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Updates on the Scientific Evidence of Radiofrequency at 448 kHz in Equine Sports Medicine

SCIENTIFIC EVIDENCE OF RADIOFREQUENCY AT 448 KHZ IN EQUINE SPORTS MEDICINE

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Summary

After years of success in human medicine and physiotherapy, resistive capacitive electrical transfer (RF) at 448 kHz is gaining more and more followers in veterinary medicine, especially in equine sports medicine. Radiofrequency (RF) at 448 kHz is a therapy based on the transdermal application of electromagnetic currents at a fixed frequency of 448 kHz which, in addition to the classic diathermic effect of RF, has been shown to produce electrical effects that are capable of acting on the cellular structure, stimulating and accelerating the physiological mechanisms of tissue repair and modulation of inflammation1. The synergy created between these two effects has proven effective in the treatment of different pathologies in humans, such as muscular[2-4] , tendon[5,6] , ligament[7] and joint pathologies, such as osteoarthritis[8,9] . But what are the results of its use in equines? The aim of this article is to compile the scientific evidence of the effects of radiofrequency at 448kHZ, as well as its applied use in equine sports medicine.

Thermal and electrical effects of radiofrequency at 448kHz

Thermotherapy or the therapeutic use of heat is well known in sports medicine and rehabilitation of both humans and animals. Basically, the increase in tissue temperature and consequent vasodilatation promotes tissue repair and healing due to the increased supply of oxygen and nutrients and the elimination of excess fluids and catabolites[10] .

Radiofrequency has been shown to increase temperature, improve blood circulation, increase oxygen saturation, increase muscle flexibility and decrease post-exercise fatigue in several studies[11-14] .

Additionally, the electrical effect generates biological effects that do not depend on temperature but on the electric field generated by the current at 448kHz specifically[15] .

In this regard, in vitro studies have shown that the electrical effect of radiofrequency at 448kHz induces a proliferation of mesenchymal stem cells (MSCs) without affecting their

ability to differentiate into adipocytes, chondrocytes and osteocytes[1,16] . Thus, the application of this therapy could accelerate tissue repair by stimulating MSCs present in injured tissues. Moreover, since MSCs are directly involved in the modulation of inflammatory processes through the release of immunomodulatory cytokines, this technique may be particularly useful in the control of inflammation and pain[1] .

In other studies, exposure of cell cultures to this technique demonstrated increased synthesis of type II collagen and glycosaminoglycans[16] , essential for joint regeneration; as well as increased fibroblast proliferation and overexpression of essential biomarkers for skin regeneration[17] .

Finally, the application of radiofrequency at 448kHz at low intensities, produces the absence of changes in temperature or even its decrease, which can be very useful for the treatment of those lesions that require tissue regeneration without a concomitant increase in temperature, such as acute processes[18] .

Efficacy of Radiofrequency at 448kHz applied to athletic horses:

Although the use of radiofrequency in veterinary medicine is a relatively recent technique, the use of radiofrequency at 448kHz has been showing excellent results, both in the field of rehabilitation and in equine sports performance.

In a study conducted in Italy in 2010 with 115 athletic horses with traumatic tendon and ligament injuries (grade 1 and 2 of 5) treated with radiofrequency, it was observed that 85% of the animals presented clinical improvement and that 76% of the horses have stopped claudication and presented complete ultrasound healing, as assessed by echogenicity grade (ECO) and fiber alignment (All) at 30 days[19] .

An important analgesic effect has also been described, with a significant reduction in the pain response to palpation after the application of Radiofrequency in jumping horses with *kissing spines*[20] .

In another study in which horses with chronic low back pain were treated and in which a treatment group and a SHAM (simulated treatment) group were used, a significant reduction in chronic thoracolumbar and epaxial pain was also observed in jumping horses, at walk and trot, in the group treated with radiofrequency at 448kHz. Treated horses also had greater dorsoventral power at walk and trot, probably reflecting greater dorsoventral movement and flexibility. These changes were not found in horses in the SHAM group[21] .

In addition to the studies mentioned here, there are at least 17 case reports on the use of radiofrequency at 448kHz in different equine pathologies such as tendon and ligament injuries, fractures, *kissing spines*, wounds and lumbar and cervical pain[22-24] .

In relation to improved athletic performance, the use of radiofrequency at 448kHz has also previously demonstrated interesting results in human runners, who showed a significant increase in stride length, a more efficient running pattern and faster recovery from fatigue after strenuous exercise[25] .

