13th Alltech-Hartpury Student Conference

Conference Proceedings

8th May 2024

HARTPURY UNIVERSITY

13th Alltech-Hartpury Conference:
Hello & welcome…..

Alltech® is one of the top ten global animal health companies dedicated to providing natural solutions to today's animal nutrition challenges. It is a leader in innovation and education and is proud to be associated with Hartpury University for the jointly run, annual student conference. The Alltech-Hartpury Conference is aimed at students and scientists who are interested in the application of emerging research. Traditionally, conferences can be a daunting place for students to present research work. As such, this conference gives both undergraduate and postgraduate students the chance to experience a scientific conference, from the process of abstract submission and review, to delivering a theatre presentation or producing a conference poster. In collaboration with Hartpury University, Alltech® offers the opportunity to, not only promote equine research, but to bring the next generation of researchers in to contact with today's experts.

Dr Helen Warren; European Technical Manager, Alltech

On behalf of Hartpury University and the Alltech-Hartpury Conference Committee, it is our pleasure to welcome you to the 13th Alltech-Hartpury Conference, held within the grounds of our beautiful campus here at Hartpury. Staff in Hartpury University's Equine Department are passionate about our subject and one of our wider aims is to maximise opportunities for dissemination of research across the breadth of the equine industry. Our collaboration with Alltech® has provided a unique opportunity for like-minded academics, industry professionals and students to debate emerging ideas which could have a positive impact on the performance, health and welfare of the horse, and the development of the equine industry. We are delighted with the breadth of topics and the standard of the research in this year's programme and looking forward to what is predicted to be an enjoyable and inspiring conference day; we hope you enjoy it as much as we do.

Dr Kirsty Leśniak; Conference Organiser, Senior Lecturer in Equine Science, Hartpury University

Acknowledgements

The Alltech-Hartpury Conference Committee gratefully acknowledges the support of all collaborative partners who have made this conference possible. We are very much indebted to the peer review team of Dr Helen Warren, Ella Bartlett, Natalie Stones, Lorna Cameron, Dr Georgina Crossman, Dr Simon Daniels, Dr Lucy Dumbell, Dr Jane Williams, Dr Sophie Hiscocks, Jack Merrifield, Dr Eleanor Boden, and Lily Harris who have given their time freely to offer support and guidance to those presenting today.

Thanks also to the staff members and student volunteers of Hartpury University who have helped setup in preparation for the conference. Gratitude is also extended to Professor Kristien Verheyen, Dr Heather Cameron-Whytock and Ben Atkinson for delivering the keynote presentations.

Prizes

Prizes will be awarded to both undergraduate and postgraduate students for the best theatre and poster presentations.

Prizes have kindly been sponsored by Alltech®.

Alltech-Hartpury Conference Committee members 2024

Dr Kirsty Lesniak (Lead organiser)

Dr Helen Warren (Alltech® sponsor lead)

Emma Davies

Lorna Cameron

Scientific Programme Wednesday 8th May

Morning Session:

8.15am Onsite registration

(At 9.00am please make your way down to the Conference Hall ready for a 9.10am start)

9.10am Dr Helen Warren and Dr Kirsty Leśniak: Welcome to the Conference

9.15am: **Professor Kristien Verheyen: From birth to aftercare: aligning epidemiological research with the racing industry's Thoroughbred welfare priorities**

10.00am Undergraduate Student Oral Presentations

10.00am: Kamila Augustyn: University of Liverpool - Comparing the Knowledge on Equine Pain Scales of First, Third- and Fifth-Year Veterinary Students at the University of Liverpool

10.15am: Freya Donoghue: Oxford Brookes University - Is soil pH a reliable indicator of good quality pasture? Analysis of pH and metal content at contrasting equine pastures.

10.30am: Tara Fuller: Hartpury University - Investigating sleep behaviours of international event riders.

10.45am Poster session with refreshments at Hartpury House

11.30am Undergraduate Student Oral Presentations

11.30am: Charlotte Hodgetts: University Centre Myerscough - Cooling Practices for Equine Thermoregulation After Cross-Country Competition

11.45am: Victoria Charnock-Crawford: Hartpury University - Case study investigating the feasibility of implementing a track grazing system at Hartpury University for student livery horses.

12.00pm: Molly Quirk: University of Greenwich - The effect of cryotherapy on equine stride length in walk and trot

12.15pm - Lunch Break – Hot and cold food is available to purchase at our Graze restaurant

Afternoon Session:

1.15pm: **Dr Heather Cameron-Whytock: The journey towards evidence-based risk management in equestrian eventing**

2.00pm Undergraduate Student Oral Presentations

2.00pm: Libby Southerton: University Centre Reaseheath - Equine Joint Supplements and their Effect on Stride Length, Knee, and Hock Range of Motion

2.15pm: Joshua Tan: Hartpury University - An investigation into the prevalence of groin pelvis area pain in male equestrian riders

2.30pm: Catalina Woelffer: Oxford Brookes University - The Development of Cloned Equines: A Pilot Investigation into the Physiological Advantages of Cloned Horses within Equine Sport

2.45pm Poster session with refreshments at Hartpury House

3.15pm Postgraduate Student Oral Presentations

3.15pm: Emily Legge: Hartpury University - In vitro testing of the Probiotic Yeast Strain - Saccharomyces boulardii against key beneficial and pathogenic faecal bacteria associated with the equine gastrointestinal tract microbiome.

3.30pm: Stephanie Bradley: University of Gloucestershire - The perceived effects of perimenopause and menopause on female equestrian riders

3.45pm: Rafaelle Baby: Hartpury University - Variability of sagittal joint kinematics of female horse-riders over a jump.

4.00pm: **Ben Atkinson, Atkinson Action Horses: Lessons from a life at Liberty**

4.45pm Presentation of prizes

5.00pm Conference closes

Professor Kristien Verheyen

Royal Veterinary College

Kristien is Professor of Veterinary Clinical Epidemiology at the Royal Veterinary College. She is a qualified veterinary surgeon and holds a Masters degree in Epidemiology from the London School of Hygiene and Tropical Medicine. Prior to joining the RVC in 2005, Kristien worked in the Epidemiology Unit at the (now closed) Animal Health Trust, initially on equine infectious diseases and being responsible for the veterinary care of the AHT's pony herd. She soon moved into a research role, embarking on a project investigating the epidemiology of fractures in racehorses, and completed a PhD on this topic in 2005. At the RVC, Kristien has developed an extensive research portfolio in equine epidemiology and issues affecting Thoroughbred racehorses in particular. She also teaches aspects of epidemiology and biostatistics, primarily at postgraduate level, and is a Fellow of the Higher Education Academy. Previous roles include a seven-year stint as Head of the Graduate School at the RVC and Course director for the MSc in Veterinary Epidemiology.

Dr Heather Cameron-Whytock

University of Central Lancashire

Dr Heather Cameron-Whytock is a Senior Lecturer and Researcher in Veterinary Medicine at the University of Central Lancashire. Heather's research so far has focussed on equestrian eventing, analysing data to identify risk factors for horse falls. A recent publication lead by Heather was the largest study ever published on horse falls in eventing, with the study laying out key recommendations for governing bodies, which aim to reduce the risk of injury and fatality in eventing. Heather and the team she works with have completed safety- and welfare-focussed projects for the FEI, British Eventing, Equestrian Australia and Redwings Horse Sanctuary. Heather is also involved in equine cognition and biomechanics research and supervises both masters and PhD students as such.

Ben Atkinson

Atkinson Action Horses

Benjamin Atkinson is an equestrian performer and Liberty artist. Ben has trained and performed with horses across the world for the past 10 years, gaining skills in everything from showjumping and carriage driving to Cossack trick riding and stunt work in the file industry. Ben's true passion is Liberty, the art of working horses in complete freedom. Inspired by his father and grandfather, he made the pursuit of unlocking the horses mind his goal in life. Developing new techniques, he brings simplicity and logic to a style of horsemanship often shrouded in mystery. Making the unattainable easily achievable for any person and any horse.

Comparing the knowledge on Equine Pain Scales of first, third- and fifth-year veterinary students at the University of Liverpool

Augustyn, K., Furtado, T.[1] and Bardell, D.[2]*

[1] Department of Livestock and One Health, Institute of Infection, Veterinary and Ecological Sciences, University of Liverpool, Leahurst Campus, Chester High Road, Neston, CH64 7TE.

[2] Department of Equine Clinical Science, Institute of Infection, Veterinary and Ecological Sciences, University of Liverpool, Leahurst Campus, Chester High Road, Neston, CH64 7TE.

Keywords: welfare; education; health; management

Introduction: Equine pain scales (EPS) attempt to quantify pain levels in horses using behavioural or physiological markers. This study aimed to investigate the knowledge, experience, and attitudes towards EPS of veterinary students in their first, third or fifth year at the University of Liverpool, to evaluate the capability of the undergraduate curriculum to educate students on the topic, which could impact on how students treat future equine patients.

Materials and Methods: An online questionnaire was formulated and promoted to first, third- and fifth-year veterinary students. Questions focused on the students' knowledge of EPS application in veterinary and care-giver settings, variables assessed, different scale designs, attitude towards situations where they may be utilised, and limitations. Data were analysed using Excel (version 2401; Microsoft Corporation) to derive percentages and descriptive statistics.

Results: Responses were received from 25 first, 39 second and 30 fifth year students. Students in first year had the least experience of EPS and indicated they were very important for most veterinary and caregiver settings, but were less aware of what pain scales entailed and focused more on aspects such as duration of pain rather than how to assess pain using behavioural cues. Third year students had similar first-hand experience with EPS and self-evaluated as mostly unaware of the usage and variables measured. However, their suggestions for what elements a scale should include and attitudes towards scales were more similar to fifth year students. Fifth year students had substantially more experience with using scales and therefore had more knowledge on their variables and usage, but thought scales were most valuable in specific veterinary situations, for example escalating treatment decisions or post-operative management. Across all years, the most known scale designs were the Horse Grimace Scale (Dalla Costa *et al.,* 2014) and the UK 1-10 lameness scale. All years agreed that user and individual animal variability were the biggest limitations in applying EPS, although time to implement was a larger factor for fifth year students than for other years.

Discussion and Conclusion: This study found increasing knowledge and applied experience of EPS as students progressed through the course, not unexpected due to increased teaching and practical placement time where students may be exposed to the concepts and application of pain scales. Increased clinical experience through the course could explain the adaptation in attitudes towards the roles and limitations of scales in different situations. Whilst first year students viewed EPS as

important for most situations, third- and fifth-year students perhaps had more understanding of the proficiency and time needed for these to be executed accurately and effectively, therefore considered their use better for specific clinical situations rather than more widespread implementation. These findings may help to inform the university's veterinary undergraduate curriculum on when and how pain assessment techniques are incorporated into the programme.

References:

Dalla Costa, E., Minero, M., Lebelt, D., Stucke, D., Canali, E. and Leach, M.C. (2014). Development of the Horse Grimace Scale (HGS) as a Pain Assessment Tool in Horses Undergoing Routine Castration. PLoS ONE, [online] 9(3), p.e92281. Available at: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0092281 [Accessed: 16 Mar. 2024].

Is soil pH a reliable indicator of good quality pasture? Analysis of pH and metal content at contrasting equine pastures.

Donoghue, F. and Scofield, R.M.*

Oxford Brookes University, Gipsy Lane, Headington, Oxford, OX3 0BP

Keywords: soil pH; soil elements; pasture health

Introduction: Equine health is dependent on access to pasture providing adequate nutrients, including essential elements. Many scientific studies and routine agronomic testing of soils only focus on pH and macronutrients and fail to measure key micronutrients and pollutants (Defra, 2009). This study collected representative soil samples from equine pastures and analysed them to investigate variations between pH and nutrients in two contrasting environments. Results may be applied to help improve pasture quality and to test for the presence of toxins that have adverse influences on horse health.

Materials and Methods: Study sites were chosen to test two contrasting soil types widely used for equestrian grazing. Fieldwork was undertaken in North Yorkshire at locations with soils of differing types, one on the flood plain 7m above the river Swale (52 m ASL) and the other on a glacial outwash terrace (100m ASL). The soil pH and moisture were determined *in situ* using a Morthan Soil Test Meter; P and K were prepared using a Dry Ash procedure (Haynes, 1980) and samples analysed using a Thermo-Scientific Inductively Coupled Plasma-Optical Emission Spectrometer. Total N and total C were analysed using a Thermo-FLASH combustion elemental analyser. Elemental analysis was conducted using a portable Niton XL3T 985 He Ultra X-ray fluorescence spectrometer (pXRF) and analysed Ca, Fe, Cl, Mn, Mo, As, Cr, Pb, Zn in a controlled laboratory. Data were analysed by Student's t-Test and correlation analysis using Minitab v21.4. pXRF has demonstrated highly repeatable and accurate metal concentrations across a range of soil studies with low measurement uncertainty (Ravansari *et al.,* 2020; Tighe *et al*., 2018).

Results: At the two sites, mean pH (5.71 & 5.60) and mean Total Carbon values (4.05 & 3.69) are similar and a 2-sample t-Test gave p values of 0.959 and 0.321 respectively indicating that the means do not differ at the 0.05 significance level. By contrast the mean % moisture (44.2 and 58.8), C:N Ratio (9.8 & 11.1), and the macronutrients P (17.2 & 37.0), K (3.3 & 2.6), N (0.41 & 0.33), Ca (2133 & 1064), and micronutrients Fe, Cl, Mn, and Zn all show statistically significant differences in properties at the contrasting pastures ($p < 0.001$) (Table 1). Arsenic, Cr, Pb and Zn were detected but only lead and zinc showed mean values that differed between the two sites ($p < 0.001$). The floodplain pasture and the glacial outwash terrace pasture have similar mean pH and Total Carbon values but contrasting moisture, soil nutrient and heavy metal contents, including considerable within-site variability.

Discussion and Conclusion: The objective was to examine soils utilised for equine grazing and test vital nutrients (Mencel *et al.,* 2022) to quantify differences between soil characteristics influencing pasture quality and horse health. The agronomical approach implemented supports the hypothesis

that while a soil pH of 6.0 provides an indication of nutrient availability, if used without other supporting tests, it would fail to identify important elemental differences in equine pastures. This study demonstrates differences between two nearby but contrasting sites and compares the results with typical nutrient data from UK pastures (Table 1) (Darch *et al.,* 2022; Wang *et al*., 2024).

Table 1 Soil micronutrients in parts per million (ppm) (Darch *et al.,* 2022) and WHO Maximum permissible limits of heavy metals in soils (WHO, 1996), <LOD = below limits of detection.

Nutrient	**Typical levels in Soil from Espinoza *et al*. (2006): Blue; Darch *et al. (*2022): Yellow and permissible limits from WHO (1996): Pink**	**Site 1 n=14 (ppm)**	**Site 2 n=12 (ppm)**	**Students two sample t Test p values**
Calcium (Ca)	400 - 2000	2133 ±217	1064 ±60	<0.001
Iron (Fe)	30,200	20,433 ±1,126	17,248 ±473	<0.001
Chloride (Cl)	20 - 900	124.0 ±7.93	127.0 ±10.90	0.823
Manganese (Mn)	518.0	267.3 ±26.3	364.1 ±40.9	<0.001
Molybdenum (Mo)	2.54	<LOD	<LOD	-
Arsenic (As)	15.0	6.73 ±0.17	7.23 ±0.36	0.279
Chromium (Cr)	100.0	36.88 ±2.93	35.51 ±2.42	0.725
Lead (Pb)	100.0	41.46 ±1.91	57.10 ±2.75	<0.001
Zinc (Zn)	300.0	101.92 ±4.00	87.71 ±2.97	<0.001

References:

Darch, T., Blackwell, M.S., Hood, J., Lee, M.R., Storkey, J., Beaumont, D.A. and McGrath, S.P. (2022) The effect of soil type on yield and micronutrient content of pasture species. *Plos one*, 17(11), 0277091.

Defra. (2009) Safeguarding our Soils: A Strategy for England. Available at: https://assets.publishing.service.gov.uk/media/5a795b71ed915d0422067beb/pb13297-soil-strategy-090910.pdf (Accessed April 2023)

Mencel, J., Mocek-Płóciniak, A. and Kryszak, A. (2022) Soil microbial community and enzymatic activity of grasslands under different use practices: A review. *Agronomy*, 12(5), 1136.

Ravansari, R., Wilson, S.C. and Tighe, M. (2020) Portable X-ray fluorescence for environmental assessment of soils: Not just a point and shoot method. *Environment International*, 134, 105250.

Tighe, M., Rogan, G., Wilson, S.C., Grave, P., Kealhofer, L. and Yukongdi, P. (2018) The potential for portable X-ray fluorescence determination of soil copper at ancient metallurgy sites, and considerations beyond measurements of total concentrations. *Journal of environmental management*, 206, 373-382.

Wang, X., Zhou, C., Zuo, S., Ji, Y., Liu, W. and Huang, D. (2024) Heavy grazing reduces soil bacterial diversity by increasing soil pH in a semi-arid steppe. *PeerJ*, 12, 17031.

WHO (1996): World Health Organization Report. WHO, Geneva.

Investigating sleep behaviours of international event riders.

*Fuller, T *. and Davies, E.*

Hartpury University, Hartpury House, Hartpury, Gloucestershire, GL19 3BE

Keywords: sleep; chronotype; eventing; performance

Introduction: Eventing, considered the riskiest equestrian sport, demands optimal performance to avoid catastrophic outcomes. Poor sleeping behaviours affect fine motor skills and cognitive function, as well as injury risk among athletes (Fullager et al., 2015; Von Rosen et al., 2017). However, there is no existing research on sleep within equestrian athletes. Understanding FEI eventing athletes' sleeping behaviours may be able to enhance performance and industry-wide sleep in riders. The study aimed to investigate sleeping behaviours in international event riders (IER).

Materials and Methods: Two hundred and thirty international event riders (CCI1* and above), (44 male, 185 female, 1 preferred to self-identify) aged 18-69, completed an online questionnaire, on Microsoft Forms, including the Athlete Sleep Screening Questionnaire (ASSQ). The questionnaire explored sleeping duration, sleep difficulty (SDS), chronotype, additional help, caffeine consumption and demographics. Data were analysed by comparing SDS and chronotype scores between genders (Mann Whitney U) and age categories and additional help from staff (Kruskal Wallace). Spearman's Rho correlations tested relationships between SDS, chronotype, caffeine consumption, electronic device use before bed, training and yard work hours, competition frequency and level. Riders' perceptions of barriers and facilitators for healthy sleep patterns at home and during stay-away competitions were grouped by common responses.

Results: The ASSQ found a mean SDS of 6.783±3.207 and a mean chronotype score of 7.930 ± 2.473 meaning most IER were more morning types. Common facilitators of sleep included routine, no stress and quiet, and stress, work, and noise were common barriers. Chronotype significantly varied between age groups (H (4) = 14.230 p=.007), and a weak negative correlation existed between electronic device use before bed and chronotype (r_s= -.170, p= .010), indicating as electronic use before bed increases, so does the likelihood of being an evening type. Weak positive correlations were found between chronotype and competing frequency (r_s= .77, p= .007) and FEI competition level (r_s= .159, p= .016), suggesting morning types increase with competition frequency and level.

Discussion and Conclusion: IER exhibited poor SDS, potentially due to their busy lifestyles, which often are balanced alongside a family and career. Equestrian athletes commonly have long careers unlike most other sporting athletes, which could explain the higher SDS, as poor sleep tends to increase with age due to hormonal factors. Riders were also seen to be more morning types, likely influenced by early morning yard responsibilities prioritising horse welfare. The IER identified noise as a barrier to sleep at stay-aways. The FEI could implement quiet zones in lorry parks where generators have to be turned off at a set time, and no parties. Sleep education has also been seen to enhance athletes' sleeping behaviours and is something that could be implemented to eventing.

This study is important because gaining insight into IER sleep not only allows possible performance improvements but also increases the welfare and safety of the sport.

References:

Fullagar, H.H., Skorski, S., Duffield, R., Hammes, D., Coutts, A.J. and Meyer, T., 2015. Sleep and athletic performance: the effects of sleep loss on exercise performance, and physiological and cognitive responses to exercise. *Sports Medicine*, *45*(2), pp.161-186.

Von Rosen, P., Frohm, A., Kottorp, A., Fridén, C. and Heijne, A., 2017. Too little sleep and an unhealthy diet could increase the risk of sustaining a new injury in adolescent elite athletes. *Scandinavian journal of medicine & science in sports*, *27*(11), pp.1364-1371.

Cooling practices for equine thermoregulation after cross-country competition

Hodgetts, C. and Brigden, C.*

Myerscough College, St. Michaels Road, Bilsborrow, Preston, PR3 0RY.

Keywords: heat stroke; eventing; climate; welfare

Introduction: Strenuous exercise like British Eventing (BE) cross-country competition can increase equine core body temperatures to critical levels, particularly in hot/humid conditions without suitable acclimatisation (Marlin *et al*., 1996). Heat stroke is a welfare concern, particularly with increasing occurrences of UK heatwaves due to global warming (Kendon *et al*., 2021). Cooling practices have been investigated for international competition horses working maximally (Marlin *et al*., 2018), but not specifically the practices used in industry by riders at grassroots level. The aim was to investigate cooling practices used after cross country phases at BE affiliated grassroots (80-100cm/435-475m/min) and international level competitions (110-120cm/520-570m/min). Additionally, to investigate reasons for use of specific cooling methods by BE riders.

Material and Methods: Cooling practices were observed and recorded in a classification table following cross-country, at 3 grassroots classes (n=121) and 3 international classes (n=135) across four venues. Average temperatures were recorded and grouped into low (15-19°C), medium (20-24°C) and high (25°C +). Humidity was grouped into low (45-64%), medium (65-85%), and high (86%+). Chi-square tests for associations analysed associations between cooling practices and rider level; average temperature; and humidity. In a separate survey, 55 grassroots and international BE riders completed an online questionnaire with 9 closed questions exploring practices used and rider information. 10 open questions explored reasons for practices used and were analysed using thematic framework analysis.

Results: Associations existed between rider level and observed use of different cooling practices ($P<0.001$). International riders (IR) used evidence-based practices more than grassroots riders (GRR). 90% of IR used whole body application of water compared to 37% of GRR; 67% IR used immediate cooling compared to 11% GRR. 67% of IR used continuous applications, versus 2% GRR (Figure 1). Some evidence suggested weather affected practices used but this was impacted by observations of only one international class in high temperatures. Thematic analysis revealed three themes of why cooling practices are used: practicality, educational influences, and health and welfare. Five themes for reasons for alterations in hot weather included weather conditions, competition structure, horse health, venue facilities, and horse fitness and performance. Sub-themes revealed practices chosen were mostly based on health and welfare, with rapid cooling and high temperature thresholds being the most common.

