

Review Article

An Approach to Equine Physiotherapy and Rehabilitation in United Arab Emirates

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Abstract

United Arab Emirates has a great development in horse competitions that includes: Show horses, show jumping horses, Flat races horses and endurance horses at national and international level, in the last 20 years. The growth of the horse racing industry demands facilities, staff, groomers, veterinary care, physical therapy, and rehabilitation. In a survey conducted by social media specifically instagram in the United Arab Emirates: Abu Dhabi, Ajman, Fujairah, Shajah, Dubai, Ras al-Khaimah, Umm al-Qaywayin, the question asked was Do you know about equine physiotherapy? The answer was Yes (15%) and No (85%). A total of 3,400 UAE people kindly responded to the survey. These results show the need to inform, educate and promote in United Arab Emirates riders, owners and trainers, in the prevention of injuries in horses through equine physiotherapy and rehabilitation based on equine physiotherapy in musculoskeletal injuries of the athlete horse. Physiotherapy and rehabilitation services in horses are mainly offered in the two main UAE veterinary hospitals (Dubai Equine Hospital and Sharjah Equine Hospital) and recently Equine Hydrotherapy Center in Sharjah, additionally, a significant number of private veterinarians and private physiotherapists offer physiotherapy and rehabilitation services, however, in some stables the use of cryotherapy is common in some physiotherapy equipment such as equine pools, shock wave, among other equipment.

Keywords: Equine; Horses; Physiotherapy; Rehabilitation

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Introduction

Physiotherapy is a profession with over 100 years of history [1]. The American Physical Therapy Association defines physical therapy as follows [2]. The diagnosis and management of movement dysfunction and enhancement of physical and functional abilities; the restoration, maintenance, and promotion of not only optimal physical function but optimal wellness and fitness, and optimal quality of life as it relates to movement and health; and the prevention of the onset, symptoms, and progression of impairments, functional limitations, and disabilities that may result from diseases, disorders, conditions, or injuries. Physiotherapy has been defined by the Australian Physiotherapy Council as ‘a holistic approach to the prevention, diagnosis and therapeutic management of pain, disorders of movement or optimisation of function to enhance the health and welfare of the community from an individual or population perspective’ [1]. Physical treatment and rehabilitation play major roles in recovery and maintenance of the equine athlete, and many therapeutic measures are accessible by the veterinarian in general practice [3]. Physical rehabilitation for veterinary patients expedites return to normal function, pain relief, and encouragement of optimal health for patients suffering from orthopedic, neurologic, and chronic diseases [4]. Physiotherapists aim to restore painless optimal function and, of course, prevention of loss of function, this is not dissimilar to the veterinarians aim of restoration of equine performance due to musculoskeletal or neurological dysfunction, and highlights the synergy between the 2 professions [5]. Physical therapists are trained to provide specific noninvasive interventions to produce changes in the patient that are consistent with the examination findings and contingent on re-examination and progression toward defined goals and outcomes [6]. In the last two decades, the practice of equine sports medicine and rehabilitation has progressively developed into a large and focused field of specialized equine practice [7]. The concept of treatment and rehabilitation following athletic injury is now an acceptable part of veterinary medicine and is the task of suitable qualified physiotherapist [8]. The physiotherapist is part of a team headed by the veterinary in charge of the case. One of the fundamental differences between physiotherapy and the medical or veterinary professions is that physiotherapists are trained to focus on the assessment and management of a patient’s function, rather than focusing purely on the particular patho-anatomical diagnosis, this focus includes the pathophysiological features and biomechanical abnormalities underlying the pain and movement disorders of their patients [5]. Physical rehabilitation can be an invaluable addition to a veterinary practice with relatively low overhead costs [4]. Equine physiotherapists attempt, where possible, to use an evidence-based approach to the assessment of the equine athlete [9]. The key area of physiotherapy, applicable to horses, is the study of the musculoskeletal system, this involves assessment, treatment and rehabilitation of neuromuscular and musculoskeletal disorders, functional biomechanics, neuromotor control and exercise physiology are the prime sciences supporting the profession [10]. Recently Federation Equine International (FEI) Permitted Equine Therapist

