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ORAL PRESENTATION

SHOCK WAVE THERAPY IN PODOTROCHLEAR SYNDROME IN THE HORSE

(Translation from Spanish original abstract)

SUMMARY

Shock wave therapy was used in 15 horses with a diagnosis of podotrochlear syndrome with a subacute to chronic course (presence of clinical signs for over 6 months) and grade 3/5 lameness. All the cases had received medical and orthopaedic treatment, with no results. The treatment protocol consisted of the application of 3,000 pulses, at a frequency of 10 Hz and a pressure of 3.0 bar, into the navicular fossa* and onto the posterior digital nerve, in 6 sessions with a 7-day interval between treatments. An improvement was observed from the 3rd application, and the lameness had diminished in all cases by the end of the treatment. The initial clinical picture did not recur for 60 days post-treatment. As no significant radiological changes were demonstrated, the effect of the treatment can be deduced to be fundamentally analgesic.

INTRODUCTION

Radial Shock Wave Therapy was first used in the 1980s as a non-invasive technique that avoided the use of conventional surgery in the treatment of urolithiasis in humans. It has now been observed, in the light of the preliminary results of separate studies in human and veterinary medicine, that it is also of great benefit in the treatment of particular orthopaedic conditions such as enthesiopathy, fractures, etc. Benefits have also been observed in the treatment of pain in the soft tissues of the locomotor system.

To date, shock wave therapy (SWT) has been used with good clinical results in proximal suspensory ligament desmitis, enthesiopathy, and flexor tendinitis (1). Little experience has been gained in podotrochlear syndrome.

MATERIALS AND METHODS

The study population comprised 15 show-jumping horses aged between 12 and 16 years (7 mares, 8 geldings), with a confirmed diagnosis of podotrochlear syndrome. All had a mean clinical course of 6 months, and had been treated with conventional orthopaedic corrections. Given the variability and complexity of the signs of this condition, and for standardisation purposes, the diagnostic procedure was based on the following protocol of parameters:

A- Case history and examination:

- 1) Grade 2/5 to 3/5 lameness
- 2) Decline in performance.
- 3) Shortening of stride.
- 4) Presence of hitching.
- 5) Weight-bearing on toes at rest.

* Translator's Note: The term in the Spanish original is 'fosa de Chenot', which I have been unable to find. I have translated it as 'navicular fossa', but recommend that the correctness of this term in this context is verified.



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B- Diagnostic procedures:

- 1) Palpation pressure to the foot.
- 2) Lundwitz's test.*
- 3) Anaesthesia of:
 - Digital nerves at the level of the proximal interphalangeal joint
 - Distal interphalangeal joint
 - Podotrochlear bursa

C- Radiology:

- 1) Abnormal foramina with atypical points
- 2) Angular enthesiophytes
- 3) Bone cysts
- 4) Subchondral sclerosis
- 5) Mineralisation of the deep flexor tendon
- 6) Remodelling of the flexor cortex

Since the clinical signs produced by the pre-existing conformational changes coincide with those of the condition in question, the necessary corrections were carried out by hoof trimming and by the use of orthopaedic shoes two months (minimum) before the start of the treatment.

EQUIPMENT AND APPLICATION TECHNIQUE

A radial shock wave device (**Swiss DolorClast® Vet - registered trademark of EMS-Electro Medical Systems**) was used in applications that took place every 7 days, for a total of 5 sessions (at a pressure of 3.0 bar, 3,000 impulses, and a frequency of 10 Hz, using the medium-size applicator and carboxymethylcellulose gel as the contact medium), into the navicular fossa and onto the posterior digital nerves. After each treatment, the horses were evaluated at the trot in a straight line and circling, on both soft and hard ground, and were then sedated with xylazine. During the treatment, the animals were not worked, and were walked in the morning and evening. On completion of the treatment, control radiographs were taken.

