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Feeding and management practices amongst Australian horse owners

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Nutrition plays a critical role in equine health and welfare, and inappropriate feeding has been linked to numerous health problems in horses. This survey aimed to investigate current equine feeding and management practices across Australia. An online survey explored owner and equine demographics, current management, workload and feeding practices. A total of 4573 responses were obtained providing data on 5646 horses. Though 89% (n=4148) of horses had daily pasture access of ≥ 6 hours, 90% (n=4628) of horses received supplementary feeding. It is likely that many owners were feeding their horses due to poor pasture management, with 59% (n=2858) of pastures overgrazed. Nutritional analysis of rations (n=2892) using the NRC formulas found 25% of horses were fed excess dietary energy, while 47% received excess crude protein, 66% excess calcium, 53% excess phosphorous, 57% excess sodium, 37% excess chloride, 78% excess magnesium and 88% excess potassium. Furthermore, it is likely that these figures would be higher if the nutritional composition of the pasture were included in the analysis. Moreover 65% of owners classed their horses in a body condition score (BCS) as 'good' based on Huntington's 0–5 scale. However, this may not be accurate as previous studies have found owners frequently underestimate their horses BCS. This study suggests that mismanagement of horse pastures is prevalent in Australia, hence the overreliance on supplements. Horse owners would benefit from assistance with day-to-day pasture management, understanding how to maintain a healthy horse BCS and formulate appropriate rations for their horses to reduce excessive supplementary feeding.

Keywords: equine; nutrition; management; online survey; social media; disease

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A preliminary investigation comparing the frequency of grazing and movement behavior between a track paddock system and a conventional paddock system

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Track grazing systems are anecdotally suggested to promote behavior similar to free-living horses and enable turnout without risking laminitis, although research suggests an increase in occurrence of agonistic behavior. The aim of the study was to compare behaviors observed on the Track system with those displayed in conventional paddock turnout. Five ponies (age range 10 to 28 years, mixed breed/sex) within an established social group and accustomed to both track and conventional paddock grazing were observed; on the Track system (phase 1), immediately after moving to the conventional paddock (phase 2), and following a week in the conventional paddock (phase 3). Frequency of individual grazing/ peer grazing/ movement towards or away from peers/ movement towards or away from feeding opportunities were recorded using scan sampling. Data were analysed using Wilcoxon Signed Rank ($P < 0.05$) via IBM SPSS²³. Peer grazing occurred significantly more frequently ($Z = -4.22$, $P < 0.0001$) in phase 1 compared to phase 3. Pony movement towards feeding opportunities (hay nets) was significantly more frequent ($Z = -4.12$, $P < 0.0001$) in phase 1 compared to phase 3. Movement was overall more frequent in phase 1 compared to

phase 3 ($Z = -4.34$, $P < 0.001$). Significant differences were also observed against phase 2, highlighting the importance of an acclimatisation period. The Track system appeared to promote close proximity grazing, likely due to limited foraging opportunities but also mimicking the collective behavior of feral horses moving between foraging sites. The track system appears to promote positive equine welfare in established groups, providing opportunities to consummate innately motivated foraging behaviors.

Keywords: track; paddock; grazing; horse; welfare

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The effect of trot pole exercise on rectus abdominus activity in the horse

