EQUINE CONFERENCE 2025

Combining scientific principles with effective horse owner care practices

MACDONALD BURLINGTON HOTEL
BIRMINGHAM
21-22 NOVEMBER

PROGRAMME & BOOK OF ABSTRACTS

British Society of Animal Science | 18 North Street, Glenrothes, KY7 5NA
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FRIDAY 21ST, NOVEMBER

09:15 - 09:45 | REGISTRATION & Arrival Refreshments (Horton C Foyer)

10:00 - 10:15 | WELCOME | Dr Helen Warren, BSAS President & Alltech (Horton C Room)

MORNING SESSIONS | 10:15 - 12:30 | 3 STREAMS

REPRODUCTION & GENETICS (Diamond Room)
Introduction | Session Chair | Dr Victoria Lindsay-McGee, University of Edinburgh
Keynote Speaker:
Dr Debbie Guest, Royal Veterinary College | Unravelling the genetic basis of fracture risk in Thoroughbred racehorses
Abstract Presentations:
Rumesha Siriwardena | Mechanistic Insights into the Function of VapA from Equine Rhodococcosis
Charlotte Cuffe | Multi-omic characterisation of equine muscle associated with equine exertional rhabdomyolysi
Elizabeth Attree | Methylation profiling of thoroughbred horses with myopathies and tendinopathies to investigate regulatory
Victoria Lindsay-McGee | Knowledge and priorities of UK and European equine industry stakeholders regarding equine genetics

THERAPY & REHABILITATION (Drummond Room)
Introduction | Session Chair | Dr Kirsty Lesniak, Hartpury University
Keynote Speaker:
Dr Vicki Walker, Hartpury University | Exercising Choice: From Science to Practice in Equine Rehabilitation
Abstract Presentations:
Adelaide Chinn | Effect of a Single Acupressure Treatment on the Mechanical Nociceptive Thresholds (MNTs) of the Equine Epaxial Back Musculature
Laura Howard | Preliminary investigation into the effects of chiropractic treatment and when combined with TECAR therapy on mechanical nociceptive thresholds of the thoracolumbar musculature in mixed breed riding horses
Charlotte Baker | Investigation into the Recommended Therapeutic Modalities for Horses with Overriding Dorsal Spinous Processes
Roberta Blake | Is there a difference in pressure under a Pessoa Training Aid when using different pads underneath the roller?

BEHAVIOUR & WELFARE (Horton C Room)
Introduction | Session Chair | Lorna Cameron, Hartpury University
Keynote Speaker:
Prof Leanne Proops | University of Portsmouth | Understanding the Role of Facial Expressions in Horse Communication
Abstract Presentations:
Freya Ward | The Influence of Social Media on Public Perception and Attitude Regarding the Equine Industry and its Social License to Operate
Danica Pollard | A good farrier is like gold. Once you find one don't let go.' – routine hoof care practices and problems accessing hoof care by horse, pony, donkey and mule carers
Charlotte Dodson | A Provisional Study into soundscape for stabled horses
Catherine Bradley | Differences in perceptions and understanding of equine behaviour between categories of hoof care professional - a worldwide survey
Linda Greening | Shedding light on stable lighting practices in the UK and the Republic of Ireland
Saranna Jordan | Searching for success: Exploring key indicators for suitable second careers for former racehorses
Anya Dyson | A survey investigating the health and welfare implications, risk factors and behavioural markers of learned helplessness in horses

LUNCH | 12:30 - 13:00 (Horton C Foyer)

FRIDAY 21ST, NOVEMBER

CAREER PANEL DISCUSSION | 13:00 - 13:45 (Horton C Room)
Professionals from diverse equine fields explore career opportunities and possibilities. Join the discussion to find out more in this interactive session where the audience will have opportunity to quiz the panel.

AFTERNOON SESSIONS | 14:00 - 17:30 | 3 STREAMS

HORSE & RIDER PERFORMANCE (Horton C Room)
Introduction | Session Chair | Dr David Marlin, President NEWC

Keynote Speakers:
Dr Sarah Jane Hobbs, UCLan | Managing Balance: A Horse Perspective
Dr Russell McKechnie-Guire, Centaur Biomechanics /Hartpury | Horse and Rider Interaction: Rider Aysmmetry
Prof. Jane Williams, Hartpury University | From instincts to insights: applying performance analysis in equestrian sport

Abstract Presentations:
Abdulaziz Dharman | Training Flat Racehorses in Hot Climates in Qatar: Trainers' Perceptions
Anne-Maarit Hyttinen | Effects of strength and/or endurance training on the physical fitness and riding performance of national and international level female equestrians
Warren Lamperd | What is coaching for an elite equestrian rider?
Roberta Blake | Effect of Girth Design and Girth Tension on Saddle-Horse Pressures and Forelimb Stride Kinematics in Rising Trot
Roberta Blake | Pressure Distribution when Riding Horses with a Saddle Compared to a Bareback Pad in Walk and Sitting Trot
Richard Seals | Equestrian Coaches' Use of Positive Pedagogy and Game-Based Approaches to Develop Decision-Making in Riders
Natasha Andrews | An investigation into how British Showjumping coaches assess and promote "A Good Life for a horse" in training sessions

NUTRITION & FEEDING: FEEDING HORSES IN THE FUTURE (Drummond Room)
Introduction | Session Chairs | Dr Simon Daniels, Royal Agricultural University & Dr Stephanie Wood, Equine Nutritionist

Keynote Speakers:
Ruth Bishop, HJ Lea Oakes , Chair BETA Feed Committee | Industry perspectives on feeding horses in the future
Dr Dave Davies, Silage Solutions Ltd | Forage Management for Nutrition and Hygiene

Abstract Presentations:
Robert Furmage | Occurrence and Risk Assessment of Mycotoxins in UK Horse Feed
Simon Daniels | Feeding and management practices and Equine Gastric Ulceration Syndrome (EGUS) prevalence in UK TB racehorses
Jennifer Little | The Effect of Forage Bag Design on Rate of Hay Consumption in Horses

HEALTH & DISEASE (Diamond Room)
Introduction, Session Chair | Dr Kirsty Lesniak, Hartpury University

Keynote Speaker:
Prof. Scott Pirie, The Royal (Dick) School of Veterinary Studies | Equine Grass Sickness – zeroing in on the elusive cause

Abstract Presentations:
Justyna Kalbarczyk | Animal Fascial Manipulation for ulcer problems in horses
Kirsty Gartland | Equine Neonatal Sepsis: The Ability of Equestrians to Identify Healthy Foal Parameters and their Confidence in Recognising Typical Clinical Signs
Maria Júdice da Costa | Antimicrobial Activity of Cannabinoids and Terpenes Towards Common Equine Wound Pathogens and their Biofilms
Cerys McMurray | "I don't know whether I'm doing the right thing or the wrong thing": a qualitative exploration of beliefs and practices in relation to equine parasite management in Northern Ireland

CLOSE

SATURDAY, 22ND NOVEMBER

09:15 - 09:45 | REGISTRATION & Arrival Refreshments (Horton C Foyer)

10:00 - 10:15 | WELCOME | Dr Helen Warren, BSAS President & Alltech (Horton C Room)

MORNING SESSIONS | 10:15 - 12:30 | 2 STREAMS

ALLIED PROFESSIONALS (Horton C Room)
Introduction | Session Chair | Dr Helen Warren, Alltech
Keynote Speakers:
James Arkley, Equine Dental Technician | Equine Dental Care
Di Fisher, Bridle Fitter | Bridle Fitting for Performance and Welfare
Ben Benson, Farrier | Farriery unblocking performance
Sally Charlton, McTimoney Practitioner | More than horse sense, evidence based benefits of equine chiropractic for performance

HORSE OWNER (Diamond Room)
Tailored workshops for horse owners.
Introduction | Session Chair | Dr Stephanie Wood, Equine Nutritionist
Workshop 1 - Forage for nutrition and managing pasture
Dr Dave Davies, Silage Solutions Ltd
Workshop 2 - Parasites
Dr Simon Daniels, Royal Agricultural University
Workshop 3 - Keeping our horses sound
Dr Gillian Tabor, ACPAT Chartered Physiotherapist

LUNCH | 12:30 - 13:30 (Horton C Foyer)

ALLIED PROFESSIONALS PANEL DISCUSSION | 13:30 - 15:00 (Horton C Room)
An engaging session with keynote speakers from the allied professional stream as they participate in a panel dialogue. They will delve into collaborative strategies for horse management and respond to audience questions.

REFRESHMENT BREAK | 15:00 - 15:15 (Horton C Foyer)

PLENARY | 15:15 - 16:15 (Horton C Room)
Dr David Marlin discusses the equine industry's social license to operate, as well as recent research into aspects of horse welfare.

CLOSING REMARKS | 16:15 - 16:30 (Horton C Room)
Dr Helen Warren, Alltech

CLOSE

REPRODUCTION & GENETICS

Abstract Presentations:

Rumesha Siriwardena | Mechanistic Insights into the Function of VapA from Equine Rhodococcosis

Charlotte Cuffe | Multi-omic characterisation of equine muscle associated with equine exertional rhabdomyolysis

Elizabeth Attree | Methylation profiling of thoroughbred horses with myopathies and tendinopathies to investigate regulatory mechanisms in susceptibility to disease and injury

Victoria Lindsay-McGee | Knowledge and priorities of UK and European equine industry stakeholders regarding equine genetics

Mechanistic Insights into the Function of VapA from Equine Rhodococcosis

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Key words: Rhodococcus equi, infectious disease, VapA, lysosomal neutralisation, antibiotic resistance

Rhodococcus equi (*R. equi*) is a Gram-positive, soil-borne, aerobic coccobacillus with worldwide distribution, recognized as the primary cause of purulent bronchopneumonia in foals aged 1-6 months. The infection is a major cause of high morbidity and mortality rates in foals leading to profound economical consequences (Rakowska, Cywinska and Witkowski, 2020). Currently, there is no commercial vaccine against *R. equi* and treatment primarily relies on prolonged administration of antibiotics which has led to the emergence of multidrug-resistant bacterial strains (Álvarez-Narváez Sonsiray *et al.*, 2021). *R. equi* thrives in environments with high animal density, particularly in horse-breeding farms with dry, dusty soil enriched with animal manure, where inhalation of aerosolised bacteria represents the main route of infection (Giguère *et al.*, 2010). *R. equi* pathogenesis is mediated by the virulence-associated plasmid of ~90 kb, which carries the *vapA* gene. VapA is a secreted virulence factor essential for intracellular survival within host lung alveolar macrophages (Giguère *et al.*, 1999; Jain, Bloom and Hondalus, 2003). Specifically, VapA disrupts lysosomal homeostasis by causing lysosomal enlargement, neutralising lysosomal acidity, and impairing lysosomal hydrolase activity. These effects hinder the ability of macrophages to degrade internalised bacteria and thereby create a permissive niche for bacterial replication (von Bargen *et al.*, 2019). Structurally, alphafold-based prediction indicates that VapA adopts an eight-stranded β-barrel structure, preceded by an N-terminal region. Recent studies have demonstrated that VapA's virulence is dependent entirely on its C-terminal β-barrel core, comprising 112 amino acids with an approximate molecular mass of 12.8 kDa (Rofe *et al.*, 2017). Although the central role of VapA in *R. equi* pathogenesis is well established, the precise molecular mechanisms by which VapA interferes with host lysosomal function remain incompletely understood. To investigate this further, our study employed site-directed mutagenesis of the *vapA* gene to probe the contribution of specific residues within the β-barrel core to virulence.

Several amino acids were randomly selected for mutation based on structural predictions and evolutionary conservation, with particular attention to residues across β -strands 1-4. Mutant VapA proteins were expressed, purified, and tested in mammalian cell models, including normal rat kidney (NRK) cells and murine macrophages. A combination of immunofluorescence microscopy and functional assays was used to evaluate the impact of mutations on VapA activity. Morphological changes in lysosomes were examined using LGP120 that is equivalent of human LAMP1 as a marker for lysosomal membrane, while lysosomal acidity and proteolytic activity were assessed using LysoTracker™ Red DND-99 (LT) and DQ™ Red BSA (DQ-BSA) assays via flow cytometry technique, respectively. Statistical analyses were performed by using GraphPad Prism version 9.4.1 software.

In NRK cells, wild-type VapA induced the characteristic enlargement of lysosomes, whereas tyrosine and isoleucine mutants produced little or no visible lysosomal swelling, thereby preserving normal lysosomal size. This

suggests that the tyrosine and isoleucine residues are indispensable for the lysosomal enlargement phenotype. Consistent with these morphological observations, the tyrosine and isoleucine mutants showed normal DQ-BSA hydrolysis and retained LT accumulation, in contrast to wild-type VapA. These findings imply that VapA function involves specific molecular interactions dependent on the integrity of the β-barrel core. From a mechanistic perspective, our results raise the possibility that VapA may use these residues to establish a binding pocket or groove that interacts with host lysosomal components. Identifying the precise nature of these interactions remains an important next step. Ultimately, these findings may contribute to the long-term goal of reducing reliance on antibiotics by introducing new therapeutic targets, and improving the health and economical stability of the equine industry worldwide.

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Multi-omic characterisation of equine muscle associated with equine exertional rhabdomyolysis

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Introduction: Exertional rhabdomyolysis (ER) or tying up is a painful condition affecting five and seven per cent of flat and national hunt Thoroughbred (TBs) horses, respectively, and five per cent of Warmblood (WBs) in top level competition. It is a painful condition causing muscle cramping, stiffness and reluctance to move as well as myoglobinuria, recumbency and in severe cases death. Each episode results in an average of seven days out of work, interrupting training and competition causing both economic and welfare issues. Currently, there are limited treatments available, namely, analgesics, rest and oral dantrolene prior to exercise, as well as management interventions such as a high fat diet.

While ER has a moderate heritability (h^2= 0.39-0.49), there is no clear single causative gene involved and compounded by the large role played by environmental factors, disease susceptibility is complex. Despite a strong heritability, several GWAS and linkage analysis studies have identified several regions of interest connected to ER but no candidate genes were elucidated (Tozaki *et al.*, 2010; Fritz *et al.*, 2012). This alongside research from within our group seems to suggest that ER is a complex polygenic disease. Previous work from our group suggested that there is a link between ER susceptibility and pathways related to DNA methylation, transcriptional repression signalling, DNA repair, transcription and regulation, (Lindsay-McGee, 2022), indicating a clear role for gene regulation in ER. ER is thought to preferentially affect glycolytic muscle fibres, with muscles such as the semimembranosus (SM), a primarily glycolytic muscle, being a good example. Based on all the above, we hypothesize that it is a gene regulatory dysfunction in glycolytic muscles that predisposes horses to ER.

