INDIBA®
revitalizing lives

448 kHz RADIOFREQUENCY IN THE TREATMENT OF TENDON AND LIGAMENT INJURIES IN HORSES

DAVID ARGÜELLES, BScVM, PhD, ECVS Diploma, FHCV-UAB, MARTA PRADES, BScVM, PhD, ACVS and ECVS Diplomas, FHCV-UAB, ARITZ SAITUA, BScVM, ECVS Resident, FHCV-UAB, ANA MUÑOZ, BScVM, PhD, HCV-UCO, CEMEDE, ANTONIA SÁNCHEZ DE MEDINA, BScVM, HCV-UCO, LORENZO POZO, Physiotherapist, UAB, TONI RAMON, PT, Osteopath, Vet Physio.

INTRODUCTION

In horses, musculoskeletal injuries are the main cause of performance impairment, loss of training days, reduced competitiveness, detriment of the economic value of the animal and withdrawal from competitive life (Visser et al., 2014; Egenvall et al., 2013). In addition to their considerable economic impact, these injuries also entail the added challenge of a very long and complex rehabilitation which almost never ends in a full recovery.

It has been reported that radio frequency currents at 448 kHz have the ability to promote the proliferation of stem cells, which play a crucial role in tissue regeneration (Hernández-Bule et al, 2014) and more specifically in tendinopathies, where there have been reports of a beneficial effect in relation to pain (Labanda 2009) and in the reduction of recovery times (Romanò et al., 2009). This leads us to think that its use in tendon and ligament injuries in horses might be beneficial.

OBJECTIVE

The objective of this study was to evaluate the effectiveness of a capacitive resistive monopolar radiofrequency treatment at 448 kHz in tendon and ligament injuries in horses.

MATERIAL AND METHODS

A prospective, multicentre study was carried out on clinical cases of tendon and ligament injuries (tendinitis, tendinosis, desmitis), submitted to the Clinical University Hospitals of the Autonomous University of Barcelona, the University of Cordoba and the Centre for Equine Sports Medicine between November 2017 and May 2018.

Data were collected from medical histories: age, race, sex, fitness, as well as information concerning the degree of lameness, the location of the injury and its evolution. In turn, ultrasound exams were carried out at the beginning and end of the treatment to objectively determine the scope and the progression of the injury.

The ultrasound evaluation of the injuries was performed using Esaote's My Lab 60 ultrasound scanner and a probe with a frequency of 12 MHz. An ultrasound scan was taken of the affected limb, covering the whole length of the injured structure, from proximal to distal, both in cross-section and longitudinal section, and references images were taken of the injury. At the same time, this same procedure was performed on the contralateral, unaffected limb, taking these images as a reference of the normal appearance of the structure in question.

The study included six horses of different ages, aged between 6 and 15 years, 3 females and 3 neutered males, competing in different equestrian disciplines (obstacle jumping n=4, full competition n=1 and classic dressage n=1). The tendon and ligament injuries that they had affected different structures: 4 of the horses present injuries in the superficial digital flexor tendon (SDFT), 1 in the suspensory ligament (SL) of the fetlock joint, and 1 in the accessory ligament of the deep digital flexor tendon (AL-DDFT) or check ligament (CL). These injuries are in different phases of evolution at the beginning of the treatment: 4 of the injuries are subacute, 1 is acute and 1 is chronic **(Table 1)**.

CASE	AGE	SEX	DISCIPLINE	INJURY	EVOLUTION	LIMB
1	15	F	Obstacle jumping	SDFT	Subacute	RFL
2	12	NM	Obstacle jumping	SDFT	Chronic	LFL
3	10	F	Obstacle jumping	SL	Subacute	LRL
4	6	M	Classic Dressage	SDFT	Acute	RFL
5	10	NM	Full competition	AL-DDFT	Subacute	LFL
6	13	F	Obstacle jumping	SDFT	Subacute	RFL

Table 1. List of the characteristics of treated horses. Data collected from the clinical history of the horses in study (F: Female, M: Male, CM: Castrated Male, RFL: Right Front Limb, LFL: Left Front Limb, LRL: Left Rear Limb).

After a diagnosis was made, a capacitive resistive monopolar radiofrequency unit was used to treat the injuries (model VET905 by INDIBA® (INDIBA Animal Health, INDIBA S.A., Barcelona, Spain). This unit emits in continuous mode; the treatment was applied using a combination of two different types of electrodes: capacitive (CAP) and resistive (RES). The treatment protocol for each of the horses was established according to the characteristics of their injuries, the affected structure and how the injury presented itself.

RESULTS

After the treatment, all the horses showed an evident improvement in the echogenicity of the injury (see Figures 1-3), with the disappearance of the anechogenic and hypoechogenic areas, due to the decrease of the inflammation and oedema present during the initial stages of said injury. In turn, an increase in the number of fibres present in the injury, and a good organization of said fibres, were observed in all the ultrasound scans that we performed. In addition, all the horses presented an evident improvement in their degree of lameness, as well as a decrease in the contour of the injury, all of which was associated with their improvement.

Following the radiofrequency treatment period, the horses began to be slowly and progressively reintroduced into their regular work, without any relapse of the injuries. All of them returned to their previous competition level after an interval of 5-6 months from the onset of the injury.

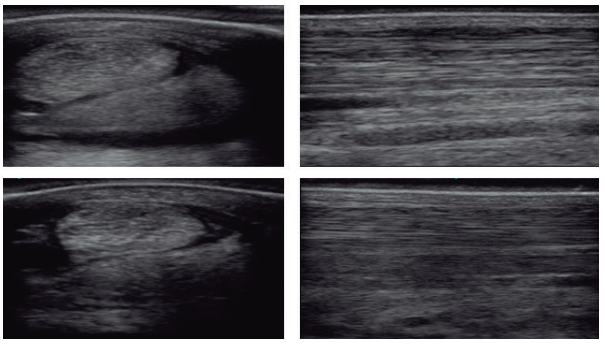

Figure 1. Ultrasound scan of the SDFT before and after the treatment of the injury in Case 1.

