IVC JOURNAL

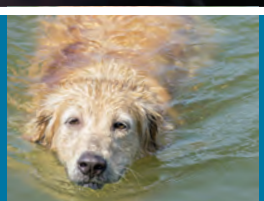
Integrative VETERINARY CARE

GERIATRIC AND HOSPICE CARE

WHY TREATING SENIOR PATIENTS USING AN INTEGRATIVE APPROACH CAN BE SO EFFECTIVE. PAGE 36

PAIN RELIEF FOR SENIORS

How therapeutic laser therapy and exercises can work together to reduce discomfort.



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Therapeutic LASER therapy and exercises for senior pets

By Laurie McCauley, DVM, CCRT, CVA, CVC

How THERAPEUTIC LASER THERAPY and EXERCISE can provide pain relief for GERIATRIC PATIENTS.

As dogs and cats age, joint problems and their associated pain can be a primary problem. Integrative medicine offers many approaches to soothe and sometimes even resolve geriatric pain. Therapeutic laser therapy and many exercises are two successful modalities to add to your practice.

1 THERAPEUTIC LASER THERAPY

Laser stands for "light amplification by stimulated emission of radiation". Low Level Laser Therapy (LLLT) involves the stimulation of tissue with low energy lasers to achieve a therapeutic effect.

The effects at a cellular level include changes in ATP production in the cells, ATP release from the mitochondria, enhancing cell respiration by affecting mitochondrial nitric oxide synthase (mNOS), generating reactive oxygen species (ROS) to become secondary messengers, and changing the cellular calcium ion balance. Many studies have been done, including some involving humans on chemotherapy[1] and on the healing of burns and wounds in rats[2].

Considering the variables

Variables of wavelength, frequency, and power in mW at the probe or J/cm^2 at the tissue can all have an effect on the outcome of laser therapy. Neves observed very different effects using four different probe powers all with the same total power to the tissue.[3] In the past, many studies were done with low power machines (60mW to 100mW), but more recently we have seen studies looking at 1W to 6W of power. Larkin showed that only one of these high power settings enhanced blood flow[4].

In practice, a range of 250mW to 12W is being used successfully to diminish pain and inflammation; speed healing; enhance blood flow and fight infection. Different wavelengths require significantly different amounts of power to create similar effects due to how superficially they are absorbed in the tissue. Less penetration is seen at low (600nm to 700nm) and high (970nm to 980nm) wavelengths so more power is needed to get to the affected tissue if deep penetration is desired.

Wavelengths in the 800nm range have been shown to be better at reducing edema, whereas the low 900nm range is better at controlling pain, and the 600nm range is superior for skin inflammation, pain, healing and infection.

As there are no good studies evaluating laser frequency I evaluated what the top-selling five veterinary laser companies used. I found that four out of five used a continuous wave plus a pulsed wave in their therapies. Only one company used greater than 5,000Hz (Hz = pulses per second). All companies used less then 100Hz for acute pain, four out of five used about 5,000Hz for contaminated wounds, and all used 500Hz to 2,500Hz to stimulate healing and diminish edema.

With all the different variables defining the capabilities of each laser, my recommendation would be to start with the laser company's recommendation, then play with the variables to see what works best in your hands.

Laser therapy can be beneficial for geriatric patients by treating pain; speeding the healing of skin, bone and soft tissue; and improving circulation. We commonly utilize laser therapy in patients with chronic back pain, osteoarthritis, acute injuries such as tendinopathy, or post-surgical issues (from cruciate repair to dental extractions), and it can also be used for otis externa, stomatitis/gingivitis, and intra-operatively with tissues with compromised circulation.

2 THE ROLE OF EXERCISE

Exercises are vital tools that can be utilized with most canine patients, and are beneficial for our geriatrics. Sarcopenia is a normal old age change where the muscle fibers are replaced first with fat (no change in circumference of the limb) and then with fibrous tissue (visible atrophy). This process has been shown to be slowed down with exercises that use resistance, for instance using the underwater treadmill, and concentric weight bearing exercises. Concentric exercises are defined as exercises that shorten the muscle as it is working.