However, data on horse genome regulation is scarce compared to other species. We aim for this research to contribute to our understanding of genome regulation in the SM and SCDM and provide insights into the role of regulation in equine ER susceptibility. Therefore, we are exploring differences at the regulation and transcription level within the SM and a primarily oxidative muscle the sacrocaudalis dorsalis medialis (SCDM). We are doing this by looking at differences in chromatin accessibility for areas of active transcription and translation, as well as gene expression within the muscle. Differences between these muscles, gives us a baseline against which to compare muscle samples from future ER cases.

Material and Methods: We performed assay for transposase accessible chromatin sequencing (ATAC-seq) in a total of 17 samples, of which 8 were SM and 9 SCDM In addition to carrying out RNA-sequencing in 30 samples, 15 SM and SCDM each, from unaffected TBs and WBs. Previous research within the group longlisted 360 genes of interest, including 33 candidate genes from a previous genome wide association study (GWAS) looking at recurrent ER (RER) susceptibility, genes of interest from those implicated in human ER and genes prioritised through regional heritability mapping. These were integrated into our results to identify regions of interest for regulation of muscle and potential areas for dysregulation within horses susceptible to ER. RNA-seq results were aligned using STAR, with transcripts quantified using salmon. Next differentially accessible genes (DEGs) were

identified using DESeq2, including as covariates within the model, breed, age and sequencing batch. Significant DEGs were those with an adjusted p-value < 0.05, and a log2foldchange >1 or <-1. The DAVID database was used for functional annotation clustering analysis of the differentially expressed genes (DEGs), where clusters with an enrichment score above 1.5 were considered significant. Functional annotation was performed to provide further insights into the pathways involved in the regulation of different muscle types. This analysis was done both across breed and within breed. From the ATAC-seq data, reads were aligned using BWA-mem, then peaks called with MACS2 before TOBIAS was used to identify transcription factor binding sites and differential binding from aggregate peaks. These results were integrated to aid in our understanding of the regulatory regions of interest between the SM and SCDM.

Results and Discussion: RNA-seq data found 727 DEGs, FDR adjusted P< 0.05, between SM and SCDM. Functional enrichment based on these results highlighted pathways involved in glycolytic processes-ADP/ATP metabolic processes, and actin binding. Of this 315 DEGs are protein coding with almost all remaining DEGs being long non-coding RNA, lncRNA. Within breed analysis of WB SM and SCDM, found 965 DEGs, with functional clustering of protein coding genes highlighting as enriched GTP binding, chemokine signaling and apoptosis and translation regulation pathways. Within breed analysis of TBs identified 427 DEGs, with clustering of protein coding genes highlighting glycolytic process, glucagon signaling pathways and calcium ion binding pathways.

ATAC-seq analysis was used to examine differential binding of transcription factors (TFs) between the two muscles of interest. TFs are proteins that bind to specific motifs in the DNA to regulate the nearby genes. We have shown previously that ER has distinct subgroup phenotypes (Lindsay-McGee, 2022) and that these also have a distinct complex polygenic genetic architecture, with many of the genomic markers associated with the disease located in non-coding or regulatory regions of the genome. Therefore, examining TF binding is of significant interest for this work. The top 233 TFs that exhibited differential binding were integrated with DEGs as well as the above candidate genes identified by previous GWAS, with several found to overlap. In control samples we were able to identify clear differences in regulation between SM and SCDM, with several of these regions overlapping with previous candidate genes for RER susceptibility. Suggesting that these regions of interest for dysregulation in the SM of susceptible horses.

Conclusion and Implications: Our study has highlighted differences in gene regulation and correspondingly, gene expression between SM and SCDM muscles. Several of these DEGs and differentially bound TFs also overlapped with candidate genes that have been previously suggested to have a role in ER susceptibility. Further genetic and functional genomic studies could not only provide the means to control the disease, via genetic testing and selective breeding programs, but they could also help identify new therapeutic targets and provide the foundation for further research into other equine myopathies.

Acknowledgements: We are very grateful for the assistance from the RVC's equine hospital and the comparative neuromuscular lab in acquiring samples.

Financial support: We gratefully acknowledge the RVC's Animal Care Trust and the Paul Mellon fund for funding this work.

Ethics approval: This work has been carried out with full ethics approval from the RVC's CRERB with associated unique reference number: 2023 2203-2

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Methylation profiling of thoroughbred horses with myopathies and tendinopathies to investigate regulatory mechanisms in susceptibility to disease and injury

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Tendinopathies such as those of the superficial digital flexor tendon are a common cause of morbidity, representing ~50% of musculoskeletal injuries in horses. These can often result in premature retirement or euthanasia and, therefore, present a major welfare problem which extends to all horses from leisure horses to racehorses. Another example of a disease affecting athletic performance that impacts equine welfare is the myopathy; exertional rhabdomyolysis (ER); characterised by repeated episodes of exercised-induced muscle soreness and cramping, skeletal muscle fibre necrosis, increases in serum-activity of the muscle enzymes creatine kinase (CK) and aspartate aminotransferase (AST), and on occasion, myoglobinuria leading to renal failure and death. Like tendinopathies, ER affects all horses from leisure horses to racehorses with a prevalence of 5-7% in Thoroughbreds (TBs) and 4.8% in Grade 2 event horses.

Diseases affecting athletic performances in horses are complex and typically involve many factors; age, weight, exercise level and diet. Many of these are thought to lead to an accumulation of damage in affected tissues. In tendons, for example, natural repair is characterised by protracted healing times and dysfunctional healing (disorganised fibrotic healing) with a high risk of reinjury in horses returning to work and poor performance posing a significant problem for equine welfare and health (O'Meara et al., 2010, Smith, 2010). Comparing methylation profiles of horses of different ages within control groups and those affected by disease will contribute to our understanding of this factor in contributing to re-injury. Re-injury of recovered tendons like the superficial digital flexor tendon recur at least 50% of the time within three years. There is an established role of genetic susceptibility or risk previously identified in both myopathy and tendinopathy research.

Genetic susceptibility or risk has been previously implicated with equine myopathies, for example RER has an identified genetic component of h2= 0.39-0.49. Similarly, heritability of superficial digital flexor tendon (SDFT) injury in Thoroughbred racehorses has been estimated to range from 0.31-0.34 (Welsh et al., 2014). The complex nature of these myopathies and tendinopathies with both genetic and environmental factors controlling them implicates epigenetic regulation involvement. This epigenetic involvement in the incidence of RER, along with other identified myopathies and tendinopathies is something we aim to investigate in this work. In humans, epigenetic status has been previously associated with predisposition to developing Achilles tendonitis, patellar tendinopathy and rotator cuff tears (Leal et al., 2017, Rickaby et al., 2019, Tural et al., 2023).

DNA methylation is an epigenetic modification of DNA that is important for the normal regulation of transcription, embryonic development, genomic imprinting, genome stability and chromatin structure (Robertson, 2005). Methylation of CpG islands (CGIs) is one of the major mechanisms involved in the regulation of gene expression by

recruiting proteins involved in gene repression or by inhibiting the binding of transcription factor(s) to DNA, thus affecting the phenotype. DNA methylation changes have been identified as contributing risk factors in many mice and human studies (Leal et al., 2017, Trella et al., 2017, El Khoury et al., 2018, Tural et al., 2023, Rickaby et al., 2019). Nevertheless, such studies are scarce in the equine literature where DNA methylation studies have focused only on the aging horse (Horvath et al., 2022).

It is currently well established that DNA methylation alterations play an important role in aging and age-related disease. DNA methylation biomarkers can determine biological age of any tissue and predict predisposition to disease (Salameh et al., 2020). RRBS is a method to study DNA methylation on a genome-wide scale at single-nucleotide resolution. RRBS focusses on regions of the genome containing high proportions of CpG dinucleotides (CGI primary sites of DNA methylation).

Understanding the genomic architecture of these diseases could not only provide the means to reduce their development and prevalence, via genetic testing and selective breeding programs, but could also help identify new therapeutic targets.

Methods and Materials: RRBS data has been analysed as described previously by our team (Attree et al., 2023). We have collected semimembranosus muscle samples from five horses affected by RER and six controls to compare methylation profiles. DNA was extracted from flash frozen muscle biopsies using a DNeasy blood and tissue kit (Qiagen) following manufacturer instructions. Bisulfite conversion of DNA and sequencing was performed by Novogene Ltd. (UK). Raw data was processed using Bismark and methylation comparisons between samples analysed using methylKit. Mesenchymal stem cells, from 8 horses with tendinopathies and 8 with controls, derived from bone marrow, were cultured under sterile conditions to generate sufficient cell number for DNA extraction (~2x106 cells per sample). DNA was extracted and sequenced as described above and the analysis followed the same protocol.

Methylation profile differences at the base and region levels were generated and significant differences between horses with myopathies or tendinopathies identified. Identification of differential methylation in specific genomic regions associated with gene regulation has informed our understanding of the role of genetic regulation in disease susceptibility and facilitated identification of potential candidate biomarkers of disease. We have, where available performed multi-omic integration of methylation data with expression data to improve understanding of the aetiopathology of disease affecting athletic performance. RNA was used for validation of biomarkers by qPCR and identification of differentially expressed genes.

RNA-seq was generated to integrate differential regulation findings with expression data. RNA was extracted from fresh muscle biopsies that had been flash frozen in RNA stabilising RNAlater using a Trizol-chlorofom extraction combined with a RNeasy extraction kit (Qiagen). RNA was sequenced by Novogene Ltd. (UK) and bulk RNA-seq performed. Raw data was processed by FastQC, trimmomatic and aligned using STAR aligner. Gene abundances were generated using Kallisto and differential expression determined by DESeq2.

Results and Discussion: In muscle, at an adjusted p value of ≤0.1, 1047 DEGs were identified, 638 were retained with the additional filter of log2fold change ≤-1 or ≥1. At adjusted p value ≤0.05, 734 DEGs were identified and 542 were retained with the additional filter of log2fold change ≤-1 or ≥1. PCA visualisation showed good separation of RER cases and control animals.

Functional enrichment analysis of identified DEGs (adjusted p value ≤0.1) using PANTHER Overrepresentation

Test, Fisher exact test, showed 79 statistically significantly (FDR≤0.5) enriched GO biological process', seven upregulated and 72 downregulated. The most significant upregulated, by fold change, of these being proteasome assembly (10.43 fold change) and antigen processing and presentation of endogenous peptide antigen via MHC class I via ER pathway (8.11 fold change), with retrotransposition and transposition also significantly upregulated (fold change 3.60 and 3.56 respectively). The most significantly downregulated was organelle localization and detection of chemical stimulus (fold change 0.14 and 0.19 respectively). Functional enrichment analysis of identified DEGs (adjusted p value ≤0.05 and log2fold change ≤-1 or ≥1) using PANTHER Overrepresentation Test, Fisher exact test, showed 13 statistically significantly (FDR≤0.5) enriched GO biological process', three upregulated and ten downregulated.

Conclusion and Implications: Genomic, transcriptomic (from RNA) and regulatory data (from RRBS) was combined and compared in order to identify significant mechanisms involved in susceptibility to disease and injury and that could be potential important biomarkers in both of these significant conditions in equine athletes. The advantage gained through identification of the mechanisms and markers is that at risk horses could be identified prior to injury or disease and appropriate measures and changes to training strategies or management could be implemented to circumvent injury improving both welfare and long-term athletic performance.

Acknowledgements: We are grateful for the assistance of vets at the RVC equine referral hospital for the collection of samples.

Financial support: We gratefully acknowledge the Horserace Betting Levy Board for funding this work.

Ethics approval: This work has been carried out with full ethics approval from the RVC's CRERB with associated unique reference number: 2023 2203-2

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Knowledge and priorities of UK and European equine industry stakeholders regarding equine genetics

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The field of equine genetics has progressed considerably in the 21st century (Kalbfleisch *et al.*, 2018, Bailey *et al.*, 2022), with a wide range of genetic tests available and considerable research efforts examining different aspects of genomics and various genetic traits (Hamilton, 2024, McFadden *et al.*, 2024, Puchalska and Witkowska-Piłaszewicz, 2025). A recent survey was conducted in the USA to assess knowledge and priorities of stakeholders in the industry to help direct future research efforts (Hernandez *et al.*, 2025). In this study, we conducted a similar survey in UK and European stakeholders.

The survey was run from July to December 2024, targeting horse owners and industry professionals in the UK and mainland Europe using a snowball sampling method. Closed-ended and free text questions regarding their genetics knowledge, their experience and concern around genetic diseases, communication and information sources, and their priorities for genetics research were asked. We also tested respondents' knowledge by asking 6 genetics questions of approximately secondary school biology level, requesting they answer 'do not know' if they were not certain of their answer, and generated a total knowledge score where respondents received 0 for an incorrect answer, 1 for 'do not know' and 2 for a correct answer. Descriptive statistics were produced, and closed-ended questions were analysed using Kruskal-Wallis tests and Spearman's correlations. The knowledge test score and self-reported knowledge scores were also transformed to a common percentile scale for analysis of over- and under-estimation of knowledge. Thematic analysis of free text responses is ongoing.

There were 177 responses, with the largest age category being 31-50 years old (n=94, 53%). The most common industry role was owner (n=78, 44%) followed by breeder (n=36, 20%), and the primary horse type worked with was sports horses (n=96, 54%) and native ponies (n=29, 16%). Respondents typically owned/cared for 1-5 horses (n=108, 61%), and their main activity was leisure riding (n=46, 26%), breeding (n=35, 20%) or dressage (n=26, 15%). The most common primary horse breeds worked with were warmbloods (n=63, 36%), other breeds (n=15, 8%) and a combination of breeds (n=11, 6%).

The majority of respondents (n=119, 67%) felt they had a 'solid' understanding of genetics (rank 3 of 4), and the lowest mean ranked information source was breed/discipline organisations (mean rank=2.59, SD=1.98), followed by universities (mean rank=3.16, SD=2.27), however respondents reported preferring to receive information via magazines/newsletters (n=103, 58%). The top three genetic diseases respondents were concerned about were osteochondritis dissecans (OCD) (n=65, 37%), polysaccharide storage myopathy type 1 (PSSM1) (n=55, 31%) and cervical vertebral stenotic myelopathy (CVSM) (n=54, 31%), whilst the disease most encountered by participant was none (n=103, 58%) followed by OCD (n=60, 34%). Respondents were interested in knowing the level of genetic diversity in their horses (n=117, 68%) and in testing for performance genes (n=91, 51%). The mean genetics

knowledge score was 8.67 out of 12 (SD=2.47) – the only significant difference in score between industry roles were in scientists, who had higher scores than breeders (U=209, p=0.033) and trainers (U=48, p=0.035).