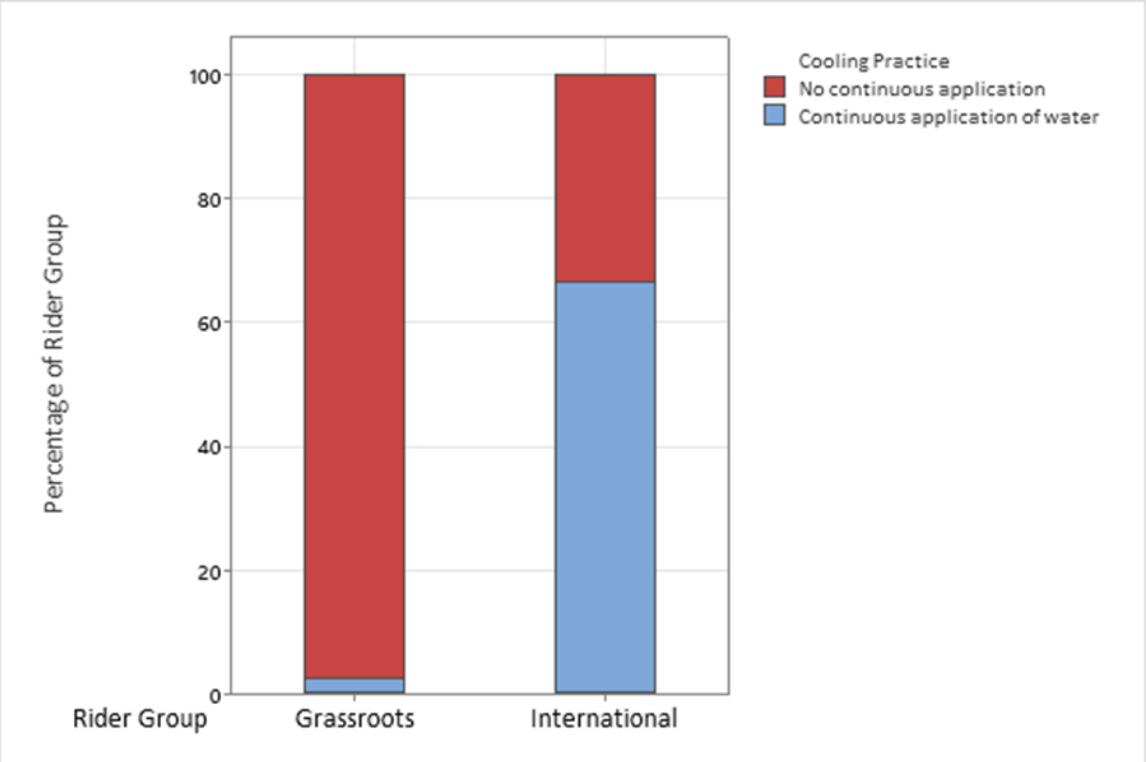


Figure 1: Percentage of grassroots and international riders using continuous application of water post cross country, at British Eventing competitions ($P<0.001$; $\chi 2=135.54$).

Discussion and Conclusions: Apparently lower use of scientifically proven cooling practices by Grassroots riders may increase risks of equine heat stroke. Results may have been affected by limited availability of cooling facilities at grassroots venues. Survey responses revealed riders felt the need for appropriately positioned water provisions, such as large water tubs at the cross-country finish. There was some indication that weather had an impact, but this requires validation from a larger sample of classes in mixed temperatures. Awareness of rapid cooling for welfare and adaption of practices in high temperatures were demonstrated in the survey, but only reflected in observations of international riders. Overall, the study indicates the need for better education of all BE riders regarding evidence informed cooling practices post strenuous exercise, as well the provision of cooling facilities at venues.

References:

Kendon, M., McCarthy, M., Jevrejeva, S., Matthews, A., Sparks, T. and Garforth, J. (2021). State of the UK Climate 2020. *International Journal of Climatology*, *41*, pp.1-76.

Marlin, D., Misheff, M., and Whitehead, P. (2018). Preparation for and management of horses and athletes during equestrian events held in thermally challenging environments. In *FEI Sports Forum*. Pp 17-18

Marlin, D.J., Scott, C.M., Schroter, R.C., Mills, P.C., Harris, R.C., Harris, P.A., Orme, C.E., Roberts, C.A., Marr, C.M., Dyson, S.J. and Barrelet, F. (1996). Physiological responses in non-heat acclimated horses performing treadmill exercise in cool (20 °C/40%RH), hot dry (30 °C/40%RH) and hot humid (30 °C/80%RH). Equine Veterinary Journal. Supplement 22, pp.70–84.

The effect of cryotherapy on equine stride length in walk and trot

Quirk, M., Delaney, P. and Svetina, A.*

University of Greenwich, Old Royal Navy College, Park Row, London, SE10 9LS.

Keywords: biomechanics; horse; cold; therapy

Introduction: Cryotherapy utilises freezing or near-freezing temperatures to administer therapeutic benefits, such as analgesia, improved muscle recovery, and reduced inflammation (Roszkowska *et al*., 2018). The use of cryotherapy dates back to Egyptians who were reported to use cold application to treat injuries and inflammation circa 2500 BCE. Although it has been more commonly researched in human medicine, several benefits have been investigated in veterinary practice. Cryotherapy has been proven to positively influence joint range of motion which indicates greater flexibility and movement (De Nardi *et al*., 2015). The aim of this study was to determine the effects of cryotherapy on horses' stride length in walk and trot.

Material and Methods: A convenience sample of three mares and three geldings (1 Irish Sports Horse and 5 Cobs, mean ± SD: 15.17 ± 1.72 years old) was chosen to compare stride length in walk and trot before and after the cryotherapy session. Cryotherapy in the form of liquid carbon dioxide at a temperature of -78°C was used to achieve the cooling effect. Cryotherapy was applied to the thoracolumbar and abdominal region, forelimbs, and hindlimbs. Quintic Sports, a video gait analysis system, was used to measure stride length. A paired sample t-test was performed on Microsoft Excel to calculate statistical significance with a p-value of 0.05.

Results: In walk, the mean stride length pre-cryotherapy treatment was 1.67 ± 0.09m and 1.74 ± 0.08m post-cryotherapy treatment. In trot, 2.12 ± 0.08m was the mean stride length before cryotherapy and 2.10 ± 0.08m after. A paired t-test found a significant statistical difference between stride length before and after the cryotherapy session in walk, ($t(5) = -3.54$, $p<0.05$). A significant difference in stride length was not found in trot ($t(5) = 0.63$, $p>0.05$).

Discussion and Conclusion: The findings show that cryotherapy significantly increased stride length in walk however, contrary to expectations, the results do not indicate a significant increase in stride length in trot. To a limited extent, this finding confirms the relationship between cryotherapy and improved range of motion consistent with studies found by Partridge *et al*., (2021). This inconsistency may be due to the biomechanical differences in the locomotion of walk and trot. Limitations of this study include the use of a small sample size which causes a lack of generalisability to the wider population, and reflective marker skin displacement variabilities, reducing the validity of the results. The results of this study are encouraging with respect to the ability to immediately influence stride length positively. This could provide many practical applications in training and performance. The study could be repeated using horses with injuries to investigate the ability of cryotherapy to restore function and range of motion. Future work is also warranted to investigate the effect of cryotherapy on individual joints to locate specific changes in the range of motion.

References:

De Nardi, M., La Torre, A., Benis, R., Sarabon, N., and Fonda, B. 2015. Acute Effects of Whole-Body Cryotherapy on Sit-And-Reach Amplitude in Women and Men. *Cryobiology*. 71(3):511-513. https://doi.org/10.1016/j.cryobiol.2015.10.148

Partridge, E., Cooke, J., McKune, A., and Pyne, D. 2021. Pre-Exercise Whole- or Partial-Body Cryotherapy Exposure to Improve Physical Performance: A Systematic Review. *Sports.* 9:135. https://doi.org/10.3390/sports9100135

Roszkowska, K., Witkowska-Pilaszewicz, O., Przewozny, M., and Cywinska, A. 2018. Whole Body and Partial Body Cryotherapies – Lessons from Human Practice and Possible Application for Horses. *BMC Veterinary Research.* 14:1-8. https://doi.org/10.1186/s12917-018-1679-6

Equine joint supplements and their effect on stride length, knee, and hock range of motion

Southerton, L. and Greenshields, B.*

University Centre Reaseheath, Nantwich, Cheshire, CW5 6DF.

Keywords: methyl sulfonyl methane; vegetarian supplements; NAF; nutrition

Introduction: Oral joint supplements are among the most common supplements used by horse owners (Murray et al., 2018). Most joint supplements contain methyl sulfonyl methane (MSM), a substance that is banned by the British Horse Racing Authority, as well as ingredients derived from animal tissue such as chondroitin sulphate (CS), indicating the need for effective alternatives. The aim was to test the effectiveness of a new MSM-free and vegetarian joint supplement developed by NAF, along with Superflex and a placebo.

Materials and Methods: Nine sound leisure horses of differing breeds (Connemara's, Welsh section A's and B's, Warmbloods and Cobs), heights (10 to 16.2hh) and ages (5 to 32 years), were used and divided into three groups. Each group was blindly assigned one of three supplements (trial product, Superflex or placebo) fed daily for a three-week duration. Measurements of stride length, hock, and knee range of motion (ROM) were taken using Quintic video analysis software, from videos of each horse at walk and trot in hand on each rein. Videos were taken before and after the horse was fed the supplement. Using R Studio version 2022.12.0, paired t-tests and Wilcoxon tests were used to analyse differences in stride length, knee and hock ROM in walk and trot before and after treatments, with significance accepted at $P<0.05$.

Results: The Superflex produced a significant increase in hock ROM at walk ($p=0.03$), whilst stride length, hock ROM at trot and knee ROM did not significantly improve. The trial supplement significantly increased stride length in walk ($p<0.01$) and trot ($p<0.05$), respectively, and knee ROM at trot ($p= 0.05$). Hock and knee ROM at walk did not significantly improve. In the group fed the placebo, there was only a significant difference in stride length at walk ($p= 0.02$) before and after treatment.

Discussion and Conclusion: The improvement in stride length and knee ROM at trot in the group fed the trial supplement may indicate that the new supplement had a positive effect on joint health. In comparison, Superflex improved hock ROM at walk. It may be suggested that the differences between Superflex and the trial product are due to key ingredients. The trial product contains rosehip shells and dried melon (antioxidants); a source of superoxide dismutase, shown to reduce cartilage loss and tissue damage (Stephanie et al., 2020). In comparison, the Superflex contains MSM, CS, Glucosamine and Hyaluronic acid, all compounds that support cartilage health and synovial fluid (Moller & Weeren, 2017), the differing antioxidant combinations could explain the difference in results. The improvements observed in the placebo group could be a result of differing housing and routines of horses between groups, which has been shown to effect locomotive behaviour and gait kinematics. These findings are of great value to the equine industry, particularly

the racing industry, as it supports an MSM free alternative joint supplement that is effective for use in competition.

Acknowledgements: NAF, equine products for providing all products used in the trial.

References:

Murray, J.M.D., Hanna, E. and Hastie, P., 2018. Equine dietary supplements: an insight into their use and perceptions in the Irish equine industry. *Irish Veterinary Journal*. *71*:1-6. https://doi.org/10.1186/S13620-018-0115-3

Stephenie, S., Chang, Y.P., Gnanasekaran, A., Esa, N.M. and Gnanaraj, C., 2020. An insight on superoxide dismutase (SOD) from plants for mammalian health enhancement. *Journal of Functional Foods*. *68*:103917. https://doi.org/10.1016/j.jff.2020.103917

Te Moller, N.C. and van Weeren, P.R., 2017. How exercise influences equine joint homeostasis. *The Veterinary Journal*. *222*:60-67. https://doi.org/10.1016/j.tvjl.2017.03.004

An investigation into the prevalence of groin and pelvis area pain in male equestrian riders

Tan, J. and Lewis, V.*

Hartpury University, Hartpury House, Hartpury, Gloucestershire, GL19 3BE.

Keywords: male; pain; saddles

Introduction: Despite a notable representation of female athletes in Team GB Equestrian, particularly in eventing and dressage, this trend is consistent with findings by Dumbell et al. (2018) where their research revealed distinct participation levels, showing 3.33 times more female riders in eventing and 1.75 times more in dressage. In contrast, the pinnacle of equestrian achievement often sees male athletes outperforming their female counterparts (Dumbell et al., 2010; Channon et al., 2016). As a result, this investigated into the prevalence of groin pain among male equestrian riders, a subject that has received little attention within the academic community.

Materials and Methods: This study utilised a 20-question JISC online survey targeting male equestrian athletes over 18, designed to collect data from 384 participants to achieve statistical reliability. Using a mixed-methods approach, the questionnaire aimed to blend quantitative and qualitative insights, focusing on the prevalence of groin and seat pain in male riders. This study also aimed to identify if saddle design and seat type impacts pain. The dissertation's poster, link, and brief description were shared through various Facebook groups targeting horse riding and student network groups (UK Equine Student Network, BSJA, Gloucestershire Horse Riders, etc.). Using a snowball sampling strategy, individuals who received the poster were encouraged to distribute it to other riders in the wider equestrian community.

Results: Findings revealed a prevalence of testicular (36.3%) and nerve issues (20.5%), with a lower incidence of prostate issues (5.3%). A notable finding in the study was highlighted in saddle designs and its impact on rider pain: riders using a deep-seated dressage saddle had a (47.6%) probability of experiencing pain, compared to (36.7%) to those using flat-seat saddle. In addition to this, riders using deep-seated saddles were found to be 1.563 times more likely to experience pain. As a result, this finding underscores the importance of ergonomic saddle design and its responsibility for groin pain in riders. This study also found that rider skill level showed no correlation with the frequency of injuries (p-value= 0.277). Despite the insignificant correlation, a high degree of resilience among riders was observed, with a majority continuing to ride despite pain with survey data showing (91.8%) indicated that pain or discomfort did not deter them from riding.

Discussion and Conclusions: This study delved into the health concerns prevalent among male equestrian riders, focusing on the groin and pelvic regions, and identified a significant occurrence of groin and saddle area pain which linked to the inherent risks of equestrian sports. The research further established that saddle type plays a critical role in rider comfort, with deep-seat saddles resulting in higher discomfort levels. The study advocates for further research into ergonomic saddle

designs and targeted interventions to improve rider health and comfort, underscoring the importance of addressing these male-specific health issues in equestrian sports more comprehensively.

References:

Dumbell, L. C., Rowe, L., & Douglas, J. L. (2018) 'Demographic profiling of British Olympic equestrian athletes in the twenty-first century', International Journal of Sport and Society, 21(9), 1337-1350. https://doi.org/10.1080/17430437.2017.1388786

Dumbell, L., Johnson, J., & de Haan, D. (2010) 'Demographic Profiling of elite dressage riders', International Journal of Sport and Society, 1(3), 15-24.

https://doi.org/10.18848/2152-7857/CGP/v01i03/54021is

Channon, A., Dashper, K., Fletcher, T., & Lake, R. J. (2016) 'The promises and pitfalls of sex integration in sport and physical culture', Sport in Society, 19(8-9), 1111-1124. https://doi.org/10.1080/17430437.2016.1116167

The development of cloned equines: A pilot investigation into the physiological advantages of cloned horses within equine sport

Woelffer, C. and Scofield, R.M.*

Oxford Brookes University, Gipsy Lane, Headington, Oxford, UK.

Keywords: competition; advantage; polo.

Introduction: Advancements within the field of cloning, particularly in the equine industry, have brought about further exploration as to whether or not cloned horses possess an unfair advantage at competitions (Chappell, 2012) questioning if cloning may be responsible for anecdotal reports of success (Willekes, 2019).

Materials and Methods: Polo teams (n=7) were recruited using convenience sample methods from the United States Polo Association Registry of 2023. Competition results from these teams were collated to assess whether the presence of cloned horses contributed to those teams' performance. The seven polo teams and their corresponding competition results from 01.01.2023 to 31.12.2023 were investigated looking at the instances where none, one, two or three cloned horses played. Polo matches (n=101) were examined, and the data entered into Excel. Data were analysed by ANOVA using Minitab 19, with significance accepted at $P<0.05$; a post-hoc t-test additionally reported significance ($P<0.05$). The statistical analyses were performed on both cloned horses and the likelihood of playing in a match and cloned horses and the likelihood of winning a polo match.

Results: Using the success rate of a team with no cloned horses (51.4%) as a baseline from the Registry, when two cloned horses participated in a match there was an increased percentage of wins ($F=7.53$, d.f.=3, $p=0.001$). However, no significant difference was shown between cloned horses and the likelihood of playing in a match compared to non-cloned horses ($F=1.97$, d.f.=3, $p=0.138$).

Discussion and Conclusion: Comparing polo to other disciplines of the equestrian industry, polo is as evenly matched as possible with players having to have the same cumulative handicap (measured in goals). As such, the assumption stands that each team should have a 50% chance of winning a match. This was verified by the results gathered on the chances of a team with no cloned horses winning, and supports the validity of the research following the teams with one, two or three cloned horses. The findings of the current study indicate that having two cloned horses in the team increased the chance of success at competitions, which may lead to an unfair advantage, putting in jeopardy the fairness of the sport.

References:

Chappell, B. 2012. Equestrian Group Clears Way for Cloned Horses to Compete in The Olympics. Available at: https://www.npr.org/sections/thetorch/2012/08/07/158373631/ equestrian-group-clears-way-for-cloned-horses-to-compete-in-the-olympics (Accessed: 15.04.2023)

Willekes, C. 2019. Breeding success: The creation of the racehorse in antiquity. *Mouseion*. 16(3): 453-469. https://doi.org/10.3138/mous.16.3.006

In vitro testing of the probiotic yeast strain - Saccharomyces *boulardii* against key beneficial and pathogenic faecal bacteria associated with the equine gastrointestinal tract microbiome.

Legge, E. and Carroll, A*.

Hartpury University, Hartpury House, Hartpury, Gloucestershire, GL19 3BE

Keywords: microbiology; dysbiosis; nutrition; antibiotic susceptibility.

Introduction: Symbiotic interactions within the equine microbiome between beneficial microbes and the host play an essential role in maintaining intestinal, microbial and immunological health in the horse. *Lactobacilli* and *Streptococci* taxa digest starch into glucose for energy and produce L-lactate for cell respiration. *Bifidobacterium* taxa benefits host epithelial cells by producing acetate to promote their growth and commensal E.*coli* reduces disease occurrence by outcompeting other *enterococci* pathogens. Factors such as diet, disease and antibiotic administration can disturb this homeostasis and create a dysbiotic microbiome and subsequent gastrointestinal disorders. A yeast-based probiotic could support and promote microbial health.

Materials and Methods: A modified agar well diffusion method (Hossain *et al.,* 2020) was used to detect microbial activities between S.*boulardii* (a strain from Saccharomyces *cerevisiae*) and microorganisms known to be beneficial to the equine microbiome (Escheria *coli, Lactobacillus* and *Bifidobacterium)* and others known to be pathogenic (Enterococcus *faecalis,* Staphylococcus *aureus,* Pseudomonas *aeruginosa* and Salmonella *enteritidis).* The disc diffusion method was used to assess antibiotic susceptibility between 6 antibiotics (penicillin G, amoxicillin, neomycin, streptomycin, tetracycline and zactran), 1 non-steroidal anti-inflammatory drug (NSAID) (Metacam) and 1 anaesthetic (Pronestesic) and two concentrations of S.*boulardii* (concentrated and diluted to 100ul) (Hossain *et al*. 2020). The aim was to identify the *in vitro* characteristics S.*boulardii* elicits on beneficial bacterial growth, the antibiotic susceptibility and any antimicrobial properties exerted against pathogenic faecal bacteria associated with the equine GIT microbiome. Data was analysed using SPSS (IBM version 29). A Shapiro Wilks test of normality determined the beneficial bacteria data to be parametric and the other two data sets to be non-parametric. A paired samples T-test determined pairwise comparisons between growth promotion of beneficial bacteria. A Kruskal Wallis test determined overall between subject effects of S.*boulardii* resistance to antibiotics and a Mann Whitney U test identified further pairwise comparisons. A Freidman's ANOVA determined any significant differences between antimicrobial zones of inhibition.

Results: Growth promotion was seen for *Lactobacillus* and *Bifidobacterium* ($P<0.05$) compared to controls. No effects were elicited on E.*coli* compared to controls. All antibiotics and Metacam demonstrated decreased mean zones of inhibition (ZOI) on the concentrated probiotic plate compared to the dilute (100ul) probiotic, indicating resistance ($P<.001$). Pronestesic had smaller mean ZOI on concentrated probiotic, indicating resistance, compared to moderate sensitivity on the

dilute probiotic (P=0.101). Significant antimicrobial effects were elicited against E.*faecalis,* S.*enteritidis* and S.*aureus* (P<0.001). No antimicrobial effects were seen for P.*aeruginosa*.

Discussion and Conclusions: Growth promotion of beneficial bacterium in the presence of S.*boulardii* may be beneficial for hindgut health in horses. Bacteriostatic and antimicrobial effects exerted on pathogenic bacteria indicates S.*boulardii* has potential to reduce pathogenic bacteria. Antibiotic resistance of S.*boulardii* indicates it has potential to be administered during antibiotic administration to support the gut microbiome. Whilst S.*boulardii* is not currently licensed within the EFSA for feeding in horses further registration trials to prove efficacy *in vivo* are now required.

Acknowledgments

This work was granted a Masters in Research Funding Scholarship from the Funding and Scholarship Committee at Hartpury University. Lallemand Animal Nutrition supplied the probiotic.

References

Hossain, M.N., Afrin, S., Humayun, S., Ahmed, M.M., Saha, B.K. (2020) 'Identification and Growth Characterization of a Novel Strain of *Saccharomyces boulardii* Isolated from Soya Paste.' *Frontiers in Nutrition*, Apr 3;7:27

The perceived effects of perimenopause and menopause on female equestrian riders

Bradley, S. and Mills, C.*

University of Gloucestershire, Gloucester, U.K.

Keywords: climacteric; impact; participation; performance

Introduction: Equestrian sport is sex integrated and enjoys a career longevity atypical for elite athletes of an Olympic sport. The average age of equestrian athletes at Rio 2016 was 44.1, with maximum age of 61. Female equestrians account for approximately two thirds of all participants, yet conversely male equestrians dominate the elite levels (Dumbell et al. 2018). Perimenopause and menopause generally occur for women during the age ranges of 35-65. Symptoms of peri/menopause are very individual, and are physiological, psychological, and cognitive. The menopause transition is complex with a variety of symptoms being experienced by most women (O'Neill and Eden 2012). Female equestrians will experience peri/menopause whilst still participating, and equestrian coaches may benefit from awareness. Equestrian success relies on a unique dyadic relationship between rider and horse. Lamperd et al. (2016) emphasised controlling anxiety and confidence as elite riders' traits. Menopause symptoms may impact these traits. There is a paucity of literature on the effect of the peri/menopause on female athletes, and none relating to female equestrians. Given the longevity of riding age, male dominance at elite level, and the overall preponderance of women within equestrian sport, there is a strong rationale to support research in this area. The aim was to explore the perceived effect of peri/menopause on female equestrian rider, identify challenges experienced, and consider implications for coaching.

Materials and Methods: An online questionnaire was shared via Facebook. Female participants (n = 1,629) were recruited from all equestrian disciplines, aged 21 – 73 years of age ($\bar{x} \pm s$; age = 51.86 ± 14.95 years) who believed themselves to be within or beyond peri/menopause. The survey contained 36 questions consisting of multiple-choice answers plus an 'other' checkbox to accommodate varying individual circumstances. The final optional question required the respondent to share their experience of this life stage. Descriptive statistics were used for the multiple-choice questions and reflexive thematic analysis used for further analysis of the final question.

