# *14th Alltech-Hartpury Student Conference*

## Conference Proceedings

*7th May 2025*

HARTPURY
UNIVERSITY

# Hello & welcome…….

Alltech® is a global animal health company that shares a vision of sustaining and nourishing the world's plants, animals and people. 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 annual 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. Over the past 14 years, our collaboration with Alltech® has provided a unique opportunity for like-minded academics, industry professionals and students to debate emerging ideas which could positively impact 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 Jane Williams, Dr Eleanor Boden, Lilly Harris, Lauren Tufton, Tracy Bye, Dr Tamzin Furtado, Dr Heather Cameron-Whytock, and Emma Davies 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 Associate Professor Simon Daniels, Dr Linda Greening, and Gillian Higgins 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 2025**

Dr Kirsty Lesniak (Lead organiser)

Dr Helen Warren (Alltech® sponsor lead)

Emma Davies

Lorna Cameron

# *Scientific Programme Wednesday 7th May*

**Morning Session:**

8.15am Onsite registration

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

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

*9.15am:* **Associate Professor Simon Daniels: The horses gut microbiome: An exploration from "analogue to digital" considering tools to help us understand gut health in horses.**

10.00am Undergraduate Student Oral Presentations

*10.00am: Taira Deubet, Oxford Brookes University: Performance of Thoroughbred Stallions in India: Analysis of all Progeny of Stallions active between 2017-2022*

*10.15am: Kerry Hogg, Hartpury University: What are the perceived barriers to optimal equine welfare for United Kingdom (UK) Horse Owners?*

*10.30am: Charlotte Hurst, Royal Agricultural University: Effects of a shim intended to relieve pressure under the girth straps on equine kinematics.*

10.45am Poster session with refreshments

11.30am Undergraduate Student Oral Presentations

*11.30am: Caitlin Torr, Nottingham Trent University: Shake & Graze: Assessing the effect of Trickle Net® Shake & Graze Chaff Net for Stabled Horses*

*11.45am: Libby Mardell-Lines and Zoie Montgomery-Pinto, Hartpury University: Soothing Soundscapes: A pilot study investigating the effect of pink noise on equine sleep patterns*

*12.00pm: Savannah Jackson, Oxford Brookes University: Efficacy of Rider Activation Exercises Performed Prior to Executing a Dressage Test When Observing Conflict Behaviours.*

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

**Afternoon Session:**

*1.15pm:* **Dr Linda Greening: Sleep hygiene for horses: What is the equine equivalent to counting sheep?**

2.00pm Postgraduate Student Oral Presentations

*2.00pm: Claire McDonald, South East Technical University: Mental health in Irish thoroughbred horse breeding: Prevalence and risk factors.*

*2.15pm: Megan Lane, Sheffield Hallam University: Burnout: That's what life's about, isn't it? A mixed-methods exploration of the burnout experiences of dual career equestrian athletes.*

*2.30pm: Tracey Smale, University of Edinburgh & Hartpury University: Navigating Menopause as an equestrian: The effect of symptomatology on human-animal interaction*

*2.45pm: Martyna Iruretagoyena Jankowska, University of Nottingham: Continuous monitoring of sleep behaviors in the stabled horse with AI computer vision*

3.00pm Poster session with refreshments

3.30pm Undergraduate Student Oral Presentations

*3.30pm: Anish Kamath, Hartpury University: An analysis of the faults and clears occurred at different double combinations during showjumping competitions (80 – 140 cm).*

*3.45pm: Freya Barton-Hine and Kacie Ralph-Pedrick, University Centre Sparsholt: The Effect of Processed Feed Types on Equine Masticatory Kinematics and Bite and Chew Rate.*

*4.00pm:* **Gillian Higgins: Horses Inside Out: The journey so far…**

4.45pm Presentation of prizes

5.00pm Conference closes

Thank you so much for attending this year's Alltech-Hartpury Conference. We would really appreciate you sparing ten minutes to provide us with your feedback via this QR code…

*Thank you and have a safe journey home!*

# Keynote Speakers

***Associate Professor Simon Daniels,*** *Royal Agricultural University*

Associate Professor of Equine Science at the Royal Agricultural University (RAU), Simon holds a BSc (Hons) Equine Science and a PhD in equine gut health. Simon has been a lecturer since 2012, progressing to Senior Lecturer in 2017 and latterly Associate Professor of Equine Science in 2022. Simon is responsible for the equine programmes at RAU alongside other management responsibilities. Simon has been involved with horses for the past 37 years starting out as a childhood hobby. After completion of his undergraduate degree, Simon spent time in industry working as a nutritionist at an animal feed company specialising in equine nutrition. Following on from this role, he took a position working for the University of Liverpool as part of the School of Veterinary Medicine working with an industry partner to design and implement a parasitology diagnostic laboratory service. This brought about the opportunity to undertake a part-time PhD in the efficacy of equine anthelmintics and their effects on intestinal health, which was completed at the University of Surrey's School of Veterinary Medicine. Completion of the diagnostic parasitology project with the University of Liverpool led to Simon's move back to full time academia in 2012, initially at Hartpury. In 2014, he joined the RAU within Equine Management and Science. Simon's main areas of interest remain within health of the equine gastrointestinal tract. Outside of the university Simon is actively involved in external examining with two other universities and with the European Workshop on Equine Nutrition (EWEN) on both the scientific committee, and the association committee and has been involved in organisation of the last three EWEN conferences. Simon is also on the memberships committee for the British Society of Animal Science (BSAS) and chairs the BSAS Undergraduate Thesis of the Year panel. Simon is an author on the CANTER best practice guidelines for parasite control in horses, launched in 2024, and an active member on the CANTER research group. Outside of a busy working life Simon can be found in the Stroud valleys with his wife, two children and dog.

# Keynote Speakers

***Dr Linda Greening,*** *Hartpury University*

Linda holds both a degree and masters in Equine Science and recently achieved a doctoral qualification for her research into equine sleep behaviour. She joined Hartpury in 2006 as a junior lecturer and moved into management in 2009, becoming head of the equine department in 2012 and head of inclusivity in 2016 to the present date. Throughout that time, she has consistently lectured and researched in the field of equine behaviour and welfare, specifically now factors affecting equine sleep. Currently she is supporting research that aims to use deep learning and brain wave activity measurements of sleep/wakefulness to produce an efficient and accurate way to measure equine sleep that would revolutionise this field of research in the future. She chairs the Equality, Diversity, Inclusivity and Accessibility Committee for the International Society of Applied Ethology and is an animal welfare reviewer for funding requests to the Morris Animal Foundation. Upon invitation she joined an expert panel at the European Food Standard Agency in September 2024 to help write first of its kind equine welfare legislation for the EU. Linda's daughter Daisy is now ten and doesn't quite understand her mother's equine enthusiasm (yet).

# Keynote Speakers

***Gillian Higgins,*** *Horses Inside Out*

Gillian is a world-leading equine anatomy biomechanics and movement educator, famous for her anatomical paintings on live horses. Over the past two decades, she has presented her popular Horses Inside Out programme across Europe, Australia and America. She has also presented to Queen Elizabeth ll. As the author of 13 books translated into 12 languages and her popularity as a knowledgeable and enthusiastic presenter, Gillian's expertise has earned her the prestigious Award of Merit from the British Horse Society. But her talents extend beyond the classroom - she is also an accomplished eventer, having competed at Advanced level and represented Great Britain as a student rider. Gillian's impressive resume also includes organising many world-leading equine science conferences as well as arranging successful anatomical and art exhibitions.

## Performance of Thoroughbred Stallions in India: Analysis of all Progeny of Stallions active between 2017-2022

*Deubet, T.* and Juler, C.*
**Oxford Brookes University, Gipsy Lane, Headington, Oxford, UK**

**Keywords:** Breeding; Genetics; Horse-Racing; Influence

**Introduction**: The thoroughbred breeding industry is a global sport, and India is part of this industry since it was introduced by the British during the colonial era (Indian Stud Book, 2025). Today, the industry includes 1445 active broodmares and 79 active stallions, many of which have international racing bloodlines (Indian Stud Book, 2025) The Indian Thoroughbred industry lacks research on stallion impact, despite its growth (Indian Stud Book, 2025). This study analyses recent active breeding stallions, assessing progeny performance across key indicators. Stallion evaluation remains central to breeding strategy (Bailey et al., 2022). Due to the absence of transparent sales figures and the private covering fee records in India, this study uses progeny performance as the primary indicator of a stallion's influence and success. The aim is to support breeders, owners, and agents in identifying successful stallions and improving breeding decisions. This research is part of a larger ongoing project, with future stages to include black type results, classic results, and dam influence.

**Material & Methods:** Stallions were selected based on having ≥19 progeny that raced between 2017–2022 (n=47). Once selected, data were collected for all progeny of each stallion, regardless of when they raced, as long as they were ≥5 years old by 2025 and had >3 race starts. For each progeny, information on total races, wins, and prize money earned was gathered to evaluate the overall performance linked to each stallion. This ensured a complete view of each stallion's impact, resulting in a dataset of 5,718 horses used to assess overall progeny performance. For each stallion, four key metrics were calculated: average prize money per horse (stakes/horse), average wins per horse, wins per start (strike rate), and prize money per start (stakes/start). Each value was normalised (0–1) by dividing by the highest value in that category. The metrics were then weighted: wins/horse = 10%, stakes/horse = 30%, win%/start = 20%, and stakes/start = 40%. These weighted and normalised values were combined using a weighted multi-metric scoring system to produce a final score, ranking stallions by overall progeny performance. This methodology aims to identify performance trends and evaluate the genetic contribution of individual stallions to the Indian Thoroughbred racing population.

**Results:** Stallion analysis showed clear variation in performance across all metrics. Stallion 5 recorded the highest average wins per horse (3.53), while Stallion 1 led in both average stake money per horse (₹4,672,151) and prize money per start (₹368,233). Stallion 2 had the highest strike rate (0.19). These stallions: 1, 2, 3, and 5, consistently ranked at the top, indicating strong overall influence. In contrast, Stallions 41, 46, and especially 47 showed notably lower figures, with Stallion 47 recording just 0.48 wins per horse, ₹268,166 average stake money per horse, a 0.04 strike rate, and ₹20,357 per start, suggesting limited impact. Overall, the stallion scores, calculated using the weighted multi-metric scoring system, showed that Stallion 1 achieved the highest total score, reflecting the strongest combination of performance indicators. These overall results are illustrated in Figure 1. The data highlights key differences in productivity and value, offering useful insights for future breeding and buying decisions.

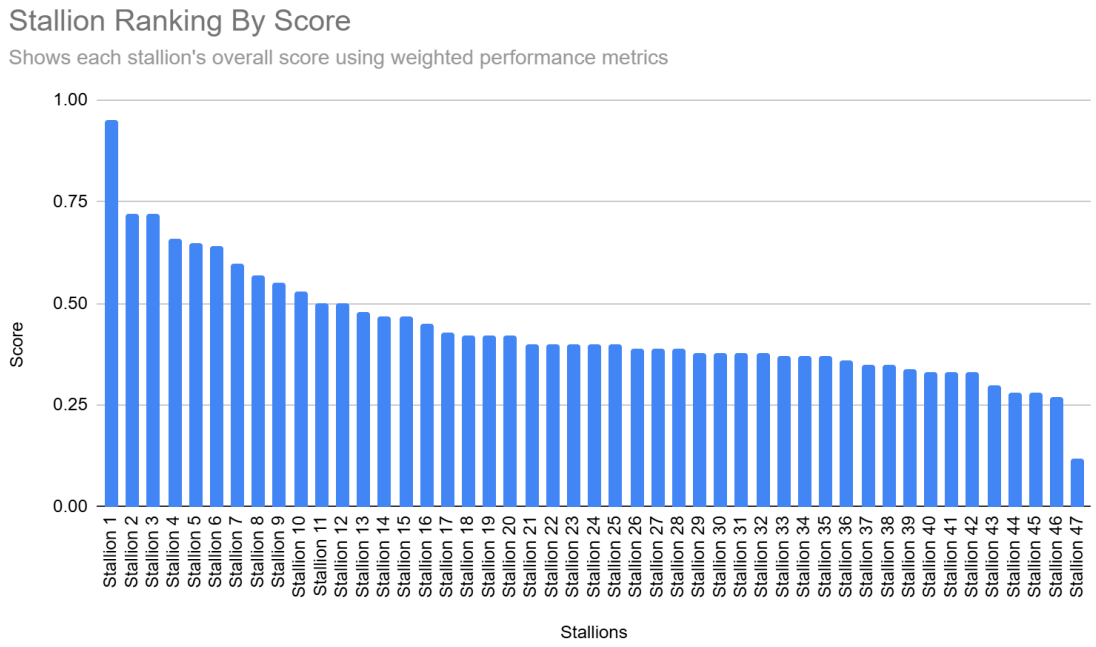


**Figure 1:** Stallion Performance Rankings

**Discussion & Conclusions:** Findings highlight variation in stallion performance, with some showing consistently stronger progeny across wins and earnings. Notable gaps in strike rates and earnings efficiency revealed differences in overall productivity. The scoring system clearly ranked stallions by success, with top performers showing a strong balance between win rate and financial return (Indian Stud Book, 2025). These results support the use of performance-based metrics in assessing stallion impact, especially in the absence of transparent sales data (Bailey et al., 2022). The consistent success of certain stallions suggests that stronger genetic profiles are more likely to produce higher-performing offspring, reinforcing the value of careful stallion selection in breeding programs (Bailey et al., 2022). This approach aligns with previous research linking genetic quality to racing success and supports the use of objective data in breeding decisions (Bailey et al., 2022). Future research should include black type results, classic wins, and dam influence to better understand Indian breeding success, produce horses more capable of success on the track, and support research into Thoroughbred performance and genetics.

**References:**

Bailey, E., Petersen, J.L. and Kalbfleisch, T.S. (2022) Genetics of thoroughbred racehorse performance, Annual Review of Animal Biosciences, 10(1), 131–150.

Indian Stud Book (2025) Indian Stud Book - Home, Indian Stud Book. Accessed on 23 February 2025 from https://www.indianstudbook.com.

Lin, X., Zhou, S., Wen, L., Davie, A., Yao, X., Liu, W. and Zhang, Y. (2016) Potential role of maternal lineage in the thoroughbred breeding strategy, R*eproduction, Fertility and Development,* 28(11), 1704.

## What are the perceived barriers to optimal equine welfare for United Kingdom (UK) Horse Owners?

Hogg, K.[1], Bartlett, E.[2], Fletcher, K.[3], Ashton, L.[1] and Cameron, L.[1]

**1 Hartpury University, Hartpury House, Hartpury, Gloucestershire, GL19 3BE.**
**2 University of Bristol, Beacon House, Queens Rd, Bristol BS8 1QU.**
**3 Welfare Aware, Welfare Aware - Consultancy for Animals, UK**

**Keywords:** Equine welfare; Barriers; Perceptions; UK Horse Owners

**Introduction:** Many horse owners lack awareness of modern welfare frameworks, such as the Five Domains Model (Mellor et al., 2020) and may unknowingly rely on outdated or inadequate practices. When made aware of improved equine management practices, many owners may face barriers to optimise equine welfare. Identifying common barriers to optimal equine welfare may lead to enabling horse owners to provide better lives for their horses.

**Material & Methods:** Qualitative data from a four-part questionnaire (quantitative data reported in Fletcher et al. 2021) were analysed with permission. The question was "*What barriers or limitations do you see to avoiding a negative mental state and promoting a positive mental state in horses?"*. Responses were extracted from and analysed utilising reflexive thematic analysis (Braun and Clarke, 2006). Key themes that emerged were tested for agreement; the first author discussed these themes with the second researcher for triangulation.

**Results:** Key barriers to improving equine welfare were identified (in order of importance) as: 1. Livery Yard Restrictions; 2. Lack of resources; 3. Lack of knowledge/education; 4. Environmental limitations; 5. Health conditions; 6. Competition/training pressures. Theme 1 included many comments on restrictive practices and reliance on traditional management methods e.g. "*Tradition, the BHS, we've always done it that way*" and "*people's lack of understanding, the old ways*" and was the theme most comments assigned. Theme 2 mainly focused on "*time and money*", and Theme 4 highlighted environmental limitations such as "*bad weather restricting turnout*" and "*individual stabling*".

**Discussion & Conclusions:** The most commonly reported barriers perceived to optimization of equine welfare in the UK were rigid livery yard practices, management, rules and facilities. These issues are compounded by a lack of awareness and education about modern equine care and welfare frameworks. These findings suggest that environmental and systemic limitations play a crucial role in hindering opportunities for many horse owners to provide positive welfare outcomes for their horses and should be further researched in an effort to promote a good life for horses.

**References:**

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101.

Fletcher, K., Cameron, L., & Freeman, M. (2021). Contemplating the Five Domains model of animal welfare assessment: UK horse owner perceptions of equine well-being. *Animal Welfare*, *30*(3), 259–268.

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: Welfare assessment for animals. Animals, 10(10), 1870.

## Effects of a shim intended to relieve pressure under the girth straps on equine kinematics.

*Hurst, C*. and Bye, T.*
**Royal Agricultural University, Stroud Rd, Cirencester GL7 6JS**

**Keywords:** Saddlery; Tack; Locomotion; Biomechanics

**Introduction:** Many horses work in monoflap saddles with short girths, which could create pressure points over the Serratus Ventralis Thoracis muscle beneath the girth straps. This pressure may affect the horse's ability to move freely but little research has been conducted into its effects on locomotion. Most studies only explore the amount of pressure and tension delivered by the girth in this area with few considering its locomotor effects. This study aimed to determine if the addition of a neoprene shim designed to relieve pressure beneath the girth straps affected kinematics.

**Materials & Methods:** Four leisure horses (all geldings with a mean age of 16 years old and mean height of 15.3hh/1.60m) were ridden by a single female rider in two conditions, with and without the shim under the girth straps. All horses were ridden in the same girth (Scharf Freedom Dressage Girth), numnah (Equitex Close Contact Airtech Numnah) and saddle (Macel Rafale S Monoquartier CC Jump Saddle) and wore their own snaffle bridle in both conditions. All tack and shims used were fitted by a qualified professional saddle fitter. The horses were fitted with 25mm circular white joint markers as per Murray *et al*. (2023). Both conditions were completed on the same day in a cross over design. Horses underwent a twenty-minute warm up, Horses 1 and 2 were ridden and recorded without the shim first, then had the shim added, had a 10-minute adjustment period and were then ridden and recorded with the shim; Horses 3 and 4 were ridden and recorded with the shim first, then had the shim removed, had a 10-minute adjustment period and then ridden and recorded without the shim. Horses were ridden down a length (30m) lane, three times on each rein, in both trot and canter and recorded at 250fps using a Sony RX100 VII camera. Videos were analysed using Quintic Biomechanics v35 to measure stride length, stride velocity, maximal shoulder extension angle and maximal hip flexion angle. Means and symmetry indices were calculated for each measurement for each horse and tested for differences between the conditions using a paired t-test in IBM SPSS v29.

**Results**: Stride velocity was consistent across both conditions ($P>0.05$). A significant decrease in maximal hip flexion angle was seen in the leading (inside) hindlimb in canter with the shim (mean= 59.7°) compared to without (mean= 61.9°), indicating more hip flexion ($t=2.719$, $P=0.03$). Although not statistically significant, all horses showed increased stride length in trot when ridden with the shim. No other significant differences were seen.

**Discussion & Conclusions**: The addition of the shim appeared to result in a greater maximal hip flexion in canter which is associated with increased protraction of the leading hind limb (St George *et al*., 2023) and flexion of the thoracolumbar spine (Faber *et al*., 2001). This could indicate increased comfort and freedom of movement. The trend for increased stride length in trot could also be considered positively, however this study was impacted by its small sample size and so lacked statistical power and would benefit from being replicated with a larger sample. These findings could potentially inform new saddlery designs to improve equine welfare and performance.

**References:**

Faber, M., Johnston, C., Schamhardt, H.C., Van Weeren, P.R., Roepstorff, L. and Barneveld, A., 2001. Three-dimensional kinematics of the equine spine during canter. *Equine Veterinary Journal*, *33*(S33), pp.145-149.