There was a significant but moderate correlation between self-reported genetics knowledge level and the test score (ρ=0.33, p=5.95e-6). When compared on a common percentile scale, 46.9% (n=83) overestimated their own knowledge, whilst 53.1% (n=94) underestimated, showing no evidence of a skew to overconfidence (binomial p=0.816). However, lower performing respondents were more likely to overestimate than higher performing respondents: 69% of the lowest quartile and 74% of Q2 overestimated their knowledge, compared to 14% in Q3 and 23% in Q4.

Overall, our responding stakeholders had both knowledge and interest in equine genetics, with key priorities for future research in genetic disease, genetic diversity and performance traits identified. Future opportunity for outreach and communication of ongoing research to industry is also clear. However, we also present evidence of a pattern consistent with a Dunning-Kruger effect in our sample.

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THERAPY & REHABILITATION

Abstract Presentations:

Adelaide Chinn | Effect of a Single Acupressure Treatment on the Mechanical Nociceptive Thresholds (MNTs) of the Equine Epaxial Back Musculature

Laura Howard | Preliminary investigation into the effects of chiropractic treatment and when combined with TECAR therapy on mechanical nociceptive thresholds of the thoracolumbar musculature in mixed breed riding horses

Charlotte Baker | Investigation into the Recommended Therapeutic Modalities for Horses with Overriding Dorsal Spinous Processes

Roberta Blake | Is there a difference in pressure under a Pessoa Training Aid when using different pads underneath the roller

Effect of a Single Acupressure Treatment on the Mechanical Nociceptive Thresholds (MNTs) of the Equine Epaxial Back Musculature

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Keywords: Horse; pressure algometer; complimentary therapies; muscle tension

Introduction: Despite widespread practical use and publications describing acupressure techniques in horses (Gosmeier, 2026), scientific evidence in the species is limited. Evidence exists for other acupoint therapies, such as acupuncture, which has been studied for equine musculoskeletal problems (Kilide, 1984; Xie et al., 2001; Rungsri et al., 2009; Dunkel et al., 2017; Varhus et al., 2019). Whilst findings are encouraging, methodological variation and inconsistent outcomes limit their interpretation. Consequently, treatment parameters for equine acupressure remain unvalidated and scientific evidence is insufficient to justify routine clinical use. Our hypothesis was that a single treatment of acupressure would have an effect on the mechanical nociceptive thresholds of the equine epaxial musculature in comparison to a sham treatment.

Materials and Methods: The study was approved by the Animal Welfare and Ethics Committee of Writtle University College (Approval number: 1411). A sample population of ten adult horses (E. caballus) of various ages (16 ± 4.49 years old), sex (geldings n=5, mares n=5), breeds (Appaloosa n=1, Thoroughbred n=1, Welsh X Arab n=1, Dutch Warmblood n=1, Irish Sports Horse n=2, Belgian Draught X n=1, Irish Draught n=1, Cob n=1, Irish Cob n=1), weights (567.8 ± 75.45kg), and heights (15.3 ± 1.03hh). The experimental design used for this trial was a randomised, single cross-over design, utilising a convenient sampling method. MNTs were measured before the treatment/sham, immediately after the treatment/sham, and one day after the treatment/sham. A washout period of two weeks was implemented; the groups were swapped and the protocol repeated.

Nine acupressure points were selected (**Table 1**) and chosen based on suggestions from the available literature on their use for equine and human back pain. The stimulation of acupressure points was completed cranial to caudal, with points being stimulated on the left first, followed by the right side.

Each acupressure point was treated with 30 seconds of direct finger pressure. Pressure was initially applied lightly (approximately 3 – 4 mm). Over the first 20 seconds, pressure was gradually increased in accordance with tissue compliance. The final level of pressure remained within a range considered tolerable and non-aversive. Continuing with the same level of pressure, six full circles were applied at the point. The sham treatment followed the same protocol, except the therapist held their finger approximately 1 inch above the acupoint without contacting the horse.A Force Ten ™ FDX 100 pressure algometer was used to measure MNTs, measuring in Newtons (N) to two decimal places, with a blunt 1cm^2 rubber tip. MNTs were measured at six points along the back (three bilaterally).

When all relevant data sets were normally distributed, a one-way repeated measures ANOVA test was used to compare absolute MNT values across the time points. If the data violated assumptions of normality, the non-parametric Friedman's test was used. Bonferroni post hoc analysis was carried out to determine differences between the conditions (pre-treatment, post-treatment, one day post-treatment) and a significance level set at

$P \leq 0.05$ for all outcome parameters. Instead of applying the Bonferroni correction on the significance level, alpha, this study reported the Bonferroni SPSS adjusted *P*-values (*P* values based on Fisher's least significant difference multiplied by the number of comparisons). The percentage change at each value from pre-treatment and post-treatment were calculated and compared between groups, utilising a paired samples t-test when all relevant data were parametric and a Wilcoxon rank being implemented if data were non-parametric. All statistical significance was set to $p<0.05$.

Table 1: Selected acupressure points and location description

Acupoint	Location
Governing Vessel 20	At the highest point of the poll, rostral to the occipital crest.
Bai-Hui	On the dorsal midline at the lumbosacral space. In the depression between the spinous processes of the last lumbar and first sacral vertebrae
Bladder 20	9cm lateral to the dorsal midline at the 17th intercostal space
Bladder 13	9cm lateral to the dorsal midline, at the caudal edge of the scapula cartilage. At the eighth intercostal space.
Governing vessel 3	In the dorsal midline at the 3rd lumbar vertebra
Bladder 15	9cm lateral to the dorsal midline in the 10th intercostal space in the iliocostal groove.

Results and Discussion: There was a statistically significant difference between the data on the left (median = 71.22N) and right (median = 73.91N) sides (p=0.03) at the MNT measurement points. Therefore, it was decided to separate the left and right data in the results. Data included is mean ± standard deviation, unless otherwise stated.

At T18 (left), MNT measurements were statistically significant at the different time points within the acupressure treatment group, $F(2,18) = 4.151$, $p=0.03$. Post hoc analysis with a Bonferroni adjustment revealed that MNT scores were statistically significantly increased immediately post-treatment (70.94 ± 18.82N) in comparison to pre-treatment (60.56 ± 18.98N), with a mean difference of 10.38N ($p= 0.01$). At T18 (right), there was also a statistically significant difference at the timepoints within the acupressure treatment group, $F(2,18) = 4.629$, $p=0.02$. Post hoc analysis revealed that MNT scores were statistically significantly increased immediately post-treatment (76.06 ± 20.29N) in comparison to pre-treatment (63.66 ± 18.72N), with a mean difference of 12.39 N ($p=0.01$)**.** At L6 (left), MNT scores were statistically significantly different at the time points within the acupressure treatment group, $X^2(2) = 7.80$, p=0.02. Post hoc analysis revealed a statistically significant difference between the acupressure treatment group one-day post-treatment (86.84 ± 24.85N) in comparison to pre-treatment (74.87 ± 27.45N) with a median difference of (11.97 N ($p=0.021$). No significant difference was determined within the treatment groups at T9 or L6 (right) ($p>0.05$). No significant difference was determined at any of the time points within the sham groups ($p>0.05$). See **Table 2** for treatment group results. At T18, there was a higher percentage of change in the treatment group (Median = 16.3%) in comparison to the sham group (Median = 6.19%), showing a statistically significant difference between the two groups ($z = -2.128$, $p=0.03$). There was no statistically significant difference between the two groups at T9 and L6 ($p<0.05$).

Table 2: MNTs (N) at the different anatomical locations in the treatment group pre-treatment, post-treatment and one day after treatment (mean ± standard deviation).

Location	Pre-treatment (N)	Post-treatment (N)	One-day Post-treatment (N)
T9 (left)	70.86 ± 27.58	78.07 ± 23.75	68.91 ± 19.42
T9 (right)	64.83 ± 21.02	71.76 ± 19.57	72.56 ± 15.10
T18 (left)	60.56 ± 18.83	70.94 ± 18.98	68.11 ± 14.70
T18 (right)	63.66 ± 18.71	76.06 ± 20.29	72.34 ± 12.80
L6 (left)	74.87 ± 27.45	82.74 ± 21.67	86.84 ± 24.85
L6 (right)	81.29 ± 28.75	86.15 ± 29.13	85.58 ± 23.48

Conclusion and Implications: This study investigated the effect of a 10-minute acupressure treatment on the MNTs of the equine epaxial musculature. Compared to a sham treatment, acupressure significantly increased MNTs at T18 bilaterally immediately, and at L6 (left) one-day post-treatment. Furthermore, there was also a statistically significant increase in the percentage of change at T18. The statistically significant findings from this study, although limited, are still useful in comprehending the effects of acupressure. To the author's knowledge, this is the only study within the equine sector measuring the effect of acupressure on muscle nociception, therefore comparability of the results is limited.

A significant increase in MNTs was observed at T18 immediately following acupressure, suggesting that the thoracolumbar region of the epaxial musculature may be particularly responsive to treatment. A decrease in MNT response could indicate a lower sensitivity of the back, allowing better back kinematics, and possibly performance.

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Preliminary investigation into the effects of chiropractic treatment and when combined with TECAR therapy on mechanical nociceptive thresholds of the thoracolumbar musculature in mixed breed riding horses

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Keywords: Equine, chiropractic, TECAR, pain-sensitivity, MNTs, thoracolumbar

Introduction: Back pain is one of the most common causes of poor performance in the equine athlete (Mayaki et al., 2020). In equine research, McTimoney chiropractic has been reported to have positive effects on back sensitivity to pain (Rossa et al., 2014). Chiropractic techniques aim to correct joint dysfunction of the spine and pelvis, thereby restoring optimum nerve and muscle function, and symmetry of the musculoskeletal system. These effects can be enhanced when therapeutic protocols combine chiropractic treatment with other therapies such as pulsed electromagnetic field therapy (Davey *et al*., 2021). Also on the electromagnetic spectrum, radiofrequency has been found to have positive clinical effects in both human (Clijsen *et al.*, 2020) and equine (Arguelles *et al.*, 2020) practice. TECAR (Transfer of Energy Capacitive and Resistive) therapy is a form of non-invasive combined contact diathermy and electrotherapy whereby the electromagnetic frequency originates from the radiofrequency wavelength (between 300kHz-1MHz). Used in both a human and veterinary setting, TECAR operates in either capacitive (CET) or resistive (RET) modes with bio-stimulating effects. The benefits include an endothermic heating of deep tissues, stimulation of vascularity, drainage of lymphatic vessels, reduction of inflammation, and decline of pain transmission (Paolucci *et al.*, 2019; Uzun *et al.*, 2025).

This study aims to objectively assess pain sensitivity of thoracolumbar musculature and whether combining TECAR therapy with McTimoney chiropractic treatment has a greater positive effect than chiropractic alone in the first 24 hours, for mixed breed riding horses.

Material and Methods: Twenty-four (n=24) mixed breed riding horses of various age (mean 14.5 ± s.d. 4.8 (range 5-20 years), height (mean 15.1hh ± s.d. 1.53, range 12.2hh-18hh) and sex (13 gelding, 11 mares) were matched with random assignment into three groups of n=8. Group 1: McTimoney chiropractic (MCT), Group 2: McTimoney chiropractic and TECAR therapy combined (MTECAR), Group 3: Control, No Intervention (C). All horses met predefined inclusion criteria and were deemed clinically sound at the time of the study and had no known back problems. A single qualified McTimoney chiropractic practitioner assessed horses in MCT groups and applied chiropractic adjustments as required. TECAR therapy was performed by an experienced practitioner using a Winback™ Back 1 device on a continuous dynamic setting. Protocol followed was based on clinical reasoning and manufacturer advice with 10 minutes spent in capacitive mode (CET) and 10 minutes in resistive mode (RET) between 20-30% intensity depending on horses' tolerance. Pressure algometry, a portable, quantifiable measurement of mechanical nociceptive thresholds (MNTs), was employed as a repeatable objective measure of muscle sensitivity to pain and tenderness (Haussler, 2020). Triplicate MNTs were measured at six bilateral anatomical sites of the thoracolumbar musculature at T18, L3, and L6, 2cm and 10cm perpendicular to the midline. MNT readings were taken pre-, post-, 2 hours post-, and 24 hours post-treatment, with the examiner blinded to the results. Datasets were tested for normality using the Shapiro-Wilk test. ANOVA/ T-tests or Kruskal Wallis Test and post-hoc Dunn's test compared datasets. Significance was $P < 0.05$.

Results and Discussion: There was no significant difference ($P > 0.05$) between left and right-side triplicate MNT means for each group at all time-periods. Mean MNTs across all measurement sites were combined for further analysis. For MTECAR group, there was a significant increase in mean MNTs between pre-treatment and post treatment ($P = 0.008$), pre-treatment and 2-hours post-treatment ($P = 0.001$), and between pre-treatment and 24-hours post-treatment ($P = 0.0002$). For both chiropractic (MCT) and control (C) groups there were no significant differences ($P > 0.05$) between mean MNTs over time periods (figure 1). Group data analysis for MTECAR was examined at each measure site. There were significant differences between data-points for all MNT sites except L6(2cm) immediately post treatment (table 1).