Results: A word cloud (Figure 1) illustrated frequency of the most impactful symptoms on performance and participation. The most prevalent symptoms were joint pain, weight gain, anxiety, sleeplessness, and loss of confidence. Showjumping and eventing participation reduced by half. Four in five respondents reported reduced enjoyment and a third reported they had stopped riding completely, temporarily or adapted their activity. One in three had ceased receiving coaching, giving a variety of reasons linked to their peri/menopause symptoms.

Figure 1. Word cloud summarising most impactful symptoms.

There is a perception of lack of support within the equestrian community. Greater awareness of symptoms, more open conversations with other riders, and empathy of coaches could offer more support.

> "*I have three of my own horses….my top horse is ready for GP, has taken me to the Nationals at every level and even international. This year I've lost all desire to ride as if I'm suddenly too exhausted to do it….I feel lost"*. Participant 461

Success from seeking medical advice though a GP was mixed – some respondents also used specialist clinics instead. Hormone Replacement Therapy alleviated some symptoms. The importance of finding empathetic coaches suggested they have a strong role to play.

> *"I avoided certain coaches who I once would have tolerated, but I do not feel as robust to cope with criticism, even when it is constructive.*" Participant 913

Discussion and Conclusions: The menopause experience for female equestrians is complex and is perceived to negatively impact female equestrians, the extent varying. A minority of respondents perceived they had not been impacted. Riders and coaches should have awareness and signpost support. Further, performance pathways should consider this aspect for elite riders within Performance Lifestyle roles.

References

Dumbell, L.C., Rowe, L. and Douglas, J.L. 2018. Demographic profiling of British Olympic equestrian athletes in the twenty-first century. Sport in Society 21(9), pp. 1337–1350.

Lamperd, W., Clarke, D., Wolframm, I. and Williams, J. 2016. What makes an elite equestrian rider? Comparative Exercise Physiology 12(3), pp. 105–118.

O'Neill, S. and Eden, J. 2012. The pathophysiology of menopausal symptoms. Obstetrics, Gynaecology & Reproductive Medicine 22(3), pp. 63–69.

Variability of sagittal joint kinematics of female horse-riders over a jump.

Baby, R., Wilkins, C., Protheroe, L., MacKechnie-Guire, R. and Nankervis, K.*

Hartpury University, Hartpury House, Hartpury, Gloucestershire, GL19 3BE

Keywords: show jumping; inertial motion sensors; technique analysis; equestrian sports.

Introduction: Show jumping rider technique is described by detailed training guidelines (B.H.S., 2017) but variations in technique application are often observed. In show jumping, emphasis is on the performance outcome: successful clearance of an obstacle course with no focus on strategies employed, potentially resulting in several successful movement strategies. Riding movement patterns are known to be influenced by rider level and fence type (Patterson*, et al.*, 2010; Nankervis*, et al.*, 2015). Movement variability could reflect different riders' strategies and/or continuous adaption to variability in horses' biomechanics. This study aimed to describe rider joint kinematics when jumping, hypothesising important inter-rider and intra-rider variability over different fences.

Materials and Methods: Six female riders (height: 1.69 ± 0.07 m, mass: 57 ± 12 kg) with competitive experience at 1.0 m, jumped a stand-alone vertical (height: 1.0 m, n=4) and oxer (width x height: 0.8 x 1.0 m, n=4), riding their own horse. Kinematics were recorded using MVN Awinda motion tracking (Movella Technologies, Netherlands). Horse linear kinematics were recorded using Alogo Move Pro (Alogo Analysis SA). All jumps (n=48) were analysed from the last approach stride to forelimb landing, in MATLAB (version R2023b, The MathWorks, USA). Peak flexion-extension angles and range of motion (ROM) were estimated for shoulders, elbows, hips, knees, and ankles. Kinematic differences over different fences were assessed using Mann-Whitney test. Inter-participant and intra-participant variability were evaluated using Kruskal-Wallis test and standard deviations (SDV), respectively.

Results: Horses' jump kinematics, rider joint ROM, and peak angles ($p>0.05$) were not significantly different over the fence types. Mean ranks significantly differed for ROM, peak flexion, and extension angles for all joints (all joints: $p<0.01$). Inter-participant variability was highest for elbows, which displayed the greatest sample population SDV of ROM (mean ± SD = 92.0 ± 43.2°). Inter-participant variability was lowest for the ankles, which displayed the smallest sample population SDV of ROM (12.6 ± 5.4°). Intra-participant variability (measured by individual SDV) differed in its magnitude between joints and participants. Individual SDV of ROM was greatest for knees and elbows.

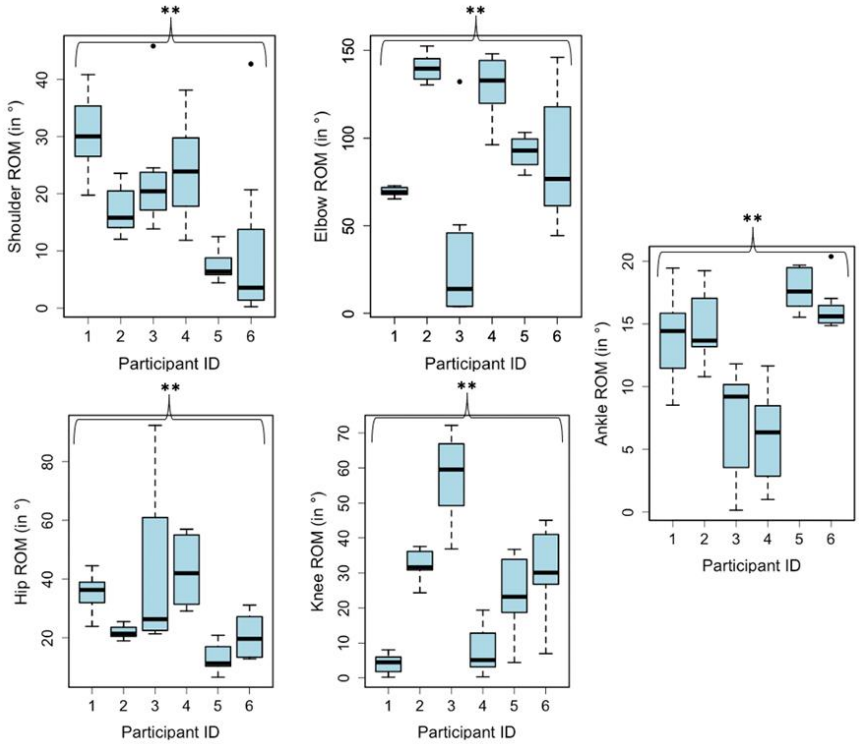


Figure 1: Boxplots of joint angles flexion/extension ROM (in degrees) for individual participants over all jumps (n=4). Significant inter-participant differences are indicated as follows: **p<0.0001 (Kruskal-Wallis test).

Discussion and Conclusions: Inter and intra-participant variability, highlighted by significant differences in mean ranks and high SDV, suggests show jumpers use different riding strategies, contrasting with the rigidity of current training guidelines. It remains unclear whether riders differ in their strategies or in their execution of the same strategy, to better adapt to horse biomechanics. Although performance (jump clearance) was not impacted, movement variability may have discrete consequences which could impact performance under more challenging conditions (e.g.: higher fences). Lack of a significant effect of fence type on horse and rider kinematics is inconsistent with literature (Nankervis et al., 2015). Fence dimensions in this study were possibly not great enough to alter horses jumping techniques, requiring minimal centre of mass elevation. Error may have been introduced by soft tissue artefact, human error, and technological accuracy. Characterisation of riding strategies across different levels would help future analyses better distinguish between strategy and execution variability.

References:

B.H.S. (2017). *Jumping*. BHS Complete Horsemanship.

Nankervis, K., Dumbell, L., Herbert, L., Winfield, J., Guire, R. and Launder, E. (2015). 'A comparison of the position of elite and non-elite riders during competitive show jumping', *Comparative Exercise Physiology*, 11(2), 119-125.

Patterson, M., Doyle, J., Cahill, E., Caulfield, B. and Persson, U. M. (2010). 'Quantifying show jumping horse rider expertise using IMUs', *2010 Annual International Conference of the IEEE Engineering in Medicine and Biology*, 684-687.

Stakeholder perceptions to incorporated veterinary equine practices in the UK

Allen, J. and Armstrong, S.*

Hartpury University, Hartpury House, Hartpury, Gloucestershire, GL19 3BE

Keywords: veterinary practice ownership; experiences; satisfaction

Introduction: Over the last decade the number of independent veterinary practices has decreased mainly due to being bought out by corporations. While independent veterinary practices accounted for 89% of the UK industry in 2013, this share had fallen to less than half (45%) by 2021 (*Competition and Markets Authority, 2023*). The purpose of this study is to understand the effects the incorporation of equine veterinary practices has had on clients and staff members in service, finance and work life. Current research mainly covers the impact of incorporation on the business functions of the practice rather than the impact on clients or staff and whether that is positive or negative. The study aimed to investigate attitudes to both incorporated and independent practices.

Methods: An online questionnaire was developed to identify experiences and opinions of veterinary practice ownership types. Participants had to be over the age of 18 and a client or member of staff in an equine veterinary practice in the UK. There was a specific question for staff however other questions were aimed at clients. The questionnaire was distributed via social media such as Facebook in December 2023 to February 2024 and was answered by 127 respondents. Quantitative data were analysed using chi-squared test/analysis for association and qualitative data were analysed using thematic analysis.

Results: Thematic analysis showed a preference towards independent practices in finances and experiences. Most respondents, including staff and clients (46%), were registered with independent practices, 22.3% were registered with an educational establishment practice (e.g., Royal Veterinary College) and 16% were registered with an incorporated practice (e.g., Vet Partners). The majority of respondents were from South East England (37%). Chi-squared tests for association showed a significant result for an increase in costs for clients when moving from an incorporated practice to an independent practice for diagnostics and medicine ($p=0.02$) (value=4.8). A significant decrease in satisfaction was shown for clients experiencing ownership change whilst a registered client in both customer service ($p=0.007$) (value=15.097) and horse welfare ($p=0.04$) (value=8.134).

Discussion and Conclusions: The general preference towards independent practices in clients and staff was mainly seen in quality of service, however, there were factors of incorporated practices that were perceived as better such as yard discounts and the process of hospital referrals such as choice of hospital and quality. Expenses were a key influence for clients and their opinions of ownership types, possibly from the rise in cost of horse ownership (*National Equine Welfare Council, 2023*) having a direct impact on horse welfare. Staff perceptions of the profession on the whole was negative regardless of ownership type which participants suggested was due to lack of motivation, long work hours and lack of benefits from the job; these findings support a recent survey of the veterinary profession (RCVS, 2019). The study showed there needs to be more information available

for clients – there is little information on ownership type as practices are still branded individually and independent practices will likely need more financial support to prevent being taken over in the future.

Acknowledgements: This research did not receive any funding from outside parties.

References:

Competition and Markets Authority (CMA) (2023) Takeover of eight vet businesses could increase costs for animal owners https://www.gov.uk/government/news/takeover-of-eight-vet-businesses-could-increase-costs-for-animal-owners

Royal College of Veterinary Surgeons (2019) Survey of the veterinary profession https://www.rcvs.org.uk/news-and-views/publications/the-2019-survey-of-the-veterinary-profession/

National Equine Welfare Council (2023) Results of survey into cost of living impact revealed https://newc.co.uk/equine-col-surveys/

Examining the influence of cultural backgrounds on equestrians' horse training approaches

Andrzejewski, L. and Cameron, L.*

Hartpury University, Hartpury House, Hartpury, Gloucestershire, GL 19 3BE

Keywords: culture; equine; learning; welfare

Introduction: A variety of research has been conducted in recent decades to investigate horse enthusiasts' strategies and practices in the context of equine behaviour and welfare (Wolframm, Douglas & Pearson, 2023). However, the impact of multi-cultural factors on equestrians' decision-making regarding training methods us particularly limited. Training approaches based on equine learning abilities have been enhanced by equine learning theory. Despite current educational and technological accessibility, global knowledge on training and learning theory is still a critical area for development and is often associated with other species (McLean & Christensen, 2017). Potential challenges to knowledge sharing for 'best' practices include socio-cultural factors, the practicality of a training method and the reliability of information about equine welfare (Hausberger, Lesimple & Henry, 2021). This study aimed to examine the influence of cultural backgrounds on horse training approaches, with the purpose of finding potential similarities or variances between individuals' cultural backgrounds and their preferred training method.

Materials and Methods: Six semi-structured interview questions were selected to collect data adapted to the research question. Three semi-structured focus groups were interviewed online via MS Teams due to the international nature of this study and were held between January and March 2024. The interviews lasted between 10 and 18 minutes, as a total of nine voluntary equestrians participated in this study, representing the nationalities German, French, British, Canadian and Poland. The chosen approach to analysing the data was qualitative data analysis, as the structure of thematic analysis was followed to identify and compare themes found throughout each interview.

Results: The findings revealed a variety of possible interconnections, not only culturally, but other factors, such as the equine specific academic context of individuals (e.g., studying an equine degree). Themes found throughout the discussions include participants' considering ridden work and/or handling as training, utilising horse-centred training approaches, identifying physiological issues, observing and comparing behavioural indicators, considering the horse as an individual, breed characteristics, theory versus practice, participants defining learning theory as well as lack of research. While participants displayed a level of agreement considering equine welfare and behaviour during training, knowledge of equine learning theory varied. Yet, limited understanding was not associated with participants' cultural backgrounds. A key aspect referred to by participants was the preciseness of terminology, stating that equine learning theory is possibly applied subconsciously in practice, without the awareness of its scientific definition, possibly as a result of common insight.

Discussion and Conclusions: A variety of factors potentially play crucial roles impacting human-horse relationships due to variability in human decision-making. To understand the existing view on equine training approaches being used, or not used, it is important to understand cultural influences on these practices. These can include traditions, beliefs and effect of level of education, each underpinning opinions on what is 'right' and 'wrong'. The findings suggest that future research is needed to focus on cultural and educational contexts, to ultimately increase education on learning theory globally. The application of ethical training methods is essential to ensure the industry's social licence to operate (SLO), especially considering the variety of disciplines and human effects, such as anthropomorphism, to provide a certain equine welfare standard during training daily (Hausberger, Lesimple & Henry, 2021).

References:

Hausberger, M., Lesimple, C., & Henry, S. (2021) 'Detecting Welfare in a Non-Verbal Species: Social/Cultural Biases and Difficulties in Horse Welfare Assessment', *Animals*, 11 (8): 2249. Available at: https://doi.org/10.3390/ani11082249

McLean, A. N., & Christensen, J. W. (2017) 'The application of learning theory in horse training', *Applied Animal Behaviour Science*, 190: 18–27. Available at: https://doi.org/10.1016/j.applanim.2017.02.020

Wolframm, I. A., Douglas, J., & Pearson, G. (2023) 'Changing Hearts and Minds in the Equestrian World One Behaviour at a Time', Animals, 13 (4): 748. Available at: https://doi.org/10.3390/ani13040748

Trailer training donkeys (*Equus asinus*) through the use of positive reinforcement and habituation

*Ashcroft, L., Wright, J., Aikman, J. & Bell, L.**

University Centre Myerscough, St Michaels Road, Bilsborrow, Preston, PR3 0RY.

Keywords: operant conditioning; luring; transportation.

Introduction: Transportation of donkeys (*Equus asinus*) is needed for daily management including moving them to areas for improved grazing, to new stables or for veterinary care and procedures (Fisher, *et al*, 2009). As studies show, transportation can impact welfare by exposing the individuals to confinement-specific stressors such as close contact with humans, different temperatures and humidity, poor ventilation, enclosed spaces, and lack of food and water (Dai, *et al*. 2020). As one of the most stressful parts of transportation has been noted to be loading on and off the trailer (Dai, *et al.* 2019), this study aimed to investigate the efficacy of positive training approaches on behaviour regarding loading of donkeys for transportation.

Material and Methods: Two male donkeys, donkey 'A 'and 'B' housed at Lodge Livery, Myerscough Farms, UK, were habituated to three handlers using positive handling and management including feeding, grooming and hoof picking for five sessions between 30-60 m time periods. Both donkeys were trained to wear head collars and as such, these were encouraged during grooming sessions. 15 training sessions were completed over a 4-month winter period between 2022 and 2023, developing from in-stable handling sessions, walking sessions and trailer loading. Both donkeys were led around a circuit starting at a 15m, 10m and progressing to a 5m distance from the trailer with food reinforcement being given at intervals and in sight of the trailer. Positive reinforcement was used to reward the donkeys when neutral or positive behaviour was exhibited on the circuit and around the trailer area. As donkey B performed negative behaviour around the trailer, sessions getting closer to the trailer were rewarded with extensive grooming and positive handling rewards in an attempt to form a neutral then positive association. The statistics gathered were analysed using Minitab 19, using this software One-way ANOVA tests were run. Parametric data was tested with a post hoc Tukey tests and nonparametric data was tested using Kruskal-Wallis.

Results: Across the 15 training sessions, donkey A loaded onto the trailer 37 times with donkey B touching the ramp 11 times but not successfully load. Significant differences (p <0.05) were found between eating, standing, and walking durations when compared with the training week with increased positive behaviours shown. No significant differences (p >0.05) however, were found between the trainer and the duration of positive behaviour and the time of training despite trends for 'favourable trainers' observed.

Discussion and Conclusion: Results suggested that positive reinforcement and luring was the most effective part of the training method, for the study donkeys towards the trailer. Despite donkey B not loading, it seems that the study showed some success with positively reinforcing the donkeys towards the trailer and possibly showing a formation of a bond with specific trainers due to trends

seen in the data. It is hoped that any future trailer loading events will positively affect the donkey's welfare and thus, allow for loading and transport to be less stressful, and provide information which could possibly aid other trainers in loading animals onto trailers.

References:

Dai, F. Costs, A.D. Bonfanti, L. Caucci, C, Martino, G.D. Lucarelli, L. Padalino, B. Minero, M. (2019) "Positive reinforcement-based training for self-loading of meat horses reduces loading time and stress-related behavior" Frontiers in Veterinary Science, 6: 350. pp 1-2. DOI: 10.3389/fvets.2019.00350

Dai, F. Mazzola, S. Cannas, S. Hienzl, E.U. Padalino, B. Minero, M. Costa, D.C. (2020) "Habituation to transport helps reducing stress-related behavior in donkeys during loading" Frontiers in Veterinary Science, 7: 593138. pp 1-2. DOI: 10.3389/fvets.2020.593138.

Fisher, A.D. Colditz, I.G. Ferguson, D.M. (2009) "The influence of land transport on animal welfare in extensive farming systems" Journal of Veterinary Behavior, 4(4), pp. 157-162. DOI: 10.1016/j.jveb.2009.03.002.

The effects of limited low-level laser therapy on equine distal hock osteoarthritis

Ball, J[1,2], Delaney, P.[1,2] and Svetina, A.[1,]*

[1] University of Greenwich Old Royal Naval College, Park Row, London SE10 9LS

[2] Hadlow College Tonbridge Rd, Tonbridge TN11 0AL.

Keywords: arthritis; photobiomodulation; gait analysis

Introduction: Arthritis, in particular osteoarthritis (OA), affects over 60% of the horse population. OA is the deterioration of the joint caused by age, repetitive injury or concussion, and can lead to a decrease in the duration and range of joint motion (Martel-Pelletier, *et al.,* 2016). In the equine industry, horses with distal hock OA are most commonly treated with polysulfated glycosaminoglycan administered by intramuscular or intra-articular injections. However, it could be argued that other avenues of therapy should be explored. Low-level laser therapy (LLLT) involves cells being exposed to low levels of near-infrared and red light. It has been demonstrated that the use of LLLT is beneficial in OA treatment however, the research into the use of this therapy as a treatment or as a complementary therapy is limited (Millis and Bergh, 2023). Therefore, the aim of the current study was to compare and measure the duration of the horses' stride with distal hock OA before and after LLLT.

Materials and Methods: Eight horses were graded with OA; the mean age of the horses was 26 ±4.02 years. The horses received five treatments with LLLT over five weeks, at the same time each week. Gaitsmart Pegasus analysis IMU system was used to measure stride duration in seconds before and after treatment. All horses were treated with an Omega laser (Omega Laser Systems, 2024) with 820nm at 48 jewels per squared at 5K Hz in between the joint of the hock, then a 20 cluster laser was applied with 6 jewels per squared on a multi-pulse setting with 20Hz, 2.5Hz and 146Hz, additionally, the 20 cluster was used to treat the local lymph node on a multi-pulse setting with 20Hz, 10Hz and 146Hz. A paired sample t-test was used to analyse statistical differences for before and after treatment.

Results: The mean value of stride duration before LLLT was 1.16±0.29 seconds and 1.33±0.19 seconds after treatment. A paired sample t-test was performed in Microsoft Excel for the study, resulting in t (7) = -1.08, p=0.16. LLLT did not significantly increase stride duration, rejecting the alternative hypothesis and accepting the null hypothesis.

Discussion & Conclusion: Although the results of this study were insignificant, this work can be used as a starting point for therapists in the industry and further work. The study met all the aims set out of testing limited amounts of LLLT on distal hock osteoarthritis. However, many factors may have influenced the results of this study, the main factor was that the recordings were taken on different surfaces. Because of the adaptability of LLLT in pulse, frequency and energy that is supplied to the treated area, more research on this topic needs to be undertaken to investigate the association between the duration of treatment and these factors. Additionally, further work can use a

combination of two gait analysis techniques such as force plates and IMUs, can develop a better understanding of the effects of LLLT on distal hock osteoarthritis.

References

Martel-Pelletier, J., *et al*. (2016). Osteoarthritis. *Nature reviews Disease primers*. *2*(1): 16072. https://doi.org/10.1038/nrdp.2016.72

Millis, D. L., & Bergh, A. (2023). A systematic literature review of complementary and alternative veterinary medicine: laser therapy. *Animals*, *13*(4), 667.

Omega Laser Systems. (2024). *The Systems*. [Online]. Omega Laser Systems. Available at: https://www.omegalaser.co.uk/equipment/systems [Accessed 14 March 2024].

The impact of landing gradient on cross-country jump biomechanics.

Barber, C. and Lesniak, K.*

Hartpury University, Hartpury House, Hartpury, Gloucestershire, GL19 3BE.

Keywords: forelimb; trunk; jumping; downhill

Introduction: The event horse must execute the cross-country phase of the CCI4* competition, characterised by solid fences and varying terrain. Understanding how gradients alter kinematic variables can be advantageous to the equine sector as it provides insight into the mechanical requirements for the elite horse when jumping out on course; current research of modern eventing is limited. The current study investigated the differences in forelimb kinematics, trunk angle and time from the start of carpal extension on landing to trailing limb contact within a group of elite horses executing two palisade-style fences with different landing gradients.

Material and Methods: Two-dimensional kinematic data were collated from 12 competitors during the cross-country phase of the NAF Five Star Hartpury International Horse Trials (CCI4*) over two fences: one on the flat (fence 19) and one on a downhill gradient (fence 8a). Recordings were taken via video cameras set perpendicularly to the left of the approach to each of the two fences. After digitisation using Kinovea (version 0.9.5), angles of the scapulohumeral, humeroradial and radiocarpal joints, and trunk angle were determined at three phases of the jump effort: the start of carpal extension during the suspension phase, maximum forelimb extension prior to forelimb impact and impact of the trailing forelimb at landing. Additionally, time recordings were taken of the total duration of the three analysed phases of the jump. Data were assessed for normality (Shapiro-Wilks) and, depending on normality, a Paired t-test or Wilcoxon test was employed to test for differences, using SPSS software (IBM SPSS Statistics, version 29).

