

Positive (PR) and negative reinforcement (NR) were compared in order to find the most effective and least stressful training method. Twelve horses with severe trailer loading problems were selected and subjected to trailer loading. They were randomly assigned to one of the two methods. NR consisted of various degrees of pressure (lead rope pulling, whip tapping). Pressure was removed as soon as the horse complied. PR horses were subjected to clicker training and taught to follow a target into the trailer. During both training methods the timing of the trainer's signals were considered of high importance. Stress-related behavior and heart rate were recorded. Training was completed when the horse could enter the trailer upon a signal, or it was terminated after 15 sessions. Ten of the 12 horses reached the criterion within the 15 sessions. One horse was eliminated from the study due to illness and one PR horse failed to enter the trailer. NR horses displayed significantly more stress-related behavior ($p < 0.0001$) than PR horses. No difference could be seen in heart rate between the two methods ($p = 0.520$). The number of training sessions spent to reach the criterion was the same for both methods ($p = 0.126$), though PR horses spent less time on a single session than NR horses ($p = 0.007$). In conclusion PR results in a calmer horse and a faster training solution.

Key words: horse; reinforcement; trailer loading; behavior; heart rate

ASSESSMENT OF STRESS LEVEL IN HORSES DURING COMPETITION USING SALIVARY CORTISOL: PRELIMINARY STUDIES

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During competition, horses are submitted to various sources of stress which could have a negative influence on performance, welfare and human safety. Serum sampling for cortisol (a well-known indirect indicator of stress) is not always well accepted by the owner and can also be stressful for horses. These studies investigate saliva sampling as an alternative non-invasive method for cortisol level measurement in horses.

In a first preliminary study, 5 horses had serum and saliva sampled, before and after a cross-country round. In the second study, 5 horses and one rider had saliva sampled at home (7 samples/12 h) to assess their cortisol baseline and during a one day eventing competition (15-18 samples around the 3 events). During the first study, mean serum cortisol concentrations were 166.73 ± 27.34 nM before the cross country round, and 232.38 ± 43.81 nM after ($n = 5$, paired T test, $p < 0.05$). Before the cross-country

round, mean salivary cortisol levels were 1.19 ± 0.83 nM and 4.03 ± 2.41 nM after ($n = 5$, paired t test, $p < 0.05$). During the second study, horses mean salivary cortisol concentration was 0.59 ± 0.40 nM at home, and 2.13 ± 1.49 nM during competition ($n = 5$, T test, $p < 0.001$). Cortisol peaks were observed after dressage, jumping and cross-country rounds. The rider's mean salivary cortisol concentration was 3.51 ± 2.42 nM ($n = 8$) at home and 4.9 ± 4.99 nM ($n = 28$) during competition. A correlation was found between salivary cortisol levels of the rider and her horses during an eventing (Pearson correlation $r = 0.54$, $p < 0.01$, $n = 28$). Saliva seems to be a good alternative to serum to measure cortisol level in horses during competition.

Key words: horses; performance; stress; cortisol; rider

USE OF DIFFERENT ITEMS OF "ENRICHMENT" FOR INDIVIDUAL AND GROUP KEPT HORSES

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The aim of this experiment was to test the effect of different occupational items on horses' activity and behavior for horses kept either individually or in groups. Two studies were performed. In the first study, 8 individually kept warmblood riding horses were given access to 7 different objects (ball BALL, cone CONE, ball with concentrates CBALL, scratching pole POLE) or chewing materials (peat PEAT, straw STRA, branches of trees BRAN) when outside in a paddock. One of the paddocks were kept without any additional items and functioned as a control (CONT). After one day the horses' activity and contact with the items were scored every minute for one hour, twice a day. In the second study, six groups of 3-4 horses (a total of 23 horses) were given access to one of four items (STRA, BRAN, CBALL or POLE) or no item (CONT) for 4 days before observations were made in the same manner as in study 1. Individually kept horses interacted significantly more with STRA (Mean \pm SE; $20.0 \pm 5.7\%$ of tot obs.) and CBALL ($21.1 \pm 7.4\%$) than POLE ($2.2 \pm 1.9\%$); CONE ($0.4 \pm 0.2\%$); BALL ($0.3 \pm 0.2\%$); PEAT ($0.01 \pm 0.01\%$) or BRAN ($6.3 \pm 1.9\%$) (Chi-square: $X^2 = 63.6$, d.f = 7,119, $P < 0.0001$). Group kept horses spent significantly more time standing passively when given access to the POLE ($38.8 \pm 4.1\%$) compared to CBALL ($19.7 \pm 3.0\%$) or BRAN ($22.4 \pm 4.0\%$) items (Chi-square: $X^2 = 18.1$, d.f = 4,222, $P < 0.005$). In conclusion, horses spent more time interacting with items that were chewable.

Key words: horse; enrichment; behavior; group housing