Murray, R., Fisher, M., Fairfax, V. and MacKechnie-Guire, R. (2023). Saddle Thigh Block Design Can Influence Rider and Horse Biomechanics. *Animals*, [online] 13(13), p.2127. doi: https://doi.org/10.3390/ani13132127

St. George, L.B., Clayton, H.M., Sinclair, J.K., Richards, J., Roy, S.H. and Hobbs, S.J., 2023. Electromyographic and Kinematic Comparison of the Leading and Trailing Fore-and Hindlimbs of Horses during Canter. *Animals*, *13*(11), p.1755.

## Efficacy of Rider Activation Exercises Performed Prior to Executing a Dressage Test When Observing Conflict Behaviours.

*Jackson, S.A*. and Scofield, R.M.*
**Oxford Brookes University, Gipsy Lane, Headington, Oxford, UK.**

**Keywords:** Sustainable; Proactive; Rider; Welfare.

**Introduction:** In human sports science, warm-up routines are a well-established means of enhancing performance, increasing muscular efficiency, and reducing injury risk (Kyranoudis *et al.,* 2021; Afonso *et al.,* 2024). However, rider-focused warm-up protocols in the equestrian industry remain underutilised and under-researched despite the growing evidence of its benefits. Rider biomechanics has a direct influence on equine locomotion (Clayton *et al.,* 2023), consequently, improving rider preparation could offer an achievable, welfare-focused intervention through minimising conflict behaviour occurrence, and therefore discomfort, in horses. The aim of this study was to explore whether an activation routine performed by the rider prior to riding would reduce equine conflict behaviours, thereby enhancing welfare.

**Materials & Methods:** A mixed-methods, quasi-experimental study was conducted with nine horse-rider combinations with varying experience levels. Each horse was subject to a soundness evaluation by a veterinary physiotherapist and were asked to complete a basic dressage test over two consecutive days. The participants were split into two groups with one group performing the activation routine prior to mounting on one day while one group did not, with each group alternating on the second day for each rider to act as their own control. The exercise routine was designed in collaboration with a sports scientist following the distribution of a questionnaire to determine rider willingness to warm-up and current practices, including dynamic movements and resistance-band exercises aimed at activating the core and postural muscles. A standardised preliminary dressage test was performed each day to assess each gait on each rein. Ridden tests were filmed and conflict behaviours (e.g., tail swishing, mouth opening, gait breaking) were tallied using a ridden ethogram. Quantitative data were analysed using one-way ANOVA in Minitab Statistical Software 22.

**Results:** Conflict behaviour frequency significantly decreased following the performance of a rider activation routine, with the mean number of conflict behaviours decreasing from 39.89±20.28 in the control condition to 18.22±8.00 under the intervention condition ($p<0.009$). However, not all behaviours analysed demonstrated significant changes; particularly tail swishing which remained low across both trials ($p>0.322$), aligning with the veterinary physiotherapists assessment that horses were not in discomfort. Certain horses displayed increases in specific behaviours such as bit resistance or breaking into trot, with individual horses favouring specific conflict behaviours more than others.

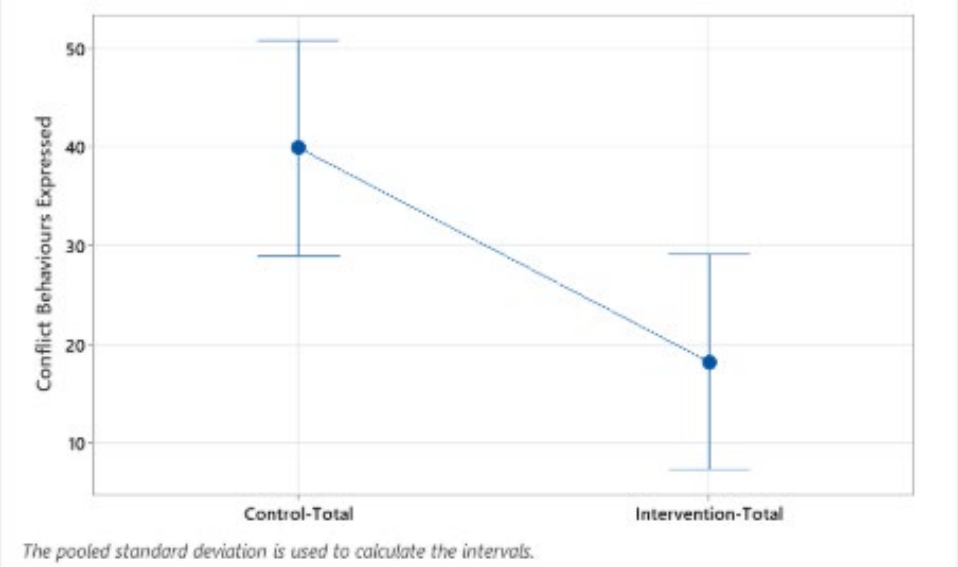


**Figure 1:** The graph demonstrates the comparison of total conflict behaviours observed in the absence (Control-Total) and presence of (Intervention-Total) the warm-up routine, with a statistical significance (F=8.89; d.f=1; P=0.009).

**Discussion & Conclusions:** This study presents novel evidence that seemingly minor, rider-focused interventions - such as pre-ride activation exercises - could have a significant impact on equine welfare. The observed reduction in conflict behaviours suggests that by improving rider biomechanics and stability, the horse-rider partnership can be enhanced while miscommunication is reduced. The equine industry remains under increasing scrutiny regarding welfare standards and ethical practice, however, the introduction of small but effective measures could initiate a domino effect of positive change. If practices like rider warm-up become embedded at grassroots level, they can help shape more empathetic and welfare-conscious equestrians from the outset. These early interventions are not only practically achievable but also highly scalable across disciplines and rider abilities. By proactively embracing welfare-enhancing strategies, the equestrian sector strengthens its social license to operate, and as welfare expectations rise, tangible evidence of proactive, rider-led improvements reinforces the industry's commitment to ethical horsemanship. Furthermore, improving equine welfare at the rider level contributes to a more sustainable sporting model, where both horses and humans benefit physically and psychologically. Creating a culture where even small, research-backed practices are valued and applied can support broader systemic change - laying the groundwork for enhanced training methods, reduced injury risk, and more transparent welfare monitoring.

**References:**

Afonso, J., Brito, J., Abade, E., Rendeiro-Pinho, G., Baptista, I., Figueiredo, P. and Nakamura, F.Y. (2024) Revisiting the 'Whys' and 'Hows' of the Warm-Up: Are We Asking the Right Questions?. *Sports Medicine*, 54(1), 23-30.

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Kyranoudis, A.E., Ispyrlidis, I., Chatzinikolaou, A., Gargalianos, D., Michailidis, Y., Papadopoulou, S.D., Kyranoudis, E. and Metaxas, T. (2021) Effect of the pre-warm-up exercise program on muscle performance. *Journal of Physical Education and Sport*, 21(1), 396-405.

# An analysis of the faults and clears occurred at different double combinations during showjumping competitions (80 – 140 cm).

*Kamath, A. and Long, M.**

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

**Keywords:** Doubles; Jumping faults; Course design; Performance

**Introduction:** Previous studies have evaluated the fault accrual across different fences and combinations in a course (Marlin and Williams', 2020; Ničová and Bartošová, 2022). However, very little is known on faults occurred on different double combinations within the course which is technical due to the related distance between two fences which warrants specific investigation. Analysis of faults and clears on double combinations provide insights to improve course design, improve the safety of competition and inform horse-rider performance. This study aimed to identify the type of double combination that results in the greatest number of clears and faults amongst the four types of double combinations chosen (Table 1).

**Material & Methods:** A collaboration between Hartpury and British Showjumping (BS) was established to obtain the data of number of clears and faults occurred on the doubles from the BS Judges Application, which were retrospectively analysed. This method was implemented as the fault type incurred is determined by the judge of the competition and the result is consistent across the eight competitions. The oxers within the doubles were ascending across the eight competitions. The methodology for this study was adapted from Marlin and Williams (2020). A total of 1,177 senior horse and rider combinations (aged 18+) competing at (80-140 cm), produced 4,688 jumping efforts (JE) across the four doubles. The total number of clears and faults including knockdowns, refusals and fall of riders on the doubles were noted. A series of descriptive statistics which includes the mean number of faults and clears were used to calculate the percentages-, while a series of independent t-tests and Chi-square tests assessed significant differences and associations, respectively, in the number of faults or fault type within the four doubles. Significance was set at $P<0.05$.

**Results:** Most combinations 93.7% (n=4391) jumped clears. The two-stride Vertical –Oxer (V-O) double, had the highest clears (92.4%; n=1044), whereas the one-stride Oxer-Vertical double had the highest faults (7.9%; n=89) (Table 1). Vertical fences across all the doubles recorded the highest faults (54.9%; n= 163), with a significant difference identified on the vertical element of the V-O doubles ($p = 0.02$). Faults occurred more frequently on the first element (A) of doubles than the second element (B) (61.9%, n= 184) (Table 1). Knockdowns were the most common fault across the doubles (81.1%, n=241). Pearson Chi square between clears and knockdowns reported a significant association across the four doubles, although these associations are weak or occur by chance as the co-efficient is below 0.5 (Balka and Nicol, 2005).

One stride V-O: $X^2$ (1, N = 595) = 354.08, $p < 0.001$.
Two stride V-O: $X^2$ (1, N = 560) = 418.31, $p < 0.001$.
One stride O-V: $X^2$ (1, N = 551) = 306.57, $p < 0.001$.
Two stride O-V: $X^2$ (1, N = 598) = 401.50, $p < 0.001$.

**Table 1:** Clear and Fault accrual on different double combinations

| Type of Double | Total JE (n) | Clear occurrence per 100 JE | Total Faults (n) | Fault on A element (n) | Fault on B element (n) |
|---|---|---|---|---|---|
| One stride Vertical to Oxer | 1213 | 24 | 88 | 64 | 24 |
| Two stride Vertical to Oxer | 1130 | 24 | 44 | 27 | 17 |
| One stride Oxer to Vertical | 1123 | 21 | 89 | 54 | 35 |
| Two stride Oxer to Vertical | 1222 | 25 | 76 | 39 | 37 |

**Discussion & Conclusions:** Recent anecdotal reports from SJ competitions have raised concerns of incorporating the two stride V-O double in competitions. The number of clears occurred on the two-stride V-O double contradicts the anecdotal views and perceptions of elite riders on this type of double which poses higher risks in competition this could be due the fence height of the competition and distance within the double (Charles, 2025). Previous studies have identified that the first element within doubles results in higher number of faults, which this study agrees with (Marlin and Williams, 2020). Stachurska et al. (2002), suggested horses tend to jump under impetus conditions and the decision to commit to a double is typically made at the first element (A) of the doubles. These findings provide insights on combination performance jumping, different double combinations within SJ courses. This knowledge can support course designers when designing SJ courses to enhance the safety and performance of horses and riders.

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## The Effect of Processed Feed Types on Equine Masticatory Kinematics and Bite and Chew Rate

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**Key Words**: Electromyography; Muscle activity; Equine; Mastication; Consumption

**Introduction**: Horses are herbivores and when wild lived on predominately grass, leaves, and shrubs which all require a grinding motion of the teeth to start digestion. Since domestication their diet has drastically changed with addition of processed feeds which are mostly comprised of shorter fibres and compounds which require reduced grinding motion to form the bolus within the buccal cavity before deglutition. The motion of chewing produces saliva which contains bicarbonate, acting as lubrication and as an acid buffer when digesta enters the stomach (Witherow, 2025). This study aimed to investigate whether a variety of processed feed types have an effect the horse's masticatory kinematics.

**Material & Methods**: Ten horses were chosen and split into two age groups group A= 9-12 and group B=15-25 years. Four processed feeds were chosen from the Spiller's range, a chaff, cube, mix and fibre mash, all reflective of a diet suitable for the sample population. Over a four-week period, one feed was selected per week and 50 grams fed on three consecutive days, separate to their normal ration. Delsys Trigno Research System Package was used to collect electromyography data from six surface electrodes which were placed on the following muscles: masseter, pterygoideus lateralis, pterygoideus medialis and the temporalis, buccinator and depressor labii inferioris (Gamucci et al., 2022). Bites and chews videoed and rewatched to calculate per day for each horse and an average taken for the three days. Data were analysed using a General Linier Model, to test significance between the four feeds and six sensors, and bites and chews. A two sample T-test and Mann- Whitney was used to determine significance between feeds and the two age groups with significance value $P<0.05$.

**Results**: Results showed different processed feeds do have an effect on masticatory kinematics with a significant difference (SD) found between all four feeds ($P<0.05$) and the six EMG sensors ($P<0.001$). Chaff had significantly decreased overall muscle activity compared to cubes ($P<0.01$) and sensor six which was located on the depressor labii inferioris showed significantly greater muscle activity than the other five sensors when horses were fed all four processed feeds ($P<0.05$). GLM for bite and chew rates when consuming different feed types identified a SD between bite ($P<0.001$) and chew rates ($P<0.001$). Bonferroni correction identified the greatest difference for both bites and chews were seen between chaff and mash (bites $P<0.001$, chews $P<0.001$) (Table 1). Younger horses showed significantly greater muscle activity with cubes ($P<0.05$), but older horses showed significantly greater activity with mix ($P<0.05$). There were no significant differences ($P>0.05$) between age groups for bite and chew rate apart from chews seen when consuming the mash.

**Table 1:** Differences between age groups for bite and chew rates across feed types

| | Young Mean | Old Mean | Young StDev | Old StDev | P-Values |
|---|---|---|---|---|---|
| **Bites** | | | | | |
| **Chaff** | 11.33 | 12.53 | 1.15 | 1.66 | P=0.22 |
| **Nuts** | 6.80 | 6.73 | 0.44 | 0.14 | P=0.83 |
| **Mix** | 6.06 | 6.66 | 0.82 | 0.57 | P=0.74 |
| **Mash** | 3.60 | 3.86 | 0.59 | 0.55 | P=0.48 |
| | | | | | |
| **Chews** | | | | | |
| **Chaff** | 48.13 | 53.8 | 9.04 | 8.58 | P=0.34 |
| **Nuts** | 24.33 | 25.67 | 3.21 | 3.12 | P=0.52 |
| **Mix** | 22.33 | 23.93 | 1.73 | 4.02 | P=0.45 |
| **Mash** | 6.66 | 8.06 | 0.78 | 0.86 | P=0.03 |

**Discussion & Conclusions**: The study highlights the impact different processed feeds have on horse's masticatory kinematics. Differences in physical characteristics, hardness, size and fibre content of feed types (Bochnia et al., 2019) appear to influence both muscle activity and bite and chew rates. Interestingly, feeds with a longer chop, less dense presentation had decreased muscle activity, but increased bite and chew rate. There were no significant differences in overall muscle activity, or bite and chew rate across the two age groups when consuming chaff, suggesting age does not play a factor, but further research into the mixing of different feed types would further support the management and welfare of a variety of horses.

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## Mental health in Irish thoroughbred horse breeding: Prevalence and risk factors.

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**Keywords: W**ellbeing; Occupational health; Horseracing; Stud farm staff

**Introduction:** The horseracing industry faces issues of staff retention which may be attributed to a high workload, poor work-life balance, and a lack of career progression (Juckes et al., 2021). Working conditions contribute to mental health and turnover intention in other industries and sporting organisations. Staff on thoroughbred breeding farms work long hours with limited job control (Mc-Conn-Palfreyman et al., 2019). Despite this, research on mental health in the breeding sector is lacking. The aim of this study was to investigate mental health in thoroughbred breeding staff, and associations with occupational risk factors on Irish stud farms.

**Materials & Methods:** Thoroughbred breeders and stud farm staff ($N$ = 99) were recruited for an anonymous online survey. Validated self-report questionnaires assessed the prevalence of Common Mental Disorders (CMDs) including depression, anxiety and substance use. Predictor variables including career satisfaction, job control and workplace bullying were also assessed. Pearson's Correlation Coefficient was used to test for associations between CMDs and risk factors.

**Results:** Preliminary findings show high prevalence rates for CMDs in breeding staff. 49.5% of breeding staff met the criteria for depression, 38% for psychological distress, 28% for anxiety, and 26% for adverse alcohol use. Lower career satisfaction was related to higher turnover intentions, $F(2, 41.71) = 19.63$, $p < .001$. Lower job control was associated with higher psychological distress ($r = -.335$, $n = 99$, $p = < .001$). Workplace bullying was strongly associated with increased anxiety ($r = .565$, $n = 99$, $p = < .001$). Female staff ($M = 45.40$, $SD = 22.28$) were significantly more likely to experience workplace bullying than males ($M = 34.14$, $SD = 14.33$); $t(94.90) = 3.026$, $p = .003$.

**Discussion & Conclusions:** Findings indicate that breeding staff report similar CMD prevalence to racehorse trainers and jockeys (King et al., 2021). High prevalence rates of CMDs are influenced by working conditions in thoroughbred breeding. Working conditions also influence staff leaving intentions. Results indicate gender differences in working conditions in the breeding industry. This novel research increases understanding of factors influencing mental health in the breeding sector. Research on working conditions and mental health of breeders and stud farm staff is necessary in order to inform policy and interventions aimed at improving staff mental health and retention in the thoroughbred breeding industry.

**Acknowledgments:** This work was supported by South East Technological University and Horse Racing Ireland as part of a PhD programme.

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## Burnout: That's what life's about, isn't it? A mixed-methods exploration of the burnout experiences of dual career equestrian athletes.

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**Keywords:** Demands; Stressors; Role conflict.

**Introduction:** Burnout is a multidimensional cognitive affective syndrome, characterised by emotional and physical exhaustion, reduced accomplishment, and sport devaluation (Raedeke & Smith, 2001). It can lead to illness, decreases in performance and motivation, and increases depression and anxiety (Gustafsson et al., 2008). It is important to better understand burnout in equestrian athletes, due to the unique demands horse ownership poses for equestrian athletes, particularly those with dual careers. Dual career athletes are required to balance equestrian demands with work demands and other life demands (Stambulova & Wylleman, 2015). Dual careers have been linked to burnout, therefore, when considering the intense and unique demands of equestrian sport, combined with other experienced demands, it could be said that dual career equestrian athletes may be at an increased risk of burnout. This study aimed to understand the burnout experiences of dual career equestrian athletes and offer evidence-based recommendations for reducing and managing burnout in the equestrian industry.

**Materials & Methods:** This study employed a mixed-methods design. Twenty female participants (M = 41 years, SD = 9.23), who had their horses on DIY or part-livery and worked over 30 hours per week, completed the Athlete Burnout Questionnaire (ABQ) (Raedeke & Smith, 2001) and participated in semi-structured interviews. The ABQ assesses overall burnout and three subscales: reduced sense of personal accomplishment, exhaustion, and sport devaluation. Scores across the subscales were added to give total burnout scores, which identified current burnout levels. Subsequent semi-structured interviews explored participants' experiences as dual-career equestrian athletes, their perceptions of burnout, and their recommendations for managing and preventing burnout, with responses being analysed using thematic analysis.

**Results:** A total of 47% of participants were experiencing burnout; the highest scores were within the reduced sense of personal accomplishment subscale. Following thematic analysis, six key themes were identified: the complex nature of equestrian demands, the struggles of balancing work and personal demands, the multifaceted nature of the impacts of burnout, protective factors, comprehensive work satisfaction, and improving the lives of dual career equestrian athletes. Many participants highlighted that the equestrian industry needs more awareness and education around burnout and emphasised the importance of accessible resources on burnout symptoms, prevention strategies, and mental health support, alongside fostering open conversations about these issues.

**Discussion & Conclusions:** The primary impact of burnout in dual-career equestrian athletes appeared to be a reduced sense of accomplishment, with many participants feeling they were not achieving enough in any life domain. Role conflict could be said to be a prominent issue, with participants struggling with balancing their demands, sometimes resulting in negative emotions and thoughts of sport drop-out. Participants believed a negative culture surrounding mental health within the equestrian industry discourages help seeking, further exacerbating the issue. Overall, there is a lack of awareness of burnout and available support for equestrian athletes, and increased

education may be useful for both the prevention and management of burnout in equestrian sports to improve and protect the well-being of dual career equestrian athletes.