Results: The scapulohumeral joint angle was significantly more flexed ($P \leq 0.05 – P \leq 0.01$) at the start of carpal extension during landing (7.7°) and at maximum forelimb extension before trailing limb impact (6.85°) when jumping on the downhill gradient compared to the flat. Trunk angle was less steep ($P \leq 0.05 – P \leq 0.001$) over the fence on the downhill compared to on the flat (14.85°, 8.95°, 5.55°), reflecting the increased total time duration ($P \leq 0.001$) from the start of carpal extension during landing to the impact of the trailing forelimb on landing. The angles of the distal limb did not significantly alter with changes in landing gradient.

Discussion and Conclusions: The increased flexion in the scapulohumeral joint recorded for the downhill landing is likely to be influenced by decreased stride frequency and decreased longitudinal propulsive forces (Chateau *et al.,* 2014) undertaken during the approach to the fence. Variation in the time to landing is related to the trajectory over each fence. The flatter landing encouraged a more elevated trajectory, characterised by a more upright trunk angle, and thereby increasing the time in the suspension phase. The findings provide an original insight into the mechanical impacts on the elite event horse jumping on different gradients.

References:

Chateau, H., Camus, M., Holden-Douilly, L., Lepley, J., Falala, S., Ravary, B., Vergari, C., Denoix, JM., Pourcelot, P., Crevier-Denoix, N. (2014) 'Kinetics of the Forelimb in Horses Trotting an Uphill and Downhill Slope', *Equine Veterinary Journal*, 46(S46), pp. 37–37. Available at: https://doi.org/10.1111/evj.12267_113.

Differences in rein tension over upright and cross pole jumps when riding unaffiliated horses.

Bristoll, P. and Scofield, R.M.*

Oxford Brookes University, Gipsy Lane, Headington, Oxford, UK

Keywords: rein tension; cross pole jump; upright jump, leisure horses

Introduction: Rein tension (RT) is a key aspect in the riding, training, and welfare of horses (Christensen *et al*. 2021). However, little research has been conducted into the relationship between RT and jumping. This preliminary study focused on RT when jumping cross and upright poles with data collected analysed to look for differences in left and right RT.

Methods and Materials: Four college horses of mixed age, height and sex were ridden in canter by one right-handed experienced rider over each type of jump four times (twice on each rein) using a random crossover selection for jump type. Horses used were schooled to preliminary standard and regularly jump to 80cm with novice riders. Jumps were set at a height of 60cm with a ground pole and single pole width. TeleRein® was attached to each horse with strain gauges between the bit and reins with a transmitter at the poll recording RT at all phases of jumping, with the transmitter being stopped and restarted to reduce the amount of RT recordings on the flat. A Wilcoxon analysis median score of left/right RT was undertaken using Minitab21®.

Results: Preliminary investigations looked at left and right RT over both jumps. Counts of RT measures equaled 282 for both left and right rein tension over approximately five minutes for all jumps combined for each subject. The median score for left RT was 10.4N (range 2.06 - 82.3) (W=32131.00), and for right RT 8.4N (range 0.6 – 76.1) (W=35511.00).

Discussion and Conclusions: The median scores for cumulative R and L RT during jumping reported here correspond to an appropriate level of RT according to Eiseriö *et al* (2015). However, it should be noted that peaks and troughs of RT varied throughout the jumping period suggesting RT consistency may not be maintained. Further studies should therefore examine consistency in RT and whether it influences success in riding over jumps.

References:

Christensen, J.W., Munk, R., Hawson, L., Palme, R., Larsen, T., Egenvall, A., von Borstel, U.U.K. and Rørvang, M.V., (2021). Rider effects on horses' conflict behaviour, rein tension, physiological measures and rideability scores. *Applied Animal Behaviour Science*, *234*, 105184.

Eisersiö, M., Rhodin, M., Roepstorff, L., & Egenvall, A. (2015). Rein tension in 8 professional riders during regular training sessions. *Journal of Veterinary Behavior*, *10*(5), 419-426.

Investigating Reliability of Qualified Saddle Fitters and Coaches When Observing Saddle Fit on the Horse During Ridden Exercise

Bruce, S. and MacKechnie-Guire, R.*

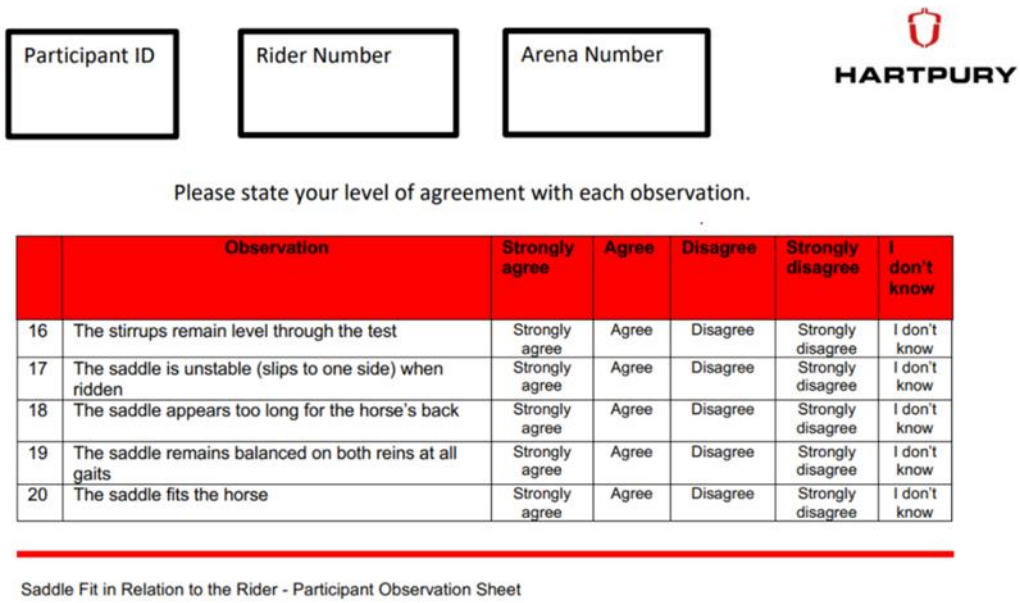
Hartpury University, Hartpury House, Hartpury, Gloucestershire, GL19 3BE

Keywords: agreement; subjectivity; dynamic; standardised

Introduction: Saddles play a crucial role in horse-rider interaction, impacting balance, comfort, and performance. Ill-fitting saddles can compromise performance, alter kinematics and induce back problems and asymmetry in both the horse and rider (Greve and Dyson, 2013). Regular assessments by a qualified saddle fitter are recommended. Despite perception of professionalism and qualification status, subjective challenges within the saddle fitting industry persist. Additionally, coaches' ability to recognise saddle issues is pivotal for rider guidance. This study addresses gaps in understanding agreement in dynamic saddle fit assessments among professionals, aiming to enhance industry standards and credibility. This study aimed to quantify agreement within three group variables: 1) among Society of Master Saddlers qualified saddle fitters (QSF), 2) among United Kingdom Coaching Club/British Horse Society qualified coaches and 3) between the two groups when observing saddle fit on the horse during ridden exercise, using Likert-scale observation sheets.

Materials and Methods: Eight QSFs and four coaches observed twenty-nine horse-rider-pairs conducting a ridden exercise test, evaluating dynamic saddle fit criteria. Recruitment was conducted using social media and snowball sampling, enlisting riders ≥18 years old, pain-free and not undergoing musculoskeletal treatment, with horses engaged in regular activity and the pair demonstrating confidence in various environments. Participation required saddle fitting by a qualified saddle fitter within six months. Observers required proof of industry-qualification. Data collection replicated a dressage competition day, featuring a rider-prescribed warm-up and standardised exercise test. Likert-scale responses for observation sheets related to suggested dynamic saddle fit criteria were used (Figure 1). Inter-observer reliability and agreement were calculated using Fleiss Kappa, percentage observed agreement, and correlation tests.

Results: Agreement varied from poor to fair and was dependent on the criterion evaluated and the group assessed. Poor agreement was found for saddle length among coaches (k=-0.134) and between QSF and coaches (k=-0.041). Slight agreement was found across all group variables for stirrup level (1) k=0.207, 2) k=0.164, 3) k=0.158), and also for overall saddle fit (1) k=0.146, 2) k=0.170, 3) k=0.078). Slight agreement was found for saddle stability among QSF (k=0.129) and between the two groups (k=0.154), also for saddle balance (1) k=0.126, 3) k=0.152). Slight agreement was found for saddle length among QSF (k=0.049). Fair agreement was found among coaches for saddle stability (k=0.371) and saddle balance (k=0.306).



Participant ID | Rider Number | Arena Number

HARTPURY

Please state your level of agreement with each observation.

	Observation	Strongly agree	Agree	Disagree	Strongly disagree	I don't know
16	The stirrups remain level through the test	Strongly agree	Agree	Disagree	Strongly disagree	I don't know
17	The saddle is unstable (slips to one side) when ridden	Strongly agree	Agree	Disagree	Strongly disagree	I don't know
18	The saddle appears too long for the horse's back	Strongly agree	Agree	Disagree	Strongly disagree	I don't know
19	The saddle remains balanced on both reins at all gaits	Strongly agree	Agree	Disagree	Strongly disagree	I don't know
20	The saddle fits the horse	Strongly agree	Agree	Disagree	Strongly disagree	I don't know

Saddle Fit in Relation to the Rider - Participant Observation Sheet

Figure 1. Horse-Rider-Saddle Fit Observation Sheet.

Discussion and Conclusion: Desirable agreement levels ideally range from moderate to perfect (Landis and Koch, 1977), yet none of the evaluated group variables achieved this. Varying levels of agreement were observed among QSF and coaches in assessing saddle fit dynamically, with notably lower agreement on saddle length which is a factor that significantly alters equine spinal kinematics. Factors such as observation angle, communication limitations, and differing expertise purportedly influence agreement levels (Guire *et al*., 2017). This highlights the need for standardised guidelines and objective measures to validate saddle fit. Collaborative efforts between QSF and coaches are crucial for holistic horse-rider care. Standardised protocols considering visibility, communication, and evaluation criteria are essential to promote consistency and trust in the industry, ultimately enhancing horse welfare and performance.

References:

Greve, L. and Dyson, S. (2013) 'The horse–saddle–rider interaction', The Veterinary Journal, 195(3), pp. 275–281. Available at: https://doi.org/10.1016/J.TVJL.2012.10.020.

Guire, R. *et al*. (2017) 'Investigation Looking at the Repeatability of 20 Society of Master Saddlers Qualified Saddle Fitters' Observations During Static Saddle Fit', Journal of Equine Veterinary Science, 56, pp. 1–5. Available at: https://doi.org/10.1016/J.JEVS.2017.04.001.

Landis, J.R. and Koch, G.G. (1977) 'The Measurement of Observer Agreement for Categorical Data', Biometrics, 33(1), p. 174. Available at: https://doi.org/10.2307/2529310.

The effect of discipline and competition level on rider anxiety in equestrian sport

Buffery, J. and Davies, E.*

Hartpury University, Hartpury House, Hartpury, Gloucestershire, GL19 3BE

Keywords: self-confidence; cognitive anxiety, somatic anxiety, coping.

Introduction: Anxiety is a common challenge for athletes in all sports and is especially important in equestrian sports which requires a harmonious partnership between horse and rider combination (Bridgeman, 2009). Understanding various anxiety types is crucial for riders, trainers, and professionals in the equestrian industry as anxiety must be maintained and utilised to maximise performance potential. The aim of this study was therefore to identify the effect of discipline and competition level on rider anxiety.

Materials and Methods: An online retrospective survey was completed by 159 horse riders of any discipline and competition level, identifying anxiety experiences and coping strategies at competition, and demographics. Participants were also asked to reflect on prior competitions from the previous 12 months when completing the Competitive State Anxiety Inventory (CSAI-2), measuring cognitive and somatic anxiety (CA, SA) and self-confidence (SC) (scored: 9 (low) to 36 (high). Following assumption testing, Kruskal-Wallis tests compared competition regularity and discipline for SA, CA, and SC, whilst Mann-Whitney U tests compared anxiety between unaffiliated and unaffiliated riders.

Results: Riders had moderate to high cognitive ($\bar{x}$ = 27) and somatic anxiety ($\tilde{x}$ = 25), and lower self-confidence ($\bar{x}$ = 17). Results revealed significant differences in somatic anxiety (H (7) = 18.20 (p=0.01) and self-confidence (H (7) = 20.02, (p=0.01) between participants competing at different intervals of regularity. Cognitive Anxiety (H (4) = 10.584, p= 0.03) and Self Confidence (H (4) = 13.11, p= 0.011) were significantly different between competition disciplines, with dressage riders reporting the highest self-confidence (median = 17), and cognitive anxiety (median = 31). Unaffiliated riders had higher somatic anxiety (H (1) = 4.97, p=0.03) (median = 27) and lower self-confidence (H (1) = 6.70, p = 0.01) (median = 15) than affiliated riders (SA median = 23.5; SC median = 17). Respondents reported utilising various coping strategies, including herbal remedies, breathing exercises, time management, music, professional help in the form of a sports psychologist, distractions, and dietary adjustments. However, 80 participants did not utilise any management techniques before competing.

Discussion and Conclusions: Findings suggest that rider anxiety is influenced by characteristics such as competition regularity, discipline, and level of competition. Those competing more regularly may have lower levels of anxiety due to the constant exposure to the competitive environment however high-stake competitions and the desire to qualify for championships may affect this. Disciplines demand different aspects from all riders and therefore it is likely that anxiety would differ as a result. Level of competition also has an effect due to differing experiences, personal goals, and competitive

demands. Anxiety interventions are successful in other sports and coaches should aim to improve the education and management of competition-induced anxiety in horse riders.

References

Bridgeman, D.J., 2009. The working relationship between horse and rider during training and competition for equestrian sports (Doctoral dissertation, University of Southern Queensland).

Case study investigating the feasibility of implementing a track grazing system at Hartpury University for student livery horses.

Charnock-Crawford, V., Smith, C., James, H., Rowlinson, H. and Cameron, L.J.*

Hartpury University, Hartpury House, Hartpury, Gloucestershire, GL19 3BE

Keywords: equine welfare; improvements; liaison

Introduction: Track grazing systems are widely believed to have a positive impact on social contact of horses, contributing towards beneficial management of laminitis, and providing additional turnout. An up-and-coming alternative grazing method, benefiting health and welfare, encouraging natural equine behaviour. Implementing a track livery system at Hartpury University will set a good example for the wider industry (Cameron et al., 2021). Hartpury currently have 150 stables available for student livery, situated within the Equine Centre alongside Hartpury loan horses. Solo/herd turnout is offered as a part of the stabled livery, the track system would account for a substitute to classic field turnout.

Materials and Methods: Two online questionnaires were distributed. The first questionnaire asked track livery owners how they currently manage their track grazing and initial set up costs. The second questionnaire was aimed at both current and potential students, gaining opinions on whether a track grazing system would be popular. Each questionnaire was descriptively analysed and assessed independently.

Results: The questionnaire aimed at owners received 23 responses; the student questionnaire received 87 respondents. Initial set up costs for existing tracks ranged from £100 - £50,000. Common considerations for initial track set up were: check the gradient of the land to ensure optimal drainage, add plenty of enrichment, and have a large open barn as the field shelter. Preferred choices for enrichment activities were sand pits and logs.

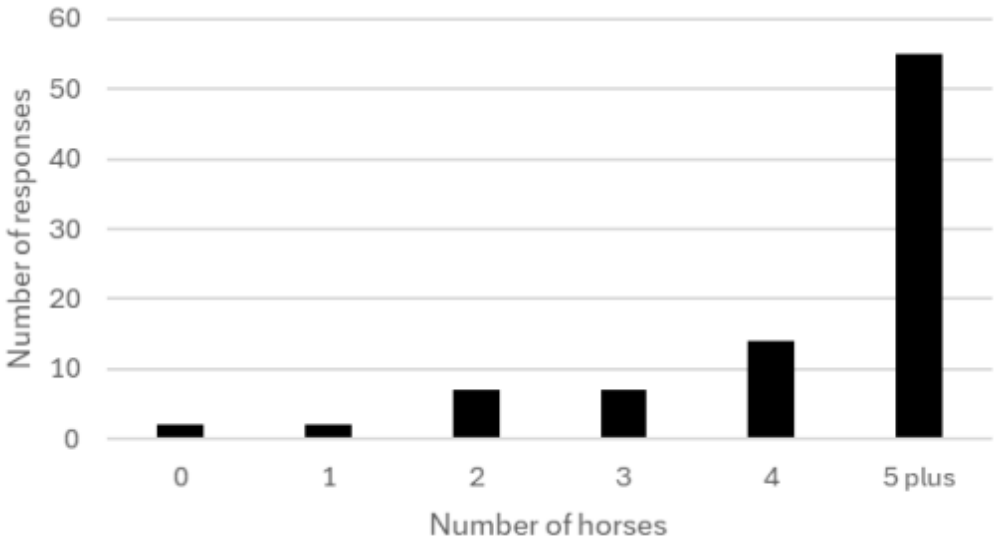


Figure 1 - Number of horses students are willing to herd with on a track livery.

Costings vary for each proposed standard of track, however, the highest initial set up costings would be for Mud Control Mats (£8.10 per 1m2), field shelters (from £5012 plus VAT), and essential planning permission.

Eighteen percent of students suggested their key deterrent for a track grazing system was the risk of horse injuries due to potentially narrow areas and ground conditions, often dependent on competition level of their horse. With comments suggesting willingness to have a horse on track livery was associated with which horse breeds would herd together (requires further investigation.) Another deterrent was possible mismanagement of horse's individual feeding/forage requirements.

Discussion and Conclusions: Three standards of track livery systems are proposed for Hartpury University, gold standard being the optimal. Land usage is the predominate arising limitation, considering ground for grazing at Hartpury University is limited. Options to build a track through currently minimally used woodland area supports feasibility of this case study, increasing optimal usage of available ground. In response to challenges, several suggestions have been developed. Options to have a track system as an alternative to current livery is popular among students. Overall, the results of this case study signify implementing a track system at Hartpury Equine Centre is feasible thus far given the positive response from students and the accessibility of currently vacant ground.

References:

Cameron, A., Harris, P., Longland, A., Horseman, S. and Hockenhull, J. 2021. UK horse carers' experiences of restricting grazing when aiming to prevent health issues in their horses. *Journal of Equine Veterinary Science*, 104, p.103685.

An investigation into horse owner/loaner knowledge on equine sleep and non-syncopal collapse.

Davidson, P. and Greening, L.*

Hartpury University, Hartpury House, Hartpury, Gloucestershire, GL19 3BE.

Keywords: sleep deprivation; education; welfare.

Introduction: Sleep plays a vital role in the welfare of all animals. Horses sleep for between 3-4 hours and require 25-40 minutes of REM sleep in a 24-hour period, for which they must be recumbent (Greening and McBride,2022). Non-syncopal collapse has been associated with horses that cannot achieve a recumbent posture, such that REM sleep occurs whilst standing up (Haines, 2022). Due to muscle atonia associated with this sleep state, the horse then partially or fully collapses. The study's aims were to determine overall understanding of equine sleep, and also to record owner experiences of equine non-syncopal collapse.

Materials and Methods: An online questionnaire was sent to equine Facebook groups such that the sample population of horse owners and loaners (N=75) was derived from volunteer and snowball sampling. Closed questions enabled statistical analysis (Mann Whitney U; $P<0.05$), where the participants were classified based on whether they believed horses typically slept for four hours or less (Group 1), or horses typically sleep for five hours or more (Group 2). Open questions captured owners' experiences of collapse, which were subject to thematic analysis.

Results: Quantitative data revealed a gap in knowledge for most participants when asked how much sleep they thought their horse required. Overall, 41% of respondents believed that horses slept less than 4hrs and 59% believed horses slept more than 5hrs. A significant difference ($Z=2.072$, $P= 0.038$) was determined between group 1 (mean$\pm$SD= 1.4$\pm$0.76) and 2 (mean$\pm$SD=1.8$\pm$0.9) for whether participants were more likely to consider lack of sleep as a reason for lack of energy. Thematic analysis split management of collapse into three themes; environmental changes, medical treatment, and short-term changes. These themes were similar for the question asking about what veterinary advice was given, if it was given. Of the participants, 20% had experience with collapse. The majority described their horse as falling forwards onto their fetlocks or knees at the time of collapse, and all the horses were relatively calm at the time of collapse; they were almost all either grazing or standing quietly. The age of the horse did not seem to influence the description of the collapse episode.

Discussion and Conclusions: Ongoing education around equine sleep is important so that it is taken into consideration relative to aspects of performance and welfare. This study highlights the prevalence of collapse and how similar episodes are, suggesting similar underlying causes, however further research is required to link this to sleep problems and how to address these to reduce the occurrence of collapse.

References:

Greening, L. and McBride, S. (2022)' A Review of Equine Sleep: Implications for Equine Welfare', *Frontiers in Veterinary Science,* 9. Available at: https://doi.org/10.3389/fvets.2022.916737

Haines, A. (2022) *Sleep Deprivation in Horses.* Available at: https://www.veterinary-practice.com/article/sleep-deprivation-in-horses (Accessed: 19th February 2024).

Current equine management in Equine Assisted Services (EAS)

*Ellisson, A.*and Cameron, L.*

Hartpury University, Hartpury House, Hartpury, Gloucestershire, GL19 3BE

Keywords: welfare; animal-assisted; husbandry.

Introduction: Equine Assisted Services (EAS) is a rapidly growing sector of the equine industry (García-Gómez *et al.*, 2020) currently without specific enforced guidelines on practice, or husbandry, of the equids involved. In 2020 the International Association of Human-Animal Interaction Organizations (IAHAIO) produced recommended guidelines for the welfare of equids within EAS. This investigation aims to gain an understanding of current practices within the sector and determine if IAHAIO welfare guidelines covering care, training and welfare of equids and The Five Domains Welfare Model (Mellor *et al.*, 2020) are being considered.

Materials and Methods: An online questionnaire consisting of 29 open and closed ended questions regarding current EAS practices and equine management techniques was distributed via email to current professionals within the sector. Professionals were identified from The Federation of Horses in Education and Therapy International (HETI) alongside professionals known to the author. All direct emails were sent to facilities in the United Kingdom (UK), but the questionnaire was shared internationally by some participants. The questionnaire was split into six sections: EAS Sessions, Environment, Physical Wellbeing, Mental Wellbeing, Behaviour and Nutrition. Data from all 54 respondents from the UK and internationally were analysed using quantitative methods, including Chi Squared Goodness of Fit and Wilcoxon Signed Rank Test, and thematic analysis, as appropriate, to determine common themes between facilitators and adherence to recommended guidelines.