(PET) is a new category of personnel introduced in 2018. PETs are permitted to carry out 'Restricted Therapies' in which they have been trained, according to the Veterinary Regulations 2018, Chapter VI [11]. Restricted Supportive Therapies include: a) electrical current devices (e.g. TENS machines, NMES and H-wave); b) therapeutic ultrasound therapy; c) vacuum therapy; and d) physical therapies (e.g. physiotherapy, acupuncture, trigger point massage, myofascial release, osteopathy, chiropractic and spinal manipulation). FEI have adopted regulations that require a withdrawal period after treatment before the horse is allowed to perform, for example, ESW therapy is not permitted during competition and for a period of five days prior to the first horse inspection [12]. PETs are not permitted to carry out acupuncture at FEI events, regardless of any national legislation that may otherwise allow them to do so. Only Permitted Treating Veterinarians (PTVs) can carry out acupuncture at FEI events [13].

Equine Physiotherapy and Rehabilitation in United Arab Emirates

United Arab Emirates has a great development in horse competitions that includes: Show horses, show jumping horses, Flat races horses and endurance horses at national and international level, in the last 20 years. The growth of the horse racing industry demands facilities, staff, groomers, veterinary care, physical therapy, and rehabilitation. In a survey conducted by social media specifically Instagram in the United Arab Emirates: Abu Dhabi, Ajman, Fujairah, Shajah, Dubai, Ras al-Khaimah, Umm al-Qaywayin, the question asked was Do you know about equine physiotherapy? The answer was Yes (15%) and No (85%). A total of 3,400 UAE people kindly responded to the survey. These results show the need to inform, educate and promote in United Arab Emirates riders, owners and trainers, in the prevention of injuries in horses through equine physiotherapy and rehabilitation based on equine physiotherapy in musculoskeletal injuries of the athlete horse. Physiotherapy and rehabilitation services in horses are mainly offered in the two main UAE veterinary hospitals (Dubai Equine Hospital and Sharjah Equine Hospital) and recently Equine Hydrotherapy Center in Sharjah, additionally, a significant number of private veterinarians and private physiotherapists offer physiotherapy and rehabilitation services, however, in some stables the use of cryotherapy is common in some physiotherapy equipment such as equine pools, shock wave, among other equipment. A international Survey regarding the use of rehabilitation modalities in horses, the majority of respondents were located in the USA (60%), Europe (25.6%), and Canada (5.6%) [7]. The type of equine physiotherapy modality known was not consulted in the survey conducted in the United Arab Emirates. The 10 most prominently utilized were controlled hand walking (97.3%), therapeutic shoeing (96.1%), ice (95.2%), compression bandaging (89.5%), platelet rich plasma (PRP; 86.5%), therapeutic exercises (84.3%), interleukin-1 receptor antagonist protein therapy (IRAP; 81.4%), stretching (83.3%), and cold water hydrotherapy (82.9%), heat (77.6%), massage (69.0%), and acupuncture (68.3%) were also commonly utilized, the least prominently used modalities were hyperbaric oxygen therapy (9.4%), cyto wave (8.3%), and radiofrequency (6.4%), injectable modalities (IRAP, PRP, mesotherapy, stem cells) were almost solely administered by veterinarians; other modalities were variably applied by veterinarians, technicians, veterinary assistants, farriers, physical therapists, trainers, and other entities [7].

Indications for Equine Physiotherapy and Rehabilitation

In our experience in horse competitions the most common injuries are: include injury or trauma to tendons, ligaments and muscle; injury causing stiffness and pain in the neck, thorax, low back, and pelvis; stifle joint problems; injury to nerves and wound care. However, other authors consider: most common problems in the practice are those associated with loss of quality of movement or unresolved lameness issues [10].

Poor saddle/tack fit: Ill-fitting tack can result in the horse shifting or moving away from the pressure/painful spots. This can create poor movement patterns that stress joints and muscles and create pain in other areas.

Rider influence: A riding/training error or injury to a rider that changes balance and movement in the seat can also affect the horse. A rider's pain can change the effectiveness of her aids and her ability to move the horse properly with balance and control. Equine physiotherapy also may involve physiotherapy assessment and treatment of riders [5].

Repetitive stress: Training the same way day in and day out, can lead to muscles working in ways they were not designed to, or for longer periods than they are able to. Poor training techniques and over training can also stress joints. Repetitive stress can also be caused by poor training surfaces.