**Acknowledgements:** While they did not contribute financially, the charity Riders Minds helped to source participants.

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## Navigating Menopause as an equestrian: The effect of symptomatology on human-animal interaction

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**Keywords:** Menopausal transition; Female equestrians

**Introduction:** The menopausal transition is a female life stage that involves fluctuations in the hormone levels of oestrogen, progesterone, and testosterone. These changes often elicit varied symptoms that can impact lifestyle during and beyond this time. As equestrianism is a lifelong sport that is predominantly female-dominated, this study aimed to investigate the influence of the menopausal transition on female equestrians' interaction with their equestrian lifestyle, symptomatology and use this information to identify any need for equestrian menopause education interventions. Women need to be prepared for their menopause transitions; improving knowledge is key (Tariq *et al.*, 2023). Huebner and Ma (2023) found that competitive weightlifters had fewer symptoms than the general population and that athletes must balance their training intensity and menopause symptoms to achieve their competition goals.

**Materials & Methods**: Following ethical approval, a four-section mixed-methods survey was distributed via social media, covering Demographics, Menopause Symptoms, Impact on Life and Treatments, Social and Educational Issues. The survey was open for three months and completed by 147 female equestrians who identified themselves (as defined in the survey) as currently or previously experiencing perimenopause, menopause, or post-menopause. The data were analysed descriptively (percentages) and thematically to identify higher-order themes.

**Results:** The majority of respondents owned (86%) and or loaned (21%) a horse(s) and looked after them, themselves. The thematic analysis described the respondents' menopausal transitions with three higher-level themes: positive (33%), neutral (7%), and negative (55%). The negative experiences induced changes in participation behaviour: more cautious approach (47.6%), riding less (32.6%) and competing less (18.4%). The unexpected/expected nature of menopausal symptoms was analysed, and joint and muscle pain (58%) was the most commonly reported unexpected physical symptom experienced. Reduced confidence (61%), along with loss of motivation (60%) and loss of joy (58%), were the most common unexpected mental/emotional symptoms reported. Fatigue, poor memory (93%), and irritability (90%) were the most commonly reported symptoms. Equestrian-specific menopause transition education would be welcomed by 89%, and 85 % thought menopause-focused equestrian coach education would be well-received. When analysing the impact of equestrian lifestyle on menopause transition, 74.3% of respondents reported a positive impact, e.g. "*my horse kept me sane*".15.2% were neutral, and 10,4% reported a negative impact.

**Discussion & Conclusions**: Most respondents menopause experiences. manifested feelings of indifference or dissonance, many decided to change their equestrian life. Similar findings by Ussher *et al*. (2009) saw masters swimmers perceive that menopause harmed their performance. Heubner and Ma (2023) also found that menopause symptoms needed to be considered in training programs

for competitive weightlifters. Some symptoms were reported as being unexpected. The fact that these symptoms were not expected infers poor menopause knowledge levels (Tariq *et al*.,2023). The majority would welcome equestrian-specific education for the athlete and the coach. Overall, their equestrian life had a positive impact on their menopausal transition, so anything we can do to keep these people riding and engaging with horses would be a good thing at this life stage. Future research needs to focus on developing and validating effective education and coping strategies for female equestrians during their menopause transitions.

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## Continuous monitoring of sleep behaviors in the stabled horse with AI computer vision

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**Keywords:** Equine; Welfare; Machine learning

**Introduction**: Sleep deprivation in horses negatively impacts health and welfare. Monitoring and assessing behaviors associated with sleep activity is subjective and time consuming, relying primarily on human manual observations. Equally, the presence of human observers and ECG machines is likely to affect equine sleep patterns and quality. The main objective of this study was to investigate the use of an artificial intelligence (AI) computer vision model to identify behaviors associated with equine sleep.

**Materials & Methods**: Static 4G enabled 5MP HD CCTV cameras, with 30m infrared night vision range, were installed in the corners of stables of ten individually housed horses, capturing full stable interior views, at one frame every one or ten minutes, over continuous 24-hour periods. Sleep-related behaviors (sternal and lateral recumbency) were monitored using previously trained and validated computer vision algorithms available through Vet Vision AI (www.vetvisionai.com) (Figure 1). Image labeling to train the algorithm was led by a group of five veterinary medicine students, then manually reviewed by the primary researcher. Filtering was carried out to include only data where the horse was identified in the stable for >80% of each 24hr period, in order to better identify main sleeping patterns, as most horses spent time outside for turn out. The resulting dataset included five horses, across three yards, for a mean of 9 days per animal (range 4-17 days).

**Results**: Metrics constantly update as more data is being input to train algorithms. For this version, the mAP50 for lying sternal was 0.988 and 0.942 for lying lateral, indicating reliability. Horses spent a mean of 35 minutes (±12) in lateral recumbency (range 16-49 minutes), and 125 minutes (±53) in sternal recumbency (range 58-195 minutes) per 24hr. Associations between contact with other horses, bedding quantity, stable width and limb injury status, with time spent in recumbency were identified in descriptive analyses, however, were not statistically significant due to low sample sizes. Horses in stables allowing for contact with others engaged in sternal and lateral recumbency on average for 195 and 43 minutes, respectively, compared to an average of 108 and 34 minutes, respectively, in other horses. The former being comparable to the 230 minutes usually observed for equine sleeping behavior (Greening and McBride, 2022). While the animal on box rest spent the least amount of time in lateral recumbency, at 16 minutes, and the second lowest recorded time for sternal recumbency, at 79 minutes.

**Discussion & Conclusions**: Research into equine behavior is often time consuming and subjected to human error and bias and further complicated by horses potentially 'hiding' negative welfare (Torcivia and McDonnell 2020). Due to this, small sample sizes and limited sampling time frames are often observed (Torres Borda *et al*., 2023). Therefore, the ability of this algorithm to reliably identify 32,702 equine behaviors is an important step in developing objective behavioral studies. Computer vision offers a valuable tool in assessing and managing sleep related issues in horses, as well as general equine welfare. Further studies are needed to investigate factors affecting sleep patterns and their impact on welfare.


Figure 1. Example of current key behaviors being monitored using Vet Vision AI computer vision methods, including (from left to right and top to bottom) lying in both lateral and sternal recumbency, feeding, and standing with either low, neutral or high head carriage.

**Acknowledgements**: Martyna Iruretagoyena Jankowska's PhD studentship is funded by an AI DTC program, which is part funded by Vet Vision AI.

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## The effects of a 6-week thoracolumbar massage programme in riding school horses on the glenohumeral and carpal joints.

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**Keywords:** Massage; Movement; Equine therapy

**Introduction:** Massage therapy is widely researched in horses but requires investigation into its specific effects on the equine locomotory system (Hill and Crook, 2010). This study intends to bridge this gap in existing research by examining forelimb extension at the glenohumeral (GL) joint and carpal (C) joint following a 6-week thoracolumbar massage programme, as prior research has primarily focused on hindlimb locomotion (Mabutt *et al.,* 2022; Hill and Crook, 2010).

**Materials & Methods:** An ethics and welfare team approved the current study. Twelve subjects were randomly assigned into treatment (A) and control (B) groups, excluding subjects on other therapeutic interventions or with injuries. Pre and post treatment trot ups were recorded on an iPhone, in walk and trot on both reins. Group A received six weekly 30-minute massages (effleurage, petrissage, myofascial release) targeted at the thoracolumbar region with minimal variability, by using the same massage therapist, while group B received no treatment. Instant centre of rotations were identified and marked prior to 2D gait analysis (OnForm: video analysis App) measuring protraction angles on nearside and offside in walk and trot for both GL and C joints. A single stride was captured at maximal protraction. Data were statistically analysed using IBM SPSS Statistics 26 software. A Shapiro Wilks test confirmed non-parametric assumptions, Mann-Whitney U and Wilcoxon Singed Ranks tests analysed unrelated and related data respectively.

**Results:** For the GL joint in walk on the nearside, a significant difference between group A and B in week 6 was observed (P = 0.015) with group A being higher, but not in week 1 (P = 0.394). Group A observed increased angle means and SD over time (week 1 = 103.17˚, SD ±13.01; week 6 = 109˚, SD ±10.00). group B observed a decrease in angle means over time and increased variability (figure 1). A significant difference was observed in group A (P = 0.045) but not in group B (P = 0.752) in week 6 in trot on the offside in the C joint. An average difference of 3˚ was observed between groups (with group A being higher) in week 6 under these conditions.

**Discussion & Conclusion:** Findings suggest an improvement in protraction in the GL joint post massage, likely due to the proposed benefits of massage; prevention of muscle imbalance, joint stability and reduce inflammation explaining the better performance in group A. The decrease in SD in group A indicates massage helps regulate movement patterns and improve neuromuscular coordination. In concurrence with Hill and Crook (2010), massage has been evidenced to improve locomotion, measured in the current study by joint angles compared with passive stretching ability. Improving equine locomotion (especially in riding school horses) can promote comfort and longevity. The simplicity of techniques used suggests they could be integrated into riding school routines, though further research is warranted. Further research is required to explore the long-term effects, optimal duration of massage and specific techniques to maximise welfare for horses in riding school settings to confidently determine the relevance of massage in the industry.

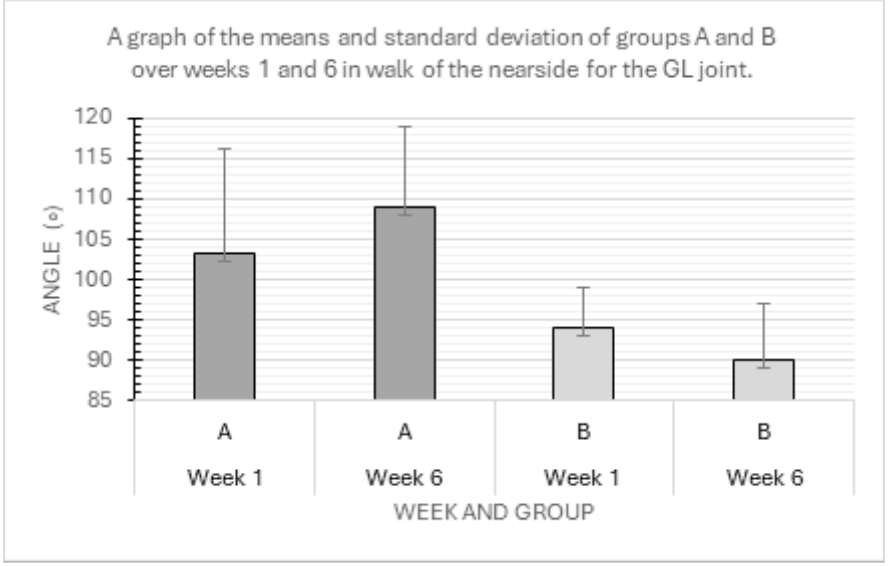


**Figure 1:** A graph showing means and SD's of the GL joint in group A and B over weeks 1 and 6.

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## Does water treadmill exercise affect stride and stance phase durations in walk in the horse?

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**Keywords:** Biomechanics; Gait; Analysis

**Introduction:** Water treadmill exercise is becoming an increasingly popular choice for cross-training sports horses and is an effective tool to promote posture change and encourage building core and back strength (Nankervis *et al.,* 2024). Varying water depths have been shown to impact the flexion, and extension ranges of movement of the horses' limbs (Mendez-Angulo *et al.* 2013; Nankervis *et al.,* 2024). Mendeez-Angulo *et al.* (2013) also found that stance and swing phase duration were altered whilst walking on the water treadmill. To date, no other studies have reported changes in stance and swing duration. This study aimed to determine if the normal walk movement pattern is affected by carpal depth water during walking on the water treadmill.

**Materials & Methods**: Six horses (age 7-20yr, height 152cm-175cm) that partake in regular water treadmill exercise were recruited from the Hartpury Equine Therapy Centre's livery population. Footage was captured using high-speed videography of the horses walking (4km/h-4.1km/h) on a dry treadmill belt and below carpal depth water. Hoof markers placed on the lateral side of the offside limbs and the medial side of the nearside limbs were tracked using Kinovea software to generate percentage of stance duration per stride (%) and stride duration (s) data. Data were determined to be parametric using Shapiro-Wilk test of normality. Paired T test found no difference between left and right limbs for all conditions, so limb data were averaged. The general linear model test of difference with repeated measures on both factors, was used to test for difference between dry and water conditions for hindlimb and forelimb stride durations and stance durations. Results were displayed as means ± standard error of the mean (SEM) and statistical significance was determined if the p value was above 0.05.

**Results**: Stride duration significantly increased with water compared to the dry condition ($F(1,5) = 85.76$, $p<0.001$) for all limbs (1.89±0.4s vs 1.54±0.34s, respectively). Stance duration overall decreased in water, but there was a significant interaction ($F(1,5) = 8.38$, $p<0.05$) with hind and forelimbs responding differently in each condition. Stance duration was higher in the forelimbs (62.3±0.004%) than the hindlimbs (60.8±0.003%) in dry conditions. There was no statistical difference between fore (56.7±0.003%) and hindlimbs (56.3±0.003%) in water conditions, but the stance duration was overall lower for both in water, than in dry conditions.

**Discussion & Conclusions**: Results from this study show that walking on the water treadmill at below carpal depth water, increased stride duration and decreases stance duration in line with finding from Mendez-Angulo *et al.,* (2013). This happened as water is more viscous than air, which increase the resistant force acting on the horse's limb during protraction, increasing swing phase duration (McCrae, 2019). Understanding of stance and swing phase duration changes can assist in creating rehabilitation and fitness plans to suit the individual needs of horses.

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## Impact of stirrup design on rider biomechanics: A comparison between traditional and Acavallo Opera GP Evol stirrups

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**Keywords:** Stirrup design; Rider biomechanics; Joint kinematics; Equestrian simulator

**Introduction:** Stirrup design has been shown to influence rider posture and stability (Baragli *et al.,* 2022) contribute to asymmetrical force distribution during simulated riding (Clayton, MacKechnie-Guire and Hobbs, 2023) and affect overall rider position and interaction with the horse (Stapley, Stutzman and Manfredi, 2020). The Acavallo Opera GP Evol stirrup is a modern innovation marketed to improve rider stability and joint alignment. Despite these claims, limited research has been done to assess their biomechanical impacts in controlled settings. This study analysed the influence of the Acavallo Opera GP Evol stirrup on rider lower limb kinematics compared to a traditional stirrup.

**Materials & Methods:** Ten adult leisure riders under 14 stone in weight, aged 18+, and injury-free were recruited. A Racewood Advanced Eventing Simulator (Racewood Ltd.) was used for the trials, allowing for regulated replication of the walk, sitting trot, and canter. After a 3-minute warm-up, each rider completed three 1-minute gait trials (walk, trot, and left canter) in both stirrups as part of a repeated-measures design. A counterbalanced alternating sequence, in which the order of stirrup conditions changed between participants, was used to reduce order effects. The hip, knee, ankle, and toe were all marked with reflective markers. Video footage was captured from a horizontal view using an iPhone 13 mounted on a tripod. Quintic Biomechanics v30 was used to examine kinematic data. Lower leg displacement (mm) and static joint angles (°) at the ankle, knee, and hip were measured three times during each one-minute trial in walk, trot and left canter for both stirrup types. R Studio was used to process the data. Non-parametric statistical analysis, including Friedman, Wilcoxon signed-rank, and Shapiro-Wilk tests, was applied.

**Results:** The Acavallo stirrup led to greater flexed joint angles and significantly less lower leg movement across all gaits. The average joint angle reductions for Acavallo compared to typical stirrups were 3.2° ± 1.45 for the knee, 2.3° ± 1.24 for the ankle, and 2.3° ± 1.65 for the hip ($p < 0.001$). At walk, lower leg displacement decreased by 1.1 mm ($p < 0.001$), at trot, by 0.84 mm ($p < 0.001$), and at left canter, by 0.6 mm ($p < 0.001$). Large effect sizes ($r > 0.85$) were seen for all gaits, supporting the hypothesis that stirrup design has a biomechanical influence that could apply to practical riding conditions.

**Discussion & Conclusions:** Rider biomechanics may be impacted by stirrup design, according to the results. The Acavallo stirrups led to reduced lower leg movement and increased joint flexion, which may offer biomechanical benefits. Although the results were statistically significant, external validity is limited by the controlled simulated environment. The study's generalisability is limited by the small sample size of leisure riders, brief trial periods, and 2D video analysis. To evaluate the long-term and useful implications of stirrup design, future studies should investigate these findings in real-world contexts, such as live horse trials, diverse disciplines such as show jumping, and among experienced or professional riders.

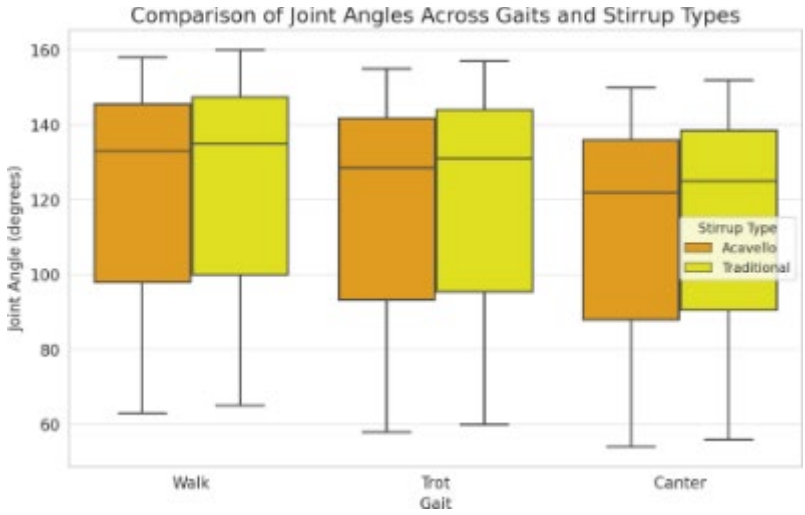


**Figure 1:** Box plot illustrating joint angles (°) at the ankle, knee, and hip during walk, trot, and left canter using traditional and Acavallo Opera GP Evol stirrups. Acavallo trials demonstrated greater flexed joint postures across all gaits.

**Acknowledgements:**
The authors thank Racewood for simulator access and the riders for their participation.

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## Investigating horse owners' knowledge, use and perceptions of equine calming supplements.

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**Keywords:** Behaviour; Nutrition

**Introduction:** Equine supplements or "Complementary feeding stuff" under The Feeding Stuffs (England) Regulations (2005) are defined as "a compound feeding stuff which has a high content of certain substances and which, by reason of its composition, is sufficient for a daily ration only if it is used in combination with other feeding stuffs". Equine calming supplements (ECS) claim to have a calming effect on horses and are consequentially used by horse owners in a variety of situations (Hoffman *et al.,* 2009). There is very little research, however, into the number of owners who feed their horses ECS, and even less research into the individual reasons *why* they use them. Therefore, this study aimed to investigate owners' opinions and knowledge of ECS to gain a better understanding of the consumers' perspective and rationales for decision making.

**Materials & Methods:** An online survey was distributed via social media to horse owner groups and networks. It was required that respondents were over 18 and a UK-based horse owner. The survey comprised a combination of open and closed questions, gathering data on characteristics of the participants' horses (age, sex, breed etc.), whether they use or have ever used ECS, their knowledge of the active ingredients and mode of action, and their perceptions of the effectiveness of ECS. This data was then analysed using descriptive statistics with thematic analysis being carried out on qualitative responses.

**Results**: Preliminary results from 115 horse owners showed 25% (n= 29) of respondents currently fed their horse ECS, with 37% (n=43) having previously (but not currently) used them and 37% (n=43) having never used ECS. Of those currently or previously using ECS, 61% researched the product before feeding it to their horses. However, only 21% (n= 10) used peer-reviewed articles for their research, with the majority relying on the supplement producer's website and general Google searches. Owners' perceptions on the effectiveness of ECS varied. Answers scaled 1-5 with 1 being completely ineffective and 5 being extremely effective, were spread fairly evenly. For example, 18% of respondents said ECS were completely ineffective and 20% said ECS were completely effective. Qualitative data also showed very varied perceptions of effectiveness amongst participants.

**Discussion & Conclusions**: This study demonstrated variation in the use of ECS amongst horse owners and their perceptions of effectiveness. This was particularly evident in the qualitative data collected. For example, some participants stated "*… he is much calmer in the stable now"* and "*… they have a huge impact on my horse's behaviour"* with others commenting, "*Didn't even make a slight difference…"* and "*Waste of money.".* Participant comments therefore clearly suggest perceptions were highly dependent on the individual horse and environment, and that most owners carried out some research into benefits before using supplements; this was predominantly done using general Google searches and producers' websites. More research is required into observable benefits of calming supplements, and into gaining a better understanding of how individual characteristics of horses and owners influence use of ECS.