Table 1: Change in MNT (N) mean ± s.d between time points at each measurement site for MTECAR horse group

	Measurement site location					
Time period	T18-2cm	T18-10cm	L3-2cm	L3-10cm	L6-2cm	L6-10cm
Pre to post Tx	6.0 ±5.2 $P = 0.01$	6.3 ± 4.9 $P = 0.008$	6.9 ± 7.5 $P = 0.03$	9.5 ± 7.4 $P = 0.008$	4.2 ± 6.1 $P = 0.09$	7.4 ± 7.9 $P = 0.03$
Pre to 2hrs post	8.3 ± 6.8 $P = 0.01$	10.4 ± *8.4* $P = 0.01$	10 ± 8.9 $P = 0.02$	12.9 ± 7.4 $P = 0.002$	10.3 ± 7.4 $P = 0.006$	12.1 ± 7.9 $P = 0.003$
Pre to 24hrs post	9.1 ±5.1 $P = 0.001$	11.5 ±5.3 $P = 0.0008$	11.4 ±5.2 $P = 0.0004$	13.2 ±8.0 $P = 0.002$	10.2 ± 5.1 $P = 0.0008$	13.44 ±5.1 $P = 0.0002$

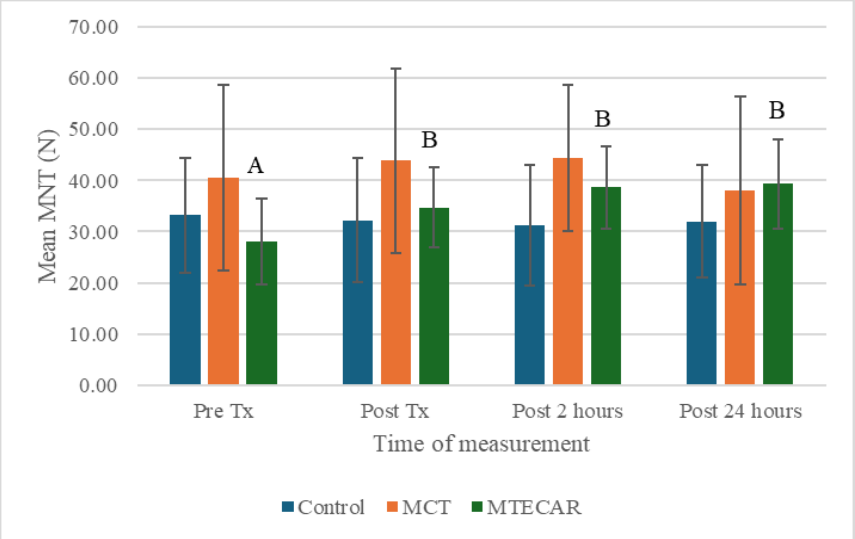

Figure 1: Combined MNT (N) (mean ± s.d) for each horse group (n=8) at each time-period. Standard deviation shown as bars. Significant difference between mean values is indicated A, B ($P<0.01$)

Conclusion and Implications: A combined treatment protocol of chiropractic and TECAR therapy provides an effective method of reducing back muscle sensitivity to pain in horses over a 24-hour period at the targeted TECAR application site, but it is not known if this is due to the combination of treatment or the TECAR alone. Although chiropractic treatment reduced muscle sensitivity to pain for 1st 2hrs in measured area, it was not significant due to wide individual variation within the group. Further research is warranted using larger cohorts, across longer time points and with TECAR alone. Effects of different intensity levels and multiple treatments would also help further evaluate the potential benefits of these treatments and add to the evidence required to assist in clinical reasoning and protocol development for these combined therapies.

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Ethics approval: Legal and ethical requirements have been met and informed consent obtained from all participants, this was reviewed by the College of Health Research Ethics Committee (CoHREC) before commencement of the study.

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Investigation into the Recommended Therapeutic Modalities for Horses with Overriding Dorsal Spinous Processes.

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Introduction*:* The spinal column has three primary functions: to provide flexibility during locomotion, support when weight bearing, and protect the spinal cord. During locomotion, the equine spinal column requires support from concentric contraction of the abdominal and sublumbar muscles and is often referred to as a bow and string, where the bow is represented dorsally, and the string is formed ventrally. The anatomy of the thoracolumbar spine enables three primary movement patterns: flexion-extension, axial rotation, and lateral bending. The occurrence of spinal pathologies decreases spinal range of motion (Bausisch et al., 2024), suggesting a potential impact on pressure distribution during limb loading and ridden exercise. Back pain in horses has been associated with longissimus dorsi fasciculations on palpation, muscle stiffness, and reduced lateral bending and hindlimb impulsion (Mayaki et al., 2020).

Overriding Dorsal Spinous Processes (ORDSPs) or Impinging Dorsal Spinal Processes (IDSP) affect 39% of horses (Turner, 2011); however, recent studies suggest that the prevalence may be as high as 92% (Pilati *et al*., 2025). This dysfunction is characterised by close approximation of two or more vertebrae. It is prevalent in Thoroughbreds, Arabs, Polo Ponies, and Warmbloods, though research favours Thoroughbreds and Warmbloods (Rosa *et al*., 2022). Rehabilitation aims to improve mobility, strength, and function. Marshall-Gibson *et al*. (2023) found veterinarians recommend shockwave therapy (45%) and chiropractic therapy (45%). Shockwave reduces muscle sensitivity and pain (Trager, 2019), while chiropractic alleviates back pain, stiffness, and hypertonicity (Maldonado *et al*., 2022). Additionally, 71% of orthopaedic specialists recommend controlled exercise, and 42% manual therapy, though owner preferences were not considered, emphasising the study's importance.

Literature recognises owners' roles in senior equine management, parasite control, pain scores, and colic, but currently limits understanding of owner experience in relation to therapeutic modalities for rehabilitation for ORDSPs. This study aims to investigate differences among manual, exercise, and specialist therapies and whether owners' experience influences the top three therapeutic choices.

Material and Method: A 12-question survey administered through Google Forms was open for two and a half months (November 2024 – January 2025). It included open, multiple-choice, and binary questions, data were collected from 102 horse owners. The questionnaire was shared on Facebook© across three groups (Horses with Kissing Spine, 24,400 members; Positive Kissing Spine Stories Updates, 4,500 members; and Horses with Kissing Spine UK, 2,100 members). Data collected was stored securely and complied with GDPR. The data was analysed with IBM SPSS Statistics 29 (SPSS). Chi-square tests were used to compare observed and expected data and examine associations between variables.

Results and Discussion: For exercise-based therapies utilised in ORDSPs rehabilitation, significantly more than expected were noted for some exercise types (P= 0.013, X^2= 14.463, Df= 5), with the most utilised being ground poles (GP) (N= 98, 96.1%), in-hand walking (N= 89, 87.3%), and lunging (N= 88, 86.3%) (Figure 1). Brassington et al. (2024) found that owners reported an exercise programme to be beneficial for equines to return to previous level of performance following IDSP, however the exercises used were not determined. Results from this study indicates a range of beneficial exercise are being undertaken to promote spinal rehabilitation, with GP most commonly applied which is in-keeping with literature. The use of GP within a rehabilitation plan promotes proprioceptive awareness, activates abdominal muscles, develops posture and enhances neuromotor control (Shaw et al., 2021). Additionally, GP increases activation of spinal columns stabilising muscles, reducing unwanted movement (Stubbs et al., 2010). Shaw et al. (2021) found that walking over GP increases the activity of the longissimus dorsi and rectus abdominus muscles.

Controlled exercise in-hand, as part of a rehabilitation plan, helps maintain function and reduce stiffness (Paulekas and Haussler, 2009) and more readily undertaken. Lunging is also versatile, with the benefit of incorporating pole exercises and therapeutic aids, however, is usually performed on circles which may contradict straight-line exercise recommendations in early rehabilitation plans. Long reining exercise provides controlled exercise in straight-lines or circles, however this featured least within this survey (N= 55, 53.4%). The top three exercise-therapies applied were not associated with owner experience (P= 0.248, X^2= 10.242, Df= 8), suggesting owners' experience does not influence the therapy applied.

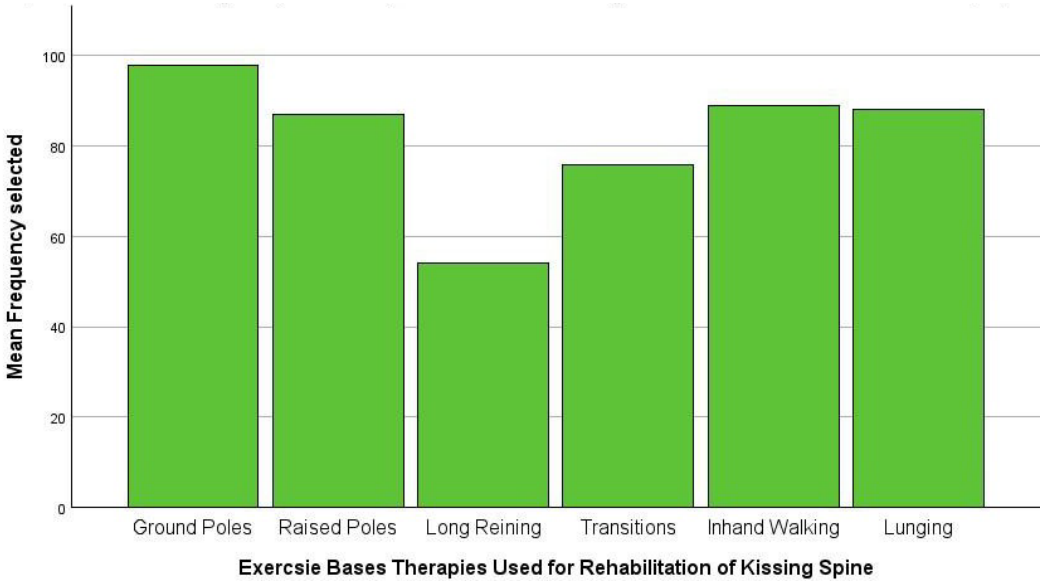

Figure 1: Bar chart showing the distribution of exercise-based therapies utilised for rehabilitation of ORDSPs.

For manual therapies utilised in ORDSPs rehabilitation, a significant difference was noted (X^2= 30.909, Df= 5, P = <0.001). Furthermore, specialist therapies utilised in ORDSPs rehabilitation indicated a significant difference (X^2 = 33.263, Df = 5, P = <0.001).

Most research undertaken to date centres on professionals' views; these findings are important as they demonstrate that horse owners of varied experience are applying a range of beneficial therapeutic modalities with rehabilitation programmes. However, this study did not explore successful outcomes for horses which would be a key future research focus. Although significant findings were identified, limitations such as social desirability and unconscious bias may have affected the results, and duplicate responses were possible.

Conclusion and Implications: Survey results indicate that owner's of horses with ORDSPs have a higher use of certain exercise therapies in rehabilitation. Ground pole exercise has the highest reported frequency and the use of this modality is well supported in scientific literature. Results indicated experience does not impact the choice of exercise therapy. Future research is needed in a practical-based study investigating the success of recovery based on owners' implementation of therapeutic modalities for ORDSPs.

Ethical Approval: Ethical approval was provided by Bishop Burton College Ethics and Welfare Committee.

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Is there a difference in pressure under a Pessoa Training Aid when using different pads underneath the roller?

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Introduction: In the equine industry training rollers are routinely used for both rehabilitation and training purposes. This is achieved by attaching different training aids, with the objective of gaining specific gait alterations or posture, with the aim of improving performance and enhancing rehabilitation (Walker et al., 2013). There is previous research regarding pressure underneath saddles and the use of materials which are most effective at reducing pressure (Dittmann et al., 2022; Kotschwar et al., 2010a, 2010b; Lewis et al., 2016; Mackechnie-Guire et al., n.d.). Although the studies have indicated some materials performing better than others, due to the vast amount of different commercial pads available, conclusion as to which is most beneficial is difficult. Similar to saddles, when a training roller is placed over the horse's back, pressure occurs, and it has been found that certain training aids such as the Pessoa increases this pressure (Mackechnie-Guire et al., 2018). This is especially important in cases where training rollers are used routinely and for rehabilitation purposes, such as overriding dorsal spinous processes, causing excessive pressure unwarranted (Turner and Acvs, 2011). More research is needed to identify methods to reduce the pressure under training rollers, to ensure that no harmful effects are linked to their use. This study is important and will provide insight as to which pads can reduce pressure underneath a training roller. Consequently, this may lead to the safe and effective use of certain training aids such as the Pessoa, in rehabilitation and training programmes, and help prevent injuries such as back pain occurring from repeated pressure to the horse's back underneath a training roller. The aim of this study was to investigate the effect of three different pads underneath a training roller, with the attachment of a Pessoa training aid, in trot and canter.

Materials and Methods: The study was carried out with approval by the Writtle University College Ethics Committee (approval number 1396). Six healthy horses were sourced from the Writtle University Equestrian Centre and used in the study, to measure the effects of three different pads underneath a training roller, with a Pessoa training aid (PTA). The data was collected with saddle pressure mapping system (Tekscan CONFORMat). Pad 1 was the control pad, which was a regular cotton saddle pad with the pressure sensor which, Pad 2 was a Roma cotton saddle cloth folded in half (Treatment A), and Pad 3 a 'Busse' training roller foam pad (Treatment B) (Fig. 1). The pads were placed in the same position underneath the training roller and position was assessed throughout the trial to ensure there was no displacement of any of the equipment. The pads were assessed before data collection to make sure there were no creases to ensure accurate data was collected.

Horses were lunged on a 16m circle. Each horse had the same warm up protocol, 10 minutes. Being two minutes of walk each rein, two minutes of trot each rein and one minute of canter each rein. Kinetic data under the training roller were recorded using a pressure mapping system. Kinetic data was exported from Microsoft Excel into SPSS (version 22 IBM, Armonk, USA.). The data from the three different Pads (Pad 1, Pad 2, and Pad 3) in Average Pressure (kPa), Force (N), Peak Force (N), and Peak Contact Pressure(kPa), at trot and canter, data were presented as mean ± standard deviation. Normality was assessed using the Shapiro-Wilk test. Data were analyzed using Friedman's test followed by Bonferroni's post hoc multiple comparisons test. P-values ≤ 0.05 were considered significant. For multiple comparisons, SPSS adjusted p-values are reported for the Bonferroni corrections.

Figure 1. The Tekscan CONFORMat pressure mapping system, numnah normal was associated: A - Pad 1 (Control) used throughout the trial, regular cotton numnah; B - Pad 2 used throughout the trial, regular Roma cotton saddle cloth numnah folded in half; C - Pad 3 a specifically designed training roller pad by 'Busse' made of 35mm thick foam, the top side was made of microfibre, and the lower side was made of polycotton.

Results:

Average Pressure

Trot – A statistically significant reduction in average pressure was observed: 38.83% between Pads 1 and 2 ($P = 0.014$), 74.76% between Pads 1 and 3 ($p < 0.001$), and 58.73% between Pads 2 and 3 ($P = 0.014$) (Fig. 2).

Canter – Statistically, average pressure decreased by 28.71% between Pads 1 and 2 ($P = 0.014$), 74.26% between Pads 1 and 3 ($P < 0.001$), and 63.89% between Pads 2 and 3 ($P = 0.014$) (Fig. 2).

Average Force

Trot – A statistically significant reduction of 23.79% was observed between Pads 1 and 2 ($P = 0.014$), 72.19% between Pads 1 and 3 ($P < 0.001$), and 63.50% between Pads 2 and 3 ($P = 0.014$) (Fig. 2).

Canter – Statistically, this reduction was 70.86% between Pads 1 and 3 ($P < 0.001$) and 65.74% between Pads 2 and 3 ($P = 0.014$) (Fig. 3).

Peak Force

Trot – A statistically significant reduction of 37.93% was observed between Pads 1 and 2 ($P = 0.014$), 81.61% between Pads 1 and 3 ($P < 0.001$), and 70.37% between Pads 2 and 3 ($P = 0.014$) (Fig. 2).

Canter – A statistically significant reduction of 81.61% was found between Pads 1 and 3 ($P < 0.001$), and 70.37% between Pads 2 and 3 ($P = 0.004$) (Fig. 2).

