Standard Operating Procedure

for

Physiotherapeutic rehabilitation of dogs with muscle atrophy

Background information

- Muscle atrophy in animals is a process involving wasting of muscles or deterioration of muscle tissue.
- The condition may occur due to various reasons such as lack of muscle use, neuromuscular diseases, chronic diseases, nerve injuries or trauma and nutritional deficiency.
- This condition is typically modest and progresses gradually.
- Muscle atrophy is frequently linked to conditions affecting the spine, joints, or muscles, such as osteoarthritis, hip dysplasia, or chronic intervertebral disc disease.
- Neural atrophy is the result of either a temporary or permanent loss of nerve supply to the muscles and occurs in conditions such as polyneuropathies, polyradiculoneuritis, or traumatic injury to nerves.

Dogs with severe thigh muscle atrophy

Symptoms

- Dogs with neuromuscular disorders exhibit varying degree of muscle weakness and muscle wastage and this weakness could result from an inability of the electrical nerve impulse to travel along the nerve (neuropathy), an inability of the chemical messenger to cross the space between the nerve and the muscle (neuromuscular junction), or an inability of the muscle to contract (myopathy).
- In addition, other signs often include weight gain, limping or paw dragging, imbalanced gait or loss of coordination, sagging back or other changes in posture, increased lethargy or inactivity and crossing of the legs while walking or standing.

Procedure for clinical and laboratory examinations

- The presented dogs with the lameness will be scored and it may be 3 to 4 (Nganvongpanit, 2013).

Moderately lame when walking

Severely lame when walking

- Neurological examination through spinal reflex assessment will be performed.
- An absence of patellar and withdrawal reflex, diminished gastrocnemius reflex with a normal perineal reflex may be observed, which may be due to spinal compression.

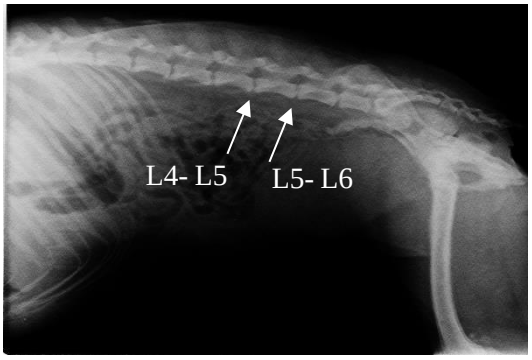
Patellar reflex

Pelvic withdrawal reflex

Gastrocnemius reflex

Perineal reflex

- Further diagnosis will be done through radiography where a compression between L4-L5 and L5-L6 lumbar vertebrae indicating spinal nerve damage.



Compression between L4-L5 and L5-L6

- Dogs found to have normal blood hemoglobin level but lower sodium and potassium serum levels compared to the normal physiological range.

Procedure for Physiotherapy for rehabilitation of dogs

- For physiotherapy, after their arrival to the clinics, the animals will be rested for 30 minutes for calming the animal before beginning of physiotherapy session.
- The physiological parameters *viz.* heart rate, respiration rate, body temperature and blood pressure were recorded.
- A rehabilitation plan was developed for the animals which included physical therapy along with therapeutic exercises on daily basis that is traction, psoas muscle stretching, balancing, support to stand on the affected limb and joint movement will be performed as required to improve strength and power in the rear limb's muscles, active range of motion, balancing and coordination.

Traction for spinal compression

Psoas muscle stretching

- To stimulate sensory nerves and reduce pain and inflammation, Transcutaneous Electrical Nerve Stimulation (TENS) will be used at a frequency of 80-150 Hz and amplitude of 100-150 μs for 20 minutes, four days a week for 3 weeks.

- Following TENS therapy, if there is significant improvement in the patellar reflex and pelvic withdrawal reflex, and the patient demonstrated the ability to bear weight for a few minutes with support.
- Then after, Therapeutic ultrasound treatment will be given at a frequency of 1 MHz and intensities of 1-2 W/cm² for 10 minutes, five days a week for 4 weeks in continuous mode to deeply heat the muscle tissues.

TENS therapy

Therapeutic ultrasound

- After receiving ultrasound therapy, the animals may regain normal spinal reflexes, posture, muscle mass (15%), weight bearing ability, and gait. The animals may recover completely after 8 weeks of the rehabilitation program.
- To aid the response to treatment, NSAIDs (Meloxicam @ 0.2 mg/kg body weight intramuscular for 3-5 days) will be given along with nervine tonic (containing Mecobalamin 500mcg and Gabapentin @ 10 mg/kg body weight orally for 50 days), calcium with vitamin D3 orally once daily for 1 month and supplement such as protein diet and Omega-3 Fatty Acids.
- Animal may completely recover after seven weeks with this protocol i.e. Physiotherapy and supportive treatment as shown below:

Dog after recovery showing normal standing posture and gait

Conclusion

- Physiotherapy plays a crucial role in restoring and maintaining not only the passive range of motion and optimal physical function but also overall wellness, fitness, and quality of life.

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