

Effectiveness the Acupuncture and Electroacupuncture in the Treatment of Delayed Onset Muscle Soreness in Racing Horses: Comparative Study

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Abstract

This study aimed to investigate the efficacy of acupuncture and electroacupuncture on the symptoms of Delayed Onset Muscle Soreness DOMS in racing horses through diminishing inflammation and decreasing pain. Unpredictable allocation to (10) racing horses with (DOMS), were assigned randomly to two groups, namely Acupuncture (A group) and Electroacupuncture (EA group). Both groups were performed the treatment three times every week for four sequential weeks. Measurement of pain with both front legs was used as indices of their efficacy by using the VAS (Visual Analogue Scale). Significant differences in visual analog scores for pain were found between (A group) and (EA group) immediately after treatment. The results show that stimulation points of Acupuncture and Electroacupuncture relieved muscle pain of DOMS.

Key words: Acupuncture, Electroacupuncture, Delayed Onset Muscle Soreness, Races Horses

**استخدام الوخز بالأبر والأبر الكهربائية في علاج تأخر بداية وجع العضلات في خيول السباق
دراسة مقارنة
عبدالمعظم إبراهيم صالح الجبوري**

قسم تقنيات التحليلات المرضية – الكلية التقنية – كركوك – الجامعة التقنية الشمالية

الخلاصة

هدفت هذه الدراسة إلى تحقيق فعالية الوخز بالإبر والأبر الكهربائية على أعراض تأخر بداية وجع العضلات DOMS في خيول السباق من خلال تقليل الالتهاب وتخفيف الألم. تم تخصيص (10) خيول سباق تعاني من تأخر بداية وجع العضلات DOMS وتقسيمها عشوائياً إلى مجموعتين: وهما الوخز بالإبر (مجموعة A) والوخز بالأبر الكهربائية (مجموعة EA). نفذت كلتا المجموعتين هذا العلاج ثلاث مرات في الأسبوع لمدة أربعة أسابيع متتالية. تم قياس درجات الألم لكل من الأرجل الأمامية كدلالة على مدى الفعالية باستخدام مقياس التماثلية البصرية (VAS). وجدت فروق معنوية في درجات التناظرية البصرية للألم بين (مجموعة A) و (مجموعة EA) مباشرة بعد تلقي العلاج. وأظهرت النتائج أن نقطة تحفيز الوخز بالإبر والأبر الكهربائية أزالت ألم العضلات في تأخر بداية وجع العضلات DOMS.

Introduction

On November 3rd -5th, 1997, the National Institute of Drug Abuse (NIDA) held what it called a Consensus Conference on Acupuncture, which is the more important ways to deal with the investigation of needle treatment were in the zones of surgical anesthesia and chronic pain (1). Electroacupuncture is exceptionally similar to customary needle treatment in that the same focuses are actuated alongside treatment (2). Similarly as with customary needle therapy, needles were inserted at correct places along the body as appeared in figure1. Then, the needles were closed to an a touch of hardware that produces continuous electric pulses using small clips. These gadgets are utilized to regulate the frequency and density of the impulse being delivered, relying on the circumstance being treated (3). Electroacupuncture employs two needles at once, for this reason the driving forces can leave beginning with one needle then onto the following. Little pairs of needles can be empowered simultaneously, generally close to thirty minutes at once (4). Planed clinical experiment had to be performed to avoid the indiscriminate use of tingly with needles and to determine specific conditions where it might be indicated. Electroacupuncture and trans-cutaneous nerve incitement have been beneficial to persons and animals with chronic pain (5). After effects of pilot studies (6) on (DOMS) in steeds bolster the view that further studies are justifie