Conformational faults: There is a strong association between conformation and predisposition to movement dysfunction and lameness. It is important, however, not to overemphasize conformation as a cause of lameness.

Trimming/shoeing problem: Poor trimming that affect the shape and angles of the hoof can lead to stress on joints as well as tendons and ligaments. If a horse is experiencing hoof pain, it can affect his movement, leading to stress and potential injury.

Prolonged stall rest: Periods of stall rest are often required to allow an injury to heal. During stall rest, however, the horse will shift his weight and move in a certain way to take the stress off the painful area. This can cause certain muscles to atrophy or waste, decreasing in size and, therefore, strength.

Common types of Physiotherapy and Rehabilitation for equine

A good rehabilitation program takes into account the possible causes for the injury [14]. The treatment plan and program depends on a veterinary diagnosis and each case is different and particular. Once the underlying cause of the injury is determined, a veterinarian can construct an appropriate rehabilitation plan and use the available electrophysical therapies to their greatest effect, treating the horse correctly for the type and location of injury, and the stage of rehabilitation of the tissue, helps ensure full rehabilitation success [14]. We can summarize this in a personalized diagnosis and precision veterinary medicine. Precision medicine: is an emerging approach for disease treatment and prevention that takes into account individual variability in genes, environment, and lifestyle to better determine the patient's responsiveness to treatment and outcomes. We can introduce this new concept in veterinary medicine, physiotherapy and rehabilitation considering: the breed of the horse (genetics), the conformation, the nutrition, training (type, frequency, intensity) (lifestyle) and the environment (geographic region, climate, temperature, humidity,

stable, box, paddock) (environment). Rehabilitation changes as the animal improves and recovers; the therapist must be educated about physical rehabilitation, creative and flexible with protocols, and adjust them for each situation [4]. Treatment techniques include manual therapy such as joint mobilization and manipulations, muscle re-education through stretching and strengthening and proper movement patterning exercises [10].

Manual therapy: Manual therapy or manipulative therapy refers to the practice within musculoskeletal physiotherapy of therapist-applied passive or assisted active movement techniques for the management of pain and impairments in the mobility of joints, muscles and neural tissue, joint mobilization and manipulation is performed by several professional groups including physiotherapists, chiropractors, and osteopathic physicians [10]. Other manual therapy techniques in horses include various types of massage, myofascial release and active release therapy, these are hands-on techniques applied to muscle and surrounding connective tissue to alleviate spasm and pain and to help restore motion. Manual therapies involve the application of the hands to the body, with a diagnostic or therapeutic intent, touch therapies, massage, joint mobilization, and manipulation are all critical components in the management of muscular, articular, and neurologic components of select injuries in performance horses [15].

Cryotherapy: Cryotherapy or cold therapy is the application of a cold agent to an affected area of the body, such as a surgical site, to provide therapeutic effects by reducing tissue temperature. Research has shown that cryotherapy is effective in the first 72 hours after acute injury or surgery [4].

Heat therapy: Heat therapy is used to achieve effects opposite to those of cryotherapy; however, both modalities are used to provide analgesia and decrease muscle spasms. Since cold therapy should be performed for the first 72 hours, heat therapy should only be initiated after 72 hours and continued for a period based on the individual patient, typically 5 to 7 days. Beginning heat therapy too early can lead to worsening edema, swelling, and potential seroma formation [4].

Passive range of motion: Passive Range of Motion or (PROM) refers to exercises that move joints through their available range of motion without weight bearing muscle contraction [4].

Balance therapy: Weight shifting can be used to improve balance once the patient has regained the ability to stand on its own or with the assistance of a sling or therapy ball, this therapy is focused on helping the animal understand that the affected limb(s) is no longer painful [4].

Walking exercises: Walking exercises are essential to any animal's rehabilitation program. Walking exercises provide: increased range of motion, improved gait, muscle mass, and strength, improved circulation in blood and lymphatic vessels, increased endurance, prevention of joint degeneration [4].

Cavalletti rails: Cavalletti rails are rails that are raised above the ground a certain distance for patients to walk over, benefits of cavalletti rails include increasing stride length, range of motion, proprioception, balance, and limb use [4].

