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Effects of equine back massage pads on stress indicators by the assessment of behaviour, heart rate and salivary cortisol

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Introduction Equine massage therapy is becoming increasingly popular, particularly the use of electronic pads which eliminate the need for a masseur and make the treatment more accessible. Domestic horses live in conditions that are different to which they are naturally adapted. Horses are free roaming, social trickle feeders but modern management houses them in isolation and confinement with little or no social interaction and highly concentrated feeding regimes (Harewood and McGowan, 2005). The inability to carry out these behaviours may lead to stress. Stress may alter the biochemistry of the body and could affect reproduction, growth, metabolism and immune function, which in turn may reduce the performance potential of an individual. Stress can have a negative effect on welfare so it is the responsibility of horse owners to reduce stress. Massage may help in stress reduction due to a similarity to mutual grooming, believed to be a goal directed behaviour and have a reward of stress reduction (McBride *et al.*, 2004). The effect of massage on horses, particularly with an electronic massage pad is not established. The aim of the study was to examine the effect of an electronic pad on the stress perception of domestic horses.

Materials and methods Ten horses were divided into two match paired treatment groups (control and massaged). The massaged group were treated six days per week with the massage pad for six weeks. The massage pad delivers a pre-set timed treatment of 30 minutes. The control group wore a massage pad that was switched off at the same time as the corresponding treated pair. Measurements of frequency of positive and negative behaviour, duration of positive behaviour, average heart rate (HR), standard deviation of HR and salivary cortisol were taken the week before the start of the trial (baseline), weekly during the treatment period and two weeks post treatment at the same time each day. A Polar™ heart rate monitor took continuous readings at 15 second intervals during the treatment. The video camera was set up to film each horse throughout the course of the treatment (30 minutes) and the behaviour was assessed using an ethogram of positive and negative behaviours. Positive and negative behaviours were adapted from McBride *et al.* (2004). An assessment of stress using a saliva sample was collected using a commercially available Salivette™ oral swab immediately before and after the treatment. Cortisol levels were determined using ELISA technique. General linear models were used to examine the difference between treatment groups for heart rate, behaviour and salivary cortisol.

Results Frequency and duration of positive behaviour was significantly higher ($p<0.001$) and frequency of negative behaviour was significantly lower ($p<0.001$) in the massaged group than in the control group during the six weeks treatment. There was a significant difference between mean heart rate ($p<0.05$) and standard deviation of heart rate ($p<0.01$) between groups during the six week treatment period (Table 1). Duration of positive behaviour within the massaged group was significantly higher ($p<0.01$) during treatment weeks than at baseline and post treatment. Frequency of negative behaviour and standard deviation of HR within the treatment group were significantly lower ($p<0.05$) during treatment than at baseline or post treatment. There were no significant differences between baseline and treatment weeks in the control group. Week number had no significant effect on all measurements ($p>0.05$). There were no significant differences in the salivary cortisol measurements between groups or during baseline, treatment or post treatment.

Table 1 Mean (±se) responses during six week massage treatment (letters denote differences at $p<0.05$)

	Massage Treatment (6 weeks)	Control (6 weeks)
Frequency of positive behaviour	3.9(±0.7) [a]	0.6(±0.2) [b]
Frequency of negative behaviour	0.7(±0.2) [a]	7.6(±1.2) [b]
Mean heart rate (bpm)	33.4(±0.7) [a]	35.2(±0.7) [b]
Standard deviation heart rate (bpm)	3.4(±0.2) [a]	4.4(±0.3) [b]

Conclusions Measurements of positive and negative behaviour and heart rate demonstrate the use of an electronic massage pad as a useful tool to significantly reduce stress level indicators in the domestic horse. Week number had no significant effect on all measurements suggesting that results from using a massage pad can be seen as early as the first week. Duration of positive behaviour, frequency of negative behaviour and standard deviation of heart rate returned to baseline levels two weeks post treatment suggesting that the electronic massage pad should be used regularly. This study supports the use of massage therapy to reduce stress but further research is needed to design the optimum massage programme to improve the welfare of the horse.

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