

Role of Physical Therapy in Veterinary Science

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Abstract:

The present review is an attempt to illustrate a broad foundation in the field of animal physiotherapy or veterinary physiotherapy. Physiotherapy is well established in medical field with a strong evidence-based data for treatment of various conditions in human beings. Physiotherapy has been an integral part of treatment in musculoskeletal, cardiovascular, respiratory, neurological, gynaecology, paediatric, geriatric, etc. field. The field of veterinary physiotherapy is still in its nascent stage but the available options, increased expertise and enhanced awareness in the field of veterinary sciences has lead to explore the role of physiotherapy in animals too. Thus, the purpose of the present review is to put forth the importance of animal physiotherapy and to explain the role of physiotherapy in varied conditions studied. Literature has been explored to take a plunge into the role of physiotherapy in animals. It could be concluded that physiotherapists' along with veterinarians should work as a multidisciplinary team for the betterment of veterinary services and for better treatment options for animals. This is essential for the emerging field of veterinary physiotherapy.

Keywords: Veterinary, Physiotherapy, Emerging field, Veterinarians, Veterinary services

Background:

Animal physiotherapy is an emerging field where physiotherapists are getting referrals from veterinary surgeons to give inputs and treatment in varied conditions. This kind of collaborative effort is essential for the new field of animal physiotherapy. In some countries the term veterinary physiotherapy is also used. In recent years, the usefulness of physiotherapy in rehabilitation of small animals has been recognized but still a lot has to be done. Usually physiotherapy is considered as an alternative therapy but in fact it is a useful adjunct with the conventional veterinary treatment and gives good results when it is used along with the conventional veterinary treatment. The physiotherapy adds on to the treatment provides promising results in rehabilitation following injury and improved outcome post-surgery. The physiotherapists may provide treatment via referral in-house or on-site (Sharp, 2008).

Research based studies show that techniques similar to human beings are applied to animals for physiotherapy treatment. Animal Physiotherapy is a growing field due to numerous reasons including faster recovery, increased awareness of the clients and increased demand. Advancement in the field of veterinary science has lead to improvement in diagnostic technology as well as treatment which resulted in sophisticated integration of veterinary sciences and animal

physiotherapy for both companion and performance animals. The better treatment module has led to increased longevity of animals (Veenman, 2006).

Management:

The physiotherapists' work to provide in a thorough manner the assessment, diagnosis, treatment and rehabilitation of animals. The functional assessment includes identification of pain, loss of function caused by a physical injury, any disorder or disability and to identify other causes of pain or dysfunction. After gross assessment, the physiotherapists' work for the best possible options for treating pain, disability, improving movement and muscle function in order to increase motor function, reduce disability and enhance performance. In post-operative cases, the role of physiotherapy has paralleled and veterinary surgeons are stressing the need for the same for better results post-op. For example, elite equine athletes' and their riders are now accessing the team of veterinarian and animal physiotherapists' for optimal performance (McGowan et al., 2007).

Animals also get affected by neurological conditions. For example, degenerative myelopathy is a neurological condition which is slow, progressive and degenerative disease of the spinal cord in older large breed dogs leading to non-ambulatory paraparesis (Averill, 1973; Griffiths and Duncan, 1975; Braund and Vandeveld, 1978; Clemmons, 1992; Clemmons et al., 1995; Johnston et al., 2000).

The usefulness of physiotherapy in the course of disease, i.e. degenerative myelopathy was proposed in the year 2001 by Kathmann et al. (2001) and it was put forth that physiotherapy is an integral part of rehabilitation of dogs afflicted with most of neurologic conditions. It was stated that physiotherapy would improve quality of life of animals (Jaggy and Kathmann, 2001; Kathmann et al., 2001).