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## Can rider position provide a visual indicator of horse/rider fatigue during the cross-country phase of eventing?

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**Keywords:** Performance; Fitness; Horse welfare.

**Introduction:** Horse welfare in Eventing is being increasingly questioned by the public. Research has focused on risk factors in the cross country (XC) associated with falls (Bennet, et al., 2022, 2024) rather than riders' physiological demands (Douglas, 2017). During competition, officials can eliminate combinations if safety or welfare appears compromised. This study explored whether visual assessment of rider position during XC could indicate rider fatigue and inform decision-making to promote safety.

**Materials & Methods:** Videos (~5s duration) were recorded at a UK Novice Event XC on flat sections of the course near the start, middle and end (n=285). Horse and rider combinations were analysed using notational analysis by a trained observer at 0.25x speed in a random order using an ethogram developed by experienced researchers from footage. Positional factors included: trunk position: forwards/neutral/backwards, hand position: forwards/backwards, hand stability: stable/unstable, hand height: consistent/varying, leg stability: still/swinging, leg position: in front of girth/on-girth/behind girth, knee motion: bent absorbing force/locked-out resisting force, seat variation: sat down/off horses back/rising with light saddle contact(RLSC)/rising with hard saddle contact(RHSC) and centre of mass (COM) movement: stable/unstable. Differences in the frequency of behaviours across the course were examined using Friedmans' analyses with post-hoc Wilcoxon Signed-rank tests (Significance: $p \leq 0.05$). Differences in behaviour across independent horse fatigue groupings: none, slight, moderate and severe fatigue, identified by Cattle (2024) were examined using Kruskal-Wallis and post-hoc Mann Whitney-U tests (Significance: $p \leq 0.05$).

**Results**: Five factors: hand stability, hand height, leg position, knee motion and seat variation differed significantly across the course ($p \leq 0.05$); post-hoc tests found no differences between the start-middle-end for hand stability, leg position, and knee motion. Between the start and middle of the XC a 34.7% decrease in consistent hand height (Median start: consistent, Median middle: consistent $p \leq 0.001$) and changes in seat variation with a 8.4% decrease in riders RLSC and 1.1% decrease in riders off the horse's back with an 16.9% increse in RHSC (Median start: RLSC, Median middle: RLSC, $p=0.04$).

Four factors: hand position, leg stability, seat variation and centre of mass differed significantly across horse fatigue groupings ($p \leq 0.05$); post-hoc tests found a 19.31 increase in forward-hand position when horses were slightly fatigued (Median: forwards, $p=0.002$,) and 27.7% increase when moderately fatigued (81.0%, Median: forwards $p=0.14$) when compared to no fatigue (Median: forwards). Stable leg position decreased by 12.9% when the horse was slightly fatigued (Median: stable, $p=0.11$) compared to no fatigue (Median: stable). While a 26.6% increase in RHSC was observed when horses were moderately fatigued (Median: RLSC, $p=0.12$) and 78.9% increase when severely fatigued (100% Median: RHSC, $p=0.003$) compared to no fatigue (Median:

RLSC), alongside a 45.9% increase in riders with unstable COM when the horse was severely fatigued (Median severe: Unstable, Median no fatigue: stable, p≤0.001).

**Discussion & Conclusions**: Changes in rider seat variation and hand height were observed in the middle of the course; these could be indicative of the onset of rider fatigue or reflect riders' responses to their horse's way of going; however, further research is required to confirm this. Increases in RHSC and unstable rider COM occurred in horses with higher fatigue ratings; increased rider movement could increase the metabolic demand on the horse or reflect changes in riding strategy or riders' skill level. Validation using physiological measures of fatigue alongside positional variables is warranted to provide officials with practical tools that can be applied in competition to enhance the welfare of horses and improve safety.

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## Physiological Metrics and Their Impact on Reproductive Success in Arabian Mares: A Longitudinal Study

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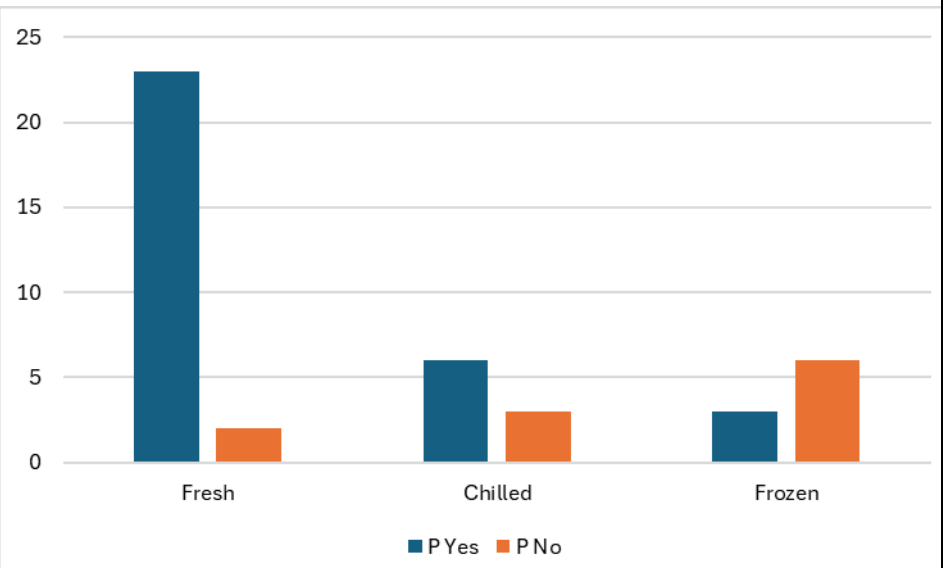
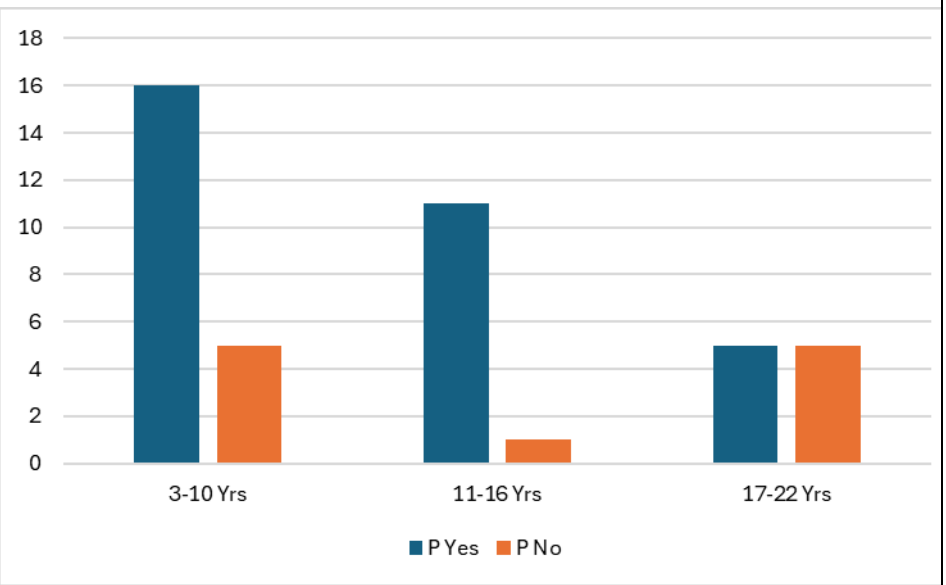
**Keywords:** Physiology; Breeding Efficiency; Equine

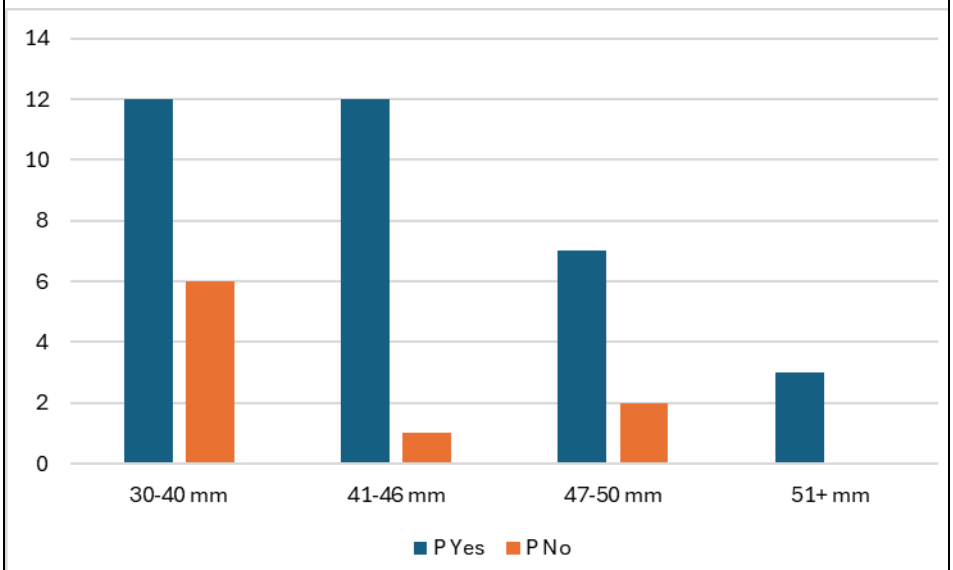
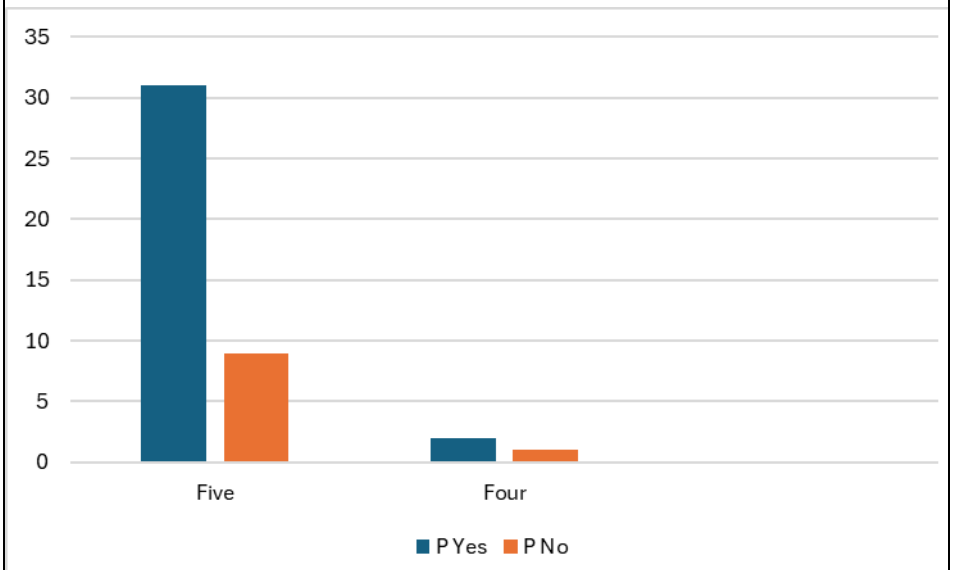
**Introduction**: Reproductive success is essential for the sustainability and genetic preservation of Arabian mares, a breed renowned for its historical and cultural significance (Barker, 2020). However, despite their importance, limited research exists exploring how physiological factors such as age, follicle size, oedema, and semen type influence reproductive outcomes. This study aimed to investigate the impact of these metrics on pregnancy success over a four-year period with the goal of improving breeding strategies and reproductive management.

**Materials & Methods**: A longitudinal observational study was conducted across four breeding seasons (2021-2024) to evaluate reproductive success in Arabian mares within a semi-natural herd environment. To reduce selection bias, mares from each year were numbered and selected using a random number generator. Although ten mares were selected from each year, repeated breeding led to a final sample size of 43 cases. Reproductive parameters (follicle size and uterine oedema) were recorded using transrectal ultrasound examinations performed at key points during the oestrous cycle. Descriptive statistics summarised the dataset. To analyse associations between categorical variables, such as oedema score and semen type, with pregnancy success, Fischer's Exact Test was utilised. For follicle size between pregnant and non-pregnant mares, a two-sample T-test was conducted with an Anderson-Darling test to confirm normality. The age distributions did not satisfy normality requirements, therefore the Mann-Whitney U test was used for comparison.

**Results**: Fischer's Exact Test showed a statistically significant association between semen type and pregnancy success ($p=0.0015$), with fresh semen resulting in higher pregnancy rates than frozen semen (Figure 1). No statistically significant associations were observed for age ($p=0.06$, Mann-Whitney U), follicle size ($p=0.116$, T-test), or oedema score ($p=0.5579$, Fischer's Exact test).

**Table 1**: Summary of Physiological Variables and Pregnancy Success

| Variable | Statistical test | p-value | Descriptive Statistics (Bar Chart) |
|---|---|---|---|
| Semen type | Fischer's Exact test | 0.0015 | *Figure 1 Bar Chart Showing Semen Type on Reproductive Success in Arabian Mares (Author's Own, 2025)*   |
| Age (Years) | Mann-Whitney U | 0.615 | *Figure 2 Bar Chart Showing Age on Reproductive Success in Arabian Mares (Author's Own, 2025)*   |

| | | | |
|---|---|---|---|
| Follicle Size (mm) | 2-Sample T-test | 0.116 | *Figure 3 Bar Chart showing Follicle Size on Reproductive Success on Arabian Mares (Author's Own, 2025)*   |
| Oedema Score | Fischer's Exact test | 0.5579 | *Figure 4 Bar Chart Showing Oedema Score on Reproductive Success in Arabian Mares (Author's Own, 2025)*   |

**Discussion & Conclusions**: Figure 2 indicates higher fertility in younger mares (3-10 years) and those with follicles measuring 41mm-46mm (Figure 3), aligning with the findings of Lane *et al* (2016). Not all variables influencing fertility were controlled – some mares received deslorelin to induce ovulation, which may have altered natural follicular development or oocyte quality. Similarly, while age appeared to affect conception rates descriptively, the absence of a significant statistical association may be partially due to the lack of reproductive history data, such as parity or previous fertility issues. The absence of a significant correlation between oedema and pregnancy success challenges assumptions in previous studies by Barker (2020), suggesting that hormonal regulation and reproductive history may play a larger role. These results underscore the complexity of equine reproduction and the multifactorial nature of fertility outcomes. Ultimately, while this study reinforces the importance of semen type as a significant factor in pregnancy success, it highlights the need for future research to incorporate hormonal profiling and

reproductive history. Refining these variables will support more precise insights into reproductive efficiency and help optimise breeding strategies for Arabian Mares.

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## Body image in equestrians: Reluctant fluctuations in body image among equestrians and the subsequent impact on their enjoyment.

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**Keywords:** Mental health; Self-esteem

**Introduction:** Body image (BI) and self-esteem in sports can differ, yet in equestrianism, the 'ideal' BI and physique for that of the athlete is to be an ectomorph; a person which has a tall slim physique. BI is how a person sees their own embodiment; it is a subjective evaluation of oneself and can be negative or positive (Cash, 2024). Having a positive self-perception is one of the steps in reaching self-actualisation (McLeod, 2024) the effects of which on optimal sporting performance in equestrianism is under-researched. The study aimed to identify equestrians' self-perceptions and to highlight relationships between exposures for example competition and yard settings, with the aim to increase career longevity and enjoyment within the sport.

**Materials & Methods:** Using a multidimensional approach, data were collected via an adapted Physical Self Descriptive Questionnaire (PSDQ) by Davies and Collins (2015). Seven subsections were created integrating both qualitative and quantitative data responses (n=74) using an online questionnaire. A Kruskal Wallis, Dunns test and Chi-square were used to analyse statistical significance between ratings used within each subsection on Minitab 19 Statistical Software. Thematic analysis was used to analyse the qualitative data to identify key themes.

**Results:** The results identified significant differences ($P<0.05$) within five subsections including: Physical Activity, Global Physical, Flexibility, Appearance, Global Esteem. The subsections which had the most influence included sports competency (ones perceived or actual ability within sport) and global esteem (overall self-worth and respect) ($P=0.01$). Thematic analysis produced nineteen 1st order themes, seven 2nd order themes and three general dimensions (Figure 1). Negative stereotypes seen within equestrianism was the most common theme mentioned by all levels of riders.

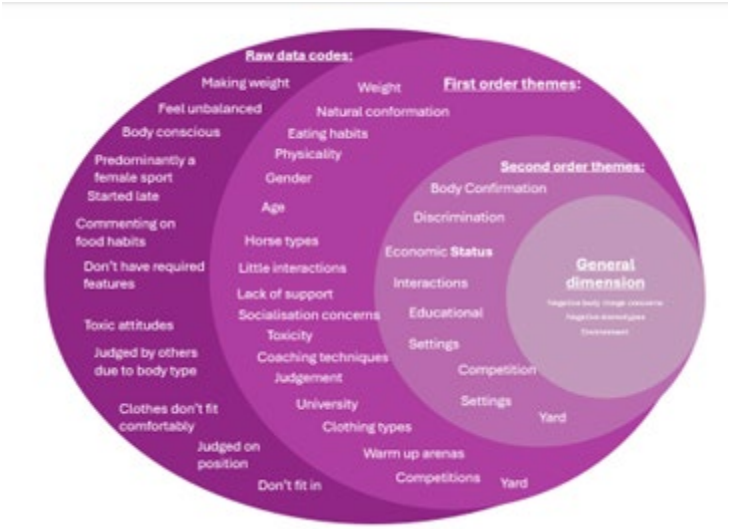


**Figure 1**: Thematic Framework of whether equestrian stakeholders have felt uncomfortable within the industry.

**Discussion & Conclusions:** BI and self-esteem concerns are complex and unique to individuals. The data showed that concerns on BI are prevalent in which various factors play a role in self-perceptions in equestrians. Thematic analysis further highlighted equestrian concerns with mental health, expressing how little it is discussed within the industry. The findings align with previous research empathising the impact of societal sport specific expectations (Cash, 2024). This expectation may contribute to body dissatisfaction and, in some cases, decreased self-esteem among athletes who do not conform to this standard, potentially reducing longevity within the sport. The presence of these stereotypes may act as a psychological barrier, hindering riders' ability to progress towards self-actualization, as conceptualized in Maslow's theory. The subsections which had the most influence include sports competency and global esteem. This suggests the confidence within their sporting ability and overall sense of self-worth are key factors within self-perception and body image within equestrianism. Potentially when athletes have higher confidence in their abilities, they will have a greater chance of having a positive BI and higher levels of self-esteem. Conversely, those who struggle with self-perceived competency may experience greater self-doubt, which can decrease motivation levels, increasing absenteeism. Charities such as Riders Mind should continue to promote positivity, offering support, and guidance using social media for promotion of positive body image to reach one's full athletic potential without the fear of judgement from peers.

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## A Retrospective Study into Platelet-Rich Plasma Therapy for Equines Using One Commercial Preparation System

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**Key Words:** Biologics; Musculoskeletal; Horse

**Introduction:** Musculoskeletal injury is prevalent in the sport horse, resulting in time off work and associated economic losses. Standard pharmaceutical treatment options, while effective, often have contraindications and increased levels of re-injury. Regenerative biologic treatments are becoming popular due to associated reductions in time off work and re-injury rates. Platelet-rich plasma (PRP) is the most researched biologic (Baria *et al.,* 2019), utilizing increased platelet concentrations and platelet-derived growth factors in healing, yet no standardized preparation or administration methods are available leading to variance in composition and clinical outcomes. Efforts to validate preparation systems for consistent platelet yield have been made in humans, but limited research is available for equine use despite continued use and positive treatment outcomes (Hessel *et al.,* 2015). The study aim was to analyse the difference between whole blood and PRP platelet yields using two different haematocrit settings on one commercial platelet-rich plasma (PRP) system

**Material & Methods:** Haematology data was collected from 31 equines treated with PRP. Participants were between 3- and 18- years old, of various breed, height, and gender. PRP was prepared using the Angel™ system (Arthrex, Naples, Florida, USA) following a standard operating procedure. PRP was prepared using either the 4% (n=12) or 7% (n=19) haematocrit setting. Data was analysed using SPSS (v29; IBM). Following normality testing, Mann-Whitney U tests were used to measure the difference between whole blood (WB) platelet count and PRP platelet count within categories (all cases, 4%, and 7%).