Peak Contact Pressure

Trot – A significant reduction of 37.87% was observed between Pads 1 and 2 ($P = 0.014$), 80.07% between Pads 1 and 3 ($P < 0.001$), and 67.92% between Pads 2 and 3 ($P = 0.014$) (Fig. 2).

Canter – A significant reduction of 78.53% was found between Pads 1 and 3 ($P < 0.001$), and 65.24% between Pads 2 and 3 ($P = 0.004$) (Fig. 2).

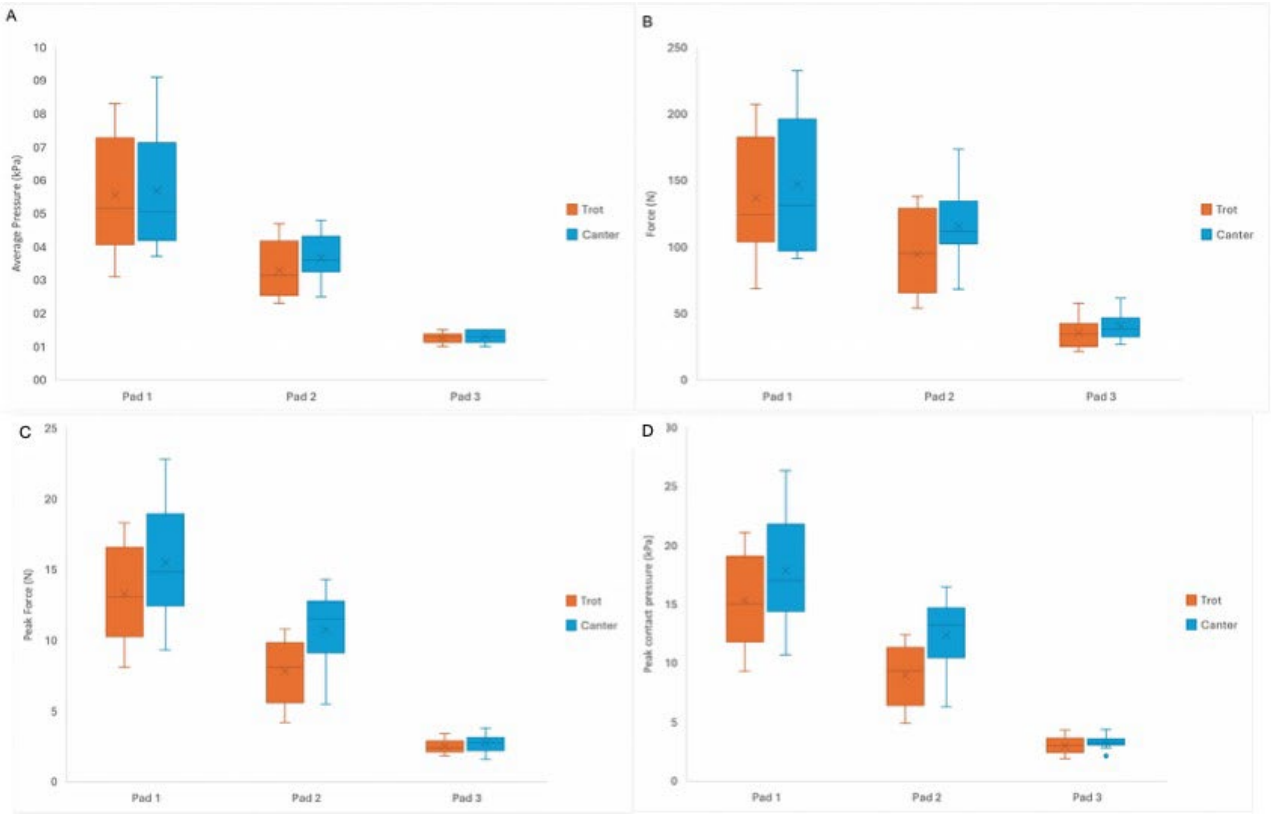


Fig. 2. Box plots representing different pressure and force measurements in trot and canter for the three different pads (Pad 1, Pad 2, and Pad 3): A. Average pressure (kPa); B. Force (N); C. Peak force (N); D: Peak contact pressure (kPa). The lower and upper edges of each box represent the first and third quartiles, respectively, while the band inside the box indicates the median. The 'x' marker denotes the mean value. The vertical lines extending from each box illustrate the minimum and maximum observed values.

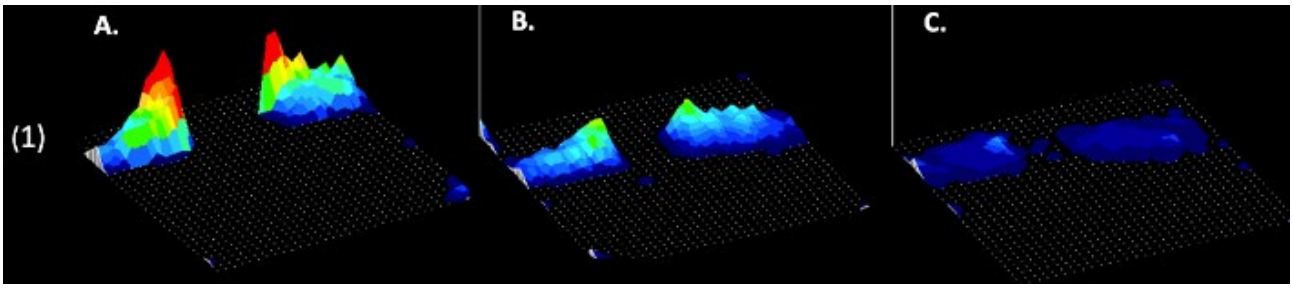
The effects of different pads were evaluated using the Tekscan CONFORMat pressure mapping system with a Pessoa training aid (PTA) to determine the kinetic influence of the pads on horses. The quantitative and qualitative data allowed for the establishment of the action (of the pads used in equestrian practice.

During trot and canter, the average pressure exerted by Pad 1 (4.67 kPa) can cause tissue damage. The results showed differences in average pressure when comparing the pads. The use of appropriate pads, when combined with the use of the PTA, was able to reduce pressure, preventing damage to soft tissues, particularly Pad 3. The material of Pad 3 reduced the imposed pressure. Notably, some outliers observed for Pad 2 were generally attributed to the conformational characteristics of each horse. Contact pressure decreased with Pads 2 and 3, which are recommended for use in equestrian practice. The peak force data decreased with Pads 2 and 3 during trot and canter. Among them, the construction of Pad 3 reduced the peak force, possibly due to its greater thickness. The pads used under the saddle reduced pressures, due to cushioning. Of the pads evaluated, Pad 3 was the most effective in reducing the maximum contact pressure. The peak box pressure created a single point within the assessed area, indicating a potential pressure point, suggestively harmful. Prolonged use of Pads 1 and 2 could generate focal pressure points, predisposing to the development of pressure ulcers and discomfort, precursors to injury. In contrast, Pad 3 reduced the peak box pressure, making it the most beneficial and ideal for frequent use during training and rehabilitation programs (Figure 3). The choice of an appropriate pad for use with the PTA in horses, one that does not cause damage (to epaxial muscles, ligaments, or spinous processes), proved to be crucial. Specifically, the combined effect of pads and an PTA had not been previously reported. The results then

benefited the equestrian industry, as they addressed a tool routinely used in training initiation protocols. The study allowed trainers to have confidence in using an PTA, a fact that provides veterinarians (physiotherapists) with better knowledge of the effects of pads in reducing pressure on the horses' backs.

Figure 3. 3D view of the pressure mapping, showing high pressures towards the midline of the back underneath the training roller in canter. 1 = Horse 1, 2 = Horse 6, 3 = Horse 4, Row A = Pad 1, Row B = Pad 2, Row C = Pad 3.

Conclusion and Implications: The global use of a training roller without a sufficient pad underneath increases the risk of potential implications on the horse's musculoskeletal system and can compromise equine welfare. Pad 2 demonstrated some positive effects in reducing pressure, although these results were not as significant as Pad 3, which showed substantial improvement across all the kinetic parameters. The results of this study highlight that the foam Pad 3 was effective at alleviating pressure a training roller across trot and canter with a Pessoa training aid. This provides reliable evidence to veterinary professionals, owners and trainers within the equine industry and allows them to make decisions to reduce pressure underneath a training roller and thus clinically justify the use of training aids such as a Pessoa during rehabilitation and training protocols.



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BEHAVIOUR & WELFARE

Abstract Presentations:

Freya Ward | The Influence of Social Media on Public Perception and Attitude Regarding the Equine Industry and its Social License to Operate

Danica Pollard | A good farrier is like gold. Once you find one don't let go.' – routine hoof care practices and problems accessing hoof care by horse, pony, donkey and mule carers

Charlotte Dodson | A Provisional Study into soundscape for stabled horses

Catherine Bradley | Differences in perceptions and understanding of equine behaviour between categories of hoof care professional - a worldwide survey

Linda Greening | Shedding light on stable lighting practices in the UK and the Republic of Ireland

Saranna Jordan | Searching for success: Exploring key indicators for suitable second careers for former racehorses

Anya Dyson | A survey investigating the health and welfare implications, risk factors and behavioural markers of learned helplessness in horses

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. The null hypothesis (H_0) is that SM does not influence public perceptions and attitudes towards the equine industry and has no influence on its SLO.

Material and Methods: This study conducted an online Google forms survey, receiving 112 responses after inclusion and exclusion criteria was met. This criterion included: 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, analysis focused on quantitative data as qualitative was limited.

Results: A statistically significant association was found between participants' use of SM as their main source of general news and information, and their belief in whether SM provides a true reflection of current news and events ($X^2 = 63.536$, df= 4, $P<0.001$). A statistically significant association was found between the participants' belief in SM's influence on their general perceptions of news, information and events, and their belief in SM's influence on their views of the equine industry ($X^2 = 31.661$, df = 4, $P<0.001$). A statistically significant association was found between participants' belief that equine welfare needs improving and their belief that the equine industry has made changes to improve equine welfare ($X^2 = 93.179$, df = 4, $P<0.001$). A statistically significant association was found between participants' belief in SM's influence on their general perception of news, information and events, and their belief in how SM has influenced their confidence in equine welfare ($X^2 = 117.732$, df = 4, $P<0.001$). Furthermore, 42.73% of participants reported traditional media as more influential than SM, while 27.27% reported an equal influence.

Discussion and Conclusion: Findings suggest that SM shapes public perceptions. However, despite these measurable links, SM was not identified by most participants as their dominant source of influence, 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. Frequent 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 only partially supported, with findings indicating 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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‘A good farrier is like gold. Once you find one don’t let go.’ – routine hoof care practices and problems accessing hoof care by horse, pony, donkey and mule carers

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Keywords: foot care, trimming, shoeing, farrier-client relationship

Introduction: Access to regular hoof care is paramount to maintain equid quality of life and athletic performance. Lack of access to appropriate and timely hoof care is a welfare concern. Shoeing in Great Britain (GB) is restricted by law to only qualified and registered farriers, while there are no restrictions on trimming. Ireland et al. (2013) found 95.6% of horses in GB received farriery on average every 6 to 8 weeks. Anecdotally, regional gaps in access to qualified farriers have been reported to the British Horse Society and The Donkey Sanctuary. The aim of this study was to describe routine hoof care practices and identify factors and themes associated with lack of access to hoof care providers by horse, pony, donkey and mule carers in the UK and Republic of Ireland (ROI).

Material and Methods: An anonymous online questionnaire was created, consisting of a mixture of multiple choice and free-text questions relating to routine hoof care practices, decisions around using their current hoof care provider and problems accessing hoof care in the previous year. Responses were collected between June and September 2024. Categorical data were described as proportions (%). The Chi-squared/Fisher’s exact test was used to identify relationships between having had problems accessing hoof care in the previous year (Yes/No) and geographical location, carer age category and number and type of equids cared for, followed by post-hoc pairwise comparisons with Bonferroni adjustment. Free-text answers were analysed qualitatively using content analysis and grouped into themes and quotes were used to provide context for the quantitative data.

Results and Discussion: In total 3,123 responses were received, 69.5% (n=2,172) from England, 21.8% (680) from Scotland, 5.9% (n=183) from Wales, 1.6% (n=50) from Northern Ireland and 1.0% (n=31) from ROI. Most of the respondents were aged between 35 and 64 years (68.4%; n=2,137). Horses/ponies were cared for by 98.9% (n=3,089) of the respondents, donkeys by 4.3% (n=134) and mules by 0.6% (n=18). For routine hoof care 74.4% (n=2,325) used a farrier, 14.6% (n=456) an equine podiatrist, 9.0% (n=282) a barefoot trimmer, 1.5% (n=47) trimmed their own equids and 0.4% (n=13) used both a farrier and an equine podiatrist or barefoot trimmer. In the subset of respondents using farriers, the majority (>90%) valued the advice of their farrier and felt they had a good relationship, however 60% were worried about the price of farriery in the future, 51% were worried they would not be able to secure the farrier of their choice if they needed to and 31% felt there was a shortage of farriers in their area. When respondents were asked to provide free-text answers as to why they use their current hoof care provider, some of the most important themes that came out were that (1) the hoof care provider had a good reputation and showed kindness, patience and empathy when working with their equids, treating them as individuals, as show by the quote below:

“I use 2 farriers. One for my two barefoot horses and another for the donkeys. Horse farrier has been with me for 20 years. Donkey farrier was chosen as they are female. My horse farrier was too rough and impatient.”

(2) that they were reliable, efficient, organised and communicated well, (3) that they were team players and were willing to work with veterinary surgeons and other professionals if necessary and (4) that they not only had the required and up-to-date qualifications, skills and knowledge but were also willing to share this knowledge. However, some decisions were based on location (specifically remoteness) which led to perceived

compromises in the quality of the services provided - both in terms of skills and knowledge and communication as part of the farrier-client relationship:

“Training for farriers is far away from here, remote Scottish Highlands, and they tend not to take any further training once qualified. My farrier is ok but won't come back if you lose a shoe or even fit you in if you drive horse to him, he never answers phone or returns messages.”

“My new farrier is only part time and has offered to support me until I can secure a new farrier and this has been impossible. I have tried to source farriers as far a field as 250 miles without any success.”

Thirteen percent (12.7%, n=397) of respondents said they had problems accessing hoof care in the previous year. Geographical differences were identified (p<0.001), with problems accessing hoof care more prevalent in Scotland and ROI compared to England (Figure 1).