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Trot pole exercises are used as a tool to improve equine performance or as a component of rehabilitation regimes, and are thought to activate the horse's core musculature including *rectus abdominus* (RA) to retain stability. Six horses of variable age (13 ± 4 years) and height (1.6 ± 0.1 m), confirmed sound by their owners and experienced in undertaking trot pole exercises were fitted with Delsys Trigno™ standard surface electromyography electrodes on the RA 6cm bilaterally to the umbilicus. Horses completed a warm-up, then were videoed being ridden through 15m: no poles (NP) followed by two trot pole exercises of 8 poles (3m length, spaced: 1.35m), with poles on the ground (GP) and with raised poles (RP) (0.2m). Mean and maximum RA contractions were normalised to the maximum dynamic contraction from NP using integrated EMG. Friedman's analyses with post-hoc Wilcoxon signed-rank tests (Bonferroni adjusted: $P < 0.02$) identified if differences in RA workload occurred for the cohort and individuals. Mean (MeW) and maximal (MaW) workload did not differ for the cohort between the three conditions ($P > 0.05$). Significant increases in MaW occurred for three horses; H2 and H4: NP to GP ($P < 0.001$; $z = 3.18$, d.f.=9), NP to RP ($P < 0.001$; $z = 3.21$, d.f.=9) and GP to RP ($P < 0.001$; $z = 3.18$, d.f.=9), H5: NP to GP ($P < 0.05$; $z = 2.44$, d.f.=9) and NP to RP ($P < 0.001$; $z = 2.94$, d.f.=9). However H6 recorded a significant decrease in workload between GP to RP ($P < 0.05$; $z = 2.42$, d.f.=9). The results suggest trot pole exercises can increase RA activity compared to working on the flat in some horses.

Keywords: electromyography; pole; exercise; equine; training; rehabilitation

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The effect of the Pessoa™ training aid on equine rectus abdominus workload on a treadmill

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Equestrian trainers use the Pessoa training aid (PTA) to improve strength in horses with muscular hypotrophy present because of underlying pathology and a lack of training. Kinematic analysis has found the aid shifts weight-bearing from the forelimb to the hindlimb, producing spinal flexion which should activate the horse's core musculature, including *rectus abdominus* (RA). This study investigated if differences occurred in equine RA workload with the PTA at the low and middle positions compared to no PTA. Seven horses accustomed to working in the PTA and on a treadmill (HST) participated in the study. Delsys Trigno™ electromyography electrodes were attached 6cm lateral to horses' umbilicus. Horses completed a 3 minute warm-up in walk then completed three randomised trials (3 minutes duration) in walk (1.45m/s) and trot (3m/s): 1) No PTA, 2) Low PTA and 3) Middle PTA. Mean and

maximum right and left RA contractions were normalised to the maximum dynamic contraction from condition 1 for 10 matched and consecutive strides using integrated EMG. Friedman analyses with post-hoc Wilcoxon signed rank tests (Bonferroni adjustment; $P < 0.02$) identified if differences in RA workload occurred between the conditions. No significant differences were found in RA activity between no PTA and the use of the PTA in the low or middle position, or between the low and middle position ($P > 0.05$). The use of the PTA did not increase RA workload in walk and trot on the treadmill. Evidence-informed protocols outlining how to use training aids are warranted and could enhance equine welfare and performance.

Keywords: training; aid; Pessoa™; equine; rehabilitation; performance

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Factors influencing the symmetry and magnitude of rein tension in english and western riding

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The reins are one of the main means of communication between rider and horse, but little objective information on rein tension exists. The aim of this study was to investigate factors influencing the symmetry and magnitude of rein tension in Western (W) and English (E) riding. Rein tension was measured in a total of 93 combinations of 49 riders and 71 horses in different gaits and standardized tasks in E (50 rides) and W (43 rides). Mixed-model analysis was used. English riders applied overall higher rein tension (E: 13.1 ± 2.3 N vs. W: 5.7 ± 2.4 N, $F_{6,150} = 10.58$, $P < 0.0001$) and tensions differed within the specific disciplines, too (show jumping: 19.7 ± 4.3 N, dressage: 12.5 ± 1.4 N, leisure riders: 11.2 ± 1.3 N in E; reining: 6.5 ± 1.3 N, cutting: 5.3 ± 1.3 N, all-round: 4.9 ± 1.2 N in W, $F_{6,137} = 10.86$, $P < 0.0001$). Riders assessing their own contact as “very strong” had indeed significantly higher mean tension (21.8 ± 5.5 N) compared to strong (9.9 ± 0.8 N) or light (9.2 ± 0.8 N) contact ($F_{3,161} = 8.59$, $P < 0.0001$). Performances perceived as symmetric showed higher tension (10.5 ± 0.7 N vs. 9.2 ± 0.7 N (asymmetric), $F_{1,1962} = 8.55$, $P = 0.004$). Those described as “very harmonious”, showed the highest rein tension (12.3 ± 1.2 N), whereas lightest contact was applied to horses perceived as tensed (harmonious: 12 ± 0.9 N, unharmonious: 11.5 ± 0.9 N, tensed: 7.1 ± 1.2 N, $F_{4,210} = 8.71$, $P < 0.0001$). The magnitude of rein tension is related to or influenced by factors such as riding style, disciplines and riders’ experience. Importantly, the rider’s perception of rein tension is inaccurate, which is likely to affect training as riders may inadvertently maintain too strong contact and/or give rein aids of inappropriate intensity. Consequently horse welfare can be affected.

