Investigation into the effectiveness of an equine back massage pad to promote relaxation and relieve back stiffness in horses; preliminary findings

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Summary

Ten dressage horses at novice level or above were used in a matched pair design to investigate massage effects on back stiffness and relaxation. The treatment group and control group consisted of five horses each. There were two parts to the study 1) the horses were measured for signs of stress / relaxation immediately before, during and after the application of the massage pads over a six week period and two weeks following cessation of the treatment and 2) the horses were assessed in terms of flexibility and suppleness following the six week programme and two weeks following cessation of the treatment. Baseline data was also collected prior to the treatment. Stress / relaxation was measured by taking salivary cortisol levels, measuring heart rate and recording behaviour. Flexibility and suppleness were measured by assessing stride length and range of motion of shoulder, elbow, pelvis and stifle joints through two dimensional motion analysis during trot (in hand) and by static arch and dip of the spine with the use of a flexi-ruler and mapping this to measure the change. The results at this stage are preliminary, the study has not been completed but data up to week four has been analysed. These preliminary findings suggest that the massage pads affect the horse's heart rate and flexibility. The preliminary heart rate data infers that the horses that were treated with the massage pad were more relaxed due to the effect of the massage. This is evident from the heart rate results which show a significant difference (P=0.0001) between the treatment group and the control group at week 4 (heart rate is lower in the treatment group). The arch and dip data were greater following four weeks of massage treatment. The arch was significantly different between the treatment group and control group (P=0.0002) and the dip although not significantly different (p=0.0697), showed an increase. The findings so far show no significant difference between stride length and range of motion for the treatment group and control group but the trial is not yet complete. The implications of this are twofold in that the horse's welfare may improve because the horse is more relaxed and the performance of the horse would be expected to improve because the horse's back muscles are showing greater flexibility. Relaxed muscles will assist with flexibility and movement in particular for competition horses performing dressage movements and jumping technical fences.

Introduction

Animal physiotherapy including massage has become popular for the treatment and maintenance of the musculoskeletal system in recent years (McBride *et al*., 2004). Cowen *et al*. (2006) described massage as a generic term that encompasses a wide range of touch therapies. Massage is essentially the manipulation of soft tissues (Veenman, 2006). The application of human massage techniques into the equine industry is a current field of growth due to increasing owner awareness and demand (Veenman, 2006). Massage therapy has been noted to aid the prevention of injury, recovery from fatigue, relaxation and increasing mobility (Hemmings, 2001). Performance depends on freedom of movement, full flexibility and an absence of musculoskeletal pain, all of which can improve with massage (Gellman, 1998). Traditionally massage methods have been manual but with recent advances in technology, electrical modalities have been introduced such as the equine massage pad used in this study.

The aim of this study was to determine the effectiveness of a massage pad in terms of promoting relaxation and relieving back stiffness both during use and following treatment.

Methodology

Treatment regime

All horses were habituated to the massage equipment for two weeks prior to the beginning of the experiment as recommended by Gough (1999). The treatment group underwent treatment using the massage pad for 25 minutes six days a week for six weeks. Horses were tied up in the stable during the treatment to ensure safety whilst minimising stress (McBride *et al.,* 2004). The control group also wore the massage pad for the same amount of time but it was not switched on. Data collection is still ongoing although preliminary results have been produced for the study up until week four.

Stress / relaxation measurements

In order to measure the stress of the horse, measurements previously shown to indicate stress have been used. These are heart rate (Diego *et al.,* 2004), cortisol levels (Field *et al.,* 2005) and behaviour (McBride *et al.,* 2004). Heart rate was measured using a polar heart rate monitor placed around the girth area. Cortisol levels were measured through saliva using swab samples of 1-2ml. The cortisol results have not yet been completed. The cortisol levels will be assessed by an enzyme linked immuno-sorbent assay (ELISA) performed by a commercial laboratory. Behaviour was recorded using an ethogram adapted during the pilot study to assist with overall understanding.

Flexibiltiy / suppleness measurements

Baseline kinematic measurements of stride length, range of motion, back and neck length and back arch and dip were taken to measure back stiffness before any massage treatment was given. Kinematic measurements took place during trot in hand on a concrete surface and filmed from a lateral view. This data was downloaded and analysed by a two dimensional motion analysis software programme (Equinalysis^{TM}). These parameters are considered as an indicator of spinal kinematics (Rhodin *et al.,* 2005) and therefore it is assumed, back relaxation. Reflexes will be used to produce arch and dip of the spine and measured using a flexi-ruler and then mapped.