Results: There were significantly greater than expected (χ^2=89.471; df=1; P=0.001) non-ridden EAS sessions offered compared to ridden. Horses spending up to one hour in a daily EAS session was reported by 51.85% of respondents, 37.04% (n=20) reported 2-3 hours, 5.56% (n=3) reports of 3-4 hours, 3.70% (n=2) of 4-5 hours and only 1.85% (n=1) 5+ hours. Responding facilitators had a variety of qualifications: 90.74% held either an equine or counselling-based qualification while 11.11% held an EAS specific qualification. The ability of equids to perform natural behaviours was of great importance to 98.15% of respondents. All (n=54) reported that their equids received regular veterinary and dental checks, as well as farrier or podiatrist treatment. Grass and hay were the most common forages offered (χ^2=33.50; df=4; P=0.001).

Discussion and Conclusion: EAS practices within sessions generally followed IAHAIO guidelines and wellbeing of equids was a priority for facilitators. All aspects of the Five Domains Model were considered to ensure wellbeing of equids by respondents in this investigation. A greater proportion of non-ridden sessions may lead to the inclusion of retired or rescue horses which might come with their own additional needs. Meeting these could be a challenge considering the lack of required specialist equine training for facilitators. Differences between riding schools (Ijichi *et al.*, 2023) and EAS facilities in this investigation have been noted regarding the workload and enrichment provision

for equids. From the limited sample, it is clear that an industry wide intention to prioritise welfare of equids is both valued and practiced. Despite a lack of regulation, existing guidelines for equine welfare are being followed.

References:

García-Gómez, A., Guerrero-Barona, E., García-Peña, I., Rodríguez-Jiménez, M., Moreno-Manso, J.M. (2020) 'Equine-assisted therapeutic activities and their influence on the heart rate variability: A systematic review', *Complementary Therapies in Clinical Practice*, 39, p. 101167. Available at: https://doi.org/10.1016/j.ctcp.2020.101167.

Ijichi, C., Wilkinson, A., Riva, M.G., Sobrero, L, Dalla Costa, E. (2023) 'Work it out: Investigating the effect of workload on discomfort and stress physiology of riding school horses', *Applied Animal Behaviour Science*, 267, p. 106054. Available at: https://doi.org/10.1016/j.applanim.2023.106054.

Mellor, D.J., Beausoleil, N.J., Littlewood, K.E., McLean, A.N., McGreevy, P.D., Jones, B., Wilkins, C. (2020) 'The 2020 Five Domains Model: Including Human–Animal Interactions in Assessments of Animal Welfare', *Animals*, 10(10), p. 1870. Available at: https://doi.org/10.3390/ani10101870.

Paris Olympic Games 2024 & Equine Wellbeing Parliamentary Report

Föttinger, L. and Hewer, N.*

Hartpury University, Hartpury House, Hartpury, Gloucestershire, GL19 3BE.

Key Words: SLO; nationalities; competitions

Introduction: The Olympics were the world's greatest sporting event, but recent incidents in equestrian sport linked to the mistreatment of horses: Jet Set, Saint Boy, and Kilkenny, at the Tokyo Games sparked controversy and called for improved welfare measures (Meier, Tickell and Konjer, 2023). A French parliamentary report containing 46 recommendations and discussions on ethics and welfare was part of efforts to address these issues (Dombreval, 2022). This research project aimed to determine people's perceptions of the usefulness and effectiveness of the parliamentary report, depending on their nationality and/or equestrian background, in the context of the Paris 2024 Olympic Games.

Materials and Methods: An online multilingual questionnaire with 14 questions was posted in both English and French Facebook groups, which may or may not have been specific to the equestrian community. It garnered 214 responses. An independent samples T-test was used to analyse any statistically significant differences in responses according to nationality and whether or not the respondent belonged to an equestrian community.

Results: Out of 214 participants, 47% were French and 38% were English. More English (65) than French (58) were part of the equestrian community. Among equestrian participants, 130 were aware of the Saint Boy's horse abuse case at Tokyo 2020. However, only 44% knew about the equine welfare charter for Paris 2024. English (45) were more aware of the charter compared to French (36). 154 supported the charter's impact on horse welfare, while 60 opposed it. Conversely, 153 believed the charter alone wasn't enough for horse welfare, compared to 61 who disagreed. In the open questions section, four categories emerged:

1. Monitoring and control of rules (48 responses);
2. Education of riders and the Social License to Operate (SLO) for equestrian sports (17 responses);
3. Concerns about equestrian equipment (10 responses); and
4. Suggesting either banning horse riding or stopping equestrian sports at the Olympic Games (three responses).

T-test results showed no significant difference between nationalities and charter knowledge, $t(212) = 2.30$, $p = 0.55$. However, within the equestrian community group, there was a significant difference, $t(209.72) = -4.69$, $p < 0.001$, indicating that equestrian communities had better knowledge of the charter.

Discussion and Conclusions: The results showed the British are more effective in the way they communicate information. The equestrian world is complicated to understand and follow for

someone external to it (Yli-Koivisto, 2019). Furthermore, people outside the equestrian community are virtually unaware of what's going on within it. However, scandals such as that of the Tokyo Olympics, and especially concerning the mistreatment of horses, went beyond the confines of the equestrian community. The results also showed that the various equestrian scandals surrounding the Tokyo 2020 Olympic Games triggered controversy in the equestrian community sampled, tarnishing the already vulnerable image of the SLO in equestrian sports. Finally, if equestrian sports continue to be associated with the mistreatment and suffering of horses, they risk following the evolution of modern equestrian pentathlon and being banned from the Olympic Games under pressure from public opinion.

References

Dombreval Loïc, 2022, « Bien-être équin, Recommandations pour les Jeux Olympiques de Paris 2024 » (=translation Equine well-being, Recommandations for the Paris 2024 Olympic Games), Available at :

https://savoir-animal.fr/wp-content/uploads/Rapport_sur_le_bien-etre_equin_pour_les_JO_de_Paris_2024.pdf (Accessed : 29/10/2023)

Meier Henk Erik, Tickell Samuel, and Konjer Mara Verena, 2023, “A tale of two scandals: scale shift and the inefficacy of crisis communication management in Olympic scandals”, Frontiers in Communication, vol. 8, p. 1155747

Yli-Koivisto Saila, 2019, “Change or Be Changed: Empowerment of World Culture in the New Olympic Format of Equestrian Sports”, Master's thesis, Tampere University

Investigating British and Polish horse owners' approach to turnout and the possible health and behavioural problems from limiting access

Frischke-Szulc, A., and Williams, L.K.,*

Department of Animal and Agriculture, Hartpury University, Hartpury, Gloucestershire, GL19 3BE.

Keywords: equine welfare; turnout practices; abnormal behaviours

Introduction: Equine welfare is getting more recognition not only amongst professional equestrians but also horse owners in general (Butler et al., 2019). Studies conducted over the past decade have shown sport horses of high value tend to be managed differently than regular non-competition animals, therefore questioning the ethical background of some practices for example limiting turnout (Campbell, 2021). This could potentially lead to poor animal management affecting both mental and physical health of the horses, resulting in the appearance of abnormal behaviors in stabled conditions (Lesimple et al., 2020). The aim of the study was to ascertain the current horse management practices used in two countries: Poland and the United Kingdom as well as looking into differences in turnout time between competition and non-competition horses.

Material and Methods: An online Questionnaire was distributed via social media platforms including Facebook, and with the use of snowball sampling. A total of 749 responses from Poland and the UK were collected and then analyzed with descriptive statistics, content analysis and statistical testing. Spearman's rank tests were used to analyse correlations between injury risk and turnout, taking safety precautions (such as wearing leg protection while out in the pasture) in competition and non-competition horses. Chi-square tests were conducted to assess differences in turnout time between horses that are competing and those that are not.

Results: The results of the study showed great differences in turnout practices between the two countries, such as taking precautions while turning out horses is not as common in Poland as in the UK The results significantly differed with 78% (n=339) UK and 54% (n=167) Polish respondents claiming to do so. Analyzing open-ended questions gave an insight of opinions about turnout from horse owners from multiple equine backgrounds When asked '' Can you decide on your horse's turnout time?'' a total of 129 (n=129) respondents from both the UK and Poland stated that they do not have a say in this matter. 110 (n=110) participants reported that the reasoning for their lack of control over turnout time is the yard rules and its owners' decisions. A Chi-square test revealed that competition horses receive a different turnout time than non- competition ones ($x=49.94^{2;}$ p=0.002)

Discussion and Conclusions: By examining the turnout practices in Poland and the UK, a greater understanding of horse owners' opinions and turnout trends was achieved. The comparison of results from those two countries showed the differences between equine societies of Western and Eastern Europe. This creates an opportunity for them to learn from each other and ideally, improve the welfare of their horses. These results encourage further research on management practices in the equine industry. By understanding the principles of equine welfare, owners' control of turnout

could improve the conditions that horses are kept in and therefore lead to better quality of life for many horses in the industry.

References:

Butler, D., Valechon M., Annan R., Whay H., Mullan S., (2019) 'Living the "best life" or "one size fits all"—stakeholder perceptions of racehorse welfare', *Animals*, 9(4), p. 134. doi:10.3390/ani9040134.

Campbell, M.L. (2021) 'An ethical framework for the use of horses in competitive sport: Theory and function', *Animals*, 11(6), p. 1725. doi:10.3390/ani11061725

Lesimple, *C*., Reverchon-Billot L., Galloux P., Stomp M., Boichot L., Coste c., Henry S., Haubserg M., 2020) 'Free movement: A key for welfare improvement in sport horses?', *Applied Animal Behaviour Science*, 225, p. 104972. doi:10.1016/j.applanim.2020.104972.

Investigating the effects of fly masks on equine (*Equus caballus*) affective states and social communication.

Harvey, C. and Pawson, C.*

Hartpury University, Hartpury House, Hartpury, Gloucestershire, GL19 3BE.

Keywords: welfare; emotion; interaction; husbandry

Introduction: Fly masks are a mesh screen for the equine face used for insect prevention to avoid distress. There is almost no peer-reviewed research systematically testing their efficacy in reducing discomfort or promoting welfare in equines (Machtinger, *et al*., 2012). Given the social organisation of equids the potential occlusion of socially-relevant communication signals by fly masks may have welfare implications (Wathan and McComb, 2014). With that in mind, the authors contend that it is important to understand if masks are associated with changes in communication and interactive behaviours.

Materials and Methods: The impact of fly masks on equine behaviour was explored using observational methods to assess seven mature geldings. Using instantaneous sampling, individuals were observed in the stable via video recording to measure behaviours indicative of individual affective response to fly-masks throughout four conditions for a total of 20 minutes. To measure social behaviours, pairs were observed in the field by a single researcher throughout three conditions across 45 minutes. Observations were repeated for each individual horse, both with and without a fly mask. Raw data was transcribed into Microsoft Excel where descriptive analysis was conducted. Inferential analysis was conducted in SPSS to identify statistical significance.

Results: Behaviours were compared in the presence and absence of a fly-mask. There were no statistically significant differences in individual affective behaviours in the presence or absence of a mask. However, social behaviours were found to be significantly impacted by the fly mask. Distance between horses increased (f = 8.027, p = 0.001) and frequency of affiliative (X^2= 11.06, p = <0.001) and play (X^2 = 4.42, p = 0.04) behaviours decreased when a single horse wore a fly mask.

Discussion and Conclusions: These results are discussed with reference to the implications of fly masks for equine conspecific interaction and wellbeing, and applied equine welfare. Given that these findings highlight the potential for fly masks to influence equine social behaviour, owner awareness should be increased in order to ensure they are able to make informed choices surrounding the products or methods used for insect relief. The experimental nature of this study plays an important role in creating a foundation for future research in this area.

References:

Machtinger, E., Leppla, N. and Saunders, C. (2012) 'Pest Management Perceptions and Practices for Equine Farms in North and Central Florida' *University of Florida, Institute of Food and Agricultural Sciences*. Available at: https://www.academia.edu/download/38869404/IN98300.pdf

Wathan, J. and McComb, K. (2014) 'The eyes and ears are visual indicators of attention in domestic horses' *Current Biology, 24(15*). DOI: https://doi.org/10.1016/j.cub.2014.06.023

The Impact of Mental Toughness on Riders' Psychological Responses to Injury

Hill, L. and Davies, E.*

Hartpury University, Hartpury House, Hartpury, Gloucestershire, GL19 3BE.

Key Words: Stress; coping; participation; equestrian

Introduction: Mental Toughness (MT) increases athletes' abilities to withstand sporting demands, one such demand within equestrian sports is a high risk of serious injury associated with both ridden and non-ridden activity (Carmichael *et al*., 2014). MT is depictive of how a person responds to challenging, stressful situations, injury is a major source of psychological stress for athletes (Masten *et al.,* 2014), therefore MT has been linked to effective injury coping in athletes (Johnson, 2020). This study aimed to investigate the relationship between rider's psychological responses to injury and MT.

Materials and Methods: An online questionnaire was carried out including two psychologically validated scales – the Sports Mental Toughness Questionnaire (SMTQ-14) and the Psychological Responses to Sports Injury Inventory (PRSII) – completed by a total of 552 participants. Participants had all experienced a serious injury partaking in either mounted or unmounted equine activity in the 12 months preceding data collection. A Spearmans-Rho test of correlation tested the relationship between SMTQ-14 subscales – confidence, constancy, and control – and PRSII subscales – devastation, restlessness, feeling cheated, isolation and reorganisation. Kruskal Wallis tests were performed to analyse differences in SMTQ-14 and PRSII subscales between riders' self-reported compliance with prescribed rest and how easily they reported this transition.

Results: Results indicated weak to moderate relationships between all PRSII and SMTQ-14 subscales, other than between 'confidence' and 'devastation'. The strongest correlation was observed between 'restlessness' and 'control' ($r= -0.489$, $p= <0.001$). The ease of rider's return was significantly affected by all MT subscales 'confidence', 'constancy' and 'control' ($H (5) =41.943$, $p=<0.001$, $H (5) =18.894$, $p=0.002$, $H (5) = 25.657$, $p=<0.001$). Ease of return was significantly affected by all PRSII subscales: 'devastation' ($H (5) = 52.762$, $p=<0.001$), 'reorganisation' ($H (5) =42.144$, $p=<0.001$), 'feeling cheated' ($H (5) =29.329$, $p=<0.001$), 'restlessness', ($H (5) =57.862$, $P=<0.001$) and 'isolation' ($H (5) =49.679$, $p=<0.001$).

Discussion and Conclusions: Findings suggest that MT has the potential to impact a rider's psychological responses to injury, with more adverse responses seen in those with lower MT. The impact of psychological responses to injury and mental toughness on riders' rest compliance and ease of return indicates that psychological skills training may be necessary to enhance the MT of riders to ensure they are adequately equipped to manage injuries as a result of participation. Education of equestrian coaches surrounding the psychological implications of injury and strategies for recovery is also suggested to ensure adequate support is made available to riders in their transition back to riding post-injury.

References

Carmichael II, S.P., Davenport, D.L., Kearney, P.A. and Bernard, A.C., 2014. On and off the horse: Mechanisms and patterns of injury in mounted and unmounted equestrians. *Injury*, *45*(9), pp.1479-1483.

Johnson, K.L., 2020. *Exploring the relationship between mental toughness and self-compassion in the context of sports injury: A mixed methods approach* (Doctoral dissertation, University of Saskatchewan).

Masten, R., Stražar, K., Žilavec, I., Tušak, M. and Kandare, M., 2014. Psychological response of athletes to injury. *Kinesiology*, *46*(1.), pp.127-134.

Can Horseracing education alter perceptions of the sport in equine students and aid stable staff recruitment?

Hobson, R. and Crook, L.J.*

Myerscough College and University Centre, St Michaels Road, Bilsborrow, PR3 0RY.

Keywords: careers; curriculum; welfare; integrity

Introduction: Horseracing is dependent on public perception and participation in the sport for its continuation. Research suggests racing's popularity is declining, with ethical concerns i.e., whip-use, equine wastage and injuries noted as the main barrier preventing racecourse attendance in under 25-year-olds (Patterson and Hodge, 2021). Despite being the most regulated equine sport for welfare and integrity, the public lack knowledge of racing, as the sport is not currently included within education. The industry has a significant stable staff crisis, with an estimated shortfall of 2,500 staff, who are responsible for the daily care, exercise and welfare of the 14,000 Thoroughbred racehorses in the United Kingdom (UK) (Juckes *et al*., 2021). This study aimed to provide horseracing educational sessions to investigate how inclusion of racing within an equine curriculum could alter perceptions of racing, whilst aiding career considerations in racing, as equine students have similar horse care, husbandry and riding skills - key requirements of racing grooms.

Materials and Methods: Following institutional ethical approval, 40 Equine students from Level 1, Further and Higher Education courses participated in one-hour horseracing sessions at Myerscough College. The session presented information on horseracing sport, horse welfare and integrity, career opportunities and riding, by adopting an aerodynamic position in a racing exercise saddle on the Racewood Dressage™ simulator. The session was delivered by the researcher, utilising their knowledge as a work-rider and groom to several racehorse trainers and an Instructor at The British Racing School. A six-question questionnaire completed before the session determined students' knowledge, views and interest of horseracing and career considerations. A five-question questionnaire completed post session gained students' perceptions of racing and career considerations. Chi-squared test-for-distribution using historical counts and thematic framework analysis was used to evaluate pre and post session results (Figure 1).

Results: Prior to the session, 61% students stated they would not consider a career in racing due to negative perception of horse welfare and lack of awareness of careers in racing. Post session, 66% students adapted their views ($\chi 2 = 18.05$, DF= 2; $P<0.01$) to a more positive perception of racing, particularly regarding horse welfare and integrity, which positively correlated with career considerations in racing i.e., a significantly greater proportion of students stated they would consider a career in racing now than prior to the session ($\chi 2 = 13.67$; DF= 2; $P<0.01$). 66% students' valued horseracing inclusion in the equine curriculum due to the session ($\chi^2 = 19.95$; DF= 2; $P<0.01$), with personal fulfilment, increased awareness and racing knowledge, and racing's relevance to equine studies identified as key factors (Figure 1).

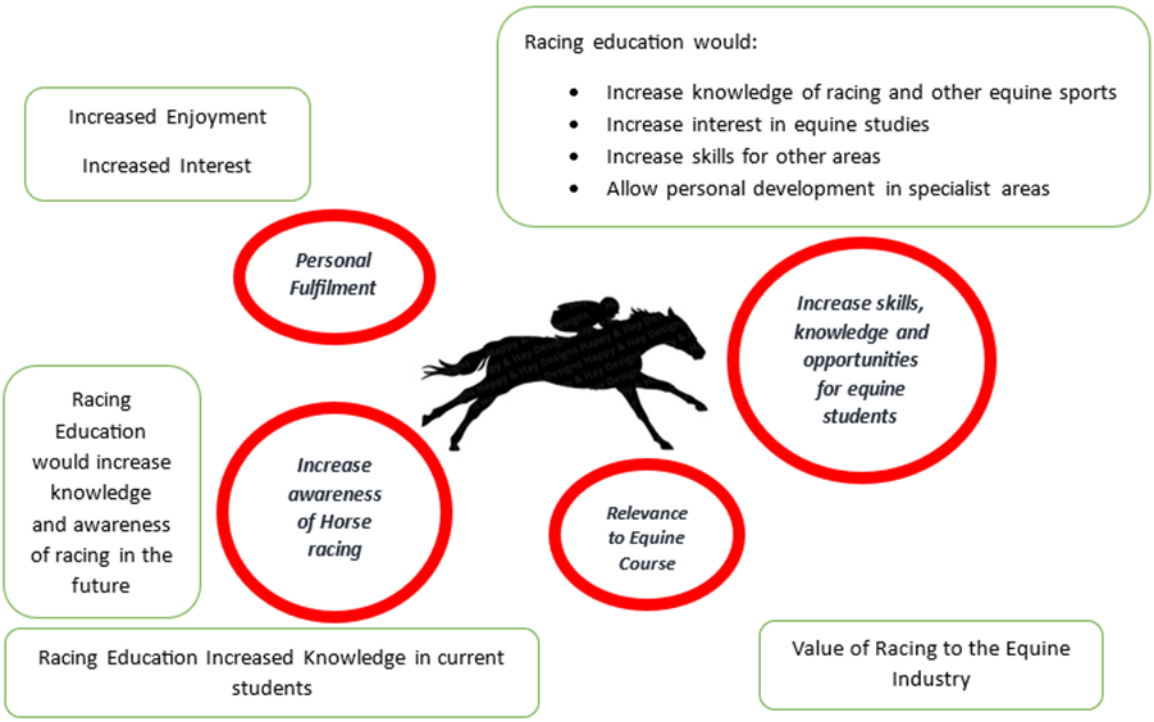


Figure 1: Factors identified for equine students wanting a permanent inclusion of horse racing in an Equine curriculum.

Discussion and Conclusions: Inclusion of horseracing in an equine curriculum could instil more positive views of racing and contribute towards increased stable staff recruitment. Utilising industry experts to increase knowledge and awareness of racing at colleges providing equine courses, by incorporating racing in an equine curriculum could influence students' perceptions of horse welfare and careers in racing. A relatively small sample size may limit results of this study and further research could clarify equine students' perceptions of racing and career considerations in a wider context to implement horseracing in national equine curriculums.

References:

Juckes, E., Williams, J., Challinor, C., Davies, E. (2021) 'Racing to a Staffing Solution: An Investigation into the current staffing crisis within the UK horseracing industry', Comparative Exercise Physiology, 17 (1), pp. 73-89.

Patterson, H., Hodge, V.J. (2021) 'A Survey of Horse Racing Opinions and Perception'. SportRxiv. Accessed 15/02/24 via A Survey of Horse Racing Opinions and Perceptions | SportRxiv

Influential factors in people's decision-making when considering rehoming a rescue horse

James, H. and Collins, R.*

Hartpury University, Hartpury House, Hartpury, Gloucester, GL19 3BE.

Keywords: restrictions; finances; purpose; time

Introduction: The number of horses relinquished to charities has increased in the last ten years despite charities being at capacity (Rosanowski and Verheyen, 2019). Hence, more research is needed on factors influencing people, as this could increase the number of rehomed horses which is required (Holcomb, Stull, and Kass, 2010). Therefore, the study aimed to identify factors influencing people's decision-making when considering rehoming a rescue horse.

Methods: An online questionnaire was conducted. The inclusion criteria required respondents to work in the equestrian industry or, own a horse, and be at least 18 years old. The mode determined the most influential factors. Mann-Whitney U and Kruskal-Wallis H compared factors influencing different groups: people who have rehomed a rescue horse (rehomers) and people who have not (non-rehomers), people who have owned a horse (owners) and people who have not (non-owners), and the different groups regarding the purpose for which people want the horse. Braun and Clarke's (2006) thematic analysis analysed factors influencing respondents who have considered rehoming a horse and respondents who have not.

Results: Responses (n=548) were achieved. Unlike previous research, charities' restrictions on rehomers were influential. Current and prior rehomers were significantly more likely to want a companion ($p=<.001$) than non-rehomers who preferred a ridden horse. Non-owners were significantly more likely to strongly agree that financial difficulties ($p=.014$) and a lack of time ($p=.014$) are influential when considering rehoming a rescue horse. There was no significant difference between the groups regarding the purpose for which people wanted the horse for regarding financial difficulties ($p=0.14$).