**Results:** Significant difference was observed between WB and PRP platelet count using both settings (4% p=0.002, 7% p=0.001). Median platelet increase values and interquartile range for all cases was reported as 4.93-fold ±4.66. Median platelet increase and interquartile range for each of the settings was: 4% (4.23-fold ±4.96), and 7% (5.34-fold ±4.06). There was no significant difference in platelet increase between the 4% and 7% (p=0.362) settings.

**Discussion & Conclusions:** Average increase of platelet concentration across all cases was 4.93-fold - double the reported values in equines (2.3-fold; Hessel *et al.,* 2015), and closer to median values reported in humans (5-fold; Baria *et al.,* 2019). There was no significant difference in platelet increase between the 4% and the 7% haematocrit settings, showing no preferred setting. Further to this, the current study used a double spin cycle on the Angel™, whereas previous equine research used a single spin. Results may suggest that a double spin is more effective for equine use. Further studies including these variables may further validate the Angel™ system for equine use.

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## A Qualitative investigation into the involvement of the equine multidisciplinary team within the care of Equine Metabolic Syndrome

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**Keywords:** Advice seeking, Collaboration, Management

**Introduction:** Equine metabolic syndrome (EMS) is a cluster of clinical signs that predispose a horse to endocrinopathic laminitis (McCue *et al.,* 2015). Though obesity is no longer considered the sole contributing factor to the condition, it remains a significant management concern due to associated physiological impacts (McCue *et al.,* 2015). Recent research by Górniak *et al.,* (2020) indicated that owners are inherently poor at assessing their horse's weight and body condition score, with Clough *et al.,* (2021) proposing that farriers and wider industry professionals may be best placed as an assessor of equine weight and welfare. This could have relevance to the care of EMS, where obesity is a key management concern. As such this study aimed to gain an understanding of the role of the equine multidisciplinary team within the management of EMS.

**Material & Methods:** A questionnaire was distributed via Meta platforms, targeting equestrians (both owners and professionals) who had been involved in the care of a horse suffering with EMS. They were required to be over the age of 18 and a resident of the UK. The sample consisted of 200 respondents including 150 horse owners, and 50 industry professionals. Data was initially coded and analysed using SPSS statistics to obtain descriptive statistics, frequency distributions and chi-squared test of association.

**Results:** Veterinarians were the most frequently consulted industry professional by 52.5% of respondents. Collaboration was a key component of EMS care with 70% of respondents indicating that they had experienced collaboration, with the vet and farrier being perceived to collaborate the most (N =114). Collaboration was significantly associated with improved clinical outcomes as perceived by owners (P=0.001). The veterinarian was the most used professional with the most frequently used professional and most asked for advice being significantly associated ($p = 0.001$). Factors impacting selection of professionals were found to be statistically significant to the industry professional chosen for both advice seeking and frequency ($P = 0.001$). However, awareness of the term "equine multidisciplinary team" remained low, with only 41% of participants recognising the term and no significant association between participant role (industry professional or horse owner) and recognition.

**Discussion & Conclusions:** This study demonstrated that collaboration between industry professionals is a key aspect of EMS management with the selection of professionals greatly influenced by trust and accessibility alongside role or expertise. The most frequently used professional was the same as previous research by Clough *et al.,* (2021) suggesting similarity between EMS and non-EMS care. Despite low recognition of the term "equine multidisciplinary team" amongst industry professionals, instances of collaboration remain high suggesting that the term itself is non-essential to its application in practice. Ultimately, the high use of professionals within the care of EMS suggests they are well placed to take a proactive role in aiding owners in the weight and welfare management of horses.

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## Foetal Positioning as a Contributing Factor to Musculoskeletal Asymmetry in Equine Neonates

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**Keywords:** Asymmetry; Biomechanics; Foetal development; Equine gestation

**Introduction:** Musculoskeletal asymmetry in neonatal foals has been frequently observed, yet the origin of these imbalances remains poorly understood (Stroud *et al*., 2016). While postnatal factors such as training or injury may exacerbate asymmetry, emerging evidence suggests that prenatal influences—particularly foetal positioning and mechanical loading—may play a formative role. This study aimed to explore whether musculoskeletal asymmetry in foals originates in utero and evaluate the biomechanical significance of intrauterine constraints.

**Materials & Methods:** A qualitative thematic analysis was conducted on literature sourced from databases including PubMed, ScienceDirect and Web of Science. Inclusion criteria comprised peer-reviewed studies related to equine foetal development, biomechanics, asymmetry, and intrauterine constraint. A meta-analysis was also performed using data from three eligible studies (Stroud *et al*., 2016; Zetterberg *et al*., 2023; Leśniak, 2013) reporting asymmetry prevalence. Studies were selected based on compatible sample populations (N=87 combined) and measurable skeletal or locomotor asymmetry. Studies published between 2000 and 2023 were considered to ensure relevance to current understanding.

**Results:** The thematic analysis identified four core themes: intrauterine constraint, biomechanical loading, postnatal asymmetry and its developmental origins, and cervical ligament development. Foetal movement was found to play a critical biomechanical role in skeletal development; restrictions in movement, often due to uterine constraint, were associated with asymmetrical joint and bone morphology. The meta-analysis revealed an overall asymmetry prevalence of 46.0% across three studies: Stroud *et al.* (2016), Zetterberg *et al.* (2023), and Leśniak (2013). Zetterberg *et al*. (2023) reported 61.1% vertical asymmetry using motion sensors, Stroud *et al.* (2016) observed 34% pelvic axial rotation, and Leśniak (2013) identified 39% directional limb and facial asymmetry. These findings collectively highlight a notable prevalence of asymmetry at birth across different locomotor and skeletal measures.

**Discussion & Conclusions:** The findings indicate that intrauterine positioning and restricted foetal movement may influence musculoskeletal asymmetry in neonatal foals. This could have long-term implications for locomotor efficiency, postural development, and future performance. Early identification of foals at risk of biomechanical imbalance may facilitate proactive management through physiotherapy and controlled exercise. Further equine specific research, including real time foetal imaging and longitudinal studies, is essential to clarify the causality and extent of prenatal asymmetry development.

**Acknowledgements:** Thank you to Hannah Williams and my peers for assistance in literature access and support through the dissertation.

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## Coach-created motivational climates in adult group riding sessions: the effects of age, gender, and rider's satisfaction with their coach.

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**Keywords:** Riding school, PMCSQ-2, Rider motivation, Coaching style

**Introduction:** Motivational climates have a significant impact on athletes' experiences within sport (Russel, 2021). Coaching within group riding settings differ from other sports due to the associated risk factors of the horse. Therefore, motivational climate research in other sports may lack transferability within equine group riding. The aim was to identify the overall motivational climate, and assess whether age, gender or satisfaction with their coach impacts the riders' perceived motivational climate.

**Materials & Methods:** Seventy participants (Table 1) completed the questionnaire, which was shared via social media, consisting of nine questions to ascertain demographic information about the participants to form the independent variables of rider age, gender, and their level of satisfaction with their coach (collected via a Likert scale and an open ended question), followed by the Perceived Motivational Climate in Sport Questionnaire 2 [PMCSQ-2] (Newton, Duda & Yin, 2000). The PMCSQ-2 consisted of a 33-item Likert scale which is comprised of two subscales; ego- and task-involving motivational climates.

**Table 1**: Spread of participants according to the independent variables.

| | 18-24 | 25-34 | 35-44 | 45-54 | 55+ | Total |
|---|---|---|---|---|---|---|
| Age | 41(58.6%) | 9(12.9%) | 4(5.7%) | 9(12.9%) | 7(10%) | 70(100%) |
| | Female | Male | | | | |
| Gender | 60(87.5%) | 10(12.5) | | | | 70(100%) |
| | Very dissatisfied | Dissatisfied | Unsure | Satisfied | Very satisfied | |
| Satisfaction with coach | 0(0%) | 4(5.7%) | 7(10%) | 21(30%) | 38(54.3%) | 70(100%) |

After testing for normality with the Shapiro-Wilks test, the Mann-Whitney U test was used to explore differences between gender and PMCSQ-2 scores, whilst the Kruskal Wallis test was used to explore differences in both age and level of satisfaction with the PMCSQ-2 scores. Finally, a content analysis was used to explore additional qualitative information about rider's satisfaction with their coach and their motivations for riding.

**Results:** The dominant motivational climate was task orientated with a median PMCSQ-2 score of 31. Age did not have a significant impact on the PMCSQ-2 scores ($p=0.10$). No significant difference was found between gender and PMCSQ-2 scores ($p=0.056$). There was a slight descriptive difference within gender, suggesting that females might perceive more task-orientated motivational climates than males. Levels of satisfaction also had no significant impact on PMCSQ-2 scores ($p=0.28$). The slight descriptive difference between the subgroups might suggest higher satisfaction with their coach leads to a more task-orientated motivational climate. Content analysis showed rider's satisfaction with their coach was dependant on the coach's understanding

and ability to encourage the riders to improve. Content analysis for rider's motivations suggested a drive to improve as a rider, enjoyment of the sport, and a want to help their horse learn and develop. These motivations aligned with the characteristics of task-orientated motivational climates.

**Discussion & Conclusions:** Regular feedback from the riders about their group sessions could assist the coaches in cultivating the optimal motivational climate for the rider. Those who thrive in competitive environments may find an ego-orientation as more beneficial (Lundqvist & Raglin, 2015). The lack of difference between gender reflects the culture of male and female horse riders learning together within groups. A longitudinal study following a coach and their riding group could provide more in-depth details around motivational climates and impacts of potential factors.

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## Prevalence of Conflict Behaviours in Western and English Equine Disciplines.

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**Keywords:** Dressage; Horsemanship; Management; Welfare

**Introduction:** Conflict behaviours (CB) are physical displays of discomfort relating to the horse's difficulty to cope with mental or physical stimuli (Christensen et al., 2024). This topic is currently a focus point of debate in the equine industry due to the recent improvements in knowledge and understanding of the impact of external forces on equine behaviour. This study aimed to establish the relationship between ridden discipline and the frequency of conflict behaviours when comparing the two ridden disciplines.

**Material & Methods:** Using publicly available, online recordings of high-level Dressage and Western Horsemanship competitions. Western horses (*n*=16) and Dressage horses (*n*=16) were observed during their performances and conflict behaviours were recorded using a specifically developed ethogram. The conflict behaviours assessed were Tail Swishing, Head Shaking/Tilting, Mouth Gaping, and Ear Rotation. Each individual presentation of these behaviours was counted when clearly displayed, CB/min was calculated to allow for appropriate comparison between disciplines.

**Results:** Horses competing in Dressage displayed a higher mean frequency of conflict behaviours per minute (CB/min = 1.42 ± 1.26) than Western Horsemanship competitors (CB/min = 1.02 ± 0.86), with 87.5% of dressage horses displaying at least one conflict behaviour. Less Western horses (75%) displayed conflict behaviours during competition, with a lower incidence of CB/min (1.02 ± 0.86). Dressage horses displayed a higher frequency of all conflict behaviours during analysis. Tail swishing was significantly different between disciplines ($p<0.001$), noted in 75% of Dressage horses, with 25% of Western horses presenting with this behaviour. Head shaking/tilting was also significantly different ($p=0.002$), with 56.25% of Dressage horses exhibiting this behaviour (*n*=9), whereas this behaviour was only observed in a single Western horse.

**Discussion & Conclusions:** One factor that may contribute to the difference in frequency of conflict behaviours in this study, is that there are different specific expectations and physical demands of the horses. Judges within both governing bodies (FEI Dressage and AQHA Western Horsemanship) seek suppleness and reactivity to cues when assessing performances. Western horses are discouraged from displaying tight frames while performing, alternatively Dressage horses demonstrate collection and elevation. The response of these horses to the demands of their performance could influence the frequency of conflict behaviours in the findings of this study. There are currently a wide range of studies related to English disciplines, including those regarding conflict behaviours, however, few mention Western disciplines, a gap in knowledge of this area of equestrianism. Discipline could be an important influence on conflict behaviours, however further studies are advised to determine the individual aspects of various disciplines that may impact equine comfort and welfare in competition. These findings suggest a correlation between equine discipline and conflict behaviours, concluding that riding discipline does impact equine behaviour. However, further investigation is required to fully understand the causes of these behaviours, whether these are individualities of the horse or the influence of human management.

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## An Investigation into the Short-Term Effects of Water Treadmill Exercise on Overground Walking Locomotion in Horses

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**Keywords:** Water-based; Gait patterns; Protocols

**Introduction:** Water treadmill exercise (WTE) is gaining popularity for training and rehabilitating horses due to its potential physical benefits including, increased range of motion, improved aerobic and cardiac capacity, and improvements in the use of arthritic limbs (Nankervis *et al*., 2021). However, despite research into the immediate effects on overland locomotion, there is limited evidence on how WTE impacts short or long-term over ground gait patterns. Therefore, this study aimed to investigate the short-term effects of WTE on overland locomotion patterns and assess whether current WTE programmes produce beneficial changes for training and rehabilitation.

**Materials & Methods:** Ethics was approved before data collection. Participants (n=7) were selected as part of a convenience sample, having past water treadmill experience. All horses were believed to be sound and free from injury at the start of the study. Skin markers were placed at key anatomical points which aligned with previous research (Nankervis *et al*., 2023). Dynamic assessments were completed pre and on the final day of a 6-week water treadmill programme which included, 2 sessions/week in addition to normal exercise routines, with water depths progressively increasing to align with pace requirements for both assessment and exercise (Tranquille *et al*., 2022). Kinematic data, analysed with Quintic version 26, measured the range of motion (ROM) of joint angles during stance and swing phase of one stride length at carpal, tarsal, and metacarpal/tarsal phalangeal joints.

**Results:** SPSS (version 26) was used to analyse the ROM of distal limb angle differences at mid-stance, maximal point of protraction and maximal point of retraction using a Kolmogorov-Smirnov test for normality, followed by a Friedmans and Wilcoxon signed rank test to determine if results were statistically significant ($p < 0.05$). Significant changes in all joint angles were documented, particularly in the carpus and tarsus. Variations were observed between left and right reins, with most joints showing increased or decreased mean angles over 6 weeks (See Table 1).

**Discussion & Conclusions:**
Water treadmill exercise demonstrates notable influence on equine overland locomotion patterns, with the results of this study highlighting significant differences in limb extension, which appear to alter equine gait patterns. Therefore, highlighting its potential as a valuable tool in equine training and rehabilitation. However, further longitudinal research is required to evaluate the efficacy of specific water treadmill protocols, particularly in relation to achieving targeted training and rehabilitation outcomes. Further research is essential for establishing evidence-based guidelines for optimising equine health and performance through water-based exercise regimes.

**Table 1**: Values of Significance to Aid Reader (Authors Own, 2025)

| Phase of Gait | Joint and Rein | Mean Week 1 | Mean Week 6 | Significance |
|---|---|---|---|---|
| **Mid Stance** | Carpus- L | 170.54˚ | 177.36˚ | *P*= 0.018 |
| | MCPJ- L | 148.27˚ | 147.28˚ | *P*= 0.612 |
| | Tarsus -L | 162.43˚ | 153.47˚ | *P*= 0.028 |
| | MTPJ- L | 149.93˚ | 148.18˚ | *P*= 1.000 |
| | Carpus-R | 171.98˚ | 174.70˚ | *P*=0.271 |
| | MCPJ- R | 148.89˚ | 151.77˚ | *P*=0.128 |
| | Tarsus- R | 159.09˚ | 151.96˚ | *P*=0.043 |
| | MTPJ- R | 153.26˚ | 157.55˚ | *P*=0.310 |
| **Maximal Point of Protraction** | Carpus- L | 170.97˚ | 172.77˚ | *P*=0.499 |
| | MCPJ- L | 158.36˚ | 163.63˚ | *P*=0.091 |
| | Tarsus- L | 165.48˚ | 161.72˚ | *P*=0.237 |
| | MTPJ- L | 149.68˚ | 150.62˚ | *P*=0.735 |
| | Carpus- R | 168.88˚ | 172.79˚ | *P*=0.063 |
| | MCPJ- R | 161.50˚ | 168.23˚ | *P*=0.018 |
| | Tarsus- R | 166.19˚ | 158.43˚ | *P*=0.018 |
| | MTPJ-R | 144.29˚ | 156.20˚ | *P*=0.018 |
| **Maximal Point of Retraction** | Carpus-L | 148.16˚ | 140.00˚ | *P*=0.028 |
| | MCPJ-L | 170.07˚ | 171.70˚ | *P*=0.398 |
| | Tarsus-L | 144.87˚ | 140.22˚ | *P*=0.499 |
| | MTPJ-L | 163.75˚ | 161.61˚ | *P*=0.612 |
| | Carpus-R | 145.05˚ | 139.82˚ | *P*=0.176 |
| | MCPJ-R | 159.55˚ | 169.96˚ | *P*=0.128 |
| | Tarsus-R | 149.44˚ | 136.08˚ | *P*=0.018 |
| | MTPJ-R | 161.67˚ | 161.45˚ | *P*=0.866 |

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## The presence of conflict behaviours, in correlation to stirrup length in show-jump training: A Preliminary Study.

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**Keywords:** Welfare; Performance; Ethogram

**Introduction**: Show-jump performance and equine welfare can be significantly influenced by horse-rider communication, with rider position being the most documented link to the presence of conflict behaviours (Christensen et al., 2021; Farmer-Day et al.,2018). Stirrup length, which affects the rider's overall posture, may play a crucial role in helping or hindering the horses was of going, but is an under-researched area, despite its potential to further improve equine welfare and showjumping outcomes (Clayton et al., 2023).

**Materials & Methods:** One experienced rider participated. The rider is familiar with all horses used. N=4 riding school horses were selected from a convenience sample with a varied demographic. They regularly partake in flatwork and jump sessions. A British Horse Society (BHS) Stage 3 Coach supervised. Long-Stirrup measure: the base of the iron aligned with the rider's ankle bone when the leg hung freely-considered a standard flatwork length (BHS, 2020). Short-Stirrup measure: shortened by two holes from the flatwork length (McGreevy and McLean, 2010). Training sessions followed a standardised format: 10 minute warm up, two 65cm jumps, and a five-minute cool down. The structure was maintained across all measures. Behaviours were recorded and categorised; including mouth opening (MO), pinned ears (PE), tail swishing (TS), head tossing (HT) and reluctancy to move forward (RF). Behaviours were recorded on an iPhone using an adapted ethogram (Hausberger *et al*., (2004); Fenner *et al*., (2016). Data were tallied into an excel spreadsheet and analysed through Minitab 22.

**Results**: A series of ANOVAS were carried out to investigate differences between measures. Results show no significant difference with TS (F=0.18, d.f.= 1, P=0.6); MO (F=1, d.f.= 1, P=0.3); PE (F=0.04, d.f.= 1, P=0.8); HT (F=0.13, d.f.=1, P=0.7) and RF (F=0.77, d.f.= 1, P= 0.4). However, graphically differences can be seen with more conflict behaviours present when the rider rode with short stirrups. No significant behaviour was shown more than any others in “short stirrups” measure (F=1.83, d.f.= 4, P=0.176); however, significantly more TS andPE behaviour was shown than any others in “long stirrups” measure (F=3.29, d.f.= 4, P=0.040).