There are exercises for core strengthening, individual limb or muscle strengthening, increasing endurance, enhancing balance or proprioception, and for weight distribution re-education. When it comes to exercise, the following general

considerations need to be factored in along with the patient's medical needs:

① Patient attitude and ability to be motivated. Motivators include food, a favorite toy, a certain person or another animal.

② The patient's physical condition. Dogs may resist exercise if they are stiff or sore.

③ Physical limitations of the person doing the exercises.

④ The ability to keep these exercises fun for the patient; positively thinking of them as a game or trick rather than work.

⑤ Control is as important as attitude. You must always have control of the patient to prevent injury both to him and yourself. This can be accomplished by the use of collars, harnesses and leashes.

⑥ Posture of the person doing the exercise. If you do not maintain your posture, you may be injured and not be able to help your canine patients. Keep your arms close to your body, your back straight, and do not hyper-extend or hyper-flex any joints.

One of the nice things about exercises is that we can tailor them to each individual patient. We can do this by altering several variables, including duration, frequency, speed, and terrain. Some exercises that we perform with our geriatric population include:

- ***Ambulating*** is a low impact exercise utilizing the whole body. By altering speed (walk, trot or run), frequency (once weekly to three times a day), duration (one minute to one hour), and terrain, we can customize this exercise to any canine. Geriatric patients may start by only walking to the mailbox or down the block, but frequently improve their strength enough to be able to go for long walks or runs.

- ***Swimming*** can be done at a beach where the dog can run in and out of the water, shaking in between dips and

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BUILD A ROCKER BOARD

Use a 1′ by 2′ piece of sturdy wood with a handrail underneath and carpet or other nonslip surface on top. Or, use a baby cradle, garbage can cover, or a hexagon with half of a rubber or wood ball attached underneath.

Rocker board exercises can be used for balance, proprioception, strengthening the front or rear limbs, or strengthening an individual limb. The round or octagon shape is most useful when we are looking to increase balance or proprioception.

The rectangular board is a great way to start enhancing strength and proprioception, making it great for geriatric patients. Using the rectangular board, you can start with either the front or rear limbs on the board, and then make it harder by raising the level of the opposite limbs. This shifts the dog's weight to the limbs on the board. Rocking the board side to side in a rhythmic fashion encourages the patient to sway, which is relaxing but not a workout. You need to constantly be changing direction and tempo to keep the muscles firing.

A rectangular rocker board can help an older animal strengthen his limbs.

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taking short rests; or in a pool or lake where he works continually to enhance his endurance and strength. Using an underwater treadmill helps with strengthening (water is up to 60 times more resistant then air), balance (in water, weight is more evenly distributed front to back and side to side), and enhancing conscious proprioception. By definition, endurance exercise is walking for greater then 20 minutes or swimming continuously for greater then five minutes.

- ***Backwards walking*** strengthens the antigravity muscles that support the body, allowing the dog to be able to stand for longer time periods, strengthens the muscles that stabilize the hip for dogs with hip issues, and strengthens the muscles of propulsion aiding running and jumping.

- ***Sideways walking*** strengthens the muscles surrounding the shoulders and hips. This is beneficial for dogs with hip dysplasia. Stand perpendicular to the dog with your feet between his front and rear feet, put one hand on the dog's collar and one close to the opposite hip, and use your knees to push the dog sideways as you take small steps for 10' to 20'. To balance this out, you need to either go to the other side of the dog or turn him around so you are walking in the other direction. Repeat for 10' to 20'. To use this as a weight-shifting exercise, where you want to strengthen one side more then the other, you would only walk the dog in one direction. He will strengthen and weight shift to the side you are stepping out with, the side you are not on.

