.

Administration is less frequent during the transitional phase. In an acute condition, this phase lasts until the disorder's resolution. In a chronic case such as hip dysplasia of

many years' duration, it may last until a certain therapeutic goal is reached such as the ability to escalate a stairwell successfully. Typically, therapy during this phase is applied twice per week.

Chronic otitis and hip dysplasia serve as examples where a maintenance phase is essential. These therapy sessions could be once per month, once every other week or once per week as the patients' clinical results dictate.

Musculoskeletal Applications

Almost all musculoskeletal disorders are responsive to laser therapy. Applications range from acute trauma, post surgical pain management as an integral part of a rehabilitation program, and the myriad problems facing the geriatric patient. The following examples serve only as a fractional list of the musculoskeletal disorders that benefit from laser therapy.

Cruciate ligament injury and post-surgery pain management:

- * Tendon or ligament injury
- * Hip dysplasia
- * Elbow dysplasia
- * Disc disease
- * Degenerative myelopathy
- * Orthopedic Disorders
- * Osteoarthritis
- * Hip dysplasia
- * Trauma/Fractures
- * Intervertebral disc disease
- * Degenerative joint disease
- * Post-operative hip surgeries: total hip replacement, FHO
- * Neurologic
- * Back and neck pain
- * Loss of motor control
- * Peripheral nerve injuries
- * Paralysis
- * Geriatric

- * Muscle weakness
- * Arthritis
- * Chronic neurologic conditions

Dermatological Applications

The addition of laser therapy to traditional standard-of-care treatment for dermal lesions can achieve dramatic response. The animal will exhibit relief of most current symptoms immediately, and some degree of the inflammation and associated edema will disappear within a few minutes of the initiation of therapy.

Treatment of acral lick dermatitis provides an understanding of the value of laser therapy.

This condition is characterized by a firm, alopecic plaque lesion on the skin secondary to excessive licking. This condition is also referred to as lick granuloma and acral pruritic nodule. These lesions usually have a multifactorial etiology with a combination of organic causes such as hypersensitivity skin disease, joint disease or neoplasia combined with a secondary behavioral involvement.

In some cases, there is no evidence of pruritis or other organic disorder initiating the chronic licking. In these cases, obsessive-compulsive behavior associated with boredom and/or separation anxiety is the primary etiology.

Traditional treatment has included topicals, intralesional therapy, systemic therapy with antibiotics, anti-inflammatories and antihistamines, physical restriction like Elizabethan collars and pharmaceutical agents that modify neurologic activity. The prognosis in most of these cases is often guarded, and many of these lesions become chronic or recur on other areas of the animal.

Combining aspects of traditional therapy with photobiomodulation has led to a total resolution of a large percentage of these cases. Photonic stimulation of ALD allows:

- * Pain decrease. This is important if the underlying etiology is joint disease.
- * Inflammation decrease. Inflammation within the skin is caused by the constant licking; a reduction of this allows healing to commence.
- * Increased nitric oxide release causing vasodilatation. This allows an enhanced leukocyte infiltration and macrophage activity level.
- * Increased fibroblast proliferation and production of collagen.
- * Increased keratinocyte proliferation and promotion of early epithelialization
- * Increased release of serotonin. Serotonin is the neuromodulator that plays a role in sensory perception, emotion, arousal and higher cognitive functions.

Other dermatological conditions that benefit from photobiomodulation resulting from the same biochemical cascade of events are:

- * Atopic dermatitis (atopy, allergic dermatitis)
- * Burns
- * Abscesses
- * Eczema
- * Feline eosinophilic granuloma complex
- * Frostbite
- * Panniculitis
- * Pododermatitis
- * Pyoderma
- * Pyotraumatic dermatitis
- * Seborrhea

This list is not complete but illustrates the concept of the versatility of this modality.

Wound Healing

When using photonic therapy in conjunction with traditional pharmaceutical and topical approaches, the healing time for wounds is greatly reduced. All four physiological phases of wound healing are influenced by photobiomodulation.

The inflammatory stage is mediated by a reduction in the inflammatory response and an increased duration of vasodilatation.

The proliferative phase is accelerated due to the stimulation of the fibroblastic activity.

Epithelialization occurs at a faster rate due to the increased proliferation of keratinocytes.

The maturation and remodeling phase is maximized as the fibroblasts are differentiated into myofibroblasts and collagen is formed at an increased rate.

Other common conditions responsive to laser therapy include oral cavity disorders, such as stomatitis, post-op pain management and periodontal disease.

Disorders of the ear include aural hematomas and otitis.

The ability to treat the inner ear canal externally allows traditional therapies to be more effective.

Laser therapy allows the treatment of sinusitis and rhinitis, externally, allowing a reduction in inflammation and edema within these cavities.

The treatment of exotic animals with photobiomodulation has the benefits of easy administration and a non-pharmaceutical approach to numerous disorders.

Laser therapy is being used worldwide. This proven modality has become the standard of care for the physiotherapeutic treatment regarding pain management, wound healing and as an anti-inflammatory mediator. Photobiomodulation is the therapy of the future and as we expand our knowledge and experience, the horizons of clinical application will only broaden. ●

Ronald J. Riegel, DVM, practiced for more than 20 years. His seven books include manuals on the clinical uses of laser therapy. Dr. Riegel is a regular speaker at conferences and seminars.