

RESEARCH PAPER

A pilot study of the effects of acupuncture treatment on objective and subjective gait parameters in horses

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Abstract

Objectives To investigate whether acupuncture can alter gait in horses as assessed by objective and subjective parameters.

Study design Prospective, randomized, single-blinded, crossover study.

Animals Eight adult horses.

Methods Horses were randomly assigned to a treatment (three acupuncture treatments in 8 days) or control group. Subjective and objective gait analyses were performed before and after each treatment and at 1, 3 and 7 days after the last treatment (time-points 1–9, respectively). Horses were assessed at the trot in a straight line on a hard surface and on the lunge on the left and right reins on a soft surface (conditions 1–3, respectively). After 12 weeks, groups were reversed. Objective gait analysis was performed using inertial sensors and subjective analysis by two board-certified surgeons who reviewed video-recordings. Each limb was assessed for lameness before and after treatment. Lameness and global scores were assigned using 4-point scales. Assessors were blinded to treatment status. The effects of treatment (yes/no), time (1–9) and horse under conditions 1–3 were compared using a linear mixed-effects model and a generalized estimating equation.

Results Treatment decreased hip hike difference under all conditions [condition 1: control, 6.3 ± 6.4 mm versus treatment, -0.2 ± 6.4 mm ($p = 0.007$); condition 2: control, 9.7 ± 7.8 mm versus treatment, 2.8 ± 7.8 mm ($p = 0.032$); condition 3: control, 7.3 ± 6.3 mm versus treatment, -2.7 ± 6.4 mm ($p = 0.003$)]. Other parameters also improved significantly under conditions 1 and 3. Based on subjective gait analysis, treatment decreased lameness [odds ratio (OR) 0.51, 95% confidence interval (CI) 0.34–0.78; $p = 0.002$] but not global (OR 0.53, 95% CI 0.24–1.10; $p = 0.12$) scores.

Conclusions and clinical relevance Acupuncture can change horses' gaits to a degree appreciable by objective and subjective analyses.

Keywords acupuncture, alternative medicine, equine, lameness, musculoskeletal pain.

Introduction

Acupuncture, which is part of traditional Chinese medicine, is increasingly incorporated into human and veterinary medicine. Traditional techniques have been adopted worldwide and numerous variations of acupuncture therapy have been developed. The mechanisms of action are still not fully understood. However, the use of modern investigation tools, including sophisticated imaging techniques, has suggested that acupuncture triggers a sequence

of events involving the release of endogenous opioid-like substances, such as enkephalin, endorphin and endomorphin, which are measurable in plasma and cerebrospinal fluid, and which modulate pain signals (Wang et al. 2008; Kawakita & Okada 2014). The limbic system has also been shown to play an important role in acupuncture-induced analgesia (Wang et al. 2008).

Although acupuncture is used in the treatment of a wide variety of diseases in people and veterinary species (Mittleman & Gaynor 2000; Schofield 2008; Yin & Chen 2010; de Fourmestraux et al. 2014; Pfab et al. 2014), one of its most common applications is in the management of chronic pain, often arising from the musculoskeletal system. Large-scale clinical trials in people have demonstrated the efficacy of acupuncture in the treatment of lower back pain compared with standard care or patients not currently being treated (Brinkhaus et al. 2006; Haake et al. 2007). Over the last decades, acupuncture has been increasingly incorporated into equine medicine, but controlled clinical trials investigating its efficacy remain sparse. Anecdotally, acupuncture has been reported to be successful in alleviating a variety of painful orthopaedic conditions, particularly back pain. However, the assessment of treatment failure or success is often subjective and influenced by the owner's and the attending veterinarian's expectations. The lack of controlled studies in which objective assessments are made has led to continued scepticism about whether acupuncture has any effects at all in horses (Ramey 2005). This pilot study tested the hypothesis that acupuncture treatment would result in alterations in gait in horses and that these would be appreciable by objective and subjective gait analyses.

Materials and methods

Authorization was granted by the Ethics and Welfare Committee of the Royal Veterinary College, London (URN approval no. 2013 1244). Eight systemically healthy horses, as determined by physical examination (performed by BD) that belonged to the Royal Veterinary College Equine Referral Hospital teaching and blood donor herd were used. The number of horses was based on those in similar studies that demonstrated treatment effects with four to eight animals per group (Xie et al. 2001, 2005; Angeli et al. 2005). Horses were unshod, not regularly exercised and lived out on pasture year round. Any horse that was sound or mildly lame

[$\leq 2/10$ on the lameness scale devised by Wyn Jones (1988)] on baseline evaluation was included in the study, but obviously lame horses (lameness score of $> 2/10$) were excluded.

Horses were randomly allocated to either the treatment or control group by drawing numbers. After a 12 week wash-out period, groups were reversed. Assessors involved in obtaining and analysing the data for objective and subjective gait analyses were blinded to the treatment status of the horse.

In practice, acupuncture treatment commonly consists of the palpatory determination of treatment points followed by needling of those points. This was mimicked in the study design. After a baseline gait analysis, horses in the treatment group were assessed independently by two veterinarians trained in acupuncture (KOV-N and BD). Transpositional horse acupuncture points were used as described (Fleming 2000). Painful or tense areas were identified by palpation and intended treatment points recorded by each assessor separately. Additionally, body regions perceived to be painful were noted [neck, shoulder, proximal thoracic and pelvic limbs (distal to the shoulder and hip joints and proximal to the carpus and tarsus, respectively), distal thoracic and pelvic limbs (distal to the carpus and tarsus, respectively), back and abdomen]. Perceptions of pain or tension were based on avoidance reactions elicited by palpation. Identified painful regions and chosen acupuncture points were then compared and the final treatment plan consisting of 11 acupuncture points was agreed upon by discussion. Eleven points were chosen because, anecdotally, some acupuncturists have advised against treatment of more points per session. Bai-hui, a frequently used point deemed to have benefits against a multitude of problems, located at the level of the lumbosacral space (Fleming 2001), was treated in every horse by prior agreement. The palpatory assessment was carried out in all horses immediately before the first treatment. Control horses were brought into a stable from pasture and rested in the stable during the initial acupuncture assessment and treatment time (approximately 45 minutes), and on later days while treatments (approximately 30 minutes) were carried out.

Acupuncture at the identified points was administered using commercially available sterile single-use acupuncture needles size 0.3×30 mm and 0.3×50 mm (Tai-Chi Power 100; Wellkang Ltd, UK). Needles were left in place for 20 minutes before

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