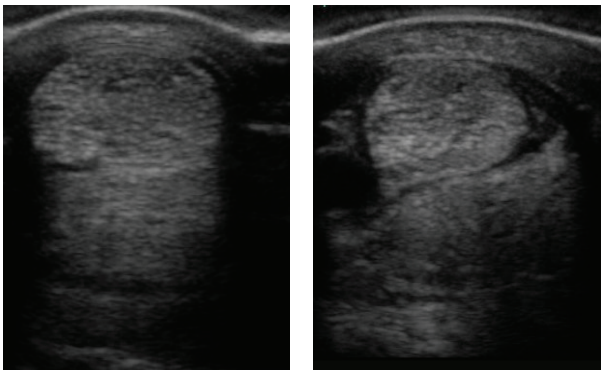

Figure 2. Ultrasound images of the SDFT injury at the beginning and after 3 months of treatment in Case 2.

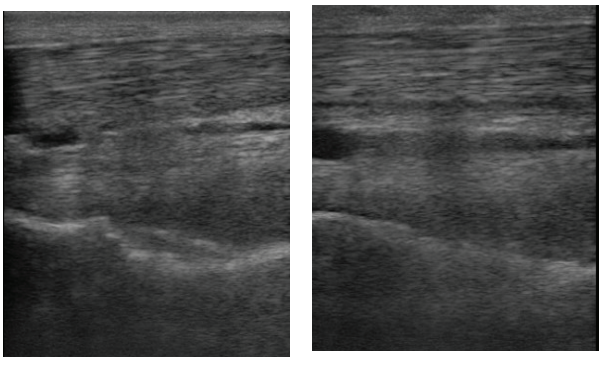

Figure 3. Ultrasound images of the SL injury, prior to the radiofrequency treatment and ultrasound image in Case 3, 3 months after the start of the treatment.

DISCUSSION AND CONCLUSION

Tendon injuries are an important cause of casualties in sport horses, with an incidence of 8-43% in race horses. SDFT injuries heal slowly, although 20-60% of animals do return to their sports activities. However, 80% of cases relapse (Dowling et al, 2005, Dowling et al, 2010).

In this study, all the horses that were treated with capacitive resistive monopolar radiofrequency at 448 kHz returned to their previous competition level after 5-6 months of treatment, which varied in length according to the extent of the injury and the duration of the treatment. This recovery period was shortened considerably because, due to the evolution of the injuries, measured both objectively through the analysis of the clinical indications and the degree of lameness, and through ultrasound scanning of the injuries, it was possible to reintroduce animals into exercising earlier. In addition, during the period in which they have continued to compete and by means of a telephone follow-up with vets, trainers and owners (over 3 months), none of the cases have relapsed.

REFERENCES

1. Bosch G, van Schie HTM, de Groot MW, Cadby J, van de Lest CHA, Barneveld A, Van Weeren PR (2009). Effects of platelet rich plasma on the quality of repair of mechanically induced core lesions in equine superficial digital flexor tendons: A placebo-controled experimental study. Journal of Orthopaedic Research 28 (2): 211-217.
2. Bosch G, Lin YL, van Schie HTM, van de Lest CHA, Barneveld A, van Weeren PR (2010). Effect of extracorporean shock wave therapy on the biochemical composition and metabolic activity of tenocytes in normal tendinous structures in ponies. Equine Veterinary Journal 39 (3): 226-231.
3. Dowling BA, Dart AJ (2005). Mecanical and functional properties of the equine superficial digital flexor tendon. The Veterinary Journal 170 (2): 184-192.
4. Dowling BA, Dart AJ, Hodgson DR, Smith RKW (2010). Superficial digital flexor tendonitis in the horse. Equine Veterinary Journal 32 (5): 369-378.
5. Dyson S (2010) Medical management of superficial digital flexor tendonitis: a comparative study in 219 horses (1992-2000). Equine Veterinary Journal 36 (5): 415-419.
6. Egenvall A, Tranquille CA, Lönnell AC, Bitschnau C, Oomen A, Hernlund E, Montavon S, Franko MA, Murray RC, Weishaupt MA, Weeren R, Roepstorff L (2013). Days lost to training and competition in relation to workload in 263 elite show jumping horses in four European countries. Preventive Veterinary Medicine 112 (3-4): 387-400.
7. Hernández-Bule ML, Paino CL, Trillo MA, Ubeda A. Electric Stimulation at 448 Khz Promotes Proliferation of Human Mesenchymal Stem Cells. Cell Physiol Biochem. 2014;34(5): 1741-55.
8. Romanò L, Zani D, Tassan S. Diathermia by capacitive and resistive energy transfer in the treatment of tendinous and ligamentous injuries of sport horses: Personal experiences. Ippologia. 2009;20(3).
9. Visser EK, Neijenhuis F, de Graaf-Roelfsema E, Wesselink HG, de Boer J, van Wijhe-Kiezebrink MC, Engel B, van Reenen G (2014). Risk factors associated with health disorders in sport and leisure horses in the Netherlands. Journal of Animal Science 92(2): 844-855.
10. Labanda MJ. Resultados del uso de corrientes de alta frecuencia en el dolor crónico provocado por tendinopatía rotuliana 2009 [Available from: https://www.efisioterapia.net/articulos/resultados-del-uso-corrientes-alta-frecuencia-el-dolor-cronico-provocado-tendinopatia-rotu.

TRN0291 V1