In horses the result has been similar. For example, in a clinical study published in 2020, which also compared a treated group with a SHAM group, locomotor accelerometric changes have been reported after treatment with Radiofrequency at 448kHz in horses exercised on a *treadmill*. In that study a significant increase in stride length and higher total power were observed. Accelerometric activity increased particularly in the longitudinal axis and these

effects were even more noticeable after the second session compared to the sham treatment[26] .

Similarly, in dressage horses, after the application of Radiofrequency at 448kHz, an increase in accelerometric activity was also recorded in the medium and long trot, and greater mid-lateral flexibility was also observed in the piaffe and trot gathered at[27] .

Finally, in another study published in 2022 it has been reported that the application of Radiofrequency at 448kHz 24 hours prior to exercise resulted in favorable locomotor changes in Thoroughbred trotters, mainly an increase in velocity and longitudinal accelerometric activity[28] .

Conclusion

In sport horses, as in human athletes, especially high performance athletes, a rapid return to activity after injury is paramount. In many cases, this goes beyond an apparent clinical improvement. In injuries to certain tissues, such as ligaments or tendons, the quality of the healing tissue is as important as the recovery time, as poor healing, or poor quality of the healed tissue, can lead to a recurrence of the injury that can often be catastrophic.

On the other hand, the prevention of these injuries in these animals is fundamental to ensure good performance and a long sporting life. This is obtained when a good management of the animal is carried out, an adequate training is performed and the tissues are allowed to recover after the sports activity.

Last but not least, ensuring animal welfare is the first premise of the veterinary professional. In addition, using tools that are painless and non-invasive, that help to control pain and improve mobility, allow the professional to obtain better results in their treatments.

Based on the demonstrated scientific evidence, the application of radiofrequency at 448kHz not only leads to accelerated tissue repair, but also to a better quality of scar tissue, thus avoiding recurrences or relapses. Additionally, evidence suggests that the use of this technology has beneficial effects on the movement and elasticity of sport horses, which presents itself as a promising therapeutic tool in the field of equine sports medicine, in addition to a good management of the horse, both in the recovery of acute and chronic injuries, and in improving the performance of athletic horses.

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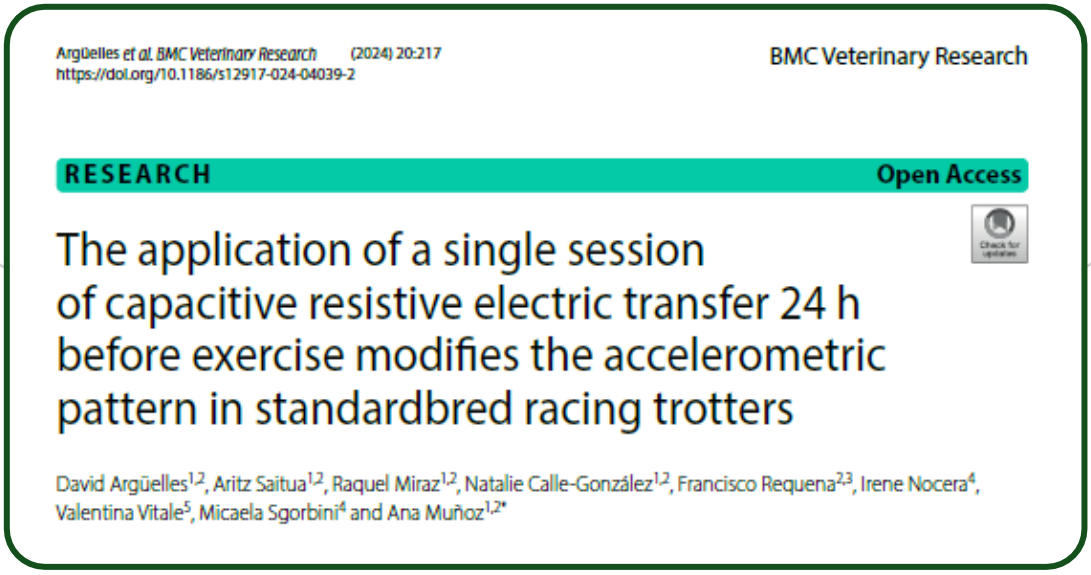

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The application of a single session of capacitive resistive electric transfer 24 h before exercise modifies the accelerometric pattern in standardbred racing trotters

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Scan or click on the QR code to read the latest publication on the use of 448 kHz frequency in competition horses and discover the extraordinary results.

And if you want to know more cases of success in the use of Radiofrequency at 448 kHz in the recovery of injuries scan here or click on the QR

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