Discussion and Conclusions: Respondents felt charities impose unrealistic restrictions due to the control charities want to keep over the horses, partly by having home checks. As rescue centres have more companions than riding horses, rehomers may be used to rehoming companions; therefore, they prefer this. Non-owners might be less financially stable due to the current cost-of-living crisis and working longer hours; thus, financial difficulties are particularly influential. This research can help charities select which horses are more suitable for different categories of people, increasing the number of rehomed horses. Charities can also reassure potential rehomers regarding their concerns about restrictions. Focus groups or interviews are needed with equestrians to understand which specific restrictions are influential. Qualitative research is also required with charity staff to establish if charities can do anything to reassure equestrians and understand if charities can practically and realistically alter restrictions.

References:

Braun, V. and Clarke, V. (2006) 'Using thematic analysis in psychology', *Qualitative Research in Psychology*, *3*(2), pp.77-101. DOI: 10.'191/1478088706qp063oa

Holcomb, K.E., Stull, C.L. and Kass, P.H. (2010) 'Unwanted horses: The role of nonprofit equine rescue and sanctuary organisations', *Journal of Animal Science*, *88*(12), pp.4142-4150. DOI: 10.2527.jas.2010-3250

Rosanowski, S. and Verheyen, K. (2019) 'Factors associated with rehoming and time until rehoming for horses listed with an equine charity', *Veterinary Record*, *185*(12), p.373. DOI: 10.1136/VR.105398

Investigating the effect of Equine Appeasing Pheromones (EAP) on Equine (*Equus caballus*) learning and memory acquisition through Visual Discrimination Tasks.

Jenkins, O., Bartlett, E. and Merrifield, J.*

Merrist Wood University Centre, HE Centre, Merrist Wood, Worplesdon, GU3 3PE.

Keywords: equine; learning; memory; pheromones

Introduction: Pheromones are chemical substances that can alter an animal's behaviour (Frank, Beauchamp and Palestrini, 2010). They have been studied extensively across various species since their discovery in 1959 (Vaglio, Bartels-Hardege and Hardege, 2018; Texas Tech University, 2022). conspecifics. However, despite their widespread use, limited research exists on their impact on learning and memory in horses. This study investigates the effects of a synthetic analogue of Equine Appeasing Pheromones (EAP) on the learning and memory abilities of horses in a training environment. Employing visual discrimination tasks, a pre-established method for assessing equine learning ability.

Materials and Methods: Horses (*n*=10, comprising 5 mares and 5 geldings) with various training backgrounds, life histories, breeds and locations in the UK were tested using a crossover design involving EAP or placebo (Vaseline) being randomly administered. Horses were subject to two visual discrimination shape tasks. Utilising two buckets (2m apart) with different shapes on the outside of each, in a sectioned off chute within the location's menage. One bucket contained a food-based reward. The position of buckets relative to the subject's starting position was randomised each trial. Firstly, horses had 5 practice trials involving only the correct answer. Each experimental learning task involved 15 trials, learning one on each treatment, either EAP or a placebo. Data collected included success rate (expressed as a percentage), and latency to success (in seconds). However, 3 horses were omitted from continuing data collections second task on ethical grounds meaning 7 were analysed (n=7). Data was consolidated in Excel prior to inferential analysis in JASP (0.18.3.0). Mean time to successful completion of task, percentage success rate, and percentage of directional success (whether the reward was in the left or right bucket) all met parametric assumptions (normally distributed when run through a Shapiro wilk test), therefore Paired T-tests were selected. The experimental design is ongoing and is currently in its final phase which tests the subjects' memory.

Results: Preliminary statistical analysis reveals no significant difference in horses' success rate ($p=0.617$) or latency to complete the task ($p=0.398$), regardless of the treatment. Interestingly, a significant difference was observed in success rates based on the location of the correct answer, with horses being more successful when the correct answer was on the right side relative to the horse's position ($p<0.01$), irrespective of the day or treatment. Additionally, horses also took significantly longer ($p=0.01$) to complete the task on day 1 compared to day 2.

Discussion and Conclusions: While horses performed faster on the second day, accuracy did not improve, suggesting habituation may play a role. A right-side preference was displayed when successfully selecting correct buckets, suggesting an element of visual side preference. Contributing to the understanding of these products seeks to optimise the learning environment for horses in various training contexts, by promoting transparency, human safety, and equine welfare within training practices. Therefore, excelling performance and peace of mind. Whilst further research is underway for the effects on memory acquisition, there is reassurance that there will be no effect on horses' learning ability while using these products for behavioural support.

References:

Frank, D., Beauchamp, G. and Palestrini, C. (2010) 'Systematic review of the use of pheromones for treatment of undesirable behavior in cats and dogs', *Journal of the American Veterinary Medical Association*, 236(12), pp. 1308–1316. Available at: https://doi.org/10.2460/javma.236.12.1308.

Texas Tech University (2022) *The Pheromone Site*, *Laboratory of Animal Behavior, Physiology and Welfare*. Available at: https://www.depts.ttu.edu/animalwelfare/research/pheromones/index.php.

Vaglio, S., Bartels-Hardege, H. and Hardege, J. (2018) 'Pheromone', in J. Vonk and T. Shackelford (eds) *Encyclopedia of Animal Cognition and Behavior*. Cham: Springer International Publishing, pp. 1–11. Available at: https://doi.org/10.1007/978-3-319-47829-6_457-1.

Investigating equine behaviour differences between alternative grazing systems

Kennedy, A.[1], Fletcher, K.[2], Challinor, M.[3], Hollister, S.[3] and Cameron, L.J.[1]*

[1]Hartpury University, Hartpury House, Hartpury, Gloucestershire, GL19 3BE

[2]WelfareAware, Pulborough, West Sussex

[3]HorseWorld, Delmar Hall, Whitchurch, Bristol, BS14 0QL

Keywords: social; welfare; track system; management

Introduction: Modern management practices can restrict natural behaviours for horse and human health, safety, convenience and ease of management (Noble, 2023). Behaviours such as social interactions and foraging have been observed throughout generations of feral and domesticated horses and the repercussions of management practices can negatively impact the mental, emotional and physical state of the horse. Excessive stabling and social isolation have been linked to stereotypic behaviours and diet-related health issues (Burla *et al.*, 2016). Track grazing systems were developed with the intention of returning the domestic horse to a more naturalistic environment. Providing the ability to engage with conspecifics, roam constantly with *ad libitum* forage and a low risk of weight-related issues, offering a potential solution to the prevalence of equine obesity, isolation and stress (Jackson, 2006). The aim of this study is to compare differences in behaviours between groups of horses on track grazing systems and traditional open paddocks.

Materials and Methods: This longitudinal study utilised an ethogram to identify positive, neutral and negative social and foraging behaviours for each grazing system. The study monitored a total of 19 horses allocated to their respective grazing system according to weight and health requirements. Behaviours were recorded in 10-minute observations of each herd twice weekly between the months of July to October (2023), resulting in 37.5 hours of logged observations. The ethogram used for observation was developed and approved by HorseWorld staff for regular use in assessments and observations of their equine population. One-zero sampling was implemented to record behaviours and correlation tests were conducted using IBM SPSS V29.0. A statistically significant relationship between behaviours displayed on track grazing systems and traditional open paddocks was evaluated using a Mann-Whitney U test.

Results: Horses in paddocks showed more agonistic and alert behaviours (76.92% of total Resource Guarding behaviours observed and 68.18% of total Hyper Responsive behaviours observed) whereas horses on track systems displayed a higher number of comfort and positive social behaviours (83.33% of total Rolling observed and 73.87% of total Allo-grooming observed). However, there were no significant differences in any behaviours observed between grazing systems ($p>0.05$).

Discussion and Conclusions: While there was no statistical significance between behaviours found between grazing systems, results tentatively show that paddock-based horses displayed behaviours suggesting a hypersensitivity to external stimuli and a lack of cohesion in the group while track

system-based horses exhibited behaviours suggesting successful rank establishment and stronger bonds in the herd. There is a lack of research and evidence behind the impact of track systems on the horse's physical or psychological wellbeing, which may present negative implications for welfare. This necessitates further study comparing natural behaviours displayed in feral and domestic horses in alternative management environments in order to discover their impact and develop management regimes that optimise equine welfare.

Acknowledgements: Thank you to the staff and horses at HorseWorld, Bristol and the Pets at Home Charitable Trust for their support.

References:

Burla, J. B. *et al.*, (2016) 'Effects of feeding management and group composition on agonistic behaviour of group-housed horses', *Applied Animal Behaviour Science*, 176, pp. 32-42, DOI: 10.1016/j.applanim.2016.01.011

Jackson, J. (2006) *Paddock Paradise: A guide to natural horse boarding.* USA: Star Ridge Publishing

Noble, G. K. (2023) 'Horse Husbandry – Nutrition, Management and Welfare', *Animals,* 13 (1), pp. 169, DOI: 10.3390/ani13010169

The effect of magnetic bands on a horse's stride parameters and distal limb circumference on overnight stabled horses.

Marshall-Burnell, S. and Douglas-Dala, K.

University Centre Reaseheath, Nantwich, Cheshire CW5 6DF

Keywords: complementary therapy; magnet; kinematics

Introduction: Complementary and alternative veterinary medicine (CAVM) is expanding in popularity within the equine industry, with a recent study reporting that 54% of horse owners have used magnetic therapy on their horse (Thirkell and Hyland, 2017). However, CAVM is lacking a robust evidence base to demonstrate uptake and efficacy in human and animal fields. In humans, static magnets have been proven to help reduce joint pain and increase mobility, but there is little evidence to show any impact upon gait parameters in horses (Pittler et al. 2007). The aim of this study was to investigate the effects of static magnets on stride length (SL) and limb circumference of leisure horses after overnight stabling.

Materials and Methods: The study was conducted at Reaseheath Equestrian Centre and was approved by the Ethical Approvals Committee prior to commencing data collection. All horses followed standardised husbandry and were stabled in 12' x 12' looseboxes from 4pm until 7.30am the following morning. The data was collected in a three-phase trial that was carried out over three weeks with three horses rotating though each phase in a randomized order (n=9). The 3 phases were; bare legs, non-magnetic pastern bands and magnetic pastern bands, both manufactured by Veredus. Before and after stabling, pastern circumference was measured in centimetres using a tape measure. Horses were then walked past the camera set up three times and an SL average from six strides on the right forelimb was taken and analysed using Quintic version v35. The recording area was the same for each phase of the trial and camera position was measured to ensure standardization across the data collection period. All horses completed all three phases of the trial. Data were tested for normality using a Shapiro-Wilk test and normally distributed data were analysed by a one-way ANOVA, followed by post hoc tests using R version 2.4.3 software.

Results: The mean SLs for treatments were 2.13m (±0.19m), 2.23m (±0.15m) and 2.1m (±0.13cm) respectively and are shown in Figure 1 below. There was a significant increase in SL between bare legs and magnetic bands (p=0.00614). There was no significant difference in limb circumference between treatments (p=0.15).

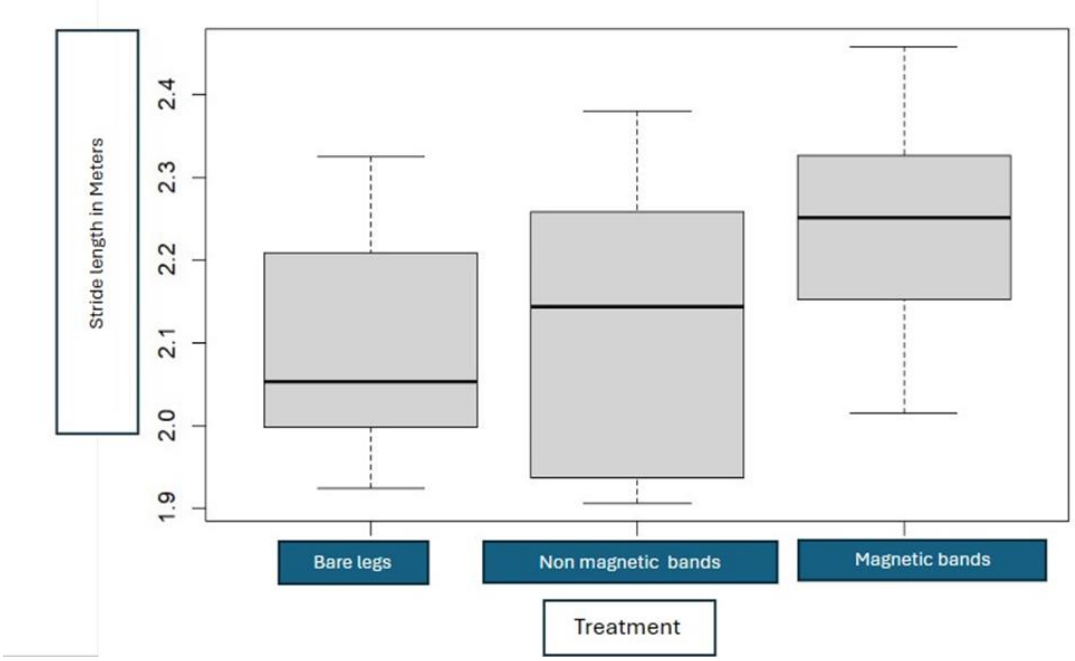


Figure 1: Mean stride lengths of horses under three treatments of bare legs, non-magnetic and magnetic leg bands (n=9).

Discussion and Conclusions: The increase in SL may be explained by the magnetic field causing disruption in the connective tissue and potential increase in localized circulation (Mulligan and Powell, 2011). It has been proven that static magnets can have effects on cell function as upregulated stem cell division has been shown in horses and dogs (Marędziak et al., 2014). A potential reason for the observed increase in SL may also be due to a proprioceptive effect on the horse's limb, which would not have been seen on the horses that had bare legs. This would not explain the non-significant SL increase in the non-magnetic band treatment group this leads to the conclusion that the magnets in the bands are the reason for the increased in SL. Based on the results of this study, the potential merits of using static magnets on the limbs of stabled horses warrants further investigation.

Reference list

Marędziak, M., Marycz, K., Śmieszek, A., Lewandowski, D., & Toker, N. Y. (2014). The influence of static magnetic fields on canine and equine mesenchymal stem cells derived from adipose tissue. *In Vitro Cellular & Developmental Biology – Animal*, *50*(6), 562–571. https://doi.org/10.1007/s11626-013-9730

Mulligan, D. and Powell, D. (2011) Comparison of Moist Heat and Magnetic Therapy on Ultrasound Changes in the Loin Area of Adult Horses. *Journal of Equine Veterinary Science*. 31: 323-324.

Pittler, M. H., Brown, E., & Ernst, E. (2007). Static magnets for reducing pain: systematic review and meta-analysis of randomized trials. *Canadian Medical Association Journal*, *177*(7), 736– 742. https://doi.org/10.1503/cmaj.061344

Thirkell, J. and Hyland, R. (2017). A Survey Examining Attitudes Towards Equine Complementary Therapies for the Treatment of Musculoskeletal Injuries. *Journal of Equine Veterinary Science.* 59: 82-87 https://doi.org/10.1016/j.jevs.2017.10.004

The knowledge of stakeholders regarding wobblers syndrome

Murphy, E., Knight, C. and Stones, N.*

University Centre Sparsholt, Sparsholt College Hampshire, Westley Ln, Sparsholt, Winchester SO21 2NF.

Keywords: cervical vertebral malformation; neurological

Introduction: Equine neurological issues are often overlooked by professional and leisure stakeholders and mistaken for orthopaedic or musculoskeletal lameness issues (Anderson, 2016; Bedenice and Johnson, 2022). Alongside this, there is no definitive neurological examination criteria, suggesting that there is an industry-wide lack of knowledge and recognition. Cervical vertebral malformation (CVM) is a progressive, multi-factorial neurological disease that is characterised by abnormalities of one or more of the cervical vertebrae. Various species, including canines, are also affected by CVM however, diagnosis is easier to reach in these smaller species (Fernandes et al., 2019). The aim of this research was to determine the knowledge of stakeholders regarding CVM, and to determine whether stakeholder years of experience impacted what they deem as an appropriate treatment method for CVM.

Materials and Methods: Data was collected through an online survey formulated using Google Forms, consisting of 17 questions of various style. The questionnaire was distributed to professional and leisure stakeholders (n=193) through various platforms to reach a broad target market, for example social medial and large professional organisations such as The Jockey Club, Association of British Riding Schools and the British Horse Society. MiniTab Statistical Software (Version 21) was used to analyse the data. Chi-Square goodness of fit test was used to analyse the data when there was one variable, whereas cross tabulation and chi-Square test was used when there were multiple variables, significance was accepted at $P<0.05$.

Results: Non-significance was found in relation to the stakeholder knowledge of CVM and years' experience ($P=1.00$). Regarding treatment method for CVM, 40.4% of participants selected management changes, 32.2% selected euthanasia, 18.7% selected medical intervention and 8.3% selected surgical intervention as appropriate methods. However, the stakeholder's years of experience did not significantly affect what they would deem as an appropriate treatment method for a diagnosed case ($P=0.06$).

Discussion and Conclusions: It may be considered that there is an industry-wide lack of knowledge and recognition regarding common equine health conditions, suggesting that there is also a lack of stakeholder knowledge and recognition regarding CVM in horses. In the current study, stakeholder years' experience did not imply a better understanding of CVM or its treatment methods. This needs to be developed through greater dissemination of research, but also improving the accessibility of such resources from welfare organisations such as World Horse Welfare and the British Horse Society.

References:

Anderson, J., 2016. Equine lameness: Exploring conditions' underlying neurological causes. *Vet Times* (July), pp.1–17.

Bedenice, D. and Johnson, A. L., 2022. Neurologic conditions in the sport horse. *Animal Frontiers*. 12(3):37–44. https://doi.org/10.1093/af/vfac036

Fernandes, R., Fitzpatrick, N., Rusbridge, C., Rose, J. and Driver, C., 2019. Cervical vertebral malformations in 9 dogs: radiological findings, treatment options and outcomes. *Irish Veterinary Journal*. 72(2):1-13. https://doi.org/10.1186/s13620-019-0141-9

Participation Experiences in Recreational Horse Riding for Female Riders with ADHD

Peters, G. and Davies, E*

Hartpury University, Hartpury House, Hartpury, Gloucestershire, GL19 3BE.

Keywords: neurodiversity; organisation; feel-good; challenges

Introduction: Attention deficit hyperactivity disorder (ADHD) is a form of neurodivergence which is believed to affect 4.4% to 5.2% of adults, with the higher rates of ADHD among participants in sport (Hoare *et al.*, 2023). Research investigating ADHD most commonly is conducted with male participants (Hinshaw *et al.*, 2022) which has led to females often going undiagnosed due to ADHD symptoms often presenting differently between males and females (Tung *et al.*, 2016). Recreational equestrian sport is a predominantly female activity, therefore female riders who have ADHD are an interesting population to investigate. This study aimed to explore the benefits and challenges of participation in recreational horse-riders for female individuals with ADHD.

Material and Methods: Online semi-structured interviews were conducted with 11 female riders (18-52 years old, mean 25.5±9.4), discussing their experiences as a rider with ADHD (Combined (n=5); Inattentive (n=3); Hyperactive (n=1); Unsure (n=2)). Eight riders had a formal diagnosis and three were self-reported. The interview involved the participants discussing their riding life, ADHD, and the relationship between ADHD and riding life. Thematic analysis was performed to identify key themes regarding the experiences of riders with ADHD outlining some of the benefits and challenges they encounter from participation in equestrian sport.

Results: The main themes identified were structure and organisation, feel-good factors, social life, and challenges in the equestrian industry.

Discussion and Conclusions: Individuals with ADHD can experience challenges with time management, motivation and maintaining routines, however recreational horse-riding benefits individuals by improving their emotion regulation, increases physical movement and personal progress, as well as improved social life and sense of understanding of themselves and from other people in the equestrian industry. Barriers for ADHD riders include working with people, competition and managing their mental health. These findings are beneficial for coaches, employers, and parents of female riders with ADHD, as well as organisations aiming to support people with ADHD, to allow them to understand the effect ADHD has on individuals and allow them to provide appropriate support. This could be provided by ADHD and neurodiversity organisations and ambassadors, by providing information posters, online resources, and educational sessions to help improve knowledge of females with ADHD in sport and recreational horse-riding, and educate coaches, athlete support staff and family members.

References:

Hinshaw, S.P., Nguyen, P.T., O'Grady, S.M. and Rosenthal, E.A., 2022. Annual Research Review: Attention-deficit/hyperactivity disorder in girls and women: underrepresentation, longitudinal processes, and key directions. *Journal of Child Psychology and Psychiatry*, *63*(4), pp.484-496.

Hoare, E., Reyes, J., Olive, L., Willmott, C., Steer, E., Berk, M. and Hall, K., 2023. Neurodiversity in elite sport: a systematic scoping review. *BMJ Open Sport & Exercise Medicine*, *9*(2), p.e001575.

Tung, I., Li, J.J., Meza, J.I., Jezior, K.L., Kianmahd, J.S., Hentschel, P.G., O'Neil, P.M. and Lee, S.S., 2016. Patterns of comorbidity among girls with ADHD: a meta-analysis. *Pediatrics*, *138*(4).

Prevalence and Risk Factors of Helminth Infections in Free Roaming Carneddau Mountain Ponies

Roberts, K. and Harley, J.J.*

University Centre Reaseheath, Nantwich, Cheshire, CW5 6DF.

Key Words: Faecal egg counts; Gastrointestinal parasites; Feral horses; McMasters.

Introduction: Helminth parasites are a significant health concern for both domesticated and feral horse populations. Studies estimate that 60% of domesticated horses are infected (Gold et al. 2019), with an even higher prevalence suspected in free-roaming and feral populations (Cain et al. 2018). Faecal egg counts (FECs) are a diagnostic tool used to detect helminth egg shedding and have been shown to negatively correlate with body condition scores (BCS) in horses (Gold et al. 2019), whereas others show no correlation (Cain et al. 2018). Additionally, higher FECs in populations have been correlated to age (younger than 5 years old), late pregnancy, early lactation, and chronic diseases (Gold et al. 2019). There is a current lack of research on the Carneddau Mountain Pony population regarding helminth infections. This study aims to determine the prevalence of strongyle helminth infections within this population and identify any potential risk factors associated with higher FECs (>500epg).

Materials and Methods: The study focused on a free-roaming population of Carneddau Mountain Ponies in North Wales, estimated to consist of 200-300 individuals, including youngstock, non-lactating and lactating mares, stallions and bachelor groups. Fifty fresh faecal samples were collected between November 2023 and February 2024. Alongside the faecal samples, data was recorded on several factors potentially affecting helminth infection, including age, lactation status, location (Conwy or Llanfairfechan area of the Carneddau Mountain), and body condition score using a modified Henneke scoring system – the use of photographs rather than palpation, although reduced accuracy, physical contact cannot be made with the population. Faecal egg counts (FECs) were performed on each individual sample using the McMaster method to estimate the approximate number of parasite eggs per gram of faeces (x25 epg). To analyse the data, non-parametric statistical tests were employed including Mann-Whitney U to compare FECs between ponies by sex, location and reproductive status. A Kruskal-Wallis was used to compare FECs across age groups (foal, subadult, adult) and Spearman's rank correlation coefficient was conducted to assess the relationship between FECs and BCS using RStudio Version: 2023.12.1+402.