Kathmann et al. (2006) studied the signalment and clinical presentation in 50 dogs with degenerative myelopathy. Whether mean survival time, neurologic status, anatomic localization, or age at onset had an influence on survival time in dogs that received physiotherapy was studied in 22 dogs. The results show that animals that received intensive (n = 9) physiotherapy had longer ($p < .05$) survival time (mean 255 days), compared with that for animals with moderate (n = 6; mean 130 days) or no (n = 7; mean 55 days) physiotherapy. The results show that affected dogs which got physiotherapy remained ambulatory longer than the animals that did not receive physiotherapy. It was reported that daily as well as controlled physiotherapy sessions prolonged ($p < .05$) survival time of affected dogs up to an average of 255 days. The physiotherapy protocol which was given to animals included daily gait exercise, massage, passive joint movement, and hydrotherapy. This protocol was effective in preserving ambulatory status in dogs with degenerative myelopathy. The survival time was positively associated with the degree of physiotherapy. The findings of the study suggested that, even in dogs with severe neurologic

deficits at time of diagnosis, physiotherapy may result in longer survival time in comparison with dogs with minor neurologic deficits that did not receive physiotherapy.

Physiotherapy is a useful method of treatment in case of nerve injuries in animals e.g., sciatic, peroneal or tibial nerve injuries.

Strasberg et al. (1996) reported the use of a wire mesh as a simple post-operative assistive device to provide regular physiotherapy. Twelve Lewis rats were randomized in two experimental groups. Each rat received a 2 cm posterior tibial nerve autograft. Postoperatively, animals in group 1 received manual physiotherapy, consisting of repeated flexion and extension exercises of the ankle, knee and hip every two weeks. Group 2 rats were permitted to climb freely on a 30 x 18 cm piece of wire mesh placed at a 45 degree angle within their cage. Group 2 rats received no manual physiotherapy throughout the course of the study. There was no development of flexion contractures in the injured hind limbs of either group as well as no morbidity such as blisters were reported with the use of the wire mesh. Also, no statistical difference was seen in walking track recovery between groups at any time period of time. On the other hand, a tendency towards improved functional recovery was noticed in the group getting constant physiotherapy via the wire mesh. It was concluded that the use of a wire mesh as a post-operative assistive device is an economical, uncomplicated and reliable technique in order to provide constant physiotherapy to animals following denervation.

Malisza et al. (2003) examined whether cerebral activation due to secondary hyperalgesia resulting from intrajoint capsaicin injection could be detected using functional magnetic resonance imaging (fMRI) in α -chloralose anesthetized rats. The investigators also detected analgesic changes in the central nervous system response to pain as a result of physiotherapy joint manipulation. Robust activation of areas of the brain identified to be associated with the processing of pain, namely the anterior cingulate (bilateral), frontal cortex (bilateral) and sensory motor cortex (contralateral), was found in all animals following injection of 25 μ l of capsaicin. Results show significantly greater activation was observed when capsaicin was injected into the plantar surface of the hindpaw compared to the ankle joint. Mechanical allodynia and secondary hyperalgesia following capsaicin injection into the ankle joint also resulted in activation of the same brain regions. Further, tendency toward decreased areas of activation in brain regions associated with pain in animals following physiotherapy joint mobilization was observed. Quiet interestingly, in animals also, physiotherapy is an effective modality to reduce weight.

Mlacnik et al. (2006) evaluated the effects of a weight reduction program combined with a basic or more complex physical therapy program including transcutaneous electric nerve stimulation on lameness in overweight dogs with osteoarthritis. 29 adult overweight or obese dogs with a body condition score of 4/5 or 5/5 and clinical and radiographic signs of osteoarthritis were included in the study. The protocol consisted of a weight-loss program. One group received

caloric restriction and a home-based physiotherapy. The other group received the identical dietetic protocol and an intensive physiotherapy including transcutaneous electrical nerve stimulation. The investigators assessed Lameness clinically and by kinetic gait analysis on a treadmill with 4 force plates to measure symmetry of ground reaction forces (GRFs) of the affected and contralateral limbs in bimonthly intervals for 6 months. The results of the study showed significant weight loss in both the groups. Nonetheless, more weight reduction was attained by dogs treated with caloric restriction and intensive physiotherapy. It was concluded that caloric restriction collective with intensive physiotherapy enhanced mobility and facilitated weight loss in overweight dogs. The blend of dietetic and physiotherapy may help to improve the health status more efficiently than dietetic treatment alone.