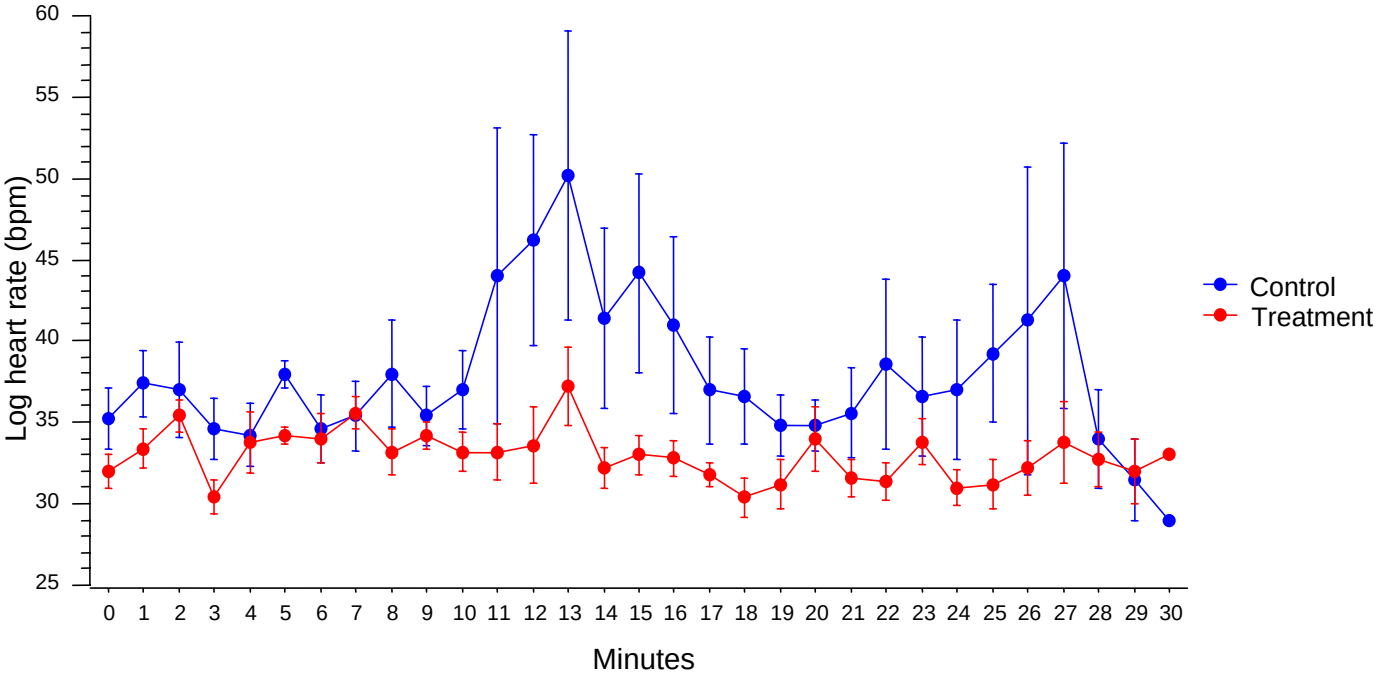
Preliminary results and conclusions

The heart rate was taken every minute over 30 minutes whilst the massage pad was on the horse. Heart rate at week four shows a significant difference between the treatment group and the control (P=0.001). This is presented in Table 1 and Figure 1. This result infers that the treatment group that were being treated with the massage pad (as opposed to the control) were more relaxed as indicated by a significantly lower heart rate (P=0.001). Initial findings also suggest that the heart rates showed less fluctuation in the treatment group with smaller standard error bars as evidenced in Figure 1.

Table 1: Comparison of heart rate in the massage and control groups at week 4 of the test period

Comparison	df	F	P	Significant difference
Control v Treatment	1	30.195	<0.001	✓
Interaction	30	0.699	0.8792	✗

Figure 1: Log heart rates (bpm) during massage and control treatment at week 4 of the test period