Results: Analysis of the 50 faecal samples revealed differences in egg counts based on two factors: lactation status and location. Lactating mares had a significantly higher median FEC of 659.38 eggs per gram (epg) with an interquartile range (IQR) of 493.75-775.0 epg compared to non-lactating mares (427.78 epg, IQR: 331.25-512.50 epg). Ponies in Conwy had a significantly higher median FEC (756.67 epg, IQR: 487.5-875.0 epg) compared to those in Llanfairfechan (537.14 epg, IQR: 350.0-687.5 epg). Although, BCS and age did not show differences on FEC ($p = 0.2092$, $R = 0.18$ and $p =$

0.2273 respectively), sub-adults had a higher average FEC (846.43 epg) compared to foals and adults. Further investigation into this trend might be warranted despite not differing in this study.

Discussion and Conclusion: This study's findings align with those of Gold et al. (2019) by demonstrating higher faecal egg counts (FECs) in lactating mares compared to non-lactating mares. Similarly, sub-adults in this study had a higher average FEC, although not statistically significant. This trend in higher FECs for lactating mares and sub-adults is potentially linked to a compromised immune system during these life stages (Urquhart et al. 1996). Interestingly, no correlation was found between FEC and BCS in this study, which is representative of other studies (Cain et al. 2018), but not of others (Gold et al. 2019). Further investigation is needed to understand this.

References:

Cain, J.L., Jarisch, K., Macaluso, K.R. and Luedtke, B.E. 2018. Correlation between fecal egg count, presence of Strongylus vulgaris, and body score of feral horses on Fort Polk, Louisiana. *Veterinary Parasitology: Regional Studies and Reports* 13, pp. 14–17. doi: 10.1016/J.VPRSR.2018.03.002.

Gold, S., Regan, C.E., McLoughlin, P.D., Gilleard, J.S., Wilson, A.J. and Poissant, J. 2019. Quantitative genetics of gastrointestinal strongyle burden and associated body condition in feral horses. *International Journal for Parasitology: Parasites and Wildlife* 9, pp. 104–111. doi: 10.1016/J.IJPPAW.2019.03.010.

Urquhart, G., Armour, J., Duncan, J., Dunn, A. and Jennings, F. 1996. *Veterinary Parasitology*. 2nd ed. University of Oxford.

A pilot study investigating the use of facial expressions as a method of analysing emotional stress in therapeutic school horses.

Robinson, E. and Ainley, N.*

Northumberland College, Kirkley Hall Campus, Ponteland, Northumberland, NE20 0AQ.

Keywords: behaviour; emotional state; welfare

Introduction: An important emotional state to understand in therapeutic riding school horses for both horse welfare and rider safety is emotional stress (Squibb *et al.,* 2018). The observation of facial expressions in horses has been suggested as a way of improving the way equine emotional state is assessed (Descovich *et al.,* 2017), however, little research has been conducted to assess the practicality and validity of this method. Therefore, the study aimed to assess if the Equine Facial Action Coding System (EquiFACS) facial expressions associated with emotional stress (Lundblad et al., 2021) could be applied in-field to identify emotional stress in therapeutic riding school horses and if there was a difference between the frequency of facial expressions of stress expressed and workload.

Materials and Methods: Six (5 geldings, 1 mare) horses were selected from the Morpeth branch of the Riding for The Disabled Association (RDA) for the study. To be selected, horses must have been used within the RDA for a minimum of 6 months. Data were collected over 4 weeks from 15 November 2023 to 7 December 2023. During data collection, horses were stabled for 24 hours Monday to Friday, due to poor weather conditions. Data collection consisted of horses being individually video recorded 3 times each on both a day they were ridden in an arena by RDA riders (workday), and they were not ridden at all (day off). A camera, held by the researcher, was used to video the horse's face, for a minimum of 1-minute for each recording. Six facial expressions thought to be associated with emotional stress (Lundblad et al., 2021) were then used to assess the videos, with each expression either being marked as present or not present. The data were then tested for a significant difference using SPSS to run a McNemar's Test.

Results: There was not a statistically significant difference in the total number of facial expressions of stress horses displayed on a workday in comparison to a day off ($p= 0.06$), however, all horses ($n= 6$) displayed at least one facial expression of stress on both workday and day off. There was a statistically significant difference in the frequency of upper eyelid raiser activation occurring, with more being displayed on workday ($p= 0.03$).

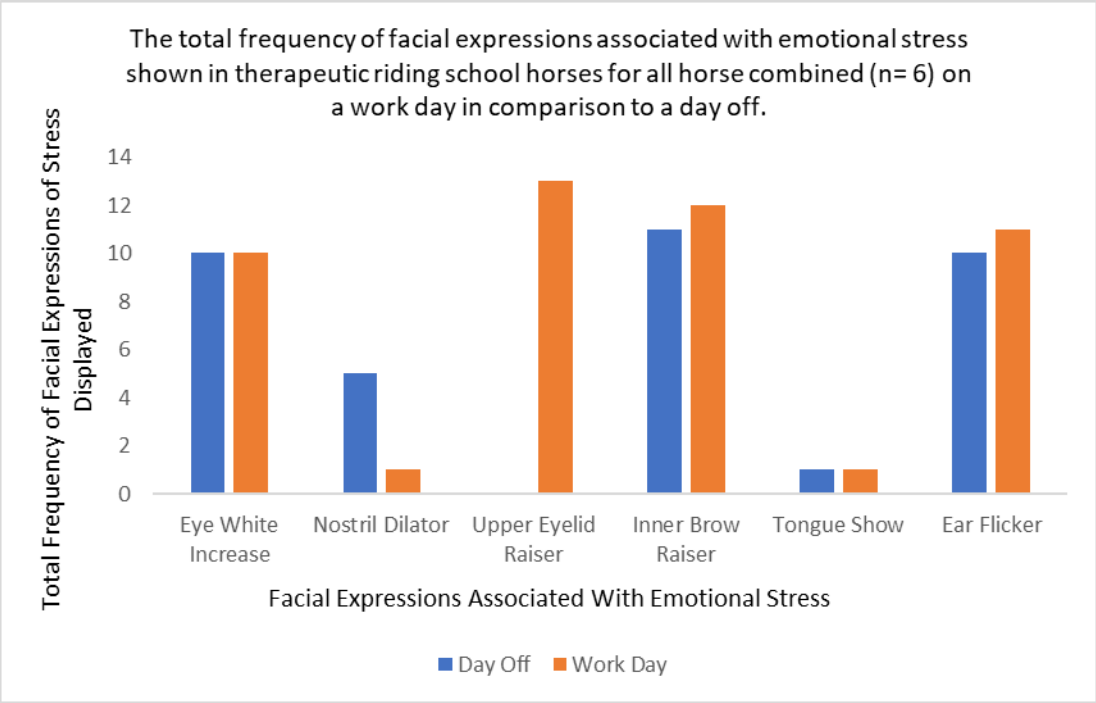


Figure 1: The total frequency of facial expressions associated with emotional stress shown in therapeutic riding school horses for all horses combined (n=6) on a workday in comparison to a day off

Discussion and Conclusions: The lack of statistically significant difference between the frequency of facial expressions of stress horses displayed on a workday compared to a day off suggests that there was little difference between workload and the presence of facial expressions of stress. This implies that there may be other factors within the horse's life, causing stress or discomfort. It also suggests that assessment of emotional stress using a one-minute video recording may not be a suitable method of assessing subtle differences in emotional state. The facial expressions used to assess stress in this study may be a useful tool for assessing the welfare of horses in-field, however, further research needs to be conducted on both the validity and practicality of this method.

References:

Squibb, K., Griffin, K., Favier, R. and Ijichi, C. (2018) 'Poker Face: Discrepancies in behaviour and affective states in horses during stressful handling procedures' *Applied Animal Behaviour Science*, 208, pp. 34-38. https://doi.org/10.1016/j.applanim.2018.02.003

Descovich, K., Wathan, J., Leach, M., Buchanan-Smith, H., Flecknell, P., Farningham, D. and Vick, S. (2017) 'Facial expressions: An under-utilized tool for the assessment of welfare in mammals' *ALTEX- Alternatives to animal experimentation*, 34(3), pp. 409-429. https://doi.org/10.14573/altex.1607161

Lundblad, J., Rashid, M., Rhodin, M. and Anderson, P. (2021) 'Effect of transportation and social isolation on facial expressions of healthy horses' *PLoS ONE*, 16(6), e0241532. https://doi.org/10.1371/journal.pone.0241532

Effects of rider awareness on asymmetrical rein tension

Scott, M. and Lewis, V.*

Hartpury University, Hartpury House, Hartpury, Gloucestershire, GL19 3BE

Keywords: visual; feedback; mechanical; simulator

Introduction: Riders communicate with the horse through operant conditioning ((McLean and Christensen, 2017), by applying a rein aid, and executing a timely release upon achieving the desired response. Evidence from previous studies found mean rein tensions measured in Newtons can vary from 7-43N in walk, 11-51N in trot to16-104N in canter (Kuhnke *et al*, 2010; Egenvall *et al*., 2015). Failure to apply and release the pressure correctly could compromise equine welfare. When riding a simulator, the rein tension could be influenced with the aid of visual feedback on the screen, as visual data presents pressure exerted and possible lateral asymmetries. The rider's ability to use correct and acceptable levels of tension, and the timing of the release of the aid is key to rider performance. The aim of this study was to determine whether rein tension, and asymmetry is impacted by visual feedback. With the addition of comparing riders perceived rein tensions and asymmetries to the recorded data.

Materials and Methods: Purposive sampling was used to recruit eighteen riders at 18 years of age or older, at level BHSQ Level 2 or above. Data were captured over one minute, with the first 30 seconds of data discarded during analysis, on the equestrian simulator (Racewood), in walk, trot canter. Rein tension was recorded using Racewood integrated rein tension gauge. Each participate rode initially without visual feedback (feedback screen covered) and with visual feedback. All riders completed a VAS score of asymmetry perception after dismounting. Descriptive data of the mean, standard deviation, minimum and maximum values and difference of the values, were analysed to evaluate frequencies and statistically tested for differences. Using a Paired T Test, a One Sample T Test and Shapiro Wilks test of normality.

Results: Results found that despite the change of gait, there was no significant difference between the rein tension asymmetry on the left and right rein with, or without visual feedback (p=0.540). Mean tensions varied with visual feedback (58.84 ± 0.3), (p = 0.97) and non-visual feedback (58.85 ± 0.18), (p = 0.259). When testing for asymmetry between nonvisual and visual feedback, there was no significant difference (p = 0.540) between the symmetry indices recorded. Moreover, despite results being non-significant, there was similarity in the predicted asymmetry from the VAS score to the ridden recordings from each rider.

Discussions and Conclusions: Visual feedback did reduce mean rein tensions applied, compared to without visual feedback. Results are comparable to Kuhnke et al., (2010) and Egenvall et al., (2015). The addition of visual feedback via a screen reduced asymmetry of the left and right contact, producing a more symmetrical ridden performance. The Racewood simulator was beneficial to enhance rider awareness of contact without compromising equine welfare. Development and understanding of rider asymmetry and awareness of tensions will improve the welfare of the horse,

and increase performance of the horse and rider. Further research could progress into the effects of visual feedback on a live horse using equipment such as the Centaur Rein Guage, enabling real time feedback.

References:

Egenvall, A., Eisersiö, M., Rhodin, M., Van Weeren, R. and Roepstorff, L., 2015. Rein tension during canter. *Comparative Exercise Physiology*, *11*(2), pp.107-117.

Kuhnke, S., Dumbell, L., Gauly, M., Johnson, J.L., McDonald, K. and Von Borstel, U.K., 2010. A comparison of rein tension of the rider's dominant and non-dominant hand and the influence of the horse's laterality. *Comparative Exercise Physiology*, *7*(2), pp.57-63.

McLean, A.N. and Christensen, J.W., 2017. The application of learning theory in horse training. *Applied Animal Behaviour Science*, *190*, pp.18-27.

Breast Kinematics and Exercise Induced Breast Pain in Simulated Horse Riding.

Searle, K., Maddock, C.* and Cameron, L.J.*

Hartpury University, Hartpury House, Hartpury, Gloucestershire, GL19 3BE

Keywords: equestrian sport; female participation; breast displacement; rider position.

Introduction: Participation of women in sport has been reported at 58% (Audickas, 2017) and is often limited by excessive breast movement and exercise induced breast pain (EIBP) (Burbage & Cameron, 2017). Increased breast movement can lead to embarrassment, pain, and damage to delicate breast tissue (Cameron *et al.,* 2022). Breast size and movement has also been linked to a decrease in participation across different sports (Burbage & Cameron, 2017). Limited research exists in the novel breast movement that may be present during equestrian activities and warrants further investigation.

Materials and Methods: Following institutional ethical approval, female equestrians were recruited (n=9), ranging in age from 20-29 all either students or faculty of Hartpury University, to ride a Racewood™ Event Simulator in four breast support conditions; everyday bra, riding bra, running bra and no support to establish the relative vertical, mediolateral, and anteroposterior breast displacement in sitting trot (medium). Retroreflective markers (12.5mm markers with a 35mm base from B&L engineering) were placed onto each participants left and right nipples, sternal notch, left and right anterior inferior aspect of the 10^{th} ribs and 3^{rd} and 7^{th} vertebrae on the back. Range of motion across three directional planes – vertical, mediolateral and anteroposterior - were tracked using four optical motion capture cameras (240 Hz), then quantified in Qualisys Track Manager ™ Software (version 2023.3(build 12577)). Five full stride cycles were recorded for sufficient analysis. A 100mm Visual Analogue Scale (VAS) was used to assess perceived pain after each breast support condition, and a questionnaire was given to gather demographic information.

Results: Significant differences were found in relative breast displacement between support conditions. Vertical: ($F=8.039$, $df=3$, $p<0.001$), mediolateral: ($F=1.132$, $df=3$, $p<0.001$), anteroposterior: ($F=4.588$, $df=5$, $P<0.001$). Specifically seen between no support (B) and running bra (RB) ($t= -4.136$, $p=0.003$), B and riding bra (RD) ($t= -3.860$, $p=0.005$) and everyday bra (EB) and RD ($t= -3.683$, $p=0.006$) across the vertical axis. EB and RB ($t= -2.873$, $p=0.021$) mediolaterally, B and RB ($t= -2.889$, $p=0.02$); EB and RB ($t= -3.397$, $p=0.009$); RB and RD ($t= 2.846$, $p=0.022$) anteroposterior also showed significant differences. Correlations were also seen between the B, EB, and RB conditions and the VAS scores ($p< 0.01$, $p<0.05$, $p<0.01$). Relating the amount of movement produced to the pain scores, whereas no correlation was seen between the RD and VAS scores.

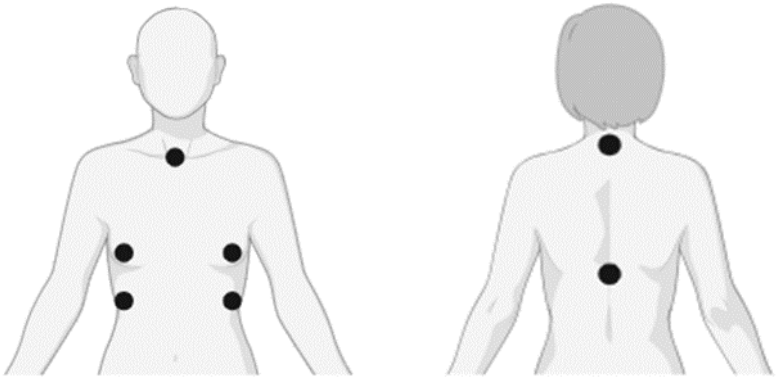


Figure 1. Authors own, depicting where the breast and body markers were placed on each participant to capture the motion across three directions, created with BioRender.com 2024.

Discussion and Conclusions: The RB and RD support conditions were seen to work best at reducing breast displacement across all three axes. As no correlation was seen between the RD and the VAS scores it could suggest that the RD worked best at reducing the perceived pain. The RD bra was seen to have the greatest reduction in pain scores from B, implying that the RD would be the best for reducing exercise induced breast pain (EIBP). The use of appropriate breast support can be linked to a change in rider position (Cameron et al., 2022), with tight competition margins could make the winning difference. A riding specific bra used within the study showed it might benefit the female horse-riding population, as it better caters to the unique movement expressed by the horse.

Acknowledgements: Thank you to all the participants who got involved with the study, the help was greatly appreciated, and the data collection wouldn't be possible without those who got involved.

References:

Audickas, L. (2017). Sport participation in England. *Number CBP*, *8181*. www.parliament.uk/commons-library|intranet.parliament.uk/commons-library|papers@parliament.uk|@commonslibrary

Burbage, J., & Cameron, L. (2017). An investigation into the prevalence and impact of breast pain, bra issues and breast size on female horse riders. *Journal of Sports Sciences*, *35*(11), 1091–1097. https://doi.org/10.1080/02640414.2016.1210818

Cameron, L. J., Burbage, J., Lewis, V., Dumbell, L., Billingsley, E., Young, K., King-Urbin, C., & Goater, F. (2022). Breast biomechanics, exercise induced breast pain (mastalgia), breast support condition and its impact on riding position in female equestrians. *Comparative Exercise Physiology*, *18*(1), 9–19. https://doi.org/10.3920/CEP210005

The effect of ground and raised trot poles on hind limb joint range of motion in the ridden horse.

*Simpson, H. and Paddison, J.**

Hartpury University, Hartpury House, Hartpury, Gloucestershire, GL19 3BE.

Key words: equine; kinematics; polework; rehabilitation

Introduction: Musculoskeletal conditions that affect the joints and muscles of equine athletes have been seen to be prominent in shortening successful competitive careers. In the unridden horse, ground and raised trot poles have been observed to improve balance and muscular control, and strengthen flexor and core stabilising musculature, as well as increasing limb joint ranges of motion (Brown *et al*., 2015). Addition of a rider increases ground reaction forces on the horse's limbs and has an overall extending effect on the back and dorsal muscle chain (De Cocq *et al.*, 2009). Therefore, the aim of this study was to evaluate the kinematics of the femorotibial, tarsus and metatarsophalangeal joints of ridden horses trotting over no poles, ground poles and raised poles.

Material and Methods: 9 horse (mean ± standard deviation; age 9 ± 2 years; height 166cm ± 10cm) and rider partnerships were recruited from the student livery population at Hartpury University. All horses were confirmed sound to be ridden over poles by a veterinarian and ridden by their usual rider. Skin fixed markers were placed on relevant anatomical sites to mark out the femorotibial joint, tarsal joint and metatarsophalangeal joint. Horses were required to trot over no poles (NP), ground poles (GP) and raised poles (RP; 20cm to bottom of pole) in a randomly assigned order to collect 3 clean repetitions. Before starting data collection, horses were warmed up for 10 minutes in walk, trot and canter following their normal routine. Poles were placed at 1.20m ± 0.10m apart in an indoor arena within a marked lane, 25 metres in length and 2 metres wide. Optimum distances between poles were individualised for each participant and confirmed in a practice trial. Two cameras were set up perpendicular and 7.5m from the centre to the lanes to capture strides at 120Hz. A related-samples Friedman's two-way analysis of variance by ranks test was used to identify significant differences, pairwise Wilcoxon comparisons were also used to explore and locate any significant differences between the range of motion (ROM) of each joint throughout the 3 exercise conditions.

Results: All joints produced a range of motion which significantly increased over GP and RP compared to NP. There was overall a significant ($p<0.05$) but asymmetrical response to the exercise conditions in the ROM of the left and right femorotibial joints based on *post hoc* testing; see Figure 1. The metatarsophalangeal and tarsal joints similarly show significant stepwise increases in ROM between the three conditions across both limbs ($p= <0.001$; $p= <0.001$).

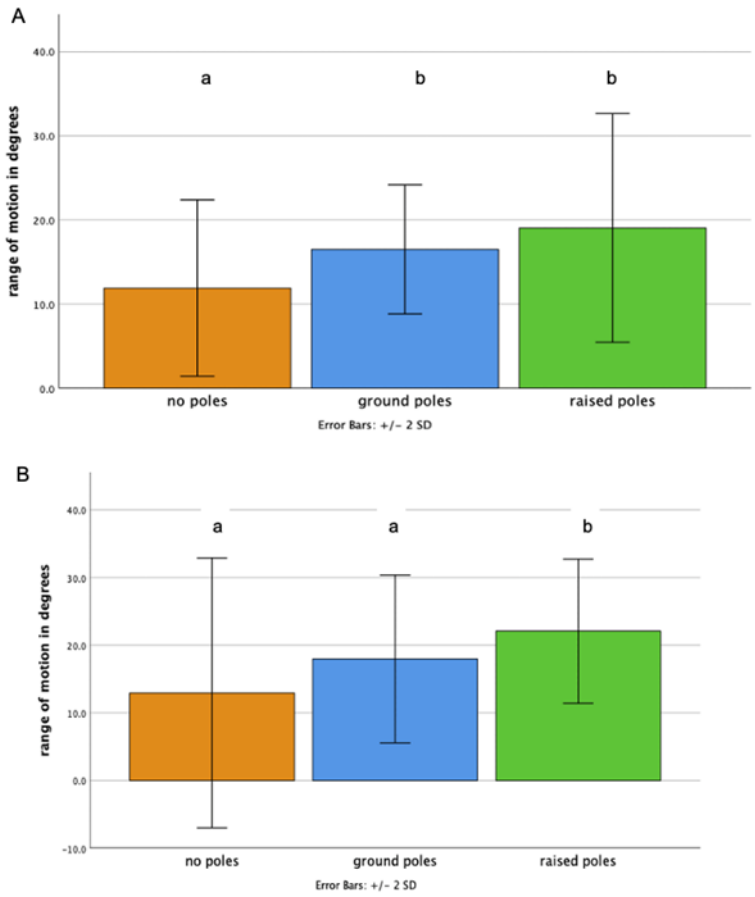


Figure 1 shows the mean range of motion in degrees, with error bars to determine standard deviation, of the stifle in the left (a) and right (b) limbs over no poles, ground poles and raised poles. Differing letters above the bars denote significant differences at $p<0.05$.

Discussion and Conclusions: All results were compared to similar studies in both the walk and trot gaits without a rider; these results express the safe use of trot poles during rehabilitation processes for restoring the full ROM of the femorotibial, tarsus and metatarsophalangeal joints even with the inclusion of the rider as the horses approaches to the poles were similar to the unridden horses (Brown et al, 2015; Walker et al, 2022). Future research should make direct comparison of limb kinematics of the ridden and unridden horse over poles and investigate the impact of varied rider weight on joint ROM over poles.

References:

Brown, S., Stubbs, N.C., Kaiser, L.J., Lavagnino, M. and Clayton, H.M. (2015). 'Swing phase kinematics of horses trotting over poles. *Equine Veterinary Journal*, 47(1), pp.107-112.

De Cocq, P., Muller, M., Clayton, H.M. and van Leeuwen, J.L. (2013) 'Modelling biomechanical requirements of a rider for different horse-riding techniques at trot'. *Journal of experimental biology*, *216*(10), pp.1850-1861.

Walker, V.A., Tranquille, C.A., MacKechnie-Guire, R., Spear, J., Newton, R., and Murray, R.C. (2022) 'Effect of ground and raised poles on kinematics of the walk'. *Journal of Equine Veterinary Science*, 115, p.104005

An investigation into the efficacy of *Urtica dioica* (Common Nettle) as a treatment for equine atopic dermatitis.