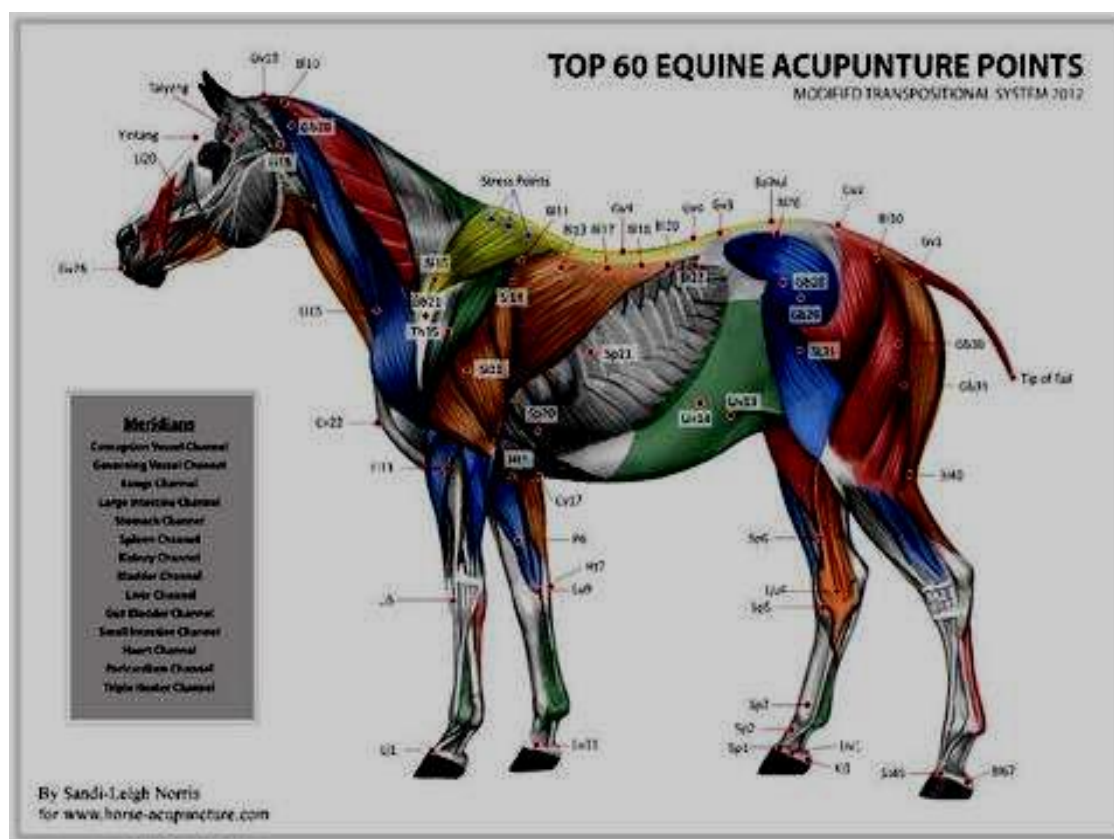


Figure 1. Equine guide of needle therapy focuses utilized as a part of torment studies (7)

The *particular kind* of muscle soreness which has been called “delayed onset muscle soreness” (DOMS), was thought to be brought on by lactic acid develop in the muscles amidst of strenuous workouts where the body’s oxygen supply is drained (8). Late research (9) has uncovered that is not the situation at all and has even demonstrated that lactic corrosive is really used by muscles for fuel when oxygen supplies are exhausted.

One would have imagined that lactic acid had nothing to do with DOMS, attributable to the way that this kind of muscle agony doesn’t show up until around 24-72 hours about from the instant the horse has been practiced, however, the lactic acid develops just endures in the muscles for mostly 60 or 120 minutes after the training is finished (10). So if it’s not lactic acid that is causing this soreness, what is it? DOMS is now understood to be raised by micro-fractures in the cells of muscle themselves. This happens when doing an activity that the muscles aren’t used to do or have done it in a much more strenuous way than they are used to (11).

The current study was performed as an intended clinical testing to decide if acupuncture would bring about clinical improvement in horses with DOMS.

Materials and Methods

Ten horses with DOMS which recruited founded on the following criteria: 1) Presence of definitive signs of (DOMS) in both front legs, as determined by (VAS) for measuring the severity of the pain as appeared in figure 2, gait evaluation, radiographic evidence; 2) (DOMS) continuously present after short distance dashing best for the proprietor's learning; 3) No other major simultaneous sickness; and 4) No medications managed through 14 days before acceptance. Sex, body weight and breed were not considered. Each horse was allocated haphazardly to (A group) Acupuncture and (EA group) Electro-acupuncture (n = 5/ group).

The experiment was performed on racing horses at Al-Ghazaliya Equestrian Club in Baghdad-Iraq.

All horses were housed in concrete floored stalls, fed hay and grain. If the shoes present, were expelled on admission. All horses had their hooves trimmed two weeks or longer previous to admission.

