

A preliminary study of the effect of chiropractic treatment on the splenius muscle in horses when measured by surface electromyography

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Summary:

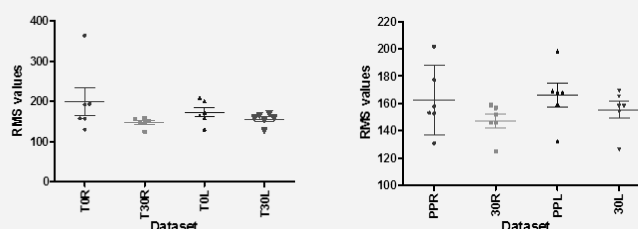
Implications Measuring muscle activity may be a useful and effective way of determining the effectiveness of chiropractic treatment in horses.

Introduction The McTimoney chiropractic method has been practised for over 70 years but there is limited scientific data to support the physiological improvements with animals. This method uses short lever, high velocity, low amplitude thrusts using the hands, to induce a therapeutic response in joint structures, muscle function and nerve reflexes. Much research to date has concentrated on the thoracic and lumbar and not the cervical area of the spine. A quantifiable measure of muscle activity related to the cervical spine will provide further understanding of the equine athlete. Surface Electromyography (sEMG) is a non-invasive method of measuring muscle activity. The splenius muscle is in part a stabilising muscle of the cervical spine and therefore shows activity when the horse is at rest. Measurement of the activity in a stabilising muscle and assessment of any changes may provide evidence based support for chiropractic techniques. The aim of this study was to determine if there is a relationship between objective measurable muscle parameters and misalignments and muscle tension in the cervical spine of equines.

Material and methods A controlled paired randomised study was designed using 14 privately owned horses (10 geldings, 4 mares) stabled on the same yard with mean age 9.9 years (range 5 to 25), mean height 157.8cm (range 127-173cm). The horses were distributed between the control and treatment group by matching work, management regime, age, sex and breed. The treatment group (n=7) received McTimoney method chiropractic treatment for the neck, back and pelvis following palpation. The control group received palpation only. A Delsys 4 sensor system was used for data collection. The probes were positioned as recommended by De Luca (2002), at a half-way point between C1/C2 joint and the crest of the neck on the left and right sides, between the tendon insertion and the motor point to maximise the signals. sEMG readings were taken from the splenius muscle at time zero (0), immediately post palpation (PP) and 30 minutes post palpation (30). Each reading was taken for 20 seconds. Methodology was similar to Licka et al (2009). The Delsys analysis software averaged and smoothed the data providing a root mean square value of the signal amplitude at each datum point. After testing for normality, data was analysed by one-way ANOVA for a global inter-group analysis and by two-tailed, non-parametric, paired T-test (Wilcoxon matched pairs) between control and time-points and treatment and time-points and also control and treatment groups combined and time-points, for both left and right side. Control and treatment group were combined at time zero and post palpation as this is before treatment and hence the individuals have all received identical procedure. Statistical significance was accepted at $p < 0.05$.

Results Pre-treatment, there was a significant difference ($p < 0.05$) between sEMG analysis at 0 and PP for control and treatment groups combined but no significant difference between left and right sides at these time points.

Post treatment, there was a significant decrease ($p < 0.01$) in sEMG activity for treatment group at 0 to 30 and PP to 30 (left and right combined). There was a significant decrease ($p < 0.05$) in sEMG for right side for treatment group at 0 to 30 (figure 1a) and PP to 30 (figure 1b). There were no such significant effects for the control group. The majority (83%) of horses had atlas rotation and tilt to the right.



Figures 1a and b Comparison of RMS values for treatment group, left and right, at time points 0 to 30 and PP to 30

Conclusion This preliminary study supports the use of sEMG as a means of assessing muscle activity of equines. This study suggests a statistically significant reduction in splenius muscle activity is observed following manual chiropractic (McTimoney) treatment although the benefit to the horse is unknown. The reduction in splenius muscle activity post palpation may be due to therapeutic touch and/or habituation. Further research is recommended to establish measurable effects in relation to performance parameters.

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References De Luca, C. J. 2002. Delsys [online]. Available from: http://www.delsys.com/Attachments_pdf/WP_SEMGintro.pdf. [Accessed 22/01/13].
Licka, T., Frey, A., Peham, C. 2009. The Veterinary Journal 180: 71-76.