Keywords: rein tension; rider symmetry; horse laterality; English riding; Western riding

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Behavioral responses of horses to humans with and without PTSD

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The use of horses in equine-assisted activities may be stressful to the animals. This study hypothesised that horses exposed to humans with PTSD would display more signs of stress than with ‘neurotypical’ humans. After 5 minutes of baseline observation, 17 therapy horses (16.4 ± 3.6 years) were individually subjected for 2 minutes in a round pen to each of four humans clinically diagnosed with Post Traumatic Stress Disorder (PTSD). A

professional acting coach then instructed four neurotypical humans matched physically to the PTSD humans in emulating the physical movements of their paired PTSD subject, after which the neurotypical humans were tested in the same manner. Heart rate (HR; bpm) and behavioral observations indicative of stress in the horse (gait, head height, ear position, distance from the human, latency of approach to the human, vocalisations and chewing) were collected every 5 seconds throughout each trial and analysed using a repeated measures GLM with Sidak’s multiple comparisons between treatments and time periods. Horse behaviors did not differ between PTSD and neurotypical humans ($F_{1,21864} = 2.63$, $P > 0.1$). However, a post-hoc analysis showed that horses approached quicker ($F_{1,54} = 6.2$, $P < 0.001$), stood closer ($F_{1,3756} = 9.14$, $P < 0.01$), and oriented their ears ($F_{1,3704} = 13.07$, $P < 0.0003$) more toward humans who were experienced with horses ($N = 4$). Horse HR was lower when paired with inexperienced humans ($N = 4$; $F_{1,21531} = 16.9$, $P < 0.0001$). Horses do not appear to respond differently to humans with PTSD than to those without, but they were more attentive to humans with more horse experience. Understanding horse responses can lead to improved welfare and horse and human safety.

Keywords: equine-assisted activities; PTSD; behavior; heart rate

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One- or two- handed riding – does it make a difference?

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The impact of riders and handlers on horses has come under growing scrutiny with increasing availability of technology capable of accurately measuring physical horse-human interactions. Effective rein use is crucial for the delivery of clear signals and subsequently the discernable release of pressure when the required response is given by the horse. Rein tension studies commonly involve two-handed riding. This study aimed to compare the effectiveness of one- versus two-handed rein use. Twenty female riders (28.2 ± 10.1 years), self-rated as experienced, representing a wide range of equestrian disciplines sat in a general purpose saddle secured on stationary saddle stand with the stirrups set at their usual riding length. Centaur Rein Tension gauges were fixed to a solid box at horse head height and fitted with a standard pair of leather 5 x 20mm wide reins. Participants were asked to take up the rein tension that they would use when riding in trot, 3 times each two-handed and one-handed (using the riders natural hand of choice) using a cross-over design with a 30-minute wash-out period. No significant differences were evident between left and right hand rein tension when using two hands ($t_{59} = 1.89$; $P > 0.05$; left = 4.73 ± 2.65 N; right = 4.91 ± 2.63 N) or one hand ($t_{59} = 0.20$; $P > 0.05$; left = 4.21 ± 2.32 N; right = 4.17 ± 2.91 N). The relative use of the left and right reins is less consistent with one hand than with two. Reliable rein tension studies using different riding styles are necessary to improve understanding of the rider’s effect on the horse and ultimately to improve the welfare of horses used in equestrianism.

Keywords: rein tension; rider hands; contact; welfare; equestrian discipline

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Development of a prototype for referees to monitor whip use in horse racing

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