RESULTS

All the animals showed analgesia from the third application. On completion of the treatment, the lameness had improved clearly. In those cases in which it persisted, it was much improved (from grade 3/5 to 1/5). No significant radiological changes were observed.

The results are classified in accordance with the following system: absence of lameness on hard and soft ground in a straight line and circling.

* Translator's Note: I have been unable to find the phrase 'test de Lundwitz'; the translation of it as 'Lundwitz's test' should therefore be verified.



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Horse. Age (years) Race Degree of lameness	Trot Ground							
	Straight hard		Straight soft		Circling hard		Circling soft	
	Pre-t.	Post-t.	Pre-t.	Post-t.	Pre-t.	Post-t.	Pre-t.	Post-t.
a- 10 Half-bred 2/5	Yes	No	Yes	No	Yes	No	Yes	No
b- 12 Argentinean saddlebred 3/5	Yes	No	Yes	No	Yes	No	Yes	Yes
c- 12 Argentinean saddlebred 3/5	Yes	No	Yes	No	Yes	No	Yes	Yes
d- 14 Half-bred, jumper 3/5	Yes	No	Yes	No	Yes	No	Yes	No
e- 15 Argentinean saddlebred 2/5	Yes	No	Yes	No	Yes	No	Yes	No
f- 12 Thoroughbred 3/5	Yes	No	Yes	No	Yes	No	Yes	Yes
g- 14 Half-bred 3/5	Yes	No	Yes	No	Yes	No	No	Yes
h- 15 Half-bred 3/5	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
i- 14 Thoroughbred 3/5	Yes	No	Yes	No	Yes	Yes	Yes	Yes
j- 12 Argentinean saddlebred 3/5	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
k- 16 Half-bred 3/5	Yes	No	Yes	No	Yes	No	Yes	Yes
l- 12 Argentinean saddlebred 3/5	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
m- 14 Argentinean saddlebred 3/5	Yes	No	Yes	No	Yes	Yes	Yes	Yes
n- 10 Half-bred 2/5	Yes	No	Yes	No	Yes	No	Yes	No
ñ- 11 Half-bred 2/5	Yes	No	Yes	No	Yes	No	Yes	No



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The analysis shows that an improvement was obtained in 100% of cases at the trot in a straight line and on hard ground and in 80% of cases in a straight line on soft ground, versus 66.66% circling on hard and soft ground.

DISCUSSION

Shock waves are mechanical pressure pulses that spread in a gaseous or liquid medium. The front wave can exceed 1,000 bar within an extremely short space of time, followed by a phase of tensile stress equivalent to 100 bar. The shock waves used hitherto in medical technology are short pressure pulses generated in water. Theoretically, the mechanism of action of the shock waves is related to (2-3):

- 1- Chemical changes that trigger the release of pain-inhibiting substances.
- 2- The destruction of cell membranes on the pain receptors where the pain is generated, thus inhibiting its transmission.
- 3- The stimulation of pain receptors, triggering the emission of nerve impulses that eliminate the perception of pain (gate theory).
- 4- The release of endorphins, which bring about local inhibition of pain.

The parameter used to measure the effects is Energy Flow Density, which refers to the amount of energy that flows per unit of area (mJ/mm^2) (3). The cells are able to regenerate after treatment (repair potential), but this ability diminishes as the energy flow increases. In fractures in which the anatomical conditions and type of bone affected are such that healing is delayed due to poor blood irrigation, the osteogenic effect can be enhanced due to the increase in metabolism induced by the shock waves (3-4-5-7).

In earlier experiments, the authors used the commercial settings of the device, i.e. 2,000 pulses, frequency of 8 Hz and 3.0 bar, but the results were not encouraging, so the dose was increased in three patients and their clinical evolution was observed. As this was so good, this schedule was extended to the whole group. The principal advantage is effective management of the analgesia without systemic or local drugs. All of the horses in whom lameness persisted presented a very notable improvement (grade 3/5 lameness reduced to grade 1/5), allowing them to undertake low-performance sport work.

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