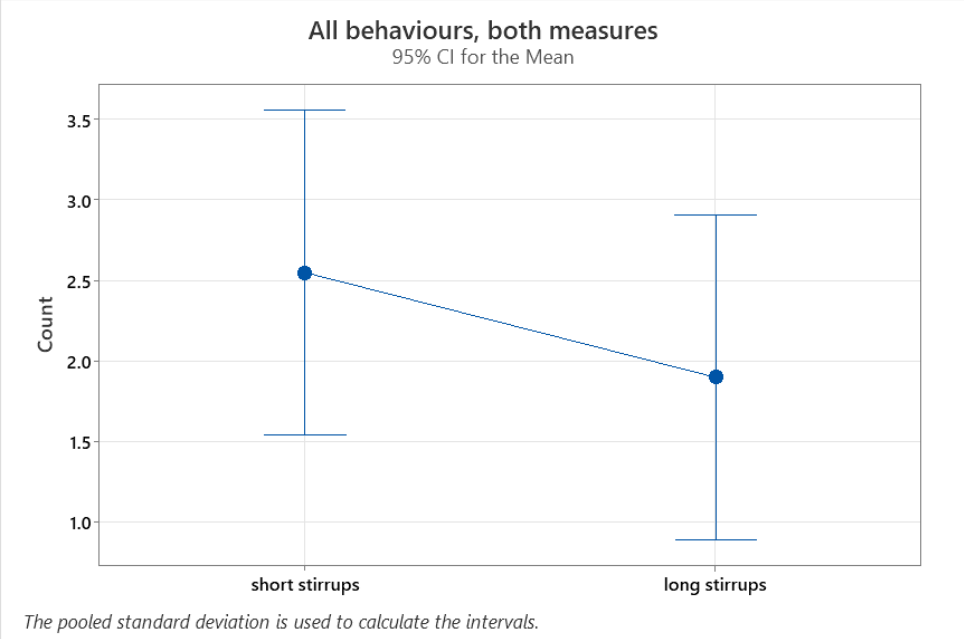


**Figure 1:** Graph to show frequency of conflict behaviours when riding with short and long stirrup

**Discussion & Conclusions:** Visual inspection of the data suggested an observable increase in overall conflict behaviours when horses were ridden with short stirrups. While the lack of statistical significance may suggest these behavioural variations are minor, Lesimple and Hausberger, (2014) emphasise that even sub-threshold behavioural trends can carry practical welfare relevance, especially when consistent across multiple horses or repeated sessions. From a practical standpoint, these findings raise important considerations for both rider biomechanics and horse welfare. Shorter stirrups are commonly used in jumping or more forward riding styles to facilitate a light seat, yet this position may alter the rider's centre of gravity and increase loading on the horse's thoracic region, particularly if the rider lacks core stability (Clayton & Hobbs, 2017). Such postural changes can restrict the horse's range of motion through the back and shoulders, which are crucial for impulsion, stride length, and collection. These postural changes may inadvertently contribute to the observed increase in conflict behaviours. As such, stirrup length should not be viewed purely in terms of rider discipline or preference but should also consider the impact on the horse's comfort and performance.

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## Investigating horse heart rate and micro-facial expressions, in the presence of differing auditory stimuli, to promote positive affective states.

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**Keywords:** *Equus caballus;* EquiFACS; Welfare, Ethology.

**Introduction:** Modern husbandry practices and domestication has reduced the horses' ability to perform natural behaviours, supressing deep-rooted evolutionary drivers, chancing increased risk of stress and anxiety. Through provisions of environmental enrichment, natural behaviours can be promoted, as well as potential encouragement of positive emotional states. In other species, the use of varying audio stimuli has shown to promote positive states (Guérineau *et al*., 2022), however there is a paucity of research exploring the effect of auditory enrichment on equine emotional state. The aim was to determine the effect of differing auditory stimuli on a physiological (heart rate) and emotional (EquiFACS facial coding) parameters within a domesticated environment.

**Materials & Methods:** Fifteen horses (eight mares and seven geldings) between the ages of 5 – 19 within two educational settings were used as the cohort for this study. Classical music, pink noise, and audio captured from a relaxed, stabled horse were chosen, along with silence as a control variable. The study consisted of a cross-over design, whereby all participants were exposed to three test conditions and the control. Participant basal heart rates (HR) and expressions were taken in the stable to calibrate the effect of the experimental location, totalling five separate sessions. Order of exposure was counterbalanced to overcome sequential bias. Audio was played for three minutes, with HR being taken via a calibrated Polar H10 monitor every ten seconds, as well as the cranial aspect of the horse being continuously videoed. Images were taken from this footage at ten second intervals for the researcher to code using EquiFACS, also aligning with HR time intervals. HR data was then analysed using ANOVA and post hoc Tukey test, whilst EquiFACS data utilised a $Chi^2$ analysis with additional Creamér's-V association.

**Results:** The effect of auditory stimuli was significant on HR ($P<0.05$), with post hoc Tukey test showing the most sizable difference between classical music (mean = 34.92bpm) and equine simulated sound (mean = 41.47bpm) for 81.81% of participants. Facial expression was also significantly different between conditions ($P<0.001$), with Creamér's-V = 0.20 showing strongest association between the muzzle region and stimuli. Co-occurrence of expression also determined anecdotal relationships related to audio exposure, such as lower lip relax occurring with neutral ears in basal condition and nostril dilator with eye white occurring in equine simulated sound.

**Discussion & Conclusions:** Classical music may have a relaxing effect due to the physiological implications on cranial nerve X as a result of the auricular branch and ear canal being in close proximity (Darki *et al*., 2022). There was indication that these specific sounds may be perceived as aversive by horses, leading to care being needed from owners if exposure is likely. It could be that classical music could aid in reducing stress in sensory deprived environments, however the efficacy of this enrichment is not fully known.

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## A Meta-Analysis on Physiological Indicators of Stress in Naïve Performance Horses: Evaluating Heart Rate Variability and Salivary Cortisol

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**Keywords:** Autonomic Regulation; Young horse; Stressors

**Introduction**: Assessing stress responses in horses is crucial for understanding the impact of various training methods and disciplines. Physiological markers such as heart rate variability (HRV), and salivary cortisol concentrations are commonly employed to evaluate acute stress levels (Ishizaka et al. 2017). For this study, stressors are defined as experiences that induce a statistically significant ($p < 0.05$) increase in cortisol levels or a decrease in HRV pre- and post-exposure. The aim of the research was to evaluate which method is more appropriate to measure equine acute stress and identify which stressor is most significant to naïve performance horses.

**Materials & Methods:** Following PRISMA 2020 guidelines and using the PICO framework to structure the search and eligibility criteria, 35 studies published between 2013 and 2025 were included, representing 1,175 horses. Selection criteria required studies to report stress caused by ≤3 stressor exposures to prevent habituation (Schmidt et al., 2010), include a minimum of 6 subjects per group, and examine breeds such as Thoroughbreds, Lusitanos, Warmbloods, and Irish Sport Horses. Eligible stressors include dressage, showjumping, endurance, transport, backing, gallops, shoeing, flat training, jump training, and lunging. Data collection required standardised methods such as HRV producing repeatable electrocardiographs (e.g., RMSSD, SDNN), while salivary cortisol was assessed using ELISA, with samples taken 30 minutes before and after exposure, standardised around 8:00 a.m. to control for diurnal variation.

**Results:** A significant combined effect size (Hedges' $g = 2.01$, $SE = 0.65$; $Z = 3.09$, $p = 0.002$) confirmed the presence of measurable stress responses across all included studies. Transportation elicited the strongest physiological response, indicated by the greatest cortisol elevation and HRV suppression. Heterogeneity analysis indicated substantial variation across studies ($Q = 886.58$, $I^2 = 96.17\%$, $T = 2.38$),

**Discussion & Conclusions:** HRV and salivary cortisol appear effective for assessing acute stress in naïve performance horses. However, interpretation must consider confounding factors such as management practices, methodological inconsistencies, and the potential progression from acute to chronic stress. These limitations highlight the need for standardised protocols and further primary research across training contexts.

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## How do Riders Perceive Bit Use in Equestrian Sport?

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**Keywords**: Knowledge; Horse; Competition; rules

**Introduction:** Social License to Operate (SLO) is a major challenge within equestrian sport at present, driving research around welfare of performance horses and public perceptions of equestrianism and 78% of stakeholders believe that the welfare of horses in sport needs improving, with training methods and tack and equipment being the top concerns (FEI Equine Ethics and Wellbeing Commission, 2022). Bits are designed to help the rider control speed and direction (Luke et al., 2023) however incorrect fit, and use will cause damage to the horse's mouth (Hill et al., 2015). There is still minimal research into the action of the bit and this unknown causes concerns for parties outside the equestrian community. This study aims to investigate knowledge and perceptions of bit use in both riders and non-riders to identify areas of concern and possible training needs.

**Material & Methods:** A focus group was conducted, made up of four 18–25-year-old university students who own and ride horses in different disciplines. Inclusion criteria for the rider group were riders who have competed under 1m showjumping, BD Novice dressage or equivalent, those competing at a professional level or holding bit fitting qualifications were excluded. A selection of bits and images of horses working in bitted bridles were presented to each group, along with a series of prompt questions. The focus group discussion was recorded and transcribed, then analysed using content analysis.

**Results:** Four themes arose from the rider focus group: rules and regulations, rider knowledge and understanding, characteristics of the horse, and tack and action of the bit (Figure 1). Rider knowledge and understanding was the largest theme throughout the focus group with 103 meaning units. Participants were unsure of where to find information on bits and bitting and demonstrated preconceived ideas that some bits were 'harsh' without fully understanding the mechanisms of the bit. Participants disagreed on bit 'strength' and there were clear differences in knowledge. When asked where they would go to retrieve information about bit fitting the most common answer was to ask advice from trainers, however there was no consideration of the qualifications these trainers held.

**Discussion & Conclusions:** This information from the focus group highlights areas for improvement. There is a lack of consistency in the knowledge and understanding of bit selection and fitting in the amateur equestrian. This indicates a lack of easily retrievable information about bit fitting, and riders are unsure where to go for advice on this topic. This is a call to action that there is a need to provide more information and training to amateur riders and their trainers to improve bitting practices and ultimately horse welfare.

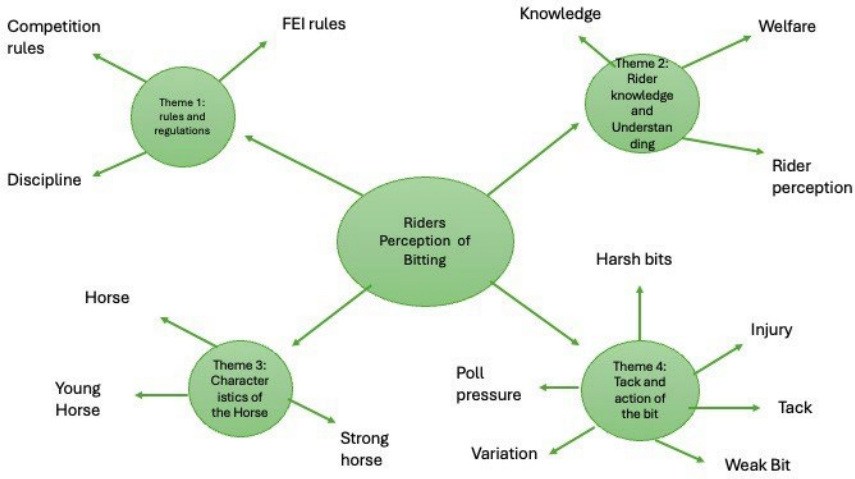


**Figure 1:** Themes and codes arising from the rider focus group

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## Investigating the impact of carpus-level water-treadmill training on flexion/extension of the equine thoracolumbar region: a pre, during and post-exercise comparison.

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**Key words:** kinematics; locomotion; sport-horse; spine

**Introduction:** Previous literature investigates the immediate influence of water treadmill (WT) walking upon equine thoracolumbar kinematics, establishing that thoracolumbar flexion/extension range of motion (F/E ROM) is positively associated with water depth up to the height of the carpus (Nankervis, Finney and Launder, 2016; Nankervis *et al.,* 2024; Tranquille *et al.,* 2022). Longitudinal research is required to clarify whether long-term WT exercise influences overground locomotion, providing a rationale for the use of WTs in the training programme of the sport-horse. Elucidation is required regarding the immediate impact of water walking on equine back kinematics upon removal of water. This research project aimed to observe how thoracolumbar kinematics change during carpus-level WT training and establish whether post-exercise thoracolumbar flexion/extension differs from pre-exercise flexion/extension.

**Material & Methods:** Eleven horses, recruited by convenience sampling through the Hartpury Therapy Centre, were walked on WT at 4-4.1km/h at three conditions: pre-exercise (dry belt), during-exercise (carpus depth water), and post-exercise (dry belt). 3 horses were excluded during data collection/analysis. The final sample of 8 varied in breed (number of breed/types=4), age (10.38 ± 4.87), height (cm)(163.13 ± 5.99) and discipline (Dressage=2, SJ=2, Eventing=2, Allrounder=2). Eight Inertial Motion Units, validated through previous research (Nankervis *et al.,* 2024), were placed on the poll, thoracic vertebrae 6 (T6), 13 (T13), 18 (T18), lumbar vertebrae 3 (L3), the midline between the tubera sacrale (TS) and the left and right Tubera Coxae (LTC/RTC), for the purpose of collecting differential rotational values for pitch between vertebrae (F/E ROM). The data were processed using EquiGait software and tested for normality using a Shapiro-Wilk. Parametric data were analysed using a Repeated Measures ANOVA to calculate significance of pairwise comparisons between conditions. Cohen's *d* (with Hedge's *g*) determined effect size, and significance set at $p < 0.05$.

**Results:** Mean and standard deviations (±) for whole TL spine ROM (T6-L3) were: pre-exercise = 2.98° ± 0.99, during WT exercise = 3.69° ± 1.10, and post-exercise = 2.90° ± 1.11.
No significant difference was shown between pre-exercise and post-exercise kinematics at any spinal segment, although an effect was demonstrated at T18-L3 and T13-L3. Significance and large effects were demonstrated between pre-exercise and during-exercise kinematics at T18-L3 and T6-L3, and between during- and post-exercise kinematics at T18-L3, T6-L3, and T13-L3 (Table 1).

**Table 1:** Significance and effect size (*g*) values of change in differential rotational pitch at T18-L3, T6-L3 and T13-L3 (Pre-WT exercise vs during WT exercise, during WT exercise vs post-WT exercise, and Pre-WT exercise vs post-WT exercise)

| | | Significance (*P*) | Hedge's *g* |
|---|---|---|---|
| | Pre/during | 0.011* | 1.05 |
| **T18-L3** | During/post | 0.002* | 1.56 |
| | Pre/post | 0.437 | 0.33 |
| | Pre/during | 0.032* | 1.28 |
| **T6-L3** | During/post | 0.027* | 1.15 |
| | Pre/post | 1 | 0.09 |
| | Pre/during | 0.101 | 0.66 |
| **T13-L3** | During/post | 0.034* | 0.84 |
| | Pre/post | 1 | 0.22 |

Statistically significant results marked by *

**Discussion & Conclusions:** It was established that WT walking with carpus-depth water increases F/E ROM in the thoracolumbar region for the duration of exercise. An effect with no statistical significance was observed between pre-exercise and post-exercise kinematics at T18-L3 and T13-L3, suggesting these segments are more susceptible to locomotory change, which is logical based on the anatomy of the spine in these regions. The effect size demonstrated provides evidence that WT exercise may have an immediate impact on back kinematics upon removal of water from the WT. The current and previous literature theorise that this locomotory alteration may result in neuromuscular adaptation over time (Nankervis *et al.,* 2024). Further research is required utilising a larger sample, utilising Optical Motion Capture and no prior habituation to WT exercise in order to limit confounding variables.

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## An investigation into forage dunking and influencing factors in horses

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**Keywords:** Management; Water; Behaviour; Allergies

**Introduction**: The aim of this study was to evaluate forage dunking and the factors that may lead to horses performing the behaviour. Forage dunking involves horses collecting forage and proceeding to dunk it in a nearby water source and ingesting as it normally would. It is believed horses do this behaviour to increase water content within forages (Dickson *et al*., 2019), however, horses who to perform the behaviour may be highlighting underlying health issues (McBane *et al*., 2014). There is no current scientific evidence to suggest the implication's forage dunking has on horses, and those who do often briefly mention dunking result in having a different rationale leading to the behaviour being overlooked altogether.

**Materials & Methods:** An online questionnaire was created with the use of MS forms; questions were established through MCQ and a Linkert scale, the questionnaire was distributed to online platforms and tack shops. Specific well detailed questions such as breed, discipline, medical conditions and forage types were asked to gather demographic information to establish correlations/relationships. The collected data was therefore nominal with some ordinal data from Likert scale questions. Therefore, chi square test was used to analyse the data.

**Results:** Overall, 455 anonymous participants were gathered. A total of 46.4% (n = 212) of horses were reported to perform forage dunking behaviour, with Warmbloods presenting with the highest rates of forage dunking (53.8%, n=129) compared to Cross breeds (40.3%, n=27) and Native breeds (36.5%, n=35), however, there was no significant association between breed and forage dunking ($X^2$ = 12.28, P = 0.267). A greater number of respondents stated horses were kept within American barns, this resulted in higher dunking rates (55.6%, n=84) and horses turned out for a minimum of 2 hours presented with higher dunking rates than other durations of turnout (52.2%, n=22). 47.8% (n=74) of horses being fed hay and grass were reported to show forage dunking, however, there was no statistical association between forages ($X^2$ = 49.29, P = 0.10), Soaking and steaming forage was not found to have an effect on forage dunking behaviour ($X^2$ = 0.406, p = 0.939) Forage dunking was also observed in horses with respiratory conditions such as equine asthma (38.9%, n=7) and laryngeal hemiplegia (100%, n = 6).

**Discussion & Conclusions:** This was the first study conducted surrounding forage dunking behaviour in horses. Factors such as management, forage, discipline and medical conditions were evaluated to influence the horse presenting with the behaviour. The primary factor thought to influence forage dunking is airborne respiratory dust (ARD). ARD was primarily evaluated to be linked to horses developing medical conditions such as equine asthma and leading to the development of forage dunking (Auger *et al,* 2017). There are many elements to consider around forage dunking however, further research is required to develop a greater understanding around forage dunking in the horse.

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## A meta-analysis on the effects of exercise on cortisol levels in Horses

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**Keywords:** Exercise; Cortisol; Training load; Chronic disease

**Introduction:** Horses have transitioned from working animals to key participants in sports and leisure, making their care and management essential. Exercise is crucial for a horse's physical and mental well-being, but it can also be a significant stressor. Cortisol, the primary stress hormone, plays a role in metabolism and energy regulation, but chronic elevation due to intense training, improper diet, or poor management can lead to serious health issues like gastric ulcers, colic, and metabolic disorders(Hinchcliff et al., 2005). Training intensity varies from light hacking to high-intensity interval training and jumping, impacting cortisol levels differently. This study examines the relationship between exercise and cortisol response over multiple studies, to gain better insight for the optimisation of training programs.

**Materials & Methods:** A literature search identified 2,881 papers from PubMed and Surrey Search. After applying exclusion criteria, 142 studies remained for secondary screening, with 8 studies (129 horses) meeting the final screening. Data was extracted and standardised to nmol/L for comparison. Cortisol changes were calculated from pre-exercise to 30–90 minutes post-exercise. Standard deviations were recalculated, and the mean (SEM) standard error was determined. A meta-analysis was conducted, and a forest plot was created with subgroup analyses for dressage, showjumping, and racing. Heterogeneity ($I^2$) and statistical significance (Q test) were assessed to determine heterogeneity between studies.

**Results:** The meta-analysis included eight studies with 129 horses, examining cortisol levels before and after exercise. The pooled effect size was 28.18 nmol/L (CI 95% -0.75 to 57.12 nmol/L), indicating a significant increase in plasma cortisol after exercise. Heterogeneity was high ($I^2$ = 99.86%), suggesting substantial study variability. Subgroup analysis showed that racing had the highest cortisol increase (48.84 nmol/L), while dressage had lower variability. The Q test confirmed significant heterogeneity between studies (p = 0.00).

**Discussion & Conclusions:** The findings indicate that high-intensity training methods, such as interval training in racing, lead to significantly higher cortisol increases compared to lower-intensity disciplines like dressage, with race training producing the greatest change in cortisol after exercise (Čebulj-Kadunc et al., 2022). Turnout and stable management also play a crucial role in mitigating stress responses in aiding the reduction of cortisol when the horse is at rest. Looking at the overall behaviour will help to see how different levels of cortisol can increase the incidence of stereotypical behaviours of crib biting and weaving. These results highlight the importance of structured physical training programs that minimise stressors, including transport, environmental factors and nutrition, while optimising the quality of the education. The studies do suggest that cortisol monitoring would be effective in overall management. However, limitations such as sample size and study heterogeneity should be considered. Future research should use a large sample size that can measure cortisol levels over a long period of time in the horse's entire life, between exercise and turnout. Then, in the same study, during training, see the levels of stress response when the horse is exposed to new training methods and how they process new

education. This will help to consider how training methods link to natural behaviours to better improve training welfare.

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## Investigative study on horse owners' use of nutritionists: reasons for and against the use of an equine nutritionist.

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**Keywords:** Equine nutrition; Motives; Advice

**Introduction:** Nutrition is essential for horse health and performance. Previous research (Murray et al., 2015) has suggested that horse owners are more likely to seek nutritional advice from vets and via the internet rather than use an equine nutritionist. This study aimed to determine what proportion of horse owners consult an equine nutritionist when planning their horse's diet and the reasons they may choose to use or not use an equine nutritionist. All nutritionists, whether independent or those employed by a feed-company but also registered or not, were grouped together in this study so that usage was focused on rather than type.