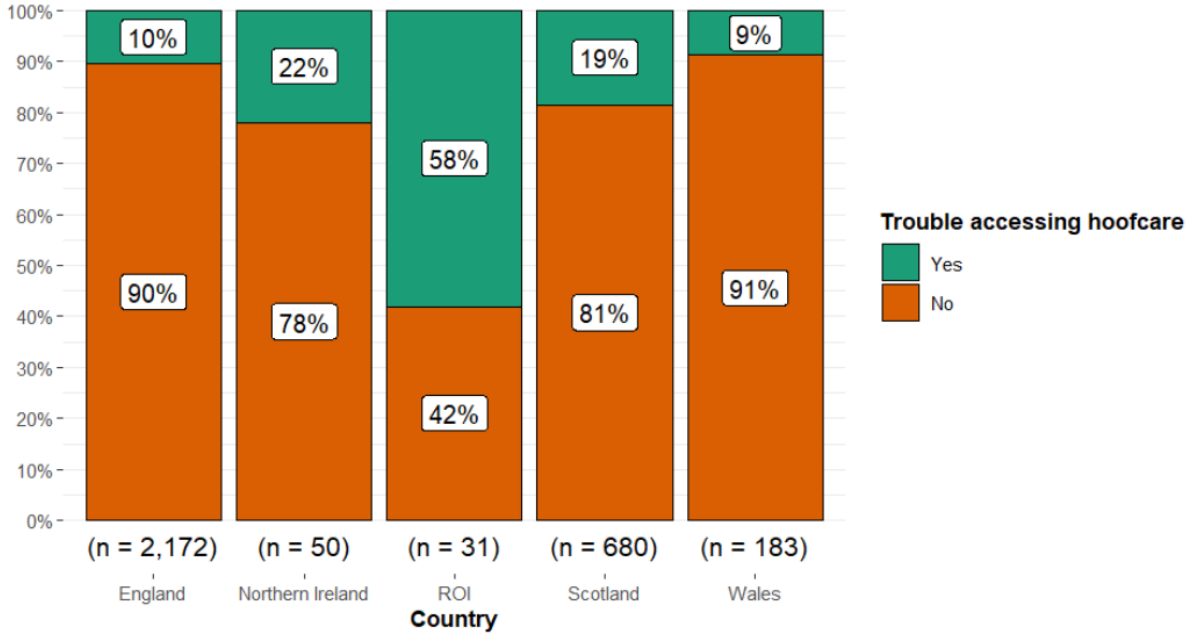

Figure 1. There were overall differences in problems accessing hoof care between countries (p<0.001), with significant differences identified between England (p<0.001), Scotland (p<0.001) and Republic of Ireland (p<0.001).

Problems accessing hoof care was also associated with age category of the carer (p<0.001), with those in the younger age categories having more trouble than those in older age categories, and the number of equids cared for (p=0.015), with those caring for 5 or more equids having more trouble than those caring for fewer, but not with type of equid cared for. A major theme identified was that farriers leaving the profession or moving away were often not replaced. Many of the remaining farriers were unable to take on new clients, or were perceived by respondents to lack a satisfactory level of knowledge or skill. This resulted in some carers being forced to mitigate by changing the type of hoof care provider they use (e.g. not able to secure a farrier so trying a barefoot trimmer) or taking on the hoof care responsibilities themselves as expressed by this respondent:

“I can't get one [farrier] to trim my 3 heavy horses for more than a few times. I haven't succeeded in getting a new one for some months. I'm thinking of trying a barefoot trimmer to come for their welfare. I did not choose this situation. I am a good customer – pay promptly, give refreshments. Farriers are the bane of my life.”

Conclusion and Implications: Equid carers valued kind and patient treatment of their animals, reliability and good communication, willingness to work with other industry professionals, interest in keeping skills and

knowledge current and the willingness to share these with the carers. There is evidence of geographical gaps in access to hoof care, particularly in Scotland and ROI, with some carers expressing welfare concerns for their equids. There were strong feelings that there was a lack of succession in the farrier industry, with many carers unsure of how they would secure a new farrier when their current one left the profession or retired. While more carers are using equine podiatrists and barefoot trimmers, which may help fill some of the gaps, concerns were raised about lack of regulation and the wide variety and standard of qualifications within the trimming industry.

Acknowledgements: Many thanks to all equid carers for contributing and to all the equestrian organisations and charities that helped share the online questionnaire.

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A provisional study into soundscape for stabled horses.

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Keywords: Behaviour, footfall, horse, rest, time budget.

Introduction: As a prey species horses evolved mechanisms enabling them to detect the presence of predators through auditory stimuli (Visser et al, 2022, Von Borell et al, 2007). Perception and discrimination of auditory stimuli is a key driver in behavioural and physiological responses, highlighted through the reduction in responses when noise dampening ear covers were applied to horses (Hole et al. 2023). In a domestic setting, horses are often kept in stables on yards or in barns, with other horses where the traffic of human footfall and associated sounds on the yard are thought to differ throughout the day. These peaks and troughs in sound within routine horse husbandry could act as a cue for certain events with the routine of a horse. The addition of auditory stimuli such as music highlights how soundscapes can be manipulated, for example to promote relaxed behaviour (Carter and Greening, 2012) or to mask novel auditory stimuli overnight (Hartman and Greening, 2019). However little attention has been paid to the normal bioacoustics generated by normal activity on a yard. This study sought to investigate and quantify self-reported quiet and busy periods on one yard to determine whether these differed across different days and times as well as between quiet and busy periods.

Material and Methods: Ten horses of mixed breeds (n=3 mares, n=7 geldings) aged 8-24 years old, ranging from 13.2hh-16.2hh were included through convenience sampling in a repeated measures observational study that took place in March 2025 at an Equestrian Centre in Gloucestershire, UK. The study received ethical approval from Hartpury Ethics committee (Ethics2024-438-LR). Soundscapes were recorded inside a barn housing twenty horses who were individually stabled in breezeblock-built stables measuring 3 x 3.6m. Decibel measurements were recorded via the 'voice memo app' (made by Apple™) and a Sound meter decibel app (Decibel-X™, Apple™) during self-described busy and quiet periods (Table 1), across three consecutive 24-h periods.

Sounds were captured using a 360-degree omnidirectional microphone and an iPad™, positioned 5ft off the ground as a typical receptor height for auditory stimuli (Hole et al. 2023). The location of the microphone moved from one end of the yard (day one) to a middle location (day two) to the opposite end of the yard (day three). Cameras as part of a Hikivision CCTV equipment comprising a 16 channel 4K Power over Ethernet and Network Video Recorder were located in the stable of each horse which were used to record footfall from human traffic, measured as the frequency with which humans entered or walked past the stable of the observed horse. Decibel measurements were averaged for every twenty-minutes of the observation period. Data were analysed using IBM SPSS™ (version 29.0.0.0). A three-way repeated-measures ANOVA was conducted to examine the effect of Location, Quiet vs. Busy period, and Time of day on decibel measurements ($P<0.05$).

Table 1. Timeframes for self-reported quiet and busy times on the yard

	Busy	Quiet
Morning	07:00 to 09:00	09:00 to 11:00
Midday	13:30 to 14:30	12:30 to13:30
Afternoon	15:30 to 17:00	17:00 to 18:30

Results and Discussion: Across 72 hours, clear peaks and troughs in decibels were observed. 0dB was never achieved. Mauchly's Test of Sphericity indicated violations for several effects; therefore, degrees of freedom were corrected using the Greenhouse-Geisser estimates where appropriate. There were significant main effects

of Location (F[1.26, 3.77] = 53.08, P = 0.002, partial η^2 = 0.947). The location of the microphone changed across three days of observation, from the main entrance/exit point to a midway location, to a less-frequently used entrance/exit point, highlighting how the soundscape of the yard is different in different locations. On average sound levels were higher during busy periods (48.2dB +7.72) compared to quiet periods (44.13dB +1.72) and a significant main effect was found for Quiet vs. Busy (Q_B) period (F[1, 3] = 18.61, P = 0.023, partial η^2 = 0.861). It appears self-reported quiet and busy periods can be classified according to sound levels (Table 2). Significant two-way interactions were found between Location × Q_B, (F[1.44, 4.32] = 145.27, P < 0.001, partial η^2 = 0.980) suggesting that differences between Q_B are different also likely due to the changing location of the microphone. A significant main effect for Time was also observed (F[1.28, 3.84] = 74.57, P = 0.001, partial η^2 = 0.961.). This suggests that during the day the environment can become significantly louder which could become a cue during the routine of individually stabled horses.

Table 2. Mean (+) decibels comparing quiet and busy periods and time of day across three days of observation.

	Busy			Quiet		
	AM	Midday	PM	AM	Midday	PM
Location 1	68.38 (+2.60)	46.98 (+3.11)	48.18 (+2.63)	45.40 (+1.30)	44.78 (+2.16)	44.70 (+2.03)
Location 2	49.68 (+1.29)	41.50 (+1.46)	47.53 (+2.92)	46.35 (+1.89)	45.63 (+0.49)	44.93 (+2.71)
Location 3	48.43 (+1.05)	41.73 (+2.47)	42.00 (+1.10)	42.23 (+2.43)	41.73 (+2.47)	41.45 (+1.74)
Average	55.50 (+9.12)	43.40 (+2.53)	45.90 (+2.77)	44.66 (+1.76)	44.05 (+1.67)	43.69 (+1.59)

Significant two-way interactions were found between Location × Time (F[1.72, 5.17] = 12.02, P = 0.012, partial η^2 = 0.800) and Q_B × Time (F[1.84, 5.53] = 29.17, P = 0.001, partial η^2 = 0.907). Importantly, the Location × Q_B × Time three-way interaction was also significant (F[1.90, 5.69] = 63.80, P < 0.001, partial η^2 = 0.955, indicating that the combined influence of Q_B and Time on decibel levels differed significantly across different locations. Differences in footfall (Figure 1) mirrored the highest sound levels at different times of the day highlighting how the volume of the people on the yard can add to the soundscape. The similarity in average sound levels and total footfall between quiet and busy periods at the midday point suggests that it was a relatively quiet time of the day. Horse care was still being administered but there was a reduction in the number of people present at that time.

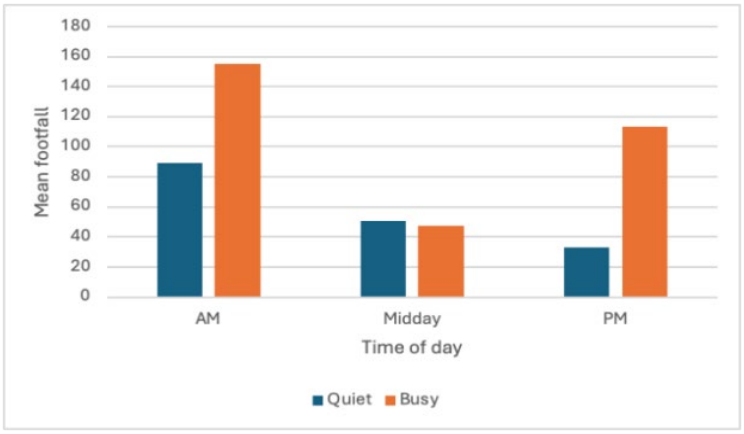

Figure 1. Mean total footfall busy and quiet AM, midday and PM

Conclusion and Implications: The average volume of sound recorded in this study fluctuated across the day but generally stayed within a range of 41 to 68dB, which is considered a safe range within the decibel scale. Significant differences in volume, due to the effects of quiet or busy period and time of day, seem to correlate with human presence according to footfall data. The effect of location highlights how different noise levels can be across one yard. This raises a question about how horses cope if they are continuously stabled in loud or busy locations (i.e. exit/entrance points). Future studies may wish to investigate human:horse interactions with different volumes of auditory stimuli to understand whether horses associate interactions with humans and noise and if this affects behaviour. Furthermore, the increase in auditory volume alongside footfall may act as an anticipatory cue to horses and it would be useful to understand the influence of noise compared to simple human presence, for example relative to unwanted behaviours. Further studies may include rest behaviour to determine whether a reduction in noise also acts as a cue for rest behaviour i.e. when anticipation of human interaction is low.

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Differences in perceptions and understanding of equine behaviour between categories of hoof care professional – a worldwide survey.

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Introduction: Appropriate hoof care is an essential part of good management of equines. Recent studies have shown high injury rates in hoof care professionals (Fuhrer et al., 2023). It is proposed that a greater understanding of equine behaviour may help to reduce human injury risk during potentially stressful situations (e.g. Doherty et al., 2017). This study aimed to assess knowledge and understanding of equine behaviour in hoof care professionals and any relationship to risk of injury. Only results pertaining to equine behaviour and restraint are reported here.

Method and Materials: The study used a questionnaire including a variety of Likert scale, multiple choice and open text answers. After initial piloting to refine the study design, the final version of the questionnaire contained three sections (demographics, injuries and equine behaviour). The survey was open to international hoof care professionals (HCPs) over the age of 18, shoeing and/or trimming more than 40 equids a month, to screen out owners who trim or shoe their own equid. Responses were anonymous. The questionnaire was launched at the BFBA Focus Conference in September 2024. Distribution was via professional associations members via email and associated Facebook groups. Additional respondents were reached through a snowball effect. The questionnaire remained open until February 8, 2025.

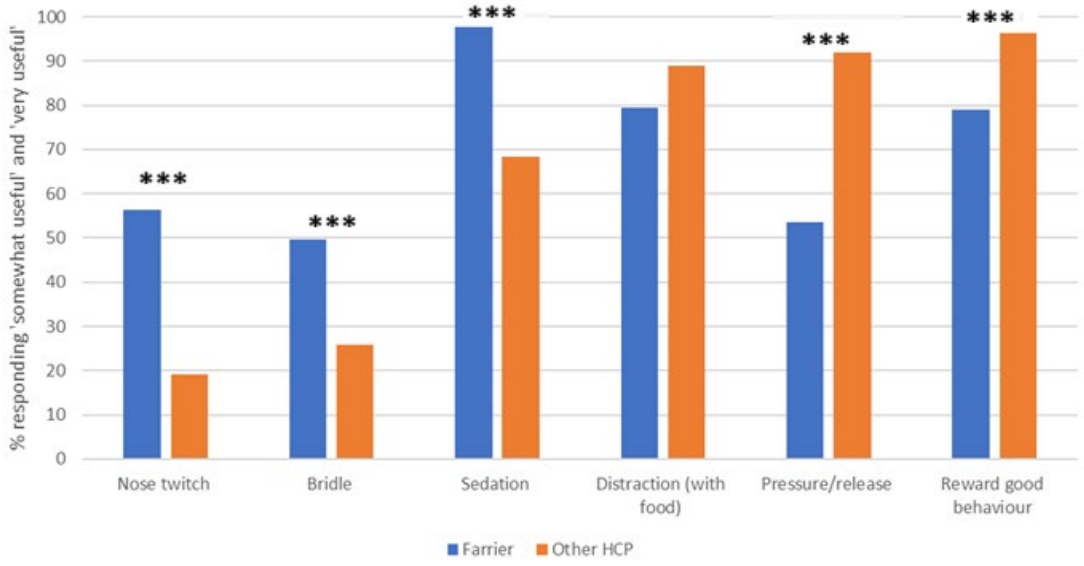
Based on the Likert scale nature of the data, Chi-square and Kruskal-Wallis tests were used for analysis. Due to the unequal distribution of farriers and other HCPs the chi square tests were run using specific proportions rather than default equal proportions, to give more accurate results. To reduce the risk of type-one error, a Bonferroni correction was applied to each set of tests, resulting in an adjusted p-value cut-off of 0.008.