Turner, E[*1,2]., Delaney, P[1,2]. and Svetina, A [1,2].*

[1] University of Greenwich Old Royal Naval College, Park Row, London SE10 9LS

[2] Hadlow College Tonbridge Rd, Tonbridge TN11 0AL

Keywords: mud fever; dermatology; horses; zoopharmacognosy

Introduction: The medicinal use of herbs to treat conditions and injuries in horses has been practiced for centuries. Horses have self-medicated various conditions by foraging different herbs and plants with medicinal properties (Attardo and Sartori., 2003) in a process defined as zoopharmacognosy. Over time, domestication has reduced the opportunity to seek out these plants and the self-medicating instinct. *Urtica dioica* (nettle) is a herb commonly used to treat a variety of conditions due to its medicinal properties. It is rich in vitamins and minerals with antihistamine, anti-inflammatory, antioxidant, analgesic, and anti-infectious properties (Bhusal *et al*., 2022). Research suggests nettles can be a successful treatment for human eczema and similar skin conditions (Erarslan *et al*., 2020). Equine Atopic Dermatitis (EAD) is a condition that has similar clinical signs to eczema and is one of the most common skin disorders in equine clinical practice. It manifests as a pruritic inflammatory disease with hair loss, pruritus, scaling and erythema as the primary clinical signs. The aim of this study was to investigate the efficacy of nettle as a topical treatment for EAD.

Materials and Methods: The study involved 10 horses with various degrees of dermatitis chosen using a purposive sampling method. Nettles were boiled at a 1:2 ratio of dried herb:water to create a 35ml hydrosol which was then mixed with a 500ml pot of aqueous cream. The cream was applied once daily for 5 days a week over a 6-week period. Each horse was graded by the researcher using a grading matrix of 0 (no symptoms) to 5 (severe symptoms) before and after the study. The researcher was a 3rd year Equine Sports Therapy and Rehabilitation student with extensive equine experience. When analysing the data, a paired sample T-test was carried out using Microsoft Excel with a p-value of 0.05.

Results: The results for the descriptive statistics for before the treatment found that the mean value was 2.3 ± 0.48 and the mean value for after the treatment was 0.4 ± 1.26. The Pearson Correlation for this study was 0.51. A Wilcoxon test was used to analyse the data as it is a statistical test for the non-parametric of dependant samples t-test and it uses ranked or ordinal data (Statistics Solutions, 2024). The p-value was set at 0.01 which means that there is a 1% chance of the result being not different. Figure 1 shows the mean and standard deviation as a bar chart with error bars.

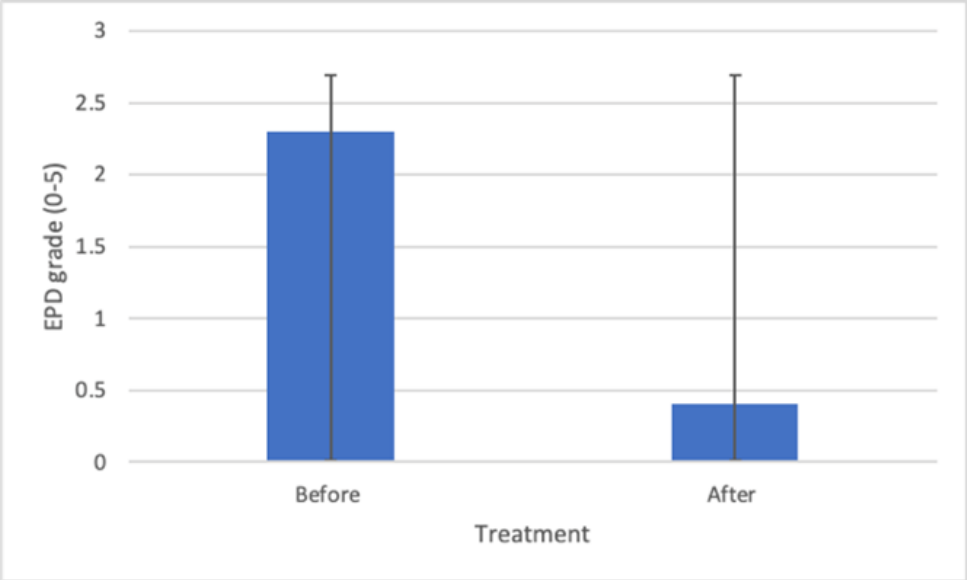


Figure 1: Bar chart of the mean with standard deviation error bars of the before and after treatment with a grading system of 0 to 5

Discussion and Conclusions: The results accepted H1 which hypothesised 'the use of Urtica Dioica as a topical treatment for EAD significantly decreases the symptoms' as the p-value was <0.05. Despite the study being successful, there is room for further research into this topic. Limitations of this study included a small sample size, and the initial grades of the dermatitis were mild which limited the progression of condition. Future research on investigating the efficacy of the herb further, could expand the sample size along with the severity of the dermatitis. To repeat the study, the nettle cream could be compared to a conventional treatment.

References

Attardo, C. and Sartori, F., (2003). Pharmacologically active plant metabolites as survival strategy products. *Bollettino chimico farmaceutico*, *142*(2), pp.54-65.

Bhusal, K.K., Magar, S.K., Thapa, R., Lamsal, A., Bhandari, S., Maharjan, R., Shrestha, S. and Shrestha, J., (2022). Nutritional and pharmacological importance of stinging nettle (Urtica dioica L.): A review. *Heliyon*.

Erarslan, z.b., Ecevit-genç, G. and Kültür, Ş., (2020). Medicinal plants traditionally used to treat skin diseases in Turkey–eczema, psoriasis, vitiligo. *Journal of Faculty of Pharmacy of Ankara University*, *44*(1), pp.137-166.

The impact of enrichment on social behaviour in donkeys.

Williams, C. and Wild, H.*

University Centre Reaseheath, Reaseheath, Nantwich, Cheshire, CW5 6DF.

Keywords: *Equus asinus*; cognition; domestication; welfare.

Introduction: Monotonous, unresponsive environments over which animals have little control lack natural challenge, decrease the opportunity to express species-specific behaviours and lower quality of life (Podturkin, 2021). Environmental enrichment is used to mitigate such effects and improve captive animal welfare through the addition of stimuli that provide opportunities for choice and control. In horses, it has been reported that enrichment can reduce passive behaviours, where the horse is standing however, not watching the item (Jørgensen, Liestøl and Bøe, 2011). However, enrichment does not always reap desirable outcomes and may incur changes to aggression (Melotti et al., 2011) and abnormal behaviour (Podturkin, 2021). The impact of enrichment in equids, particularly donkeys is less well evaluated. The present study aimed to investigate the impact of enrichment on social behaviour in a group of donkeys.

Materials and Methods: This study utilised group housed, sanctuary donkeys (n = 19) of mixed sexes and ages. Behavioural observations took place over five sessions throughout summer and autumn 2023 and conducted during the centres visiting times (10am – 12pm and 1pm-3pm). Sampling windows were split into 1-hour periods; A=10-11am, B=11-12pm, C=1-2pm, D=2-3pm. During these times donkeys were supplied with their usual enrichment chosen at random by their keepers. Enrichment was classified as either an object-based enrichment (an object which is not classed as feed), or as feed-based enrichment (an object which delivers food or a foodstuff). All donkeys were observed during each sampling period using continuous sampling. Social and non-social behaviours were recorded using a premade ethogram. R and R Studio was utilised to successfully analyse the data collected. A Spearman's Rank correlation test was used to assess the relationships between enrichment type and behaviour. Kruskal - Wallis tests were used to determine the effect of sampling time on behaviours.

Results: Spearman's Rank analysis of relationships between behaviour and enrichment type revealed a significant positive correlation between agonistic behaviour and object enrichment type ($r = 0.56$, $p = 0.01$). Whilst not significant there was a notable negative correlation between feeding enrichment type and locomotion ($r = -0.42$, $p = 0.06$). No other significant correlations were found between behaviours and enrichment types. There was no significant effect of sampling time on social or non-social behaviours ($p > 0.05$).

Discussion and Conclusion: To the best of our knowledge, this is the first study to report an increase in agonistic behaviour associated with enrichment in donkeys. Similarly, increased aggressive behaviours are reported in other species (Melotti et al., 2011). The perceived high value of enrichment types may lead to an increase in motivation to pursue them suggesting they may have an undesirable effect on arousal. Whilst not significant, movement decreased when the donkeys

were presented with different feeding enrichment types, given donkeys move whilst grazing, consideration should be taken to ensure movement opportunities are provided within environments. Future research should focus on the effect of enrichment types on specific behaviours compared to periods where no enrichment is provided to ensure welfare is not compromised.

Acknowledgements: I would like to take the time to thank The Donkey Sanctuary Manchester. Green Fold, Abbey Hey, Manchester, M18 8RJ for allowing me to carry out observations during sanctuary opening times.

References:

Jørgensen, G.H.M., Liestøl, S.H.-O. and Bøe, K.E. (2011c) 'Effects of enrichment items on activity and social interactions in domestic horses (Equus caballus),' *Applied Animal Behaviour Science*, 129(2–4), pp. 100–110. https://doi.org/10.1016/j.applanim.2010.11.004.

Melotti, L. *et al.* (2011b) 'Coping personality type and environmental enrichment affect aggression at weaning in pigs,' *Applied Animal Behaviour Science*, 133(3–4), pp. 144–153. https://doi.org/10.1016/j.applanim.2011.05.018.

Podturkin, A.A. (2021b) 'In search of the optimal enrichment program for zoo-housed animals,' *Zoo Biology*, 40(6), pp. 527–540. https://doi.org/10.1002/zoo.21642.

Building a profile of riders in riding schools in the U.K.

*Edmund, M., Williams, J. and Greening, L.**

Hartpury University, Hartpury House, Hartpury, Gloucestershire, GL19 3BE

Keywords: rider weight; horse-rider relationship; suitably mounted; Social Licence to Operate

Introduction: Riding schools are crucial in introducing individuals to the equine industry, shaping their future interactions with horses. To safeguard the welfare of riding school horses/ponies, and novice riders' safety, staff ensure they are suitably mounted. However, limited research exists on human/horse demographics in riding school populations (Nyberg et al., 2023). This retrospective cohort study analysed characteristics from UK-based riding schools from 2019 to 2023 (n=308,698), using data from EC Pro, an equestrian centre software. Designed to enable effective business management with online booking and integrated horse care, yard, and staff management systems EC Pro records riding clients' details which must be updated biannually (EC Pro, 2024).

Material and Methods: Before analysis, EC Pro anonymised all data. The software requires riders to self-report demographic details for horse management (EC Pro, 2024). This study analysed registered riders' age, self-reported height, weight, and geographical region. Data included the nine English regions, Wales, Scotland, and Northern Ireland. Rider body mass index (BMI) was calculated using height (m) and weight (kg). Descriptive analysis reported the mean (± standard deviation) variables. Chi-square analyses examined regional differences (significance: $p<0.05$).

Results: Mean rider age: 21 ±9.2 years. Mean height: 1.46 ±0.94m. Mean weight: 47.8 ±52.3kg. Mean BMI: 21.0 ±23.3. Rider BMI classification: underweight (BMI:<18.5) 38.2%, healthy (BMI:18.5-24.9) 41.5%, overweight (BMI:25-29.9) 13.8%, obese (BMI:>30) 7.5%. Regional population distribution (shown in Figure 1) along with differences for variables ($P<0.05$) possibly reflect socio-economic characteristics.

Discussion and Conclusions: Utilising software like EC Pro aids in researching rider, horse, workload/type, and environmental factors, providing objective data for analysis. This informs optimal conditions for welfare and ensures suitably mounted combinations. With equestrianism under increased public scrutiny, objective evidence is crucial for obtaining a social license to operate, emphasising the importance of evidence-based practices in horse and rider interactions to safeguard equine welfare. Recommended horse-rider weight ratio varies (10%, 15%, 20% of horse weight), aligning with most riding school riders' self-reported weights (Domino et al., 2022). However, limitations include a lack of recorded horse demographic information, rider sex, and potential inaccuracies in self-reporting. It is recommended to use these data, along with onsite rider measurements, to accurately assess riders for riding school horses/ponies, enhancing understanding of rider and horse demographics crucial for welfare, suitable mounting strategies, and resource allocation (Domino et al., 2022).

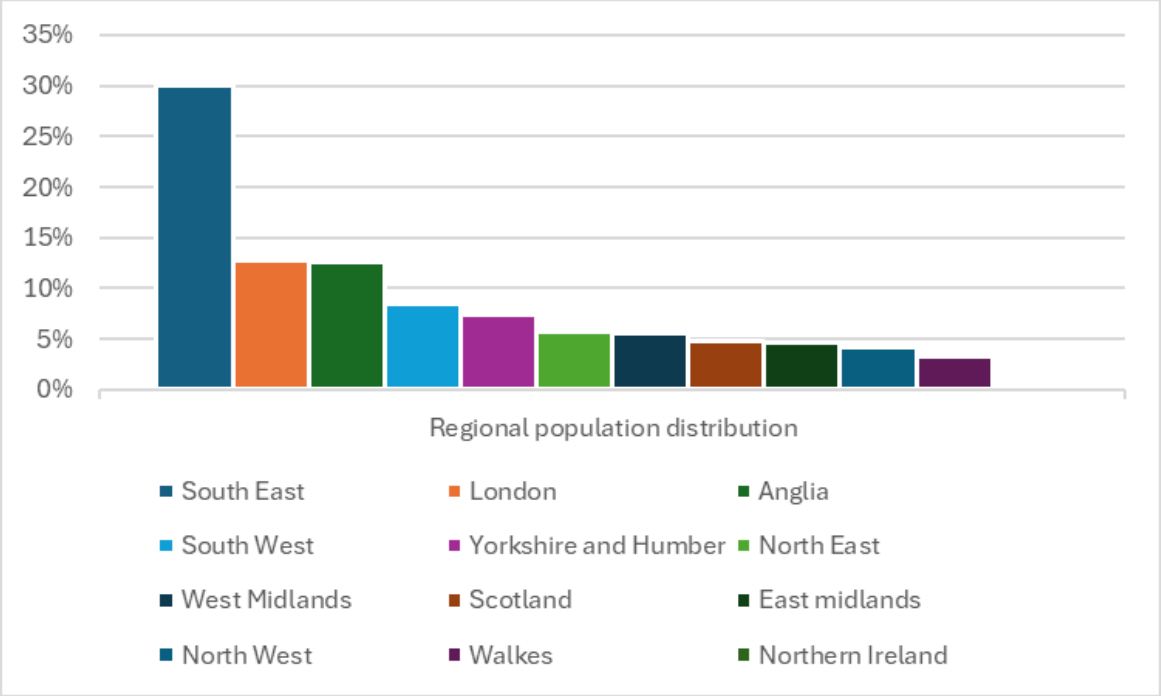


Figure 1: Bar Chart of the regional population distribution of UK riders attending riding schools.

Acknowledgements:

I extend my gratitude to EC Pro for their collaboration and data contribution, which was integral to this research. Special thanks to all individuals at EC Pro.

References:

Domino, M., Borowska, M., Trojakowska, A., Kozłowska, N., Zdrojkowski, Ł., Jasiński, T., Smyth, G., Maśko, M., 2022. The Effect of Rider:Horse Bodyweight Ratio on the Superficial Body Temperature of Horse's Thoracolumbar Region Evaluated by Advanced Thermal Image Processing. Anim. Open Access J. MDPI 12, 195.

EC Pro: Equestrian Centre Management System (no date) EC Pro | Equestrian Centre Management System. Available at: https://ecpro.co.uk/en (Accessed: 06 April 2024).

Nyberg, L., Linnavalli, T., Hartmann, E., Kalland, M., 2023. Finnish and Swedish riding school pupils' motivation towards participation in non-riding education. Front. Sports Act. Living 5.

What specific stressors impact anxiety in HE equestrian students.

O'Sullivan, N.E., Stones, N. and Freeman, M.**

University Centre Sparsholt, Westley Ln, Sparsholt, Winchester, Hampshire, SO21 2NF

Keywords: horse and rider welfare; rider mental health; sports psychology

Introduction: Between 2017 and 2022, mental health conditions increased from 1 in 10 to 1 in 4 for those aged 17-19 years (British Medical Association, 2023). Empirical literature surrounding anxiety increased due to the Covid-19 pandemic, with trends in student anxiety because of social media being a predominant contributory factor to mental health. Body image has seen a recent influx of research through different sports including equestrian sports. Rider anxiety is already proven to impact performance and equine temperament perceptions (Wolframm and Micklewright, 2010) but knowing how anxiety impacts HE equestrian students still needs addressing. The aim of this study was to investigate which stressor (social media, body image, human emotions impacting horses) had the greatest impact on equestrian students' anxiety.

Materials and Methods: Upon institutional ethical approval, a seven-section survey consisting of 31 open and closed questions was formulated using Google Forms. The survey was distributed amongst Higher Education students currently studying an equine degree in the UK (n=20). Chi Squared Goodness of Fit tests and tabulated statistics were used for categorical data and Spearman's correlation to establish the relationship between two variables.

Results: 45% (n=9) reported issues with anxiety, body image and social media use (=10, df=3, p=0.019). 100% (n=20) reported to using social media. The main stressor that increases anxiety among university students studying an equine degree is social media. With 70% (n=14) Instagram scoring the highest across all social media sites to increase anxiety (=55.46, df=11, P<0.01). 55% (n=11) reported to having issues with their body image (=4.9, df=2, p=0.086). 85% (n=17) reported to having anxiety (=24.1, df=2, p<0.01). When asked about equine welfare implications due to human emotions, 100% (n=20) ticked the 'yes' box (=20, df=1, P<0.01). When asked how equines have reacted to their stress levels,35% (n=7) said the equine reacted to a stimuli that they would not 'typically' spook at which was closely followed by not sure (n=6) with 30% (=8, df=4, P=0.092).

Discussion and Conclusions: The results suggest that social media could be a leading contributing factor to cause heightened anxiety and negative perceptions within the sampled population own body image perceptions. Instagram scored the highest across all social media sites that increases anxiety. This could be due to higher emotional investment in social media usage (Alsunni and Latif, 2021). Despite a significant rise in pertinent literature, there is limited research regarding anxiety and self-perceived body image within the equestrian sports, including menstruation and competing. Further research is recommended in establishing how best to support students with anxiety at university.

References:

Alsunni, A.A. and Latif, R. (2021) 'Higher emotional investment in social media is related to anxiety and depression in university students', *Journal of Taibah University Medical Sciences*, 16(2), pp. 247–252. Available at: https://doi.org/10.1016/j.jtumed.2020.11.004.

British Medical Association (2023) *Mental health pressures data analysis*, *The British Medical Association is the trade union and professional body for doctors in the UK.* Available at: https://www.bma.org.uk/advice-and-support/nhs-delivery-and-workforce/pressures/mental-health-pressures-data-analysis (Accessed: 27 February 2024).

Wolframm, I.A. and Micklewright, D. (2010) 'Rider anxiety, perception of equine temperament and ridden performance: do they relate?', *Journal of Veterinary Behavior*, 5(4), p. 210. Available at: https://doi.org/10.1016/j.jveb.2009.11.015.

An investigation into equestrian sports coaches' engagement with performance analysis tools

*Parker Welch, M. and Cameron, L.J.**

Hartpury University, Hartpury House, Hartpury, Gloucestershire, GL19 3BE

Keywords: key performance indicators (KPIs); rider development; diversification; qualifications

Introduction: The horse and rider dyad in equestrian sport has been the subject of research focussing on individual components of performance (Wilkins *et al*., 2022). Performance analysis (PA) is well-researched and utilised in non-equestrian sports, yet in equestrianism this holistic approach to coaching is limited. Key Performance Indicators (KPIs) in equestrian disciplines are challenging to identify and due to the paucity of research, PA has been underutilised in these sports (Hobbs *et al*., 2020). To enhance PA research and to promote its use in equestrian sports, a tailored approach could be based on knowledge of current perceptions towards and implementation of PA within equestrian coaching. This study explored the impact of coaching education and the absence of defined KPIs on coach perceptions and use of PA tools.

Material and Methods: Following institutional ethical approval, current equestrian coaches (n=7) were recruited for one-on-one interviews, stopping at data saturation. The focus was on coaches' perceptions of PA and PA tools in equestrian coaching, with questions considering identifying PA currently in use, equestrian coach perceptions, and potential influences of rider demographics on PA tool implementation in current coaching sessions, utilising a purposive sampling strategy. Microsoft Teams™ facilitated remote interviews, ensuring efficacy of transcription and a wider recruitment pool. Thematic analysis, guided by Braun and Clarke (2012), was conducted to generate codes and further lower order and higher order themes.

Results: Interviewed coaches all held appropriate equestrian coaching qualifications at a range of levels. Thematic analysis revealed five higher order themes surrounding the perception of PA: *'rider development', 'qualifications', 'marketing', 'PA tool setup', and 'competitive diversification'*. '*Rider development'* included the importance of the development of independent riding and the challenges faced with non-technological tools. Concerns arose around the impact of incorrect use of PA tools and techniques on the communication and trust within the coach-athlete relationship, requiring a sensitive approach on how to present data in a manner that considers the motivational impact on the rider. Coaches sought varied further *'qualifications'* and Continuous Professional Development (CPD) to expand PA knowledge and experience. All participants held more than one coaching qualification, BHS and university degrees being the most favoured providers (Table 1). Marketing showed high awareness but limited usage of PA tools, with video analysis as the most recognized tool. Ambitions to set up PA services and acquire the tools required faced barriers of financial investment and facility access. The study suggested *'competitive demand'* could drive PA adoption in equestrian coaching, finding links between *'marketing'* and '*qualifications'* revealing limitations in PA tool usage.

Table 1: Coaching relevant qualifications attained by the interview participants.

Qualifications		BHS	UKCC	Pony Club	University degrees	Other	Total qualifications
Participant	First qualified						
1	2005	Stage 4	Level 1				2
2	2017	Stage 4			Coaching MSc and BSc	L3 CMI	4
3	2015	Stage 4			Coaching BSc	French teaching certificate	3
4	2021			PCCC	Coaching BSc		2
5	2017	Stage 3			Coaching BSc enrolled on MSc		2
6	2023	Stage 2			Coaching BSc		2
7	2016	Stage 3	Level 2				2
Total qualifications from each category:		6	2	1	5	2	17

Discussion and Conclusions: Participants with university degrees sought scientific backing, highlighting posing threats to PA in equestrian coaching. Recommendations for future research include beginning to test the PA tools and techniques for the lacking scientific research on the benefits to riding performance. PA could be significant for comprehensive rider and horse assessment, aiding in injury diagnosis and career longevity for equestrian athletes, perhaps suggesting a separate analyst role within equestrian to support coaches in the adoption of PA. Alternatively, equestrian coach CPD could prioritise PA utilisation in practice to promote the benefits of PA for holistic rider development.

References:

Braun, V. and Clarke, V., 2012. *Thematic analysis*. American Psychological Association.

Hobbs, S.J., St George, L., Reed, J., Stockley, R., Thetford, C., Sinclair, J., Williams, J., Nankervis, K. and Clayton, H.M., 2020. *A scoping review of determinants of performance in dressage*. PeerJ, 8, p.e9022.

Wilkins, C., Nankervis, K., Protheroe, L. and Draper, S., 2022. *Equestrian rider trunk- pelvis strategies can be identified using self organising maps*. ISBS Proceedings Archive, 40 (1), P.759.