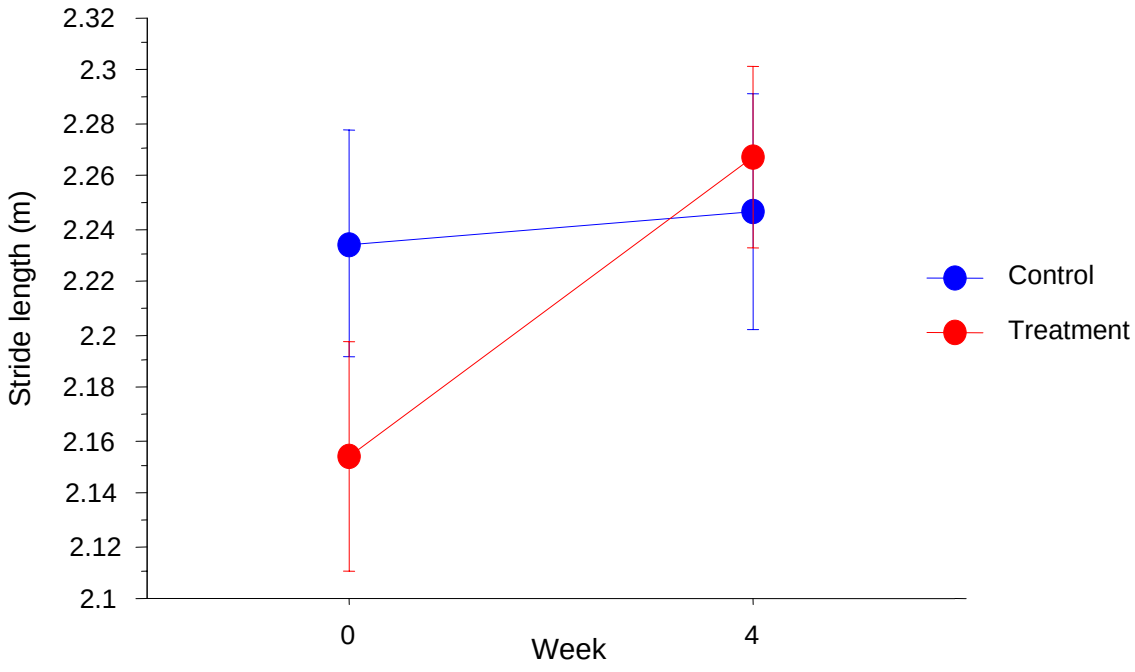


Stride length was measured every two weeks by use of two dimensional motion analysis. The preliminary results show no significant difference in stride length between treatment and control group (p=0.2244). Stride length can be influenced by external factors such as speed of trot and ambient temperature so there is more analysis to be undertaken here before this data is fully considered. Table 2 shows the significance level and Figure 2 identifies the difference between stride length in the treatment and the control group. It is apparent in Figure 2 that stride length is increasing and despite this not being significant, a small change in stride length may make all the difference to the way of going in the horse.

Table 2 : Comparison of stride length in the massage and control groups at week 0 and week 4 of the test period

Comparison	df	F	P	Significant difference
Control v Treatment	1	2.265	0.1354	✖
Week 0 v Week 4	1	0.517	0.4737	✖
Interaction	1	1.494	0.2244	✖

Figure 2: Stride length (m) (± SE) during massage and control treatment for week 0 and week 4



Arch and dip were measured to help identify reflex ability which may infer reduced back stiffness as discussed by Peham and Schobesberger (2006). The initial results suggest that the treatment group showed reduced stiffness in the back because the arch and dip were greater in the treatment group than in the control group. The arch was significantly higher in the treatment group (P=0.0002) but the dip was not significantly different (P=0.697) (Table 3 and 4 respectively). Figure 3 and 4 indentifies the changes in arch and dip between week 0 and week 4 in both groups.

Table 3: Comparison of arch in the massage and control groups at week 0 and week 4 of the test period

Comparison	df	F	P	Significant difference
Control v Treatment	1	4.331	0.0426	✓
Week 0 v Week 4	1	4.539	0.0381	✓
Interaction	1	16.507	0.0002	✓