**Materials & Methods:** An online questionnaire was sent out and consisted of closed questions like multiple choice questions and Likert scales. It investigated the demographics of horse owners that use or don't use an equine nutritionist and the reasons that they gave for their decision. The questionnaire included questions relating to the horse owner (age, competition level, etc.), the horse (age, workload, breed, etc.), and their opinions of equine nutritionists. The data was coded on an excel spreadsheet and then tested for normality using a Shapiro-Wilks test. The data was then analysed on the Excel spreadsheet and displayed in bar charts.

**Results:** 230 responses were recorded. 17% (n=39) of horse owners choose to use equine nutritionists and the main reasons are because they want to ensure that their horse is in peak condition and performance level, and they also say that their nutritionist's advice is of great value to them. 57% (n=131) of horse owners said they do not use equine nutritionists, and a key reason is because their horse is healthy on the diet that it is currently on and so see no need to use one. Some horse owners previously used an equine nutritionist (26%, n=60), however do not anymore and a main reason for this is that their horse wasn't in great condition before but with the help of a nutritionist they have improved and so no longer need assistance.

**Discussion & Conclusions:** Horse owners typically consult an equine nutritionist to ensure their horse's health and condition. Those who don't seek help often feel that their current diet is effective and so there is no need to use an equine nutritionist. Owners who previously used a nutritionist reported improvements in their horse's condition, making further assistance unnecessary, highlighting the value of initial guidance. Understanding these motivations could help nutritionists tailor their services to better meet owner expectations and grow their clientele. Future research could explore why owners choose independent versus feed-company nutritionists, as differing opinions may offer valuable insights for the equine feed industry.

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## An Investigation into the Causes and Prevalence of Overtight Nosebands within the Equestrian Community

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**Keywords:** Welfare; Competition; Regulation; Discipline.

**Introduction:** The use of the noseband on the ridden horse is a common worldwide practice, though excessive noseband tightening is causing concern among equitation scientists. When nosebands are fastened to the point of restricting normal behaviours, and even causing damage to the underlying bones, there must be a question as to why this is ever deemed necessary. The welfare of the horse may be compromised when nosebands are fastened tighter than the recommended 2- finger rule (McGreevy, Warren-Smith and Guisard, 2012). This rule states that 2 adult sized fingers should fit in the space between the horse's nose and the noseband. Though there is well documented evidence for the pain, distress and lasting injury that ensues when the 2-finger rule is overlooked (Uldahl and Clayton, 2018), there is little known about the factors that influence a rider to overtighten a noseband. The aim of this study was to investigate whether any particular rider demographic demonstrated a higher prevalence of overtight nosebands, in order to hypothesise potential causative factors for noseband overtightening.

**Material & Methods:** Fifty human participants completed a rider profile survey to provide information regarding their gender, riding experience (years), usual riding discipline, formal equestrian qualifications, and whether or not they take part in hunting and/or cross-country schooling. Immediately following the survey, participants demonstrated their preferred noseband tightness using a cavesson noseband on a model horse. Participants involved in hunting and or/cross-country schooling were invited to demonstrate a second noseband tightness if this is something they would alter for such an activity. The ISES Taper Gauge was utilised to objectively measure the noseband tightness each participant demonstrated. These measurements were then analysed in relation to rider profile to identify factors influencing preferred noseband tightness. Dependent on data type, statistical analysis was performed using Mann-Whitney U, Spearman's rho, or Kruskal-Wallis tests.

**Results:** Analysis showed a significant difference in noseband tightness depending on the rider's usual discipline, with show jumping riders exhibiting the tightest nosebands and hacking riders exhibiting the loosest. Furthermore, noseband tightness demonstrated by participants was significantly higher among those who had recently engaged in hunting and/or cross-country schooling.

**Discussion & Conclusions:** A rider's propensity to overtighten a noseband is most significantly affected by their range of recent ridden activity. Increased inclination towards tighter nosebands is seen among riders engaging in activities known to be particularly high arousal for the horse, such as show-jumping, cross-country schooling, or hunting. This could indicate that riders may be pre-emptively tightening nosebands to provide a greater sense of control and security in more dangerous situations (Hawson, McLean and McGreevy, 2010). Guidance on noseband tightness from competition governing bodies also differs between disciplines, with the least stringent measures seen in FEI Jumping. Other potential reasons for overtightening nosebands include the

desire to clamp the mouth shut to minimise pain or stress behaviours such as mouth-opening, despite this being likely to exacerbate the behaviour instead. Further research should seek to explore whether a rider's propensity to overtighten a noseband is more likely to be influenced by confidence in riding ability, or by outside influences such as competition regulations. Meanwhile, the implementation of more stringent regulation could facilitate an immediate improvement to the welfare of the competition horse, with potential to influence a trickle-down effect to all corners of the equestrian population.

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## A Comparison of Attitudes towards the Social Licence to Operate of Equestrian Sports between Equine Stakeholders and Non-Equine Stakeholders

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**Keywords:** Welfare, Public Perception, Concern, Trust, Integrity

**Introduction:** Social licence to operate (SLO) in equestrian sports is an increasingly relevant issue, influenced by growing media coverage (Williams, 2023). This study explores and compares perspectives of equine stakeholders and non-equine stakeholders regarding the SLO of equestrian sports.

**Materials & Methods:** Focus groups (n=6) were undertaken with equine stakeholders (ES) (n=8) and non-equine stakeholders (NES) (n=12). Stakeholder groups were further categorised based on job role or student status: postgraduate equine specialists, equine industry professionals in corporate sectors and equine industry professionals in welfare and research sectors. Participants responded to nine qualitative opinion-based questions and answers were transcribed. Responses were coded into categories and thematically analysed to indicate participant sentiment and their levels of support for equestrian sports.

**Results:** Prevalent themes included welfare, public trust and misconceptions. ES identified public misconception surrounding the industry, whilst NES demonstrated uncertainty and a lack of confidence in making informed judgements. ES were more critical on specific industry practices and discipline specific regulations, whilst NES showed more generalised concerns and acknowledged their opinions are largely based on media portrayal. ES groups more often reached a unanimous consensus, whereas NES groups demonstrated more debate and disagreement. Overall education, research and welfare sectors of the equine industry were most critical of equestrian sports and demonstrated a lack of hope surrounding the future of equestrian sports. NES showed generalised concern over horse welfare, but viewed equestrian sports as so embedded within tradition and culture that they did not envisage a threat to the future operation of equestrian sports. ES expressed less support for the future of equestrian sports than NES participants; 75% of ES concluded that they did not support the future of equestrian sports under current regulations, compared to 33.3% of NES.

**Discussion & Conclusions:** In line with VoconiQ, et al., (2024) this study reinforces the findings that the social importance of horse sports to UK culture is highly influential in driving positive public perception of equestrian sports. Whilst NES held generalised concerns over what they had seen in the media, they viewed equestrian sports as embedded within society and perceived a low level of threat to the continuation of the sport. Conversely, ES, particularly within education and welfare sectors showed a much greater deal of scepticism about current industry practice, highlighting the need for tangible welfare improvements in order to maintain equestrian sports' credibility, integrity and SLO. Although limited by a small sample size, this study highlights clear differences in stakeholder perspectives and provides a basis for further research surrounding effective strategies to support the sustainability and future of equestrian sports.

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## Exploring equine yard owners and managers protocols on disease control and biosecurity relating to Streptococcus equi subsp. equi (Strangles) infection.

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**Keywords:** Equine; Disease; Prevention; *S. equi*

**Introduction:** *Streptococcus equi* (*S. equi*) is a highly infectious upper respiratory disease affecting all equine species, posing a significant threat to yards, due to its rapid transmission and high morbidity rates (Lascola, 2023). *S. equi* is one of the most frequently diagnosed equine infections (Mitchell *et al.,* 2021) with over 600 UK outbreaks reported annually (Mitchell *et al.,* 2021). In recent years, significant increase in international equine trade of horses, semen and embryos has markedly increased disease transmission risk (Mealey and Long, 2017). Previous literature has focused on equine owners' knowledge of *S. equi* relating to generalised treatment, control and prevention of the disease. This study aimed to understand yard owners' and managers' approaches to *S. equi* biosecurity and protocols, identify barriers to implementation and assess information sources guiding outbreak management and prevention.

**Materials & Methods:** A quantitative online survey of 39 open and closed-ended questions, including multiple-choice, Likert scale, rating, and ranking questions, was answered by 102 UK equine yard owners and managers using volunteer sampling. This sample size obtained a 9% margin of error at the 95% confidence interval. Data analysis was conducted using IBM SPSS Statistics Version 29.0.1.0 (171) USA and Microsoft Excel Version 16.95.1, USA. Descriptive statistics were performed alongside Chi-squared and Mann-Whitney-U and Kruskal Wallis tests. This survey was distributed and promoted on social media platforms six times over the three and a half months, on the author's own Facebook page, and in numerous regional and national equine groups. Additionally, posters with a QR code were distributed in high-traffic pedestrian areas at the Pony Club Championships, Blenheim Palace International Horse Trials, and Cornbury International Horse Trials. Additionally, leaflets were included in Fence Judging packs at Cornbury, and word of mouth further supported outreach.

**Results:** A total of 44% (n=45) of respondents had experienced *S. equi* outbreaks, typically affecting one to two horses and occurring over five years ago. Most (96%, n=98) agreed good management and biosecurity, including quarantining new arrivals (88%, n=90), reduce transmission. While 65% (n=66) considered written protocols important, only 40% (n=41) had one. Barriers to protocol implementation included financial constraints ($p=0.018$), infrastructure ($p=<0.001$) and client cooperation ($p=0.002$). Yard managers (64.52%, n=20) were more likely to report barriers than owners or those who self-selected dual roles. No significant association ($p=0.959$) was found between professional role and information sources ($\chi^2=57.741$, d.f.=78). age ($p=0.938$), education ($p=0.150$), and qualification ($p=0.100$) also showed no significant influence but offered insight into addressing the research objective. Notably, 60% (n=61) had never used a scheme for advice, with 28% (n=29) unaware of any schemes to reduce *S. equi* outbreaks.

**Discussion & Conclusions:** Whilst most equine yard owners and managers recognise the importance of biosecurity and control measures against *S. equi,* responses suggest awareness does not always translate into action. With 28% of respondents unaware of educational campaigns, this highlights a missed opportunity to enhance biosecurity and knowledge through industry-supported initiatives. Future efforts should focus on encouraging, recognising and, rewarding actions, such as written protocols and appropriate quarantines for yard owners and managers on equine disease, control and biosecurity.

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## Investigating the Possibility of Differences in Faecal pH Levels of Horses Diagnosed with Equine Metabolic Syndrome Vs Healthy Horses

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**Keywords:** Equine; Health; Conditions; Hindgut; EMS

**Introduction:** The estimated prevalence of Equine Metabolic Syndrome has increased significantly in the past decade with developments in understanding, awareness and focus as 66% of laminitis cases in one hospital were diagnosed with EMS after testing (Morgan et al., 2015). The hindgut and microbiome have become prominent research areas with consideration of faecal pH and bacteria composition as possible indicators of hindgut environment and health. This study investigated whether there were any differences in faecal pH of horses with clinically diagnosed EMS and non-EMS horses.

**Materials & Methods**: Owners of horses with both EMS and non-EMS horses were recruited via social media posts. N=16 sent faecal samples from their horses in the post, n=8 with EMS, n= 8 with non-EMS or other known health conditions. Once the samples were received in the post they were immediately frozen, and this is where all the samples were all placed into separate beakers, with distilled water, shaken and left to thaw until all the particles have broken down. One by one their pH readings were taken by a Jenway pH meter, this test was repeated three times every 30 minutes. Along with consent and information forms outlining management, diet; which included what individual horse is fed and the quantities of feed given a day, and EMS history. Each diet regimen was written in detail on the information forms and showed that all the horses have different dietary regimes, which could influence the outcome. A standard t-test was undertaken to test for the mean difference in faecal pH.

**Results:** EMS group n= 8 had mean faecal pH value of = 7.26, with ± 0.48. The non-EMS group, n= 8 had mean value of = 7.28 ± 0.60. The mean difference value = 0.01, and the SD for both groups had a value of = 0.76. There was no significant difference found between these two groups (P = 0.96).

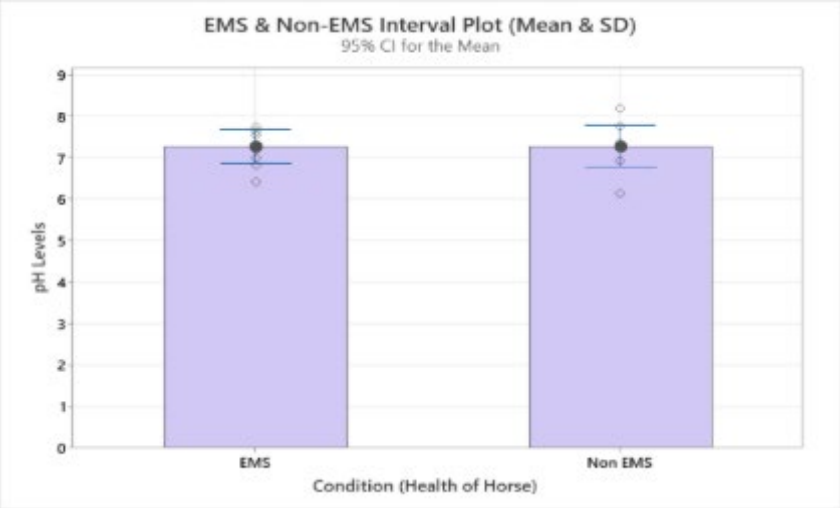


**Figure 1**: Interval Plot Graph Showing the Mean and SD of EMS and Non-EMS Horses

**Discussion & Conclusion:** Non significance (P = 0.96) between the EMS and non-EMS horses in faecal pH indicates similarities in pH. Elzinga et al., (2016) found that horses with EMS had different faecal microbiota to those without EMS. Therefore, further work is warranted to now look at faecal microbial populations in EMS cases verses non-EMS as well as faecal pH but on larger scale. Any further research to support the evolving body of work on hindgut microbiome and non-invasive indicators of health or early identification of changes to the environment are of significant importance.

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## The Effect of Birth Date Upon Racehorse Performance on the Track

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**Keywords:** Thoroughbred; Foaling Date; Race; Flat

**Introduction:** Within the Thoroughbred racing industry, there is a common ideology that the best racehorses are born earlier in the calendar year. However, the natural reproductive cycling of a mare generates a foaling season between April and September providing a warmer environment with extended day length and the most nutritious pasture available to the off spring for optimum growth and development. Yet, to achieve the most 'desirable' racehorse, the Thoroughbred breeding industry manipulates the mare's cycles to birth in the winter months from January to April in attempts to achieve increased growth and development of the horse due to the close proximity of dates to the 1st of January racehorse birthday (Aurich, 2011). Whilst this ideology is strongly followed and human research has indicated earlier calendar birthing advantageous to child and adolescence sporting endeavours primarily due to increased stature (Jakobsson et al, 2021), there is little research and data to indicate whether the winter parturition does create a stronger and better athlete or if the lack in scientific growth and development factors hinder the horses overall development. This study is aimed to investigate whether the unseasonable birthing dates has an effect on the thoroughbred athletes performance upon the flat racetrack.

**Materials & Methods:** A data set was compiled consisting of 150 Thoroughbreds, which were born between the months of January 2021 to June 2021 and raced on the flat. The data set included three different highly ranked champion racehorse trainers from Britain and Ireland with 50 horses from each trainer. Performance data was collected for each horse for their entire career up until the end of their 3-year-old season. Day of birth was calculated as the number of days after 1st January 2021 each horse was born. Linear regression was used to identify any effect of day of birth on selected racing performance metrics.

**Results:** No significant relationship was found between day of birth and any of the selected metrics of racing performance.

**Table 1:** Outcome of linear regression analyses the effect of the independent variable 'Day of Birth' on selected performance metrics for 150 flat racehorses foaled in 2021

| Dependent Variables | Beta Coefficient | $r^2$ | P value |
|---|---|---|---|
| Wins | 0.044 | 0.002 | 0.596 |
| Strike Rate (% wins from runs) | 0.138 | 0.019 | 0.091 |
| Official Rating | 0.034 | 0.001 | 0.682 |
| Prize Money | -0.013 | 0.000 | 0.870 |
| Official Top Speed | -0.018 | 0.000 | 0.831 |
| Official Racing Post Rating | 0.013 | 0.000 | 0.875 |
| Placings (2nd and 3rd) | -0.083 | 0.007 | 0.311 |
| Number Of Race Starts | -0.066 | 0.004 | 0.424 |

**Discussion & Conclusions:** There was no significant association between date of birth and racehorse performance when the entirety of the two and three year old seasons were taken into account. This appears to indicate that there is no long-term effect of earlier or later birth on performance. This work could be extended to consider the two-year-old year only, and to analyse how early in the racing calendar a horse begins its two-year-old career, which would allow assessment on whether earlier foals represent a quicker return on investment for potential owners.

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## Investigating different numnah materials and their effect on reducing peak pressures.

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**Keywords:** Numnahs; Pressure distribution; Saddle pad; Simulator

**Introduction:** Effective and even pressure distribution under a saddle is crucial for horse performance and overall comfort. Since the first discovery, saddles pads, also known as numnahs, referring to 'pad' is placed underneath a saddle with the aim to protect the saddle from dirt and sweat (Carter *et al.,* 2024). A numnahs purpose has been developed and now used to reduce pressure under the saddle, however their effectiveness can vary due to the materials used (Harman *et al.,* 2018). This study investigated the effect of different numnah materials on reducing peak pressure and increasing overall horse comfort.

**Material & Methods:** This investigation eliminated the use of live horses in order to gain accurate data and required the use of a mechanical riding simulator (Racewood Eventing). Alongside this, a 22-year-old international dressage rider weighing 73kg without the saddle was used in order, to obtain, quantify and compare the pressure distribution under five different numnah conditions (saddle only, Equitex, Sheepskin, gel and standard cotton numnah) across various gaits (walk, sitting trot, rising trot & canter) with the use of a pressure mat (CONFORMat Tekscan Pressure Measurement System 7.60-21C). Peak pressure at the front and back of the saddle was measured using Tekscan whilst a statistical analysis, a Wilcoxon matched pairs test was used to compare mean peak pressures between the front and back.

**Results:** Table 1 shows overall peak pressures measured across all gaits. SPSS (Statistical Package for Social Sciences version 29) was used throughout the trials to calculate the mean and standard deviation in order to show variation between conditions and any inconsistency through the trials.

**Table 1:** Overall peak pressures for each numnah type

| Numnah type | Overall peak pressures (kPa) |
|---|---|
| Equitex | 471.8 kPa |
| Sheepskin | 452.2 kPa |
| Gel | 568.1 kPa |
| Standard Cotton | 946.1 kPa |
| Saddle only | 1061 kPa |

The comparison of front versus back pressure distribution with different numnahs- values at the front of the saddle were higher than the back across all numnah types; Equitex (32.05 kPa), Sheepskin (158 kPa), Gel (235.6 kPa), Standard cotton (381.9 kPa), Saddle only (237.8 kPa) Corresponding back pressures; Equitex (21.4 kPa), Sheepskin (120.1 kPa), Gel (151.5 kPa), Standard cotton (223.8 kPa) and Saddle only (237.8 kPa). A wilcoxon matched pairs test showed a statistically significant difference between front and back pressure values (Z=-2.02, P=0.043),

indicates that peak pressure was significantly greater at the front of the saddle across all conditions.

**Discussion & Conclusions:** The findings from this study suggest that material selection and the individual offering properties remain crucial to maintaining an even distribution of weight and pressure. The findings suggest that using a numnah for the fundamental use, will reduce areas of peak pressures compared to riding without a numnah. Equitex and Sheepskin numnahs remained the most effective at reducing pressure throughout all trials. Compared to previous studies in the industry, most often use live horses for data collection whereas the use of a simulator within this study allowed for a controlled environment and for the variables to remain the same- rider weight and saddle fit. The findings can potentially benefit people within the equine industry for future research and purchasing. Riders, owners, and numnah manufactures, can gain knowledge into material selection for the individual horse and discipline.

