

PHYSICAL THERAPY in VETERINARY MEDICINE

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Introduction

The field of physical therapy (PT) in veterinary medicine is a rapidly expanding topic of interest. This heightened interest within both the physical therapy and veterinary professions is the result of client and consumer demand, increased longevity of our canine companions, and a higher level of surgical and medical sophistication. Patients with a pneumothorax, lymphoma, or neurologic condition all can benefit from physical therapy. Of interest to many general practitioners is the large number of older, obese and arthritic dogs. Many of these animals can benefit from muscle strengthening, improvement of joint range of motion and weight control. Physical therapy can improve their quality of life.

What is Physical Therapy?

According to the American Physical Therapy Association's (APTA), physical therapy is defined as "a dynamic profession with an established theoretical and scientific base and widespread clinical applications in the restoration, maintenance, and promotion of optimal physical function." The terms physiotherapy and physiotherapist are synonymous with physical therapy and physical therapist, respectively.

Physical therapists provide their services to patients with impairments, disabilities, functional impairments, or those with "changes in physical function and health status resulting from injury, disease, or other causes." Physical Therapists also interact and collaborate with a variety of different professionals; assess risk factors that may negatively impact optimal functioning; prevent and promote health, fitness and wellness; educate and provide consulting services to other businesses or health facilities; engage in research; and supervise and direct physical therapy services to include support personnel.

What is Veterinary Physical Therapy?

One current challenge is to prove that physical therapy is as meritorious in the dog as it is in the human. There are many new studies done in man demonstrating the value of PT on earlier recovery, resumption of a normal lifestyle, return to athleticism, and enhanced quality of life. There have been a few studies on animals, notably Johnson and Johnson's work on early use of electro stimulation; Levine and Millis' work on goniometry, range of motion, hydrotherapy and ultrasound and Steiss on ultrasound. The recent interest will only stimulate new areas of investigation and research.

In the past there was little attention paid to post operative care and many animals were lost to follow-up following suture removal. This, coupled with the notion that the animal would use the limb when it felt 'good' and the reluctance on the part of veterinarians to urge early mobility were factors that limited the use and concept of physical therapy. Despite recent advances, there are still veterinary surgeons that routinely immobilize their post-operative cranial cruciate repair patients for 4-6 weeks using casts, braces or splints. Early motion has been shown to be efficacious in hastening recovery and limiting the effects of disuse on bone, cartilage, ligaments and tendons.

Goals of Physical Therapy

The goal of physical therapy is to return the affected area and the animal back to its prior level of function. This may be accomplished by: 1) Reduce pain and accelerate healing of injured and inflamed neurological and musculoskeletal tissues; 2) Maintain or restore normal range of motion in affected joints of the forelimb, hindlimb or spine; 3) Prevent fibrosis or soft tissue contractures in injured, weak or paralyzed limbs; 4) Prevent disuse atrophy (i.e. preserve muscle mass) of an affected limb during the healing phase of neurologic or musculoskeletal insults; 5) Gain strength and improve function in weak or paralyzed limbs; 6) Provide a positive psychological effect maximizing both patient and owner well-being; 7) Educate and provide the owner with individualized home care programs to maximize the animal's functional mobility and prevent injury to the owner.

Indications for Referral to Physical Therapy

Many veterinarians ask what type of patients may benefit from physical therapy. Indications for referral to a physical therapist may be categorized by a specific orthopedic pathology or by physical therapy diagnoses. Orthopedic cases may include those animals suffering from osteoarthritis, hip dysplasia or tendonitis. Many are post operative patients who have undergone a total hip replacement, bicipital tendon release or femoral head osteotomy, an arthrodesis or amputation, cruciate surgery (intra- or extra-capsular procedures), or a fracture repair. General conditions may include delayed unions, geriatric support care or strengthening, conditioning or weight loss programs. Wounds such as degloving injuries, lick granulomas and decubitus ulcers are also rapidly resolved with rehabilitation. Physical therapy diagnoses focus more on a specific musculoskeletal problem. The list may include gait abnormalities or other movement dysfunction, pain and inflammation, decreased strength and endurance, joint stiffness or loss of range of motion.

Physical Therapy Interventions

Physical therapist interventions include a variety of components. From admittance through discharge, the physical therapist is responsible for coordinating, communicating and documenting the patient's physical therapy needs to ensure appropriate, comprehensive and effective quality care. Other interventions may involve client-related education and instruction and procedural interventions. Procedural interventions may include therapeutic exercise, manual therapy techniques, supportive or assistive devices,

airway clearance techniques, integumentary repair and protection techniques, physical agents, electrotherapeutic and mechanical modalities.