Results: Three hundred and seventeen professionals responded to the survey. The respondents identified as ‘Barefoot farrier’ (n=26), ‘Barefoot trimmer’ (n=52), ‘Equine podiatrist’ (n=53), ‘Farrier’ (n=181), or ‘Other’ (n=5). For further analysis, these groups were then dichotomised; ‘Farrier’ (n= 181; 57%) and ‘Other HCP’ (n= 136; 43%) as the groups within the ‘Other HCP’ category all specialised in barefoot hoof care. An uneven distribution of sex across the professional categories was observed, with 75.7% of farriers identifying as male while in other HCPs males made up only 14.7% of the group.

The professional groups differed in their opinions on the perceived usefulness of restraint methods, despite no difference in their actual use being reported. Significantly more farriers felt that nose twitches ($H=48.66$, $p=<0.001$), sedation ($H=101.21$, $p=<0.001$), and use of a bridle ($H=26.58$, $p=<0.001$) were useful restraint devices compared to other HCPs. The highest level of within group agreement in farriers came from the use of sedation, with 77.3% considering it a very useful tool (figure 1).

Figure 1: Percentage of combined responses per group rating each method of equine restraint as ‘somewhat useful’ and ‘very useful’. Differences between groups are signified by *** at $p<0.001$.

Other HCPs rated rewarding good behaviour (H=46.30, p=<0.001) and use of pressure/release (H=56.49, p=<0.001) more highly than farriers did. However, in both cases over 50% (the majority) of farriers did rate them as useful in some way. There was no statistically significant difference between attitudes towards distraction with food between farriers and other HCPs. The highest level of within group agreement in other HCPs came from the use of rewarding good behaviour, with 70.6% considering it a very useful tool.



Significantly more farriers than other HCPs felt that equids exhibit unwanted behaviours out of naughtiness (χ^2=24.1206, p=<0.001) and spite (χ^2=31.0651, p=<0.001) (figure 1). There was no significant difference between farriers and other HCPs in beliefs about unwanted behaviours being caused by pain, fear, boredom or poor training. All respondents felt that poor handling caused unwanted behaviours.

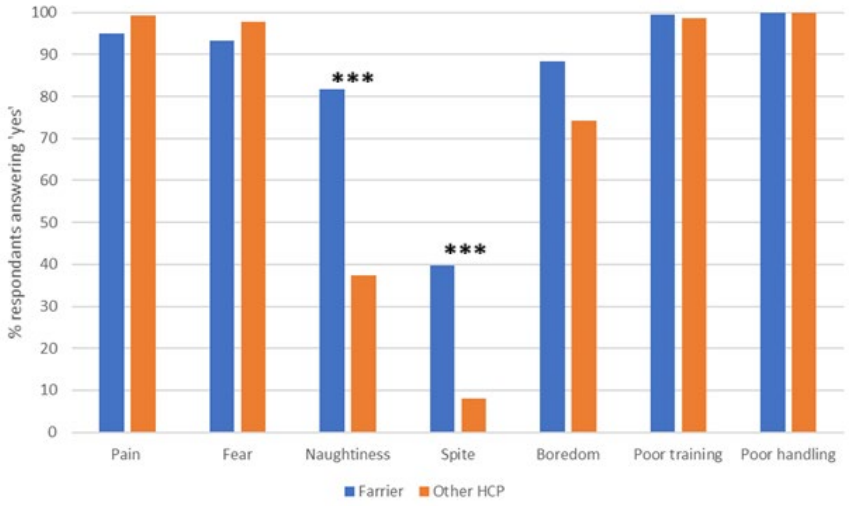


Figure 1: Percentage of respondents answering 'yes' when asked if these were reasons horses may display unwanted behaviour. Differences between groups are signified by *** at p<0.001.

Discussion: An almost even split between farriers and other HCPs responding to the current survey allowed for a good comparison between the two groups, however, due to the unequal distribution of sex across professional categories it is impossible to disentangle sex from profession in the current analysis. Several studies have found that women tend to show more compassion to animals and that men display higher levels of social dominance orientation than women (e.g. Graça et al., 2018). These sex-related predispositions may account for the differences in attitudes towards and understanding of equine behaviour and influence the value respondents of the current study placed on methods of restraint.

Mechanical or chemical methods of restraint were rated more useful by farriers than other HCPs, despite there being no difference in their actual reported use. Rewarding good behaviour and use of negative reinforcement (pressure/release techniques) was rated more useful by other HCPs than by farriers. Evidence suggests that the use of positive and negative reinforcement techniques reduces stress behaviours in horses (e.g. McLean, 2005; Hockenhull and Creighton, 2013) and thus should be encouraged over mechanical restraint. Worryingly, a large proportion of respondents reported the belief that equines can exhibit unwanted behaviours out of naughtiness or spite. Such anthropocentric views may be detrimental to the emotional welfare of the animal. While anthropomorphism can improve welfare through increased empathy, where perceived motivations of undesirable behaviours come from human emotions such as 'spite', punishment may follow. Unwanted behaviours are often an expression of stress or fear. To improve equine and human welfare (by reducing injury risk), it may be that training for HCP and handler on equine learning and behaviour would be of value.

Limitations of the study: The grouping of 'other HCP' covers a broad range of qualification and self-taught HCPs with many different training experience and many different requirements for CPD which could largely influence the perceptions of behaviour and restraint.

Conclusion: It is important to make the horses' experience positive, as it has been found that positive experience enhances learning and retention and enhances the horse-human relationship (Hall et al., 2018). This is particularly important to HCPs who will be fostering a long relationship, visiting the horse very regularly over a period of many years in some cases.

Ethics: Granted by the University of Edinburgh Human Ethics Research Committee on the 11 September 2024 (HERC_2024_094).

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Shedding light on stable lighting practices in the UK and the Republic of Ireland

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Keywords: Horse, equine, husbandry, management, circadian

Introduction: Light is a crucial factor in the lives of all organisms. The duration of the light/dark cycle regulates go/no-go responses and animals use this to regulate seasonal behaviour and physiology (Bradshaw and Holzapfel, 2010). In mammals, light is received largely through the retina which is relayed to the pineal gland via the suprachiasmatic nucleus (SCN), blocking the production of melatonin (Murphy 2019) promoting wakefulness (Schwartz and Kilduff, 2015). In some ungulates, biosynthesis of melatonin in the pineal glands appears to be strongly driven by the environmental light cycle (Murphy et al. 2011), with evidence highlighting how artificially manipulating the photoperiod can influence equine physiology (Murphy et al. 2007; O'Brien et al. 2020; Walsh et al. 2013). Evidence also exists to show how altering management parameters, such as leaving the light on overnight, can influence nocturnal behavioural profiles linked to sleep (Greening et al. 2021; Greening et al. 2023). Light at night has also been shown to disrupt equine circadian rhythmicity (Collery et al. 2023). Despite this, studies investigating equine husbandry and management practices have failed to mention stable lighting practices (Hemsworth et al. 2021; Lesimple et al. 2016), although they do highlight the need for an educational strategy to improve the horse owner's appreciation of the welfare implications of their behaviour. Currently, very little is known about current equine stable lighting practice in relation to common practice, whether this differs across different types of yards, and why these practices are employed. This study sought to identify common stable lighting practice in the UK and Republic of Ireland specifically reporting here on the type of yard and lighting, how lighting is managed at night and how light is experienced in the stable.

Material and Methods: An online questionnaire was created using MS Forms and piloted with seven unaffiliated individuals to ensure it was fit for purpose before being distributed via a variety of equine social media platforms. All respondents confirmed they were over 18 years of age and consented to the use of the data for the purposes of the study, with ethical approval granted by Hartpury Ethics Committee (ETHICS2024-186). Respondents were asked about the way in which lighting was managed including the type of yard they were reporting about, the type of lighting employed, the way in which lighting was managed at night, whether it was possible to read fine print in the stable during the day in normal light, and whether the stable experienced light pollution at night. Data was collected into an Excel spreadsheet to report on proportions of responses. Chi-squared test of independence was used to check for differences between yards ($P<0.05$).

Results and Discussion: In total the questionnaire received 230 responses (Margin of error: ±6% at 95% CI for GB and Ireland equestrian sector). The most common types of yards according to responses were privately owned (41%) and livery (45%). A recent survey of livery yard owners received 420 responses (SEIB Livery Yard Survey, 2023), highlighting lower representation in the current study. A small proportion were riding school or equine educational establishments (6%) and the remaining were sport horse competition/training yards (2%), horse breeding yards (5%) and Police horse yards (1%). Most commonly fluorescent lighting was employed (Figure 1).

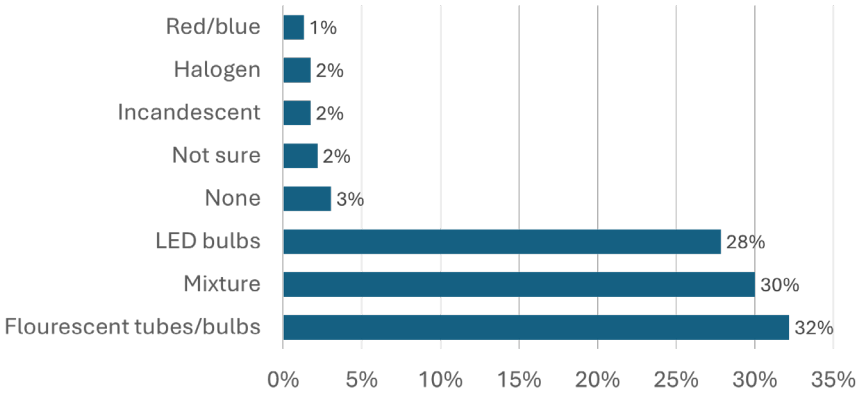

Figure 1. Response frequencies for question on type of stable lighting used.

The highest response frequency when asked about how lights were managed lighting at night was for manual control on an *ad hoc* basis (80%). The second highest response frequency (16%) was for manual control at roughly the same time every night. A small proportion of respondents reported using an automated system (3.5%), and less than 1% reported leaving lights on constantly. No statistical difference ($P>0.05$) was detected for any of the different ways of managing lighting at night between different yard types. The majority of respondents reported being able to read fine print in the stable (85%), and that their yard did not experience any light pollution (83.5%) but some were either unsure or aware that horses were experiencing light at night (light pollution) after yard lights were turned off (15.5%).

Conclusion and implications: The majority of lighting regimes employed on yards appear to support a human routine through *ad hoc* use, rather than a scheduled light/dark cycle that would better promote circadian rhythmicity for stabled horses. These findings are most applicable to private and livery yards due to underrepresentation from commercial yards such as riding schools, breeding and competition yards. The prevalence of light pollution, or being unsure about it, suggests that some horses do not experience a routine light/dark cycle at all, and a small proportion of horses also experience 24 hr light. The influence of constant light could be a area of interest for future research, which could be used to further our understanding of the importance of routine lighting systems for stabled horses.

Acknowledgements: The authors are thankful to all the respondents who took time to engage with the questionnaire.

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Searching for success: Exploring key indicators for suitable second careers for former racehorses

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Keywords: Horse racing, retrained racehorses, off-the-track-thoroughbreds, second careers

Introduction: Horses racing careers are generally short; however, the versatility and athleticism of the Thoroughbred facilitate a range of potential second careers outside of racing. Retraining racehorses is therefore a critical aspect of racing's long-term commitment to ensure racehorses' experience a good life across their life and contributes to the sustainability of the horseracing industry. Optimizing the retraining process is essential for a successful transition from racehorse to riding or sport horse, yet limited evidence exists on effective retraining practices and how retrainers source suitable second homes fo r horses in their care. This study aimed to explore the practices and perspectives of retrainers and rehomers directly involved in the transition of Thoroughbreds from racing into second careers, with a focus on identifying the factors that contribute to long-term rehoming success.

Materials and Methods: A qualitative, phenomenological approach was applied through in-person moderated focus groups: Group 1: Retrainers (n = 6) with over 10 years' experience and a proven history of successful placements, and Group 2: Rehomers (n = 5) who had cared for a former racehorse for five or more years. Recruitment was conducted using networks known to the authors combined with snowball sampling. During the recruitment process, potential participants were informed about the purpose of the study, as well as the format and logistics of the focus-group discussions. Participants received questions 72 hours prior to sessions to guide discussions and provided informed consent for audio-recording of group discussion. Audio-recordings were transcribed verbatim and then analysed by SJ using inductive thematic analysis via a grounded theory approach. Triangulation (SJ and JMW) validated emergent themes.

Results and Discussion: Five central themes emerged from the data across retrainers and rehomers: (1) Perception and reputation of the former racehorse, (2) Responsibility and motivation, (3) Challenges: For retrainers - sourcing suitable rehomers, for rehomers - sourcing suitable horses, (4) Individualised process (transition and rehoming), and (5) Success is based on personal expectations. Retrainers consistently emphasised the importance of individualised approaches and allowing time for each horse to adjust post-racing as critical. Rehomers attributed successful second careers less to competitive performance and more to stability, longevity, and ethical matching. Retrainers preferred to place horses to rehomers with prior experience, realistic expectations, and who demonstrated a clear commitment to the horse. Rehomers reported the value of transparent communication during the handover process to support future successful management of the horse. Both groups recognised rehomers' expectations were a key challenge to finding suitable second homes for former racehorses and reported mismatched partnerships often resulted in equine welfare concerns. Rehomers believed ethical retrainers are central to ensuring positive outcomes for retired racehorses, and both groups felt an accreditation system could professionalise retraining and protect against financially motivated or uninformed practice.

Conclusions: This study highlights successful Thoroughbred rehoming depends on individualized retraining, transparent communication, and ethical matching between retrainers and rehomers. Aligning horses' capabilities and future owner expectations and ensuring long-term commitment are essential to ensure long-term welfare outcomes for former racehorses. A professional accreditation system for retrainers may facilitate rehoming success.