Beginning at week one, (A group) and (EA group) were

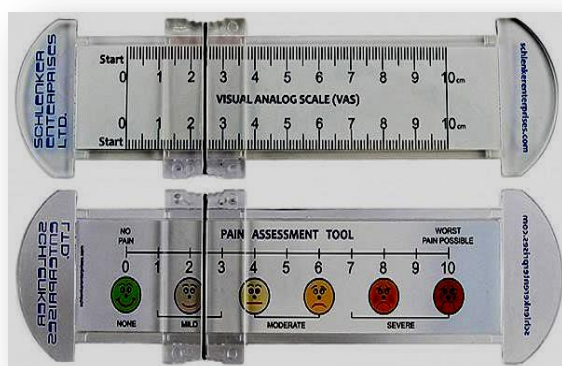


Figure 2. Visual Analog Scale

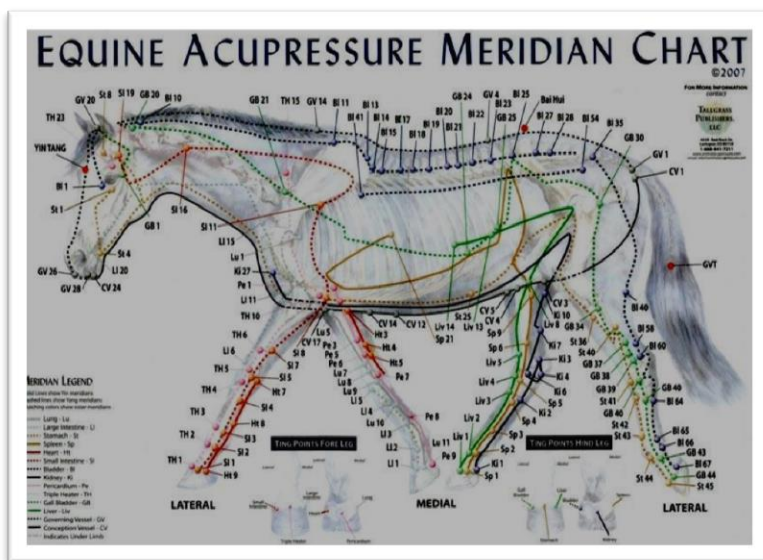
overseen for 20 min, three times in the week for four successive weeks to horses in the gatherings of treatment. All horses had their hair snipped in an example indistinguishable to treat horses, yet got no further therapy. All parameters were measured weekly. Acupuncture therapy was split into two sorts: An electrical and no electrical which composed of an electric or no electrical incitement at needle therapy points on the front

limbs that have been proposed for DOMS treatment (9). The focuses used for (DOMS) are 76, 84 and 86 to 89 points (7).

These points are found separately caudal to the shoulder joint, caudal to the proximal metacarpal

bone at the lateral side overlying the

lateral palmar nerve, ventral and dorsal to the medial and lateral sesamoid bones, and on the foot. Likewise, these points were found separately cranial and ventral to the first thoracic vertebra on the brachiocephalicus muscle, at the center of the second intercostal area at the plane of the shoulder joint, dorsal and ventral to the lateral and



Picture 2. Acupuncture point finder



Picture 1. Install of Electroacupuncture

Figure 3. Electroacupuncture locales in the entire steed body (12) medial sesamoid bones and on the foot as appeared in figure 3. At every session, at least three of the recorded points were empowered.

Points over the carpus were situated by palpation. For focuses underneath the carpus, the surmised anatomic area was cut and scoured with ether. The probe of a needle therapy point discoverer (Picture 2) was vivified on the skin until the point diminished electrical resistance was discovered (12). The point was marked with permanent ink. For

points above the carpus, stainless steel, sterilized acupuncture needles were inserted. For points underneath the carpus, metal circle surface cathodes were utilized. Conductivity gel was associated to the anodes, which were connected to the skin.

Needles and plate cathodes were associated with an acupuncture stimulator. The electric exciter comprised of a biphasic wave, 0.75 ms interim, at a frequency of 5 hertz for 20 min. The anode of every match up of leads was associated with the distal stimulation site. The power was regularly increased several times throughout treatment sessions to keep up minimal muscle contraction around the needles, or until pawing the ground.

The electroacupuncture electrodes were localized with pinpoint accuracy dedicated to measuring positions of (DOMS) as shown in series pictures 1, 3 and 4.



Picture 3. Introducing of Electroacupuncture Stimulator



Picture 4. Sewing of Electroacupuncture needles

No chemical restraint was used. The qualities in the relationship matrices stayed comparative crosswise over time for the consolidated clinical scores and walk length estimation. Subsequently, examinations of progress were utilized to dissect this estimation, utilizing time as a blocking impact. Information were analyzed to understand if weeks 1, 2, 3 and 4 varied broadly from week 0 between the A and EA groups. Missing data focuses were supplanted with a weighted mean. The information were initially undergo to rehashed measures, split-plot outline, examination of fluctuation utilizing the SAS software package (Statistical Analysis System, Version 9.1, 2009), also the dealing placemenst were driven by using the Least Squares significant difference method (Duncan's Multiple Range Test). The level of significance was 0.05 for all the statistical analyses (13).

