



Research Article

The Use of Physical Therapy Procedures in the Treatment of Soft Tissue Injuries in a Horse: A Case Study

Małgorzata Wójcik*

Abstract

Objective: Sports training of the horse requires from the animal a high level of strength, coordination and endurance. Therefore sport specific training carries a considerable risk of overload Injury, especially in muscular and skeletal systems. Soft tissue lesions (of tendons, ligaments and muscles) are a very frequent type of an injury in sports horses.

Study Design: The study is aimed at presenting the original project of physiotherapeutic measures including complex therapy methods, applicable after the injury of rupture of tendon fibers of the accessory head of the deep digital flexor muscle.

Animal: Horse.

Material and Methods: The therapeutic program was employed in a sports horse. The therapy lasted five weeks. Applied treatments: the Cito instant cold compress, kinesio taping - a lymphatic application, kinesio taping with the ligament technique, cryotherapy, deep transverse friction massage, ultraphonophoresis and restoring soft tissues elasticity and joint mobility.

Results: All of the offered physiotherapeutic procedures turned out to be effective in treating.

Conclusion: The complex application of therapeutic procedures offer allows the horse to come back to participation in show jump competitions.

Keywords

Physical therapy; Deep transverse friction massage; Stretching; Kinesio taping

Introduction

Sports training of the horse require a high level of strength and weight endurance. Therefore sports training carry a considerable risk of the appearance of overload changes and injury occurrence, especially in muscular and skeletal systems. The consequences may appear to be very negative. They temporarily limit a chance for the achievement of maximal sports result. From a long - term perspective they can disadvantageously influence on the ability of normal functioning after finishing sports career. Soft tissue lesions (of

tendons, ligaments and muscles) are a very frequent type of an injury in sports horses.

Study Design

The study is aimed at presenting the original project of physiotherapeutic measures including complex therapy methods, applicable after the injury of rupture of tendon fibers of the accessory head of the deep digital flexor muscle (DDFT - Deep Digital Flexor Tendon) in front right leg of a horse, treated non-invasively.

Materials and Methods

The therapeutic program was employed in a sports horse, possessing numerous achievements in show jumps of high rank. The age of the horse was 10 years, its sports training was 6 years. The horse, both on the injury day as well as after the completion of its physiotherapeutic treatment, was examined and diagnosed by the same veterinary surgeon. During the veterinary examination, the following pathological changes were diagnosed: painful limitations of flexion and extension in the carpal joint, tendon oedema and a temperature rise in the injury point. A veterinary expert conducted the horse's ultrasound scan which showed a rupture of tendon fibers of the accessory head of the deep digital flexor muscle in front of right leg and a haematoma. Immediately after the injury and after finishing the treatment, a test assessing the horse's locomotion at the trot, was done. During the test, the horse was observed while trotting straight ahead, to the therapist and back, from the therapist. The therapy lasted five weeks. All the physiotherapeutic procedures are applied, were the procedures that did not cause any trauma to the skin and were painless. The horse's hair in the injury point was shaven in order to make the access to the area, for the physiotherapeutic procedures, easier.

Methodology of Therapeutic Procedures

Cito instant cold compress

A disposable Cito instant cold compress made by Suomen Kylampussi Oy was directly applied after the injury. It was attached to the carpal joint with an elastic bandage. The compress temperature was about 0°, it was kept in the injury area for 20 minutes. In case of new injuries, the application of cold can neither be too intensive nor too long because it may leads to blood coagulation [1]. On the first and second day, the compress was applied every hour, at the place of the injury, for twenty minutes, except the night hours (Table 1).

Kinesio taping - a lymphatic application

A lymphatic application of kinesio taping was used in order to obtain some acceleration of the process of the oedema and haematoma absorption [2-4] (Table 1).

Kinesio taping with the ligament technique

The presence of oedema, in the place of the damaged fibers of the deep flexor tendon, caused moving the ends of the ruptured ligaments away. Therefore the kinesio taping ligament technique was applied in order to increase the contact between the ruptured fibers [2-4]. Both taping techniques were applied since the first day after the injury, till the fourth week from it (Table 1).

*Corresponding author: Małgorzata Wójcik, PhD PT (Physiotherapist), Department of Physiotherapy, Stanisław Staszic University of Applied Science in Pila, Poland, Tel: +(061) 831-25-00; E-mail: mwojcik@pwsz.pila.pl; malgo_wojcik@interia.pl

Received: January 25, 2017 Accepted: August 25, 2017 Published: August 29, 2017

Table 1: The therapeutic program applied for 5 weeks.

Therapy Week	1 st	2 nd	3 rd	4 th	5 th
Cito instant cold compress	x				
Kinesio taping lymphatic application	x	x	x	x	
Kinesio taping ligament application	x	x	x	x	
Cryotherapy	x	x	x	x	
DTFM	x	x	x	x	
Ultraphonophoresis	x	x	x		
Stretching				x	x

Cryotherapy

A cryotherapy procedure was done by means of the equipment by Zimmer company. The procedure's aim was to reduce the oedema and pain ailments [5]. At a distance of 20 cm from the injury point, a nozzle with cold dry air stream was held. The nozzle was adjusted for the maximal airflow. The person who was applying the cold stream was making round movements with the nozzle. The procedure lasted five minutes. In case of feeling cold by the patient in the injured area, the procedure was stopped. The procedure was carried out since the third day from the injury, till the fourth week of the therapy, and it was done five times a week (Table 1).

DTFM – Deep transverse friction massage

Deep transverse friction massage according to Cyriax was done on the route of the damaged fibers of the tendon. Deep transverse friction massage is a specific massage technique that helps with normal collagen fibers regeneration, causing congestion and having an analgesic effect [6]. The massage was done three times a week, for fifteen minutes. The massage was applied since the fourth day after the injury, till the third week of the therapy (Table 1).