Land treadmills: Land treadmills goals for treadmill walking are aimed at reducing pain, making the patient bear weight on the affected

limb to strengthen muscles, increasing proprioception and range of motion, producing a normal gait, and providing cardiovascular and endurance benefits [4].

Hydrotherapy: Hydrotherapy has become a key element within equine rehabilitation protocols and is used to address range of motion, proprioception, strength, neuromotor control, pain, and inflammation [16,17]. Various forms of hydrotherapy can be tailored to the individual's injury and the expected return to athletic performance [18]. Water is effective as a rehabilitation tool due to its buoyancy, which results in an effect of decreased weight. Water's hydrostatic pressure, where water is exerted equally on all surfaces of the object immersed, also provides an optimal environment for rehabilitation [19]. These forces of water reduce the weight being supported by the patient's limbs, allowing them to ambulate and perform specific exercises more easily than outside a buoyant environment [4].

Tailoring rehabilitation: Rehabilitation is an essential aspect of the recovery plan for small animal patients. Protocols should be tailored for the individual patient based on its disorder and the goals desired from rehabilitation. All therapy sessions take patience and practice; some exercises or modalities may work better for different patients' temperaments and specific conditions [4].

Modalities of physiotherapy and rehabilitation for equine

Modalities can include ultrasound, laser, Electrical Muscle Stimulation (EMS), Transcutaneous Electrical Nerve Stimulation (TENS) and acupuncture [10].

Electrotherapy: Electrotherapy is an umbrella term used to identify a range of treatments including electrostimulation of muscles and nerves, as well as the use of sound waves (ultrasound) and light (laser) to treat physical injuries [10].

Electrostimulation: EMS and TENS is the application of low or medium frequency electrical currents in order to stimulate sensory or motor nerves to produce or facilitate muscle contractions, or to provide pain relief [10].

Muscle stimulation: Muscle stimulation can be used after injury or surgery where there has been a loss of strength of a muscle or muscle group or when the timing of the firing of the muscle has been altered due to injury [10].

Phonophoresis: Phonophoresis involves the introduction of medication through the skin and tissues by using ultrasound. During this modality, will use an ultrasound machine, and medicated gel will be placed on your injured body part, for example an anti-inflammatory medicine like dexamethasone is used during phonophoresis [20].

Prosthetic and orthotic training: POT it applies to injury may require use an orthotic or prosthetic device to help move better [20].

Ultrasound: Ultrasound is the application of longitudinal sound waves to the body for a therapeutic effect, the sound waves directly affect the cells and stimulate healing [10]. Promotion of tissue healing is the main goal of ultrasound, and it can be used at any stage of recovery or where healing is delayed, pain relief as well as reduction of swelling and muscle spasm is parallel effects of this type of therapy.

Laser: Laser Light Amplification by Stimulated Emission of Radiation is a form of light energy used to stimulate and improve

healing of open wounds, ulcers and soft tissue injuries such as tendonitis [9]. It can also be used to stimulate acupuncture points to relieve musculoskeletal pain. It is sometimes referred to as LEPT (Low Energy Photon Therapy) or LLLT (Low Level Laser Therapy) [10].

Extracorporeal shock wave: A shock wave is an acoustic (pressure) wave with very high amplitude and rapid rise time, there are multiple ways to generate a shock wave. The pressure wave can be instituted by vaporization of fluid across a spark gap (electrohydraulic), expansion of piezoelectric crystals (piezoelectric), or pushing a membrane with opposite electrical current (electromagnetic). In all three mechanisms, the pressure wave is brought to a focal point by lenses or a parabolic reflector [19]. This mechanism allows the energy in the wave to aim at a specific point within the tissue. Multiple veterinarians have reported success in stimulating suspensory desmitis to heal and decrease lameness [19].

Radial pressure waves: Radial Pressure Waves (RPWs) are created by a pneumatically driven device to strike the surface. This creates a pressure wave, but the parameters of the wave are different, however they continue to be confused and incorrectly lumped together, the waveforms have different energy levels and different depths of penetration [19].