Results

The figure 3 is a chart of the group mean $\pm$ SEM estimations of the joined clinical scores of Acupuncture (A group) and Electroacupuncture (EA group). Values for the pretreatment walk lengths estimation acquired in two separate days were not extensively variance ($p > 0.05$, paired t-test).

The chart demonstrates direction to gradual improvement in the (DOMS) treated groups. Comparing baseline to week 4 assessments in the (A group). In the (A group), three animals improved (from 4 to 6 scores) within first two weeks, one remained without any change, and one deteriorated (by 2 points). In (EA group), all horses improved (from 6 to 13 scores) and this improvement happened synchronizing with progress of weeks of this experiment.

These results correspond to approximate response rates (defined here as any raise in the clinical score between weeks 0 and 4) of 70% and 95% for (A group) and (EA group) respectively. All (DOMS) horses showed

improvement with the nerve block at the ending of week 4, but the clinical estimation was not repeated (Figure 4).

The walk length estimations for the left an

right front legs are introduced in Figure 5 and 6

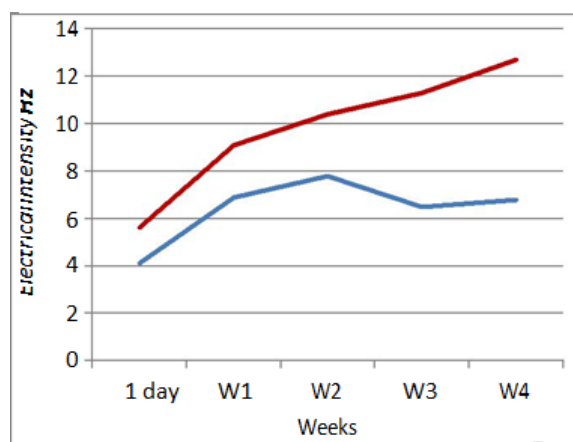


Figure 4. Clinical scores ($X \pm SEM$).

— Electroacupuncture Treatment Group
— Acupuncture Treated Group

The group means values for weeks 1 to 4 were changed from week 0 significantly. After nerve obstructs on week 4, the walk lengths expanded in both (DOMS) groups (A group, +2 cm on right and +3 cm on left; EA group, +4 cm on right and +5 cm on right). As there were no critical contrasts among left and right stride lengths ($p > 0.05$), values were combined for the two sides.

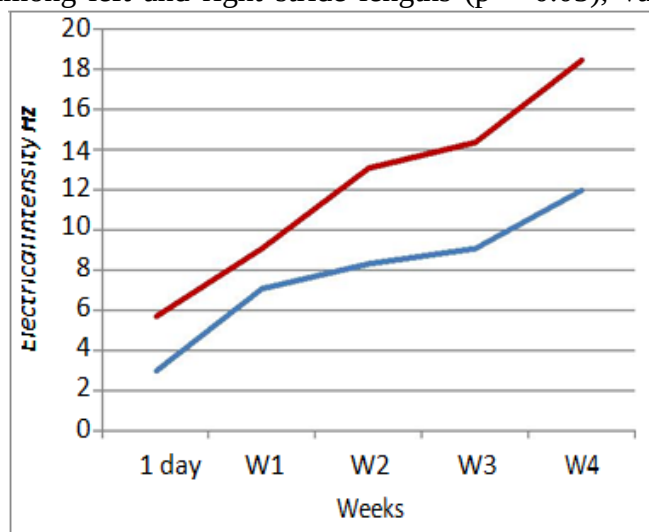


Figure 5. Stride Length of Left Leg ($X \pm SEM$).

— Electroacupuncture Treatment Group
— Acupuncture Treated Group

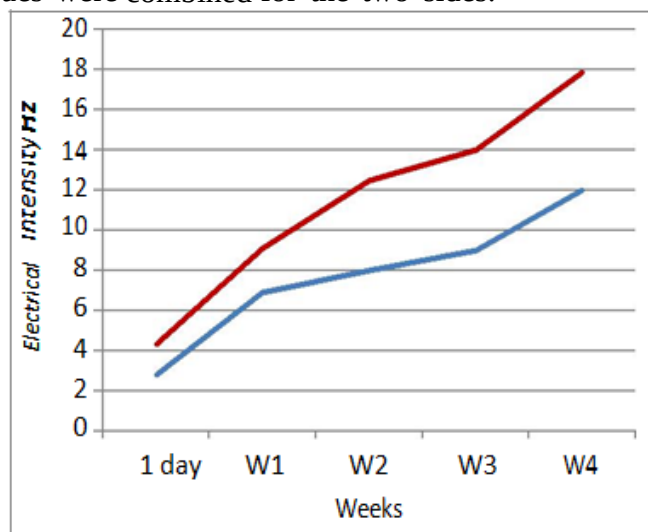


Figure 6. Stride Length of Right Leg ($X \pm SEM$).