Ultraphonophoresis

An ultraphonophoresis procedure was conducted by means of the equipment called Sonoter by Astar - Abr company. In the injury area, an oedema-reducing and anti-inflammatory gel called "Reparil", was applied. In this procedure, the medicine can be carried under the skin till the depth from one to three centimeters. This penetration indicates the application of an ultraphonophoresis procedure in soft tissue damages [7]. What is more, the gel applied in the procedure had also a function of a coupling agent. The flat electrode was placed on the extensor carpi ulnaris of the injured leg. The ultraphonophoresis head was placed on the route of tendon fibers of the accessory head of the deep digital flexor muscle. The volume of current intensity was individually adjusted to the first horse's reactions, whereas the volume of power, during the first five procedures, was 0,5 W/cm. During next procedures, till the end of the series, the volume was 1 W/cm, the work mode was continuous, and the time of a procedure was 10 minutes, 15 procedures in one series. The procedure was implemented on the third day after the injury took place (Table 1).

Restoring soft tissues elasticity and joint mobility

Passive stretching technique was applied. An application of any other muscle energy techniques was not possible because of lack of rigorous cooperation between the patient (the horse) and the therapist. The rule of passive technique application is a gradual stretching of joints till the maximal position of a particular motion range in a joint without pain and holding it for one minute [8]. The technique was applied from the movement barrier position, in the carpal joint, in the direction of extension. The therapist was holding

the horse's leg, one hand was placed above the carpal joint and the other held the metacarpus bone, applying gradual stretching until obtaining the maximal possible position. The therapist paid attention to the horse's behavior so that the procedure was painless. Next, the new achieved position was held for one minute. Restoring the elasticity was done gradually, for two weeks. Stretching was applied in the fourth and fifth week of physiotherapeutic procedures for 7 days, doing ten repetitions in one session. The technique was applied in the fourth and fifth week for the remaining joints of extremities in order to provide with soft tissues elasticity. Apart from the application of "Reparil" gel, no other pharmacological treatment was used (Table 1).

Results

In the veterinary surgeon's examination, after five weeks of the therapy, it was stated that the pain ailments and the tendon's oedema disappeared, the mobility in the right carpal joint was restored. The ultrasound checkup showed the correct course of tendon fibers of the accessory head of the deep digital flexor muscle and the disappearance of the hematoma. Before and after the therapy there was a trot test conducted. Directly after the injury, the horse was unwilling to do the trot test (during the trot, lameness in the front right leg was observed), it stopped trotting and started standing. After finishing the therapy, during the trot, there was no lameness observed while trotting straight ahead and back. After the completion of physiotherapeutic procedures, the horse was gradually accustomed to sports training, coming back to taking part in show jumping competitions, after eight weeks since the moment of the injury.

Discussion

The application of physiotherapeutic procedures in treating injuries within the musculoskeletal system in horses is a relatively new field of science thus no writing devoted to the topic is found. A partial massage of a particular body part or a global massage is widely applied in horses [9]. There are also some manual therapy techniques used, that are believed to reduce pain and improve joint mobility [9]. In case of an injury, a very popular method is RICE [10-12]. The acronym RICE stands for "Rest", "Ice" (that is cooling with ice), "Compression" (pressure dressing) and "Elevation". This way of treatment is applied in case of soft tissues injuries. The method is practiced very often and it brings positive effects in treating people. Lewis says that the RICE method is an application of "Rest", "Immobilization" - that is a lack of movement, "Cold" and "Elevation" [13]. According to Lewis such a method as RICE ought to be applied for the first and second day after the injury. Not earlier than 48 hours from the injury occurrence, a pressure dressing can be used - Compression by means of an elastic bandage or elastic therapeutic tapes. The RICE method cannot be fully applied in horses because of impossibility of the animal leg or legs elevation. Kinesio taping is a very widespread method of soft tissues plastering in humans, bringing positive results of its application [2,3]. However, before Kenzo Case applied kinesio tapes in people, he had used the method in horses [3].

Some researchers prove that the treatment using: cryotherapy, ultrasounds as well as laser therapy are not effective, or there is no sufficient information in writing, proving their efficiency [14]. Whereas Hubbard and the co-authors stated that cryotherapy procedures have a positive influence on the duration of coming back to work or to sports activity in people. They observed that

the physical therapy procedures, that were applied, influenced the therapeutic rehabilitation process of the injured soft tissues [15]. Taradaj and the co - authors think that cryotherapy should be applied in case of acute joint and soft tissue injuries [7]. Positive effects of analgesic and anti-inflammatory character, in soft tissues treatment in dogs, are attributed to Shock Wave Therapy [16]. A very important element of physiotherapeutic treatment is manual work with damaged soft tissues by means of DTFM (Deep Transverse Friction Massage) and restoring soft tissues elasticity. On account of collagen fibers reconstruction (not allowing the accretions creation) and deep congestion effect as well as analgesic effect, application of this technique seems to be the most legitimate⁶. Stretching techniques restore the elasticity of soft tissues and, at the same time, they improve joint mobility within a certain joint [8,9]. The complex physiotherapeutic proceedings seem to be a successful method in non-invasive treatment of the 3rd degree ligament injuries of the talocrural articulation in humans [17].

Conclusions

All of the offered physiotherapeutic procedures turned out to be effective in treating ruptured tendon fibers of the accessory head of the deep digital flexor muscle (DDFT - Deep Digital Flexor Tendon) in front right leg of a horse.

The complex application of therapeutic procedures offer allows the horse to come back to participation in show jump competitions.

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Author Affiliation

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Department of Physiotherapy, Stanisław Staszic University of Applied Science in Pila, Poland

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