Figure 3: Arch (m) (± SE) during massage and control for week 0 and week 4

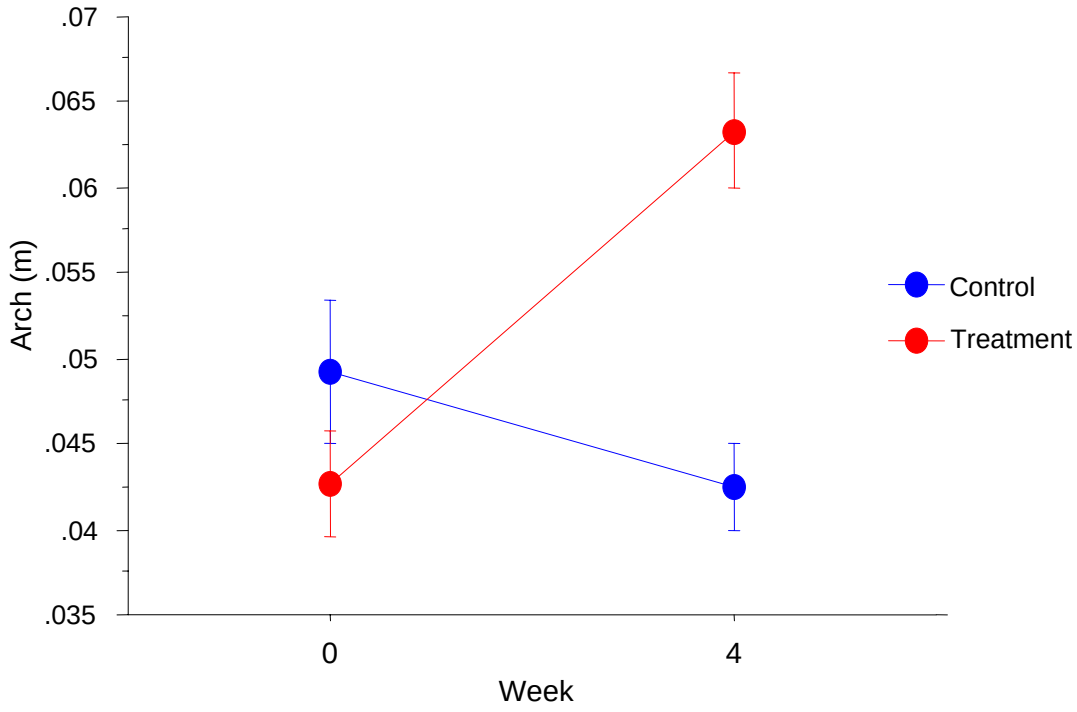
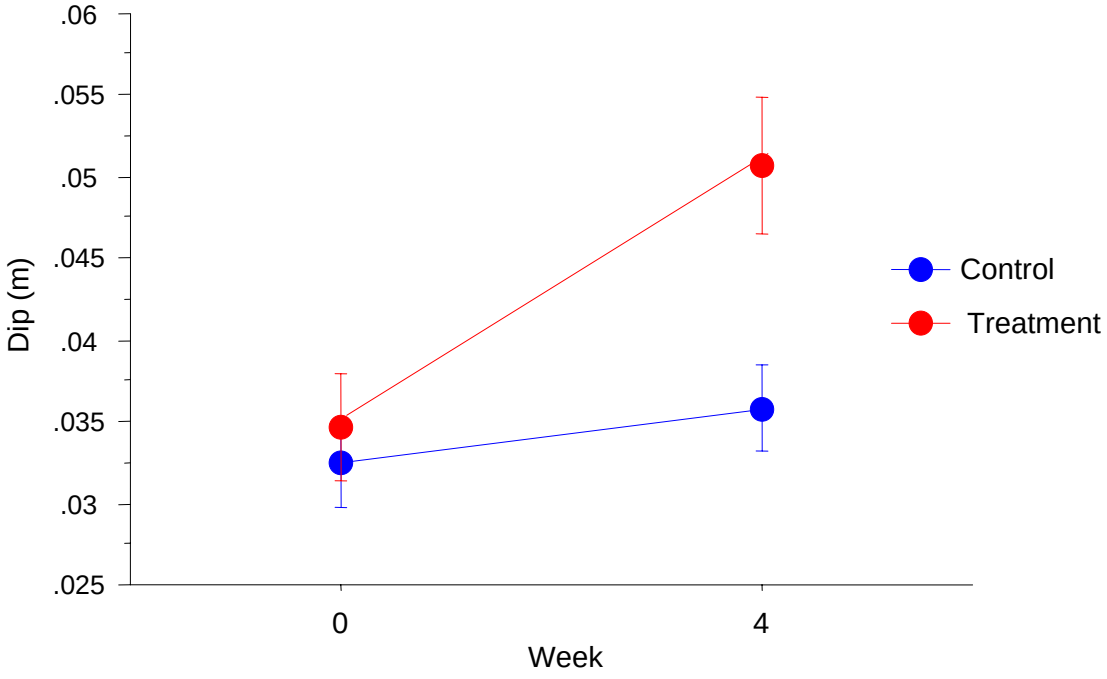


Table 4: Comparison of dip in the massage and control groups at week 0 and week 4 of the test period

Comparison	df	F	P	Significant difference
Control v Treatment	1	8.004	0.0067	✓
Week 0 v Week 4	1	6.188	0.0162	✓
Interaction	1	3.436	0.0697	✗

Figure 4: Dip (m) (± SE) during massage and control for week 0 and week 4



Overall the findings suggest that relaxation is promoted and back stiffness is reduced through the use of a massage pad in the competition horse. These initial findings may mean that the use of an electrical modality such as a massage pad can improve well being of the domesticated horse, particularly those that are subjected to routine stresses such as competing and travelling.

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