Conclusion:

No doubt, physiotherapy is an additional valuable resource, and at the same time a positive and caring image is reflected to the clients. The techniques and skill of physiotherapists' may even force the reluctant veterinary practitioners to include physiotherapy as a part of treatment regime. Still, a lot need to be explored regarding the benefits of collaborating physiotherapy with conventional veterinary treatment. There is a strong need to conduct research studies in order to develop a much-needed scientific evidence base for veterinary physiotherapy. It could be suggested that animal physiotherapy is a growing field and a professional team work is essential for the expert care of the animal. Along with injuries, there is need for the physiotherapist to understand animal behavior, animal biomechanics, animal nutrition and exercise physiology for optimal performance.

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[DNLM: 1. Physical Therapy Modalities/veterinary. SF 925 A598 2007]. SF925.A55 2007 636.089 dc22. Faculty of Natural Resources, Agriculture and Veterinary Science The University of Queensland Gatton, Queensland, 4343 Australia. Dr Nicholas Malikides BVSc, DipVetClinStud, MVCS, FACVSc, PhD, MRCVS Head of Biology Novartis Animal Health Australasia Pty Ltd Yarrandoo R&D Centre 245 Western Road Kemp's Creek, NSW, 2178 Australia. The animal physiotherapist plays an essential role in ensuring that this does not happen and that the build-up to full fitness is appropriately managed. Veterinary Science is vital to the study and protection of animal production practices, herd health and monitoring spread of widespread disease. It requires the acquisition and application of scientific knowledge in multiple disciplines and uses technical skills towards disease prevention in both domestic and wild animals. Human health is protected by veterinary science working closely with many medical professionals by the careful monitoring of livestock health as well as its unique training in epidemiology and emerging zoonotic diseases worldwide. Veterinary medicine is informally as old as the human/animal bond but in recent years has expanded exponentially because of the availability of advanced diagnostic and therapeutic techniques for most species. Keywords: Low level laser therapy; Monochromaticity; Medicine; Veterinary.

ABSTRACT. Doctor of Biological Sciences, Candidate of Engineering Sciences Leading Researcher; State Scientific Center of Laser Medicine, Moscow 121165 Russia. E-mail address: 7652612@mail.ru (S.-V. Moskvina). BioMedicine | <http://biomedicine.cmu.edu.tw/>. The role of polarisation in BMA is not discussed in detail as that is the subject of a separate study, however, it is worth mentioning that for laser sources, its contribution to the overall result is small, but when using broad spectrum light sources, it is extremely important. Unpolarised light is often completely useless from a medical point of view. Department of Veterinary Medical Sciences, University of Bologna, 40064 Ozzano Emilia, Italy. 4. Neurology and Neurosurgery Division, San Marco Veterinary Clinic, 35030 Veggiano, Italy. In the last decade, the use of physical therapy in veterinary medicine has increased and an abundance of research describing its role in the outcome of dogs with thoracolumbar (TL) intervertebral disk herniation (IVDH) has been published [1 , 2 , 3 , 4 , 5 , 6]. Physical therapy also seems to have a beneficial role in dogs with severe traumatic injuries of the spinal cord [5]. Veterinary Medical Teaching Hospital, College of Veterinary Medicine & Biomedical Sciences Texas A&M University College Station, TX, USA Kristin Kirkby Shaw, DVM, MS, PhD, CCRT, DACVSA, DACVSMR. Animal Surgical Clinic of Seattle Shoreline, WA, USA. Amie Hesbach, DPT, CCRP. the veterinary technician to better assist the supervising veterinarian when physical rehabilitation therapies are recommended. This chapter aims to answer some questions about rehabilitation for veterinary technicians and nurses. What is Rehabilitation?