Education and home care programs are necessary to provide the owner with a way to become involved in their animal's rehabilitation phase. The program is individualized to each animal's needs and is progressed accordingly. Topics may include information on surgical procedures or pathology, specific therapeutic exercises, client education and/or recommendations on how to care for the animal without injury to the owner or further injury to the animal.

Therapeutic exercise, limited only by one's imagination, plays a large role in rehabilitation and is the most cost efficient. Exercises may be structured according to the outcome desired such as improving balance, coordination, endurance, strength or flexibility. Exercise may be separated into passive, active-assistive and active. Passive exercise mimics the normal muscle pumping action to improve blood flow and sensory awareness in affected limbs. It requires movement from an external force, for example, gravity, a machine or a person. There is no voluntary muscle contraction on the animal's part. **Passive** exercise may be used when an animal is unable or not supposed to actively stress a body segment, in the presence of inflammation or when active range of motion is painful. It helps to maintain soft tissue and joint integrity enhance synovial movement for cartilage nutrition and diffusion of joint materials, and minimizes the potential for contracture formation. **Active-assistive** exercise requires an outside force to assist with the range of motion. Prime mover muscles require some degree of assistance to complete full range. **Active** exercises produce movement by active muscle contractions. Active exercise serves to increase muscle strength, cardiovascular function and coordination. It maintains physiologic elasticity and contractility of involved muscles, provides sensory feedback from contracting muscles, and provides a stimulus for bone and joint integrity.

Hydrotherapy, via an underwater treadmill or pool, utilizes three inherent properties of water (buoyancy, thermal and fluid resistance) to help strengthen, improve lung capacity and to increase blood flow.

Proprioceptive rehabilitation is a concept commonly overlooked in a patient. Proprioception refers to the conscious awareness of limb motion and position in space. Joint capsules, ligaments, synovium and fat pads all contain a variety of highly specialized receptors that respond to varying types and degrees of sensory stimuli. Proprioceptive activities include exercises that facilitate rapid muscle contractions, focusing on closed kinetic chain exercises and improvement of dynamic stability.

Myofascial manipulation, or **massage**, increases blood flow and lymphatic drainage to injured tissues. Specific techniques may be applied to stretch tendons and ligaments to decrease the potential for fibrosis and contractures. **Mobilizations** and **manipulations** may also be applied to decrease pain or increase flexibility in hypomobile joints.

Supportive or assistive devices can play an important role in the overall well-being of the animal patient with neurological or orthopedic impairments. In addition to providing

increased independence for the pet, these devices can provide additional autonomy for the owner as well. They provide support to a weak or non-functioning body part and may assist with rehabilitation. They can also help to prevent decubitus ulcers from forming, increase an animal's mobility and prevent future complications in recumbent patients. Supportive devices may range from a single orthotic to protect and support an animal from knuckling to proper fitting for animals in need of a hindlimb cart. These devices are available in a variety of forms: boots, orthotics, slings, two-wheeled and four-wheeled carts.

Modalities may include **cryotherapy** or **heat therapy** that act to decrease pain and inflammation, relax skeletal muscles, reduce muscle spasm and decrease joint stiffness. **Ultrasound** may be used as a deep-heating agent that converts electrical energy into high-frequency sound waves. It is beneficial for problems such as muscle spasm and contractures and effective in accelerating wound healing, causing vasodilation and reducing pain. **Electrical stimulation** promotes muscle re-education, slows muscle atrophy and reduces pain and edema. Low intensity **laser** therapy, in the form of infrared energy, acts to locally stimulate the production and release of nitric oxide concentrations. Nitric oxide has been shown to accelerate wound healing, decrease pain, retard scar tissue formation and increase bone density.

Team Approach

A number of differently trained professionals may be involved in animal rehabilitation. They include veterinarians, physical therapists, veterinary technicians and physical therapist assistants. Ideally, animal rehabilitation is a collaborative effort between the veterinarian and the physical therapist. The veterinarian provides medical management and has the knowledge and expertise regarding the pathophysiology of the injury or problem. The physical therapist ideally performs the musculoskeletal assessment, predicts outcome goals, and delivers and progresses the rehabilitation according to an individualized care map, or protocol.