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## Differential range of motion of the equine spine during straight-line, non-ridden exercises at walk

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**Keywords:** Rehabilitation, Kinematics, In-hand, Long-reining, Treadmill

**Introduction:** Equine spinal kinematics are of great importance in the rehabilitation process, as the back of the horse represents the core of the equine musculoskeletal system. Rehabilitation of horses often starts with straight-line, non-ridden walking exercises. Different exercise methods exist, however current literature mostly reports differences in spinal kinematics between treadmill and overground locomotion at trot (Gomez-Alvarez *et al.*, 2009). There is no current research available comparing different exercise conditions at walk or during long-reining. This study aimed to investigate equine spinal kinematics during different non-ridden, straight-line exercises at walk; including in-hand walking on soft and hard surface, walking on a treadmill and long-reining on a soft surface. It was hypothesised that differential pitch, heading and roll range of motion (ROM) of the thoracolumbosacral spine would significantly differ between exercise conditions.

**Material & Methods:** Five sports horses (mean±sd: age 12±6, height 166±5cm) had nine inertial measurement unit sensors attached to the midline of the spine at the poll, the thoracic (T) spine T5, T13, T18, the lumbar (L) spine L3, tubera sacrale (TS), top of the tail (TAI) and both right and left tubera coxae. Data were collected (100Hz) whilst horses were led in-hand on soft and hard surfaces as well as long-reined on a soft surface along a 20x1.7m track and walked on a treadmill for five minutes. The order of the exercise conditions was randomized. Speed was maintained within 0.2m/s between conditions (1.51±0.17m/s). Differential pitch, heading and roll ROM between T5-T13, T13-T18, T18-L3, L3-TS and TS-TAI were calculated (EquiGait) before using SPSS for statistical analysis. A Friedmans ANOVA test was conducted to test for difference between the conditions and post hoc Wilcoxon Signed-Rank tests were applied when appropriate. Significance level was set at $p \leq 0.05$ for all statistical tests.

**Results:** The results showed no significant difference ($p>0.05$) between conditions for differential pitch and heading ROM at any location. A significant difference in differential roll ROM ($p=0.016$) was observed at T18-L3 between exercise conditions. These results indicated an increased roll ROM during treadmill locomotion (TM) compared to long-reining (LR) (Med±IQR: TM=9.3±4.4°, LR=9.1±4.9°: $p=0.042$) and in-hand walking on hard surface (IH) (Med±IQR: TM=9.3±4.4°, IH=6.9±3.9°: $p= 0.043$). In-hand walking on soft surface (IS) also showed an increased ROM compared to hard surface (Med±IQR: IS=7.0±5.2°, IH=6.9±3.9°: $p=0.043$).

**Discussion & Conclusions:** These findings suggest that flexion-extension and lateral bending ROM are not altered between the tested exercise conditions, although axial rotation ROM in the caudal thoracolumbar spine increases on the treadmill and during in-hand walking on a soft surface. This suggests that the tested exercise modalities have minimal effect on spinal kinematics, allowing the most accessible option to be used in rehabilitation. However, if increased caudal thoracolumbar rotation is desired, treadmill or soft-surface in-hand walking is preferable. Given the study's limitations of a small sample size and the investigation in healthy horses, the results should be interpreted with caution. Nonetheless, this study can offer guidelines for future research and

offers valuable insights for veterinarians, practitioners, and horse owners in selecting appropriate rehabilitation and training exercises.

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## The Prevalence of Eating Disorder risk and Body distortion among Equestrian Athletes

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**Keywords:** Survey; EAT-26; BMI Figural Stimuli Silhouette; Trainer influence

**Introduction:** The health of the equine horse athlete is a key priority within the equine industry with a vast amount of research in this area, however, there is relatively little research into the equestrian rider athlete's health, more specifically the athletes eating behaviours and self-perception which can pose significant challenges to their overall physical and mental health (Li et al., 2024).

**Materials & Methods:** A three-part survey created on Google forms and distributed on social media platforms such as Facebook was answered by 202 participants (range 18- 65 years), the three sections related to demographic data which included discipline and competitive level, the Eat-26 test which highlights participants with a score of more than 20 as at risk (AR) and Body mass index (BMI) Figural Stimuli Silhouette.

**Results:** From the total sample 57.92% were at risk (AR) of eating disorders. Of female respondents, 59.43% (n= 104) were classed AR whilst 51.85 % (n=14) of the male participants were AR, from both groups the highest risk was recorded in flat racing with this being a 100% occurrence rate. Subgroups were used to navigate which levels the participants were competing at, these groups were created by the author and consisted of Novice, Intermediate or Advanced. The data collected suggested the highest AR group was participants competing in the novice section.

**Discussion & Conclusions:** Novice and female competitors reported higher rates of AR behaviours than the other competitive levels and males, although the highest risk was in flat racing with both genders 100% AR. Future research should investigate instructor influence and knowledge on disordered eating in order to spread awareness to their pupils and employees to try to reduce the percentage of AR riders within the equestrian industry.

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## Comparing the psychological experiences of anxiety between unaffiliated and affiliated dressage riders when competing twice in one day.

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**Keywords:** Stress Management, Competitive stress, Dressage riding

**Introduction:** Anxiety is a negative emotional response identified through worry, nervousness, and uneasiness, which can occur in high-pressure environments such as dressage competitions and can have a significant impact on performance (Wolframm and Micklewright, 2010). As a mentally and physically demanding sport, dressage may lead to somatic and cognitive anxiety symptoms such as increased heart rate, cognitive interference, muscle tension and challenges with decision-making. These symptoms can reduce rider effectiveness, and communication with the horse will decrease (Stringer et al., 2024). However, limited research has compared anxiety experiences between affiliated and unaffiliated dressage riders. Therefore, this study aimed to investigate the psychological effects of anxiety in affiliated and unaffiliated dressage riders when riding two tests in one day at a competition.

**Materials & Methods:** Nine female participants aged between 21 and 68 (39±17) took part in this study, ranging in experience from unaffiliated riding club level (n=4) to riders competing at national and international levels (n=5). Semi-structured interviews were conducted to collect the data, including sixteen questions such as “Do you notice any differences in yourself or your anxiety levels for local events compared to those that require further travel or bigger events?” This qualitative approach provided a more accurate understanding of how the rider feels. Once completed, Braun and Clarke’s (2006) six-step method were followed to analyse the data. The interviews were transcribed and repeatedly read to ensure the data was familiarised. All initial coding were grouped into themes, and a thematic tree was created to organise and distinguish the riders' responses, which were then put into specific groups of themes and patterns.

**Results:** Five main themes were identified within the results: (1) routine and preparation, (2) environmental influences, (3) anxiety changes throughout the day, (4) coping mechanisms and strategies, and (5) riders' performance mindset. All riders found that pre-competition anxiety can be reduced through having a set routine and preparation. Unaffiliated riders reported uncertainty and a lack of control when they didn’t have a set plan. The competition environment significantly influenced anxiety levels in both groups, affecting unaffiliated riders more at local events, an unfamiliar venue and when competing in front of friends and family. Whereas affiliated riders' anxiety levels were heightened because of self-belief, just before entering the test. Both groups used coping mechanisms like visualisation, muscle relaxation, and breathing techniques. Riders' performance mindset shifted with scores and horses' behaviours, unaffiliated riders showed negative reactions, causing tension and changes in riding, whereas affiliated riders were more resilient.

**Discussion & Conclusions:** Through data analysis, anxiety appeared more frequently in unaffiliated riders, whilst affiliated riders demonstrated a greater understanding of coping mechanisms when presented with performance challenges. Using sports psychologists and support strategies, coaches can help riders manage the overwhelming effects of anxiety during

competition. Equestrian organisations should acknowledge anxiety's impact and offer free advice and strategies to help. Whilst previous studies explored anxiety's effects on riders over different equestrian disciplines (Wolframm and Micklewright, 2010), a gap in the literature remains; future research should focus on common causes of anxiety across competitive levels.

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## The Influence of Social Media on Public Perception and Attitude Regarding the Equine Industry and its Social License to Operate.

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**Keywords:** Equestrian; Trust; Transparency; Questionnaire

**Introduction:** In an increasingly digital world, the equine industry's capacity to maintain its social license to operate (SLO) depends on transparent and authentic engagement across evolving media platforms. While existing literature recognises social media's (SM) central role in equestrianism's social acceptance and industry growth, its actual influence remains inconclusive (Heleski *et al.,* 2020; Gregić *et al.,* 2024). This may stem from a tendency in previous research to prioritise prescriptive strategies over examining SM's current influence on changing societal views and attitudes. Addressing this gap, this study investigates the influence of SM on public perception and attitude of the Equine industry and its impact on SLO.

**Material & Methods:** This study conducted an online Google forms survey and analysed 112 responses from the general public, who are over age 18, with no equine industry ties and active SM use. Distributed via the researcher's SM and snowball sampling, the questionnaire included multiple choice, Likert scale and open-ended questions. Data was analysed using a chi-squared association test. Although thematic analysis was attempted on open-ended responses, an insufficient response rate meant this was not pursued.

**Results:** The relationship between SM as a main information source, and if SM provides a true reflection was very highly significant ($X^2 = 63.536$, df = 4, $P<0.001$). The relationship between SM's influence on public perception and SM's influence on the public's views or feelings about the equine industry was very highly significant ($X^2 = 31.661$, df = 4, $P<0.001$). The relationship between public opinion of whether the equine industry has taken made changes to improve equine welfare in sport, and if the public believe that equine welfare needs to be improved was very highly significant ($X^2 = 93.179$, df = 4, $P<0.001$). The relationship between SM's influence on public perception and SM's influence on the public's confidence in equine welfare was very highly significant ($X^2 = 117.732$, df = 4, $P<0.001$). Furthermore, 42.73% reported traditional media as more influential than SM, and 27.27% reported an equal influence.

**Discussion & Conclusions:** Findings suggest that SM has limited influence on public opinion, potentially due to low visibility and authenticity concerns. This undermines public trust, as confidence in the industry appears diminished compared to earlier research. When SM does shape opinion, the effect is not consistently favourable, with many respondents expressing ongoing equine welfare concerns. Constant neutral responses highlight a crucial demographic for future engagement, as targeted communication efforts could shape their perceptions more effectively. Findings report that media types sometimes have equal impact, suggesting that traditional and SM should be studied in tandem. The null hypothesis ($H_0$) was accepted, though findings indicate a need for further investigation. Future research should explore the integrated impact on traditional and SM on public opinion of the equine industry. To maintain its SLO, the equine industry must shift from passive visibility to active, authentic public engagement, because in the digital age, trust isn't told, it's shown (Pearson *et al.,* 2023).

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## An Investigation into How British Eventing Under-18 Northern Coaches' Use Pedagogical Approaches to Develop Decision-Making in Their Riders

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**Keywords:** Under-18 riders; Coach development; Experiential learning; Risk management

**Introduction:** Decision-making is crucial for success in equestrian sports, where athletes navigate complex and dynamic environments under pressure (Light, 2013). Despite the acknowledged importance of decision-making in sports, limited research exists on how equestrian coaches facilitate its development in under-18 riders. Previous studies highlight the significance of fostering athlete autonomy and cognitive decision-making in other sports. Croad and Vinson (2018) further suggest that coaches play a crucial role in cultivating riders' decision-making capacities through adaptive pedagogical approaches. However, the applicability of these findings to equestrian disciplines remains underexplored. This study addresses this gap by investigating the pedagogical approaches British Eventing Northern region coaches employ to develop decision-making in young athletes.

**Materials & Methods:** This qualitative study adopted an interpretivist approach, employing semi-structured interviews with three Northern British Eventing coaches. Consequently, the research was guided by the following questions:

1. *What pedagogical approaches do British Eventing Northern under-18 coaches use to develop riders' decision-making?*
2. *How do these approaches promote rider autonomy and adaptability in real-world equestrian contexts?*
3. *What challenges and opportunities do coaches perceive in developing decision-making in under-18 riders?*

Thematic analysis was applied to identify patterns and insights regarding coaches' strategies and perspectives towards decision making in athletes. Additionally, observational data from training sessions were analysed using the Analysis of Situational Understanding and Opportunities for Instruction (ASUOI) framework to triangulate findings and strengthen the reliability of results.

**Results:** Four key themes emerged from the study. Firstly, coaches unanimously acknowledged the importance of decision-making in equestrian sports coaching. Secondly, they reported that their decision-making knowledge predominantly stemmed from practical experience rather than formal theory, reflecting Kolb's experiential learning model. Thirdly, coaches assessed young riders' decision-making abilities by evaluating their skill level and situational awareness, supporting theorists' findings on the link between skill acquisition and cognitive decision-making. Finally, the heightened risks associated with cross-country events were a significant concern, with coaches emphasising the importance of riders making effective decisions to mitigate injury, consistent with Williams and Tabor's (2017) research on risk management in equestrian sports.

**Discussion & Conclusions:** The findings suggest that while experiential learning remains a dominant method for fostering decision-making, the lack of formalised decision-making frameworks presents a gap in coach education. Structured decision-making development programs could enhance coaches' abilities to support rider autonomy and decision-making competence systematically. This research highlights the importance of integrating evidence-based decision-making models into

equestrian coaching education. Further longitudinal research is recommended to assess the long-term impact of decision-making training on rider performance and injury prevention.

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## Riding Through Change: The impact of menopausal symptoms on equestrians, the coach's role, and factors supporting sustained activity

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**Keywords:** Menopause; Perimenopause; Equestrian; Coaches; Female

**Introduction:** Menopause (M) and Perimenopause (P) are becoming widely acknowledged as a time of individual and complex physiological and psychological change, but implications within sport, specifically equestrian, are under-researched. As equestrianism is a sport with high female participation, understanding the impact of M and P symptoms is important not only for health and well-being but also for supporting sustained activity and continued participation. Therefore, the aim of this study was to investigate the impact of these M and P symptoms on equestrian athletes, with a focus on the role of coaches and their support of women during this stage of life.

**Material & Methods:** Female participants (*n* = 285) from over 20 equestrian disciplines, aged between 30-65 years of age, who were currently experiencing or having recently experienced M and P related symptoms were recruited. Participants completed an online non-validated questionnaire (JISC online surveys) and disseminated via equestrian social media platforms. Using mixed methods of research, descriptive statistics and thematic coding were used for further analysis and interpretation.

**Results:** Five distinctive themes were identified: Theme 1 emotional and psychological impact; results found impacting symptoms, including loss of confidence (72%) and reduced self-esteem (65%) to be the highest contributors. Theme 2cognitive challenges, included impacting symptoms, such as brain fog (67%) and memory problems (65%). Theme 3 physical health and fitness, with significant fatigue-related symptoms feeling tired and lacking energy (83%) and poor-quality sleep (73%), with musculoskeletal symptoms also prominent, such as joint pain (71%). Theme 4 impact on participation; results found reduced confidence (69%) in riding or handling horses and reduced self-esteem (54%), affecting confidence to participate with self-doubt leading to avoidance (49%). Finally, Theme 5 support mechanisms, where, despite a consensus of 94% (*n* = 269 participants), confirmed the importance of coach awareness of M and P symptoms and its impact; 62% (*n* = 175 participants) highlighted irregular or no engagement from their coaches regarding M and P symptoms, health and wellbeing.

**Discussion & Conclusions:** This study contributes to the growth in conversation regarding women's health in sport and highlights the need for targeted professional coach training, the importance of peer-driven support networks and the promotion of broad strategies supported by national governing bodies. Proactivity and appropriate education and management to support this demographic could go some way to prevent the decline in participation from a dedicated and experienced demographic during this stage of their life.

## Click and Connect: A Pilot Study to Evaluate changes to Equine Affective State during a Clicker Target Training Session.

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**Keywords**: Behaviour; Stress; Yerkes-Dodson; Arousal

**Introduction**: Public awareness of aversive stimuli in horse training is bringing into question the use of equines in sport. The question of how positive stimuli could be used to enhance the experience of the horse during the training session is currently a novel area of investigation. This pilot study aimed to discover whether a conditioned reinforcement session using positive reinforcement can alter the affective state of horses. The study also investigated the correlation between heart rate (HR) and stress-related behaviours as recorded on an ethogram.

**Material & Methods**: A convenience sample of five horses (one mare and four geldings) accustomed to the use of negative reinforcement training were observed during a 28-minute routine: 5-minute habituation to the presence of the camera, tripod and trainer, 10-minute pre-training observations, 3 minutes of target clicker training with a food reward and 10 minutes of post-training observations. Equine affective state was determined using a range of measures. HR was recorded using Polar H10 HR monitor (Polar.com) on an elastic surcingle. All horses were previously habituated to pressure around their torso. A novel ethogram, developed from studies by Draaisma (2018) and Minero *et al.,* (2015), recorded behaviours. The whole routine for each horse was recorded to enable continuous focal sampling over 20 minutes. Average HR was determined for the target clicker training and every five minutes during pre- and post-training. Behaviours were grouped according to Draaisma (2018) into calming, displacement or stress signals and duration measured (seconds). Frequency of ear position changes, full and half blinks, and showing of the sclera was counted comparing pre-training and post-training observation periods using descriptive statistics. A Pearson's correlation test was used to establish correlations between HR and ear position, HR and showing of sclera and HR and stress behaviours.

**Results**: Duration of calming and displacement signals, half-blink rate and ear position changes were higher during the post-training observation (calming = *seconds,* displacement=*seconds*, half blink=*count*, ear position=*count)*. There was a reduction in the duration of stress signals (duration) and full blink rate (count) after the clicker training. In addition, there was a moderate positive relationship found between changes in ear positioning and HR (r=0.534) and sclera showing and HR (r=0.666) and a strong positive relationship between stress signals and HR (r=0.823).

**Discussion & Conclusions**: Clicker-target training appeared to alter the affective state of horses in this pilot study. Key findings showed clicker-target training led to an increase in calming and displacement signals and a decrease in stress signals. This could lead to clicker training being used to alter affective state of horses, following the Yerkes-Dodson Law (Evans *et al.,* 2022) with potential benefits for safety, performance and welfare. Indicators such as ear positioning, sclera exposure and HR, alongside changes in blink behaviour, also suggested alterations in stress levels. Full eye blink rate reduced, and half blink rate increased, which may indicate heightened arousal. However,

additional research could further explore whether these body language indicators reflect stress or if they are due to positive interactions and food rewards.

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## Stable Minds: An Investigation into the Mental Health and Risk Factors among Trainers and Stable Staff in Thoroughbred Horse Racing

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**Introduction:** Research has shown that stable staff and trainers experience mental health challenges with 80% suffering from stress, anxiety, and depression (McConn-Palfreyman et al., 2019), in addition to high rates of occupational injuries, poor sleep quality and substance misuse (Davies et al., 2023; King et al., 2021). The purpose of this study is to investigate the prevalence of symptoms related to common mental disorders (CMDs) among Irish stable staff and trainers.

**Materials & Methods:** A cross-sectional survey design was employed. The participants (n=152) included 42 licensed trainers and 110 stable staff. Recruitment was conducted through social media, governing bodies, and industry gatekeepers. Participants completed an anonymous self-reported survey assessing demographics, common mental disorders, career satisfaction, social support, sense of agency, workplace bullying, help-seeking, sleep quality, alcohol & drug use, and coping strategies Prevalence rates were calculated to describe the occurrence of key mental health indicators and workplace factors within the sample.

**Results:** Preliminary descriptive statistics revealed that 28% of participants met the criteria for mild anxiety, and 16% for severe anxiety. Depressive symptoms were reported for 57% of participants with 23% experiencing severe psychological distress. Hazardous alcohol use was identified in 62.5% of participants, while 9% showed signs of drug-related problems. Career dissatisfaction was reported by 84% of participants. Additionally, 15% experienced moderate exposure and 11% high exposure to workplace bullying.

**Discussion & Conclusions:** These findings highlight the high prevalence of anxiety, depression, and psychological distress among Irish racehorse trainers and stable staff. The results also show considerable levels of career dissatisfaction, hazardous alcohol use, and workplace bullying exposure. Compared to previous research (King et al., 2021; McConn-Palfreyman et al., 2019) career dissatisfaction and hazardous alcohol use appear higher. In conclusion, these preliminary findings highlight the urgent need for mental health support for racehorse trainers and stable staff in Ireland. The findings of this study provide clear insights into the prevalence of common mental disorders among Irish racehorse trainers and stable staff, serving as a foundation for developing effective evidence-based mental health interventions.

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