- ***Snoopies*** is an exercise used to strengthen the trunk musculature as well as aid in balance. This is great for dogs with back issues, as well as ataxic dogs, or those with paraspinal muscle atrophy. A weak animal is asked to stand with diagonal limbs on blocks. Most of the weight is placed on the limbs on the floor, and the trunk is utilized for stabilization. To make this more difficult, instead of blocks, lift the diagonal limbs 1" to 2" off the ground with one finger at the tarsal and another at the diagonal carpal joints. Do not "grab" as this aids the dog's balance. If the dog is too weak to pick up the diagonal limbs, lifting just one leg at time can be used to prepare him for this exercise.

- ***Goosing*** may diminish lordosis, eliminating back pain. Lordosis, or sway back posture, is secondary to weak abdominal muscles and goosing strengthens them specifically. By tickling the abdomen or the flank and getting the dog to contract the abdominal muscles (similar to us doing sit-ups), we can strengthen the dog and change posture in three to five weeks. Try to get the dog to hold this mildly kyphotic, roachy position for three to five seconds. You can work up to 50 "gooses" a day. For dogs that have trouble standing these can also be done over a peanut ball.

- ***Cookie stretches*** are a great overall exercise that can be used for the detection of cervical and thoracic back pain; it's good for stretching the cervical and thoracic vertebrae, weight shifting, and enhanced balance. Wherever you put the cookie, the dog will turn to eat it, generating stretching and determining limitations. The cookie is first placed at the shoulder and then follows right next to the body to the hip and then the rear toes. This is done bilaterally. The cookie is then placed at the manubrium, to the floor, and then between the forelimbs to reach headstand position. The last step would be for the dog to have his forelimbs raised, standing on a chair or counter; take the cookie straight up, eliciting a concave surface of the thoraco-lumbar spine. Signs of pain or problems include stopping before getting there, or having to rotate the cervical spine to get there.

- ***Rhythmic stabilization*** is one of the first exercises I use for weak or debilitated patients. Having them stand and asking

them to "stay", we gently push them, holding for several seconds before picking another direction to push. The dogs will need to use their trunk musculature to maintain their balance. You can push in all different directions to stimulate contraction of different muscles. Don't push them so hard that they have to step out, just hard enough that you can feel their trunk muscles contract under your hand.

This is just a handful of useful exercises. The best way to look at creating an exercise program for your canine geriatric patients is to create a list of their problems, determine the goals of the exercises, and then figure out which ones will help you achieve those goals. If you cannot find an exercise that helps you achieve your goals, make one up using sound anatomical, physiological and biomechanical reasoning. Your imagination is your only limiting factor. IVC

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[2] Rochkind S, et al. "Systemic Effects of Low-Powered Laser Irradiation on Peripheral and Central Nervous System, Cutaneous Wounds, and Burns". *Laser Surg Med*. 1989, 9: 174-182.

[3] Neves M A I, Pinfildi C E, Wood V T, et al. "Different Power Settings of LLLT on the Repair of the Calcaneal Tendon". *Photomedicine and Laser Surgery*. Vol. 29, Num 10, 2011.

[4] Larkin K A, Martin J S, Zeanah E H, et al. "Limb Blood flow after Class 4 Laser Therapy". *Journal of Athletic Training*, 2012:47(2):178-183; Tuner and Hode. *The New Laser Therapy Handbook*, Prima Books, 2010.

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1. How would your products benefit an arthritic geriatric animal?
   "Lasers promote blood flow, release endorphins, and reduce inflammation, stiffness and soreness associated with arthritic and geriatric conditions," says Ellen Noll. "Quality of life is often improved through pain relief and return to daily activity."

2. Can you provide an example?
   "Killian, a nine-year-old golden retriever, was restricted in hock, stifle and hip flexion. Along with several exercises, he was given low level laser therapy, and was able to return to his normal healthy activity levels."

3. Can lasers help with decubital ulcers in elderly animals?
   "Laser therapy improves the tensile strength of tissue through increased collagen proliferation. A single treatment will often promote an improvement, although decubital ulcers benefit from daily lasing."