Radio frequency: Monopolar radio frequency CAP/RES technology at a constant frequency of 448 kHz, which gives it unique properties that allow to generate thermal and sub thermal effects that accelerate tissue recovery [21]. Radio frequency treatment at 448 kHz in the treatment of tendon injury in the horse with a regeneration effect of the damaged tissue, shortening the healing time of the same respect to habitual treatments of this pathology with non-invasive therapies [21].

Acupuncture: Acupuncture is an ancient form of Chinese Medicine involving the insertion of acupuncture needles into the skin at specific points on the body to achieve a therapeutic effect. It is used to encourage natural healing, reduce or relieve pain and improve function of affected areas of the body [10].

Biologic modalities: (PRP, IRAP/autologous conditioned serum, and stem cells) aim to repair damaged tissue, inhibit inflammatory cascades and encourage tissue regeneration and mesotherapy also represents an injection-based technique that aids in localized pain reduction [7].

Therapeutic shoeing: Therapeutic shoeing has been used by a large number of professionals, primarily for the purpose of addressing tendon and ligament injury, hoof problems and laminitis.

Hyperbaric oxygen therapy: Hyperbaric Oxygen Therapy, or HBOT, refers to a treatment in which a patient is placed in a sealed chamber and exposed to oxygen at several times normal atmospheric pressure. Oxygen is forced into the blood and other body fluids (lymph, cerebrospinal fluid, bone marrow), destroying bacteria and helping to heal injuries. Recently have been applied to some cases of exercise-induced pulmonary hemorrhage, but it has been used in breeding, anemia or blood loss, bone infection (osteomyelitis), wounds in skin and muscle tissue, laminitis, post-surgical patients and connective tissue injuries [22,23].

Many new therapies and medical treatments that are developed for use in humans are rapidly adapted for use in horses [23]. Much of the current research in human, as well as equine rehabilitation is focusing on dynamic stability and neuro-motor control, current equine research into the biomechanical effects of lameness, rider and saddle pressures, head and neck position and muscle recruitment is helping us understand some of the changes and compensations associated with various dysfunction and injury [10]. Research looking at how specific nerve endings, called sensory organs, work in our joints, muscles, tendons and ligaments has progressed the way we rehabilitate patients [10].

Equine Physiotherapy and Rehabilitation Consultation May Include

- Gait analysis
- Joint range of motion
- Muscle strength/length testing
- Discussing your horses medical history, current medications and current exercise routine
- Observation – conformation/posture, muscle development and symmetry, behaviour and willingness to perform
- Massage
- Dry needling
- Laser therapy
- All diagnosis of horse injury is made by a veterinarian, a treatment plan will then be devised specific to horses needs as a combination
- The educational consultations (Horse Injury Prevention Educational Programs for riders and trainers) to develop injury prevention measures in the horse are very valuable, this is the new concept that we want to introduce in owners, riders and trainers.

Horse Injury Prevention Educational Programs for Riders and Trainers

Firstly, the good health of the horse must be promoted and guaranteed considering:

- Nutrition: Ensuring proper and sufficient nutrition, considering your body weight, discipline, training and daily athletic activity.
- Weight: Maintaining a healthy weight for your horse to reduce impact to joints.
- Rest necessary rest and good comfort in box and paddock.
- Taking time to warm-up and cool-down.
- Do not over exert, you must maintain a progressive training program.
- Ensuring regular, proper hoof care. The balance of the hoof is very important.
- Ensuring well-fitted tack.
- Ensuring safe footing.
- Weekly veterinary review.
- Bandages can help prevent some injuries you may want to consider using.
- Massage before training can be useful in preventing musculoskeletal injuries.

- Hydrotherapy and preventive cryotherapy after training can be useful in the prevention of musculoskeletal injuries.
- Riders must maintain good posture and balance.
- The trainers must develop a progressive training program for each horse according to the discipline.

In conclusion survey results suggest (15%) that limited information exists about equine physiotherapy and rehabilitation in the United Arab Emirates. These reviews indicate that a broad range of invasive and non-invasive modalities are used in equine to address a variety of rehabilitation and performance needs. It is important to show the scientific results of horses treated with physiotherapy and rehabilitation in the United Arab Emirates with the purpose of promoting the education of riders, trainers and owners of the applications of equine physiotherapy in the prevention of injuries and the rehabilitation of injuries in horses.

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