— Electroacupuncture Treatment Group
— Acupuncture Treated Group

Discussion

Clinical studies using acupuncture or transcutaneous nerve instigation have reported alleviation of prolonged soreness in humans (14), in spite of the fact that the change was not generally enduring. The veterinary writing recommends that musculoskeletal disorders are receptive to needle therapy (15). Approved acupuncture points for treating (DOMS) have been represented (16). Studies assembled by veterinarians also infer that needle treatment was being effectively connected to this disease (17). Nonetheless, there is a nonattendance positive controlled clinical trials. The criticalness of positive controls is underlined by the way that two out of five (DOMS) control horses (A group) in the current study turned out to be clinically sound over the four week period. Factors linking to stall housing, feeding, and/ or continued rest may have represented the clinical improvement. Natural improvement, even in chronic conditions, necessarily to be considered before claiming success for any treatment method which was a shortcoming of uncontrolled studies (18 and 19). Before treatment values should not be used as control values without a different control group. There was a reaction rate of 90% in treating horses in this study. It could have deciphered as favorable, were it not for the high response rate in the (A group) horses.

Little information was available upon which to base such predictions. Studies in persons often assume response rates of 30% and 70% for placebo and genuine acupuncture, individually. With those rates, using a one-sided test: $\alpha = 0.05$, there would be roughly an 85% opportunity of recognizing this difference if the sample volume were 20 patients per group (20). Unfortunately, it was difficult to recruit more horses over a generally brief time frame. otherwise, the needle therapy methods used in the current study may have been improper. For example, the frequency of electric stimulation used may be very low. However, after the four week period, several steeds were treated for an additional three or more sessions with higher frequency

stimulation (50 hertz) with no change watched. The four week treatment course may be too short. Other needle therapy focuses (5) may be more viable; these ought to be evaluated in future controlled studies. Utilizing diverse focuses amid the four week treatment course may have altered the outcomes. In a late audit of studies utilizing needle treatment for the management of soreness in people, it was assumed that the significant of point location is still unclear (21). The blend of surface electrodes and needles in the similar horse may have impacted reactions. In any case, one study has reported that electroacupuncture and transcutaneous nerve inspiration delivered similar results (22). Alter was established in 2 horses treated with needles rather than of surface electrodes for an extra a week after the study

Curiously, others have found that steady electro-acupuncture analgesia could be prompted on the skull or extremities of horses (23). Whether earlier corticosteroid administration can have a prolonged term inhibitory result on the induction of analgesia of acupuncture on animals stays to be recorded (24). In accordance with their owners and / or trainers, none of the horses in present study had gotten corticosteroids for no less than two weeks before the presentation. It was revealed that different details of dexamethasone and prednisolone cause diminishes in plasma hydrocortisone ranging from 1 to 21 days (25). Furthermore, needle therapy and electroacupuncture therapy had been connected with elevated plasma cortisol concentrations in horses (26). The length of stride measurements provided additional objective data, but the grading scheme used by a clinician experienced in detecting equine (DOMS) was felt to be more sensitive than either of the other parameter. For (DOMS), stride length measurements correlated with the clinician's evaluation. For the subtle (DOMS) of the horses, stride length measurement was a good substitute for clinical judgment. The "stride length index" was utilized to facilitate evaluate bilateral front leg (DOMS) which shifted in a some of the animals (27). The patterns of weight redistribution as dictated by the gait length system generally paralleled the results reported by (28). Weight was exchanged from the more (DOMS) front leg onto the contralateral rear leg. This was quite to the animals with (DOMS). In a few horses with (DOMS), in any case, the weight was infrequently shifted from the more (DOMS) front limb to the contralateral front leg (29).

In conclusion, the specific method of electroacupuncture therapy utilized in the current study was not connected with critical clinical improvement in (DOMS) horses when compared to acupuncture group. However, various degrees of clinical improvement occurred in over half the horses in the (DOMS) treatment groups (30). The relatively high rate of (EA group) stallions that enhanced points out the need for proper cases while assessing

the sufficiency of needle therapy for conditions such as (DOMS).

Acknowledgments

This study was supported by a Chinese medicine center and Medical City Hospital in Baghdad in turn to bring technical support to the present study.

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