A survey investigating the health and welfare implications, risk factors and behavioural markers of learned helplessness in horses

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Keywords: Learned helplessness, equine behaviour, horses, questionnaire study, industry opinion, personal experiences, demographic analysis

Introduction: Learned helplessness (LH) is psychological phenomenon where an organism that has no control over an aversive situation cannot escape triggering a state of unresponsive behaviour (Hiroto & Seligman, 1975; Maier & Seligman, 2016). As a domesticated prey species, horses may be more prone to these types of conditions as they are often put in situations which breach their natural instincts (Goodwin, 1999) and their neurophysiology causes them to be more emotive reactors due to the strong connectivity between the hippocampus and amygdala (Takeuchi and Sugita, 2007). The aim of this study was to analyse current industry opinion on LH in horses through a questionnaire, specifically to determine, if LH is a commonly recognised condition and to identify, if any demographics characteristics affect beliefs, particularly age, country, level of education, profession, and years practicing.

Material and Methods: A cross-sectional questionnaire was created using JISC software, most of the questions were close-ended multiple choice to allow for accurate statistical analysis and reduce participant fatigue, with optional open-ended questions for participants to elaborate on topics if they so wished. The questionnaire had a total of 48 questions (5 of which were optional), these were split into 4 sections; GDPR information, personal information, terminology review and learned helplessness questions. The terminology review included a mix and match definition section to understand what terminology is preferred and best understood. The questions on learned helplessness focused on whether people believed it existed, if it was recognised and treated, personal experiences, rating the significance of potential risk factors and identifying behavioural markers associated with it. The target demographic was any paraprofessionals who were currently practicing or had previously practiced within the industry. Once created the questionnaire was distributed via various equine governing bodies and associations as well as through a social media campaign which specifically targeted equine professional cohorts. The questionnaire was open from 28/01/25 until 28/03/25, the predicted response rate was 100 but totalled only 54 responses. After screening, 49 of these responses were approved for analysis. Jisc was used to produce summary statistics and then SPSS version 30.0 was used to analyse the 34 of the closed questions using the demographic categories.

Results and Discussion: Overall, 96% of responders believed that LH could occur in horses with 71% identifying it when practicing, indicating that it is a potentially a common condition. It can be assumed that the majority of the 71% of responders that have personal experience with LH were correct in their identification as the majority of responders were able to correctly identify key behavioural markers that indicate LH (76% for reduced movement of head and ears, 69% for reduced movement of tail, 67% for tense facial muscles, 57% for head lowered below withers & 49% for triangulation of eye). In the terminology section, “shut down/switched off” was the most popular

term to use with 47% of votes, despite only 35% of people being able to match it with the correct definition. Respondents with higher education levels (degree and above) were the only ones to choose learned helplessness as a preferred term (14.3%) whereas the respondents with the lowest education level (not formally recognised) were the only responders to choose depression as a preferred term (28.6%) perhaps as this is more commonly used particularly in humans and therefore easier to understand. One hundred percent of responders from Australian/ New Zealand chose unresponsiveness as a preferred term compared with a bigger range of preferred terminology used in other countries indicating the linguistic differences between areas. This demonstrates the need to use more colloquial language when discussing LH in research or providing simplified versions to make research more accessible to all, especially as the nuances between different terminology can become difficult to understand for the average reader.

Chronic pain conditions were ranked the most significant risk factor with 86% of the respondents putting it in the "extremely important" category, indicating a strong link between LH and health issues, particularly as 100% of both veterinarians and bodyworkers had responded saying they had witnessed LH firsthand when practicing. The effect of individual stabling on LH had the biggest range of responses with 16% rating it "not important", 20% rating it "somewhat important", 16% rating it "important", 29% rating it "very important" and 18% rating it "extremely important", which may be due to the divisive and controversial topic of stabling within the industry, especially as country had an effect on answers as 100% of respondents from Australian and New Zealand rated it as "very important", the majority of respondents from mainland Europe voted for "very important" with 57.1%, England had the most range in answers with each category scoring between 12.9-25.8%, whereas the USA and Canda were split between the two extremes with 42.9% rating it "extremely important" and then 28.6% rating it "not important at all" and another 28.6% rating it "somewhat important". The behavioural marker most associated with LH was reduced head movement with 76% of responders choosing it, perhaps as it is quite an obvious sign of unresponsiveness. Previous research (Fureix et al., 2014) has used the head lowered below the withers as a behavioural marker for withdrawn behaviours but only 57% of people recognised this as a trait of withdrawn behaviours. 2% of respondents selected rounded nostrils and ears forward therefore it is the least likely behavioural marker associated with LH possibly as this body language is commonly associated with a 'happy' horse. When asked if LH was commonly recognised and treated within the industry, 96% said "no", indicating the need for more education on this topic and a deeper understanding of the potential risks and issues associated with LH.

Conclusion and Implications: The results of this questionnaire indicate that LH is prevalent within the industry and that it is a recognisable condition but that strides need to be made in research to truly understand the magnitude that it may have, especially if 71% of paraprofessionals surveyed have firsthand experience witnessing LH. The opinions showcased on potential risk factors and relevant behavioural markers could be used to shape further research to identify potential relevance. The main limitation of this research is that due to the poor response rate it's not representative of the whole equine industry and results may have differed if the response rate was higher. The response rate may have been better if it was opened to the whole equine industry not just paraprofessionals however the language used and some of the questions may have to be changed to make it more accessible to the public. As this is only preliminary research it could be taken further to gain a deeper insight to understand the whole of the equine industry opinion on LH and then impact future research on LH.

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HORSE & RIDER PERFORMANCE

Abstract Presentations:

Abdulaziz Dharman | Training Flat Racehorses in Hot Climates in Qatar: Trainers' Perceptions

Anne-Maarit Hyttinen | Effects of strength and/or endurance training on the physical fitness and riding performance of national and international level female equestrians

Warren Lamperd | What is coaching for an elite equestrian rider?

Roberta Blake | Effect of Girth Design and Girth Tension on Saddle-Horse Pressures and Forelimb Stride Kinematics in Rising Trot

Roberta Blake | Pressure Distribution when Riding Horses with a Saddle Compared to a Bareback Pad in Walk and Sitting Trot

Richard Seals | Equestrian Coaches' Use of Positive Pedagogy and Game-Based Approaches to Develop Decision-Making in Riders

Natasha Andrews | An investigation into how British Showjumping coaches assess and promote "A Good Life for a horse" in training sessions

Training Flat Racehorses in Hot Climates in Qatar: Trainers' Perceptions

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Keywords: Flat Racehorses, trainers' perceptions, training strategies, hot climate, humidity

Introduction: Heat stress is a critical welfare and performance concern in equine sports, particularly in hot and humid environments where evaporative cooling efficiency is compromised. Flat racehorses, with a high level of metabolic heat output and, relative to their size, limited surface area for heat dissipation, are especially vulnerable. Qatar's flat racing industry, which operates in desert climatic conditions, presents a unique context in which environmental heat stress, high humidity, and intense training demands combine. This study aims to explore trainers' perceptions, knowledge, and practices regarding heat stress mitigation and compare these with the current scientific literature.

Material and Methods: This qualitative study employed semi-structured interviews to explore the experiences of 15 established flat racehorse trainers in Qatar. Participants were eligible if they were ≥18 years old, had ≥5 years of training experience in Qatar to ensure familiarity with the local weather conditions, and were fluent in English. Purposive sampling captured variation in terms of stable size (Tier I–III), financial resources, number of horses trained, and regional background. Data were collected through face-to-face interviews, which were preferred over focus groups to encourage openness and reduce the withholding of "secret" techniques. A flexible, semi-structured interview schedule was developed based on both the existing literature and the researcher's personal experience in this field, with open-ended questions promoting detailed responses. The interviews were audio-recorded using an iPhone 15 Pro. Verbatim transcription was undertaken by the researcher, and the transcripts were anonymised through the use of pseudonyms.

Reflexive thematic analysis was conducted using NVivo v15.1.1 (2024), following three stages: initial coding, merging/dividing themes, and re-examining the codes and structure. Inductive coding allowed the identification of novel themes, while frequency and comparison analyses highlighted common patterns and participant-theme relationships. The researcher, a Qatari national with racing expertise, maintained neutrality and used probing to elicit depth. Data saturation was achieved by interviews with 11–12 participants, with the study concluding after 15 participants.

Results and Discussion: Five major themes emerged related to training practices: (1) Environmental Assessment; (2) Training Practices; (3) Hydration Strategies; (4) Cooling Strategies; (5) Preventive Strategies. Two major themes emerged related to trainers' knowledge and perceptions: (1) Risk Factors for heat stress, and (2)

Signs and Symptoms of Heat Stress (Figure 1)

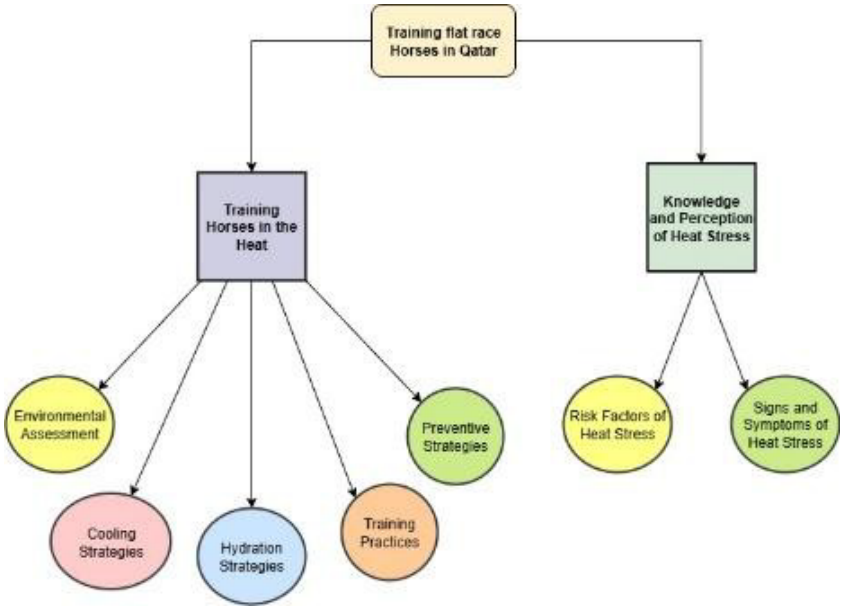

Figure 1. Major themes and subthemes that emerged from the qualitative study

The trainers identified various risk factors related to heat stress, including training intensity, high temperatures, high humidity combined with high temperature, age (younger and older horses), fitness level, coat characteristics, breed (imported Thoroughbreds being more vulnerable than Arabians), and horse temperament. Whilst in line with some of the scientific literature, factors such as race surface, race distance, WBGT levels, sex, and specific heat acclimatisation protocols were not widely mentioned (Table 1).

Risk Factors Found in the Literature	Trainers who Identified this Risk Factor
Workload (Training Intensity)	Trainers 5, 10, 13, 14
Race Surface	None
Race Distance	None
Temperature	Trainers 5, 10, 13, 14
Humidity	Trainers 10, 14, 5
Wet-Bulb Globe Temperate ≥ 28°C	None
Dehydration	Trainers 5, 10, 13, 14. “The horse's cooling systems are hampered by dehydration and electrolyte loss.” (Trainer 5)
Inadequate cooling post-training	None
Mares and geldings	None
Young age or old age	Trainers 2, 3, 5, 6, 8, 9, 10, 14
Low Bodyweight	Trainer 5
Previous History of EHI Incident	Trainers 5, 10, 14, 15
Time of the day	Trainers 13
Fitness Level	Trainers 5, 6, 8, 10, 14, 15
Acclimatisation	All of the trainers mentioned this indirectly. as they stated that imported horses, especially thoroughbreds, must be

	exposed to the harsh weather gradually. “Thoroughbreds may have less heat tolerance than breeds acclimated to the desert.” Trainer 6
Coat Characteristics (thickness& colour)	Trainer 13
Other risk factors	Identified by the trainers in this study
Breed	Trainers 5, 10, 13, 14, 15. “Breed-specific traits are also crucial since some horses retain more heat than others”. Trainer 5
Horse temperament	Trainers 13. “Horse temperament, such horses are more prone to suffer from heat stress.” Non-sweating (anhidrosis) Trainers 2 and 14

Table 1. Risk Factors for Exertional Heat Illness (EHI): a comparison between the scientific literature and the trainers’ perceptions

The most commonly reported signs and symptoms of heat stress included lethargy, exhaustion, delayed recovery, quick/shallow breathing, absence of excessive sweating, increased body temperature, a lack of focus, and a reluctance to move. Other critical signs like nostril flaring, dark urine, dark mucous membranes, and irregular heart rate, however, were not identified by any of the trainers (Table 1).

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Effects of strength and/or endurance training on the physical fitness and riding performance of national and international level female equestrians

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Keywords: show jumping, eventing, horse riding, strength training, endurance training, concurrent strength and endurance training

Introduction: Physical fitness of the rider is a critical determinant of equestrian performance and horse welfare. The balanced and efficient body use improves the stability of the rider, horse balance, the accuracy of aids, and appropriate mechanical loading. However, competitive riders may exhibit suboptimal physical capacities, potentially impairing performance and increasing injury risk. This study aimed to assess the strength and endurance characteristics of Finnish national/international-level female riders in show jumping and eventing, both without and with the horse during the obstacle test track (OTT), and to determine the effects of a 12-week strength (S), endurance (E), and the combined strength and endurance (SE) training intervention on the rider fitness and OTT performance.

Material and Methods: The present study comprised both the cross-sectional and longitudinal design. In the cross-sectional phase, 52 female riders (show jumping, n = 19; eventing, n = 33; mean age 29.4 ± 8.9 years) underwent testing on separate days in the laboratory and during OTT riding at the indoor arena. The present laboratory tests included the measurements of maximal bilateral isometric leg press, unilateral knee extension/flexion, and countermovement jump as well as maximal isometric trunk extension/flexion force, static weight distribution in a simulated riding stance, bilateral hand grip strength, and a graded cycle ergometer VO_2max test with breath-by-breath gas analysis, blood lactate sampling, and heart rate monitoring. The riding tests involved two consecutive OTT rounds consisting of 11 standardized obstacles, with continuous oxygen uptake and heart rate measurement and blood lactate collection before, during, and after the riding.

In the intervention phase, participants were randomized to the S, E, SE, or control (C) groups. The present physical training was performed three times per week in addition to four to six riding sessions per week. The S program combined circuit weight training targeting major muscle groups with maximal strength exercises for the lower limbs, progressing from 60% to 100% of one-repetition maximum in the four-week cycles. The E program consisted of running and cycling sessions at progressive intensities from 60% to 100% of the measured maximal heart rate, incorporating both interval and continuous formats. The present SE program included half of the weekly volume of each modality on separate days. Training diaries and heart rate monitoring were used to track adherence. Data (mean ± SD) were statistically analysed with normality tests, ANOVA/MANOVA with post-hoc comparisons, paired t-tests, and Pearson correlations ($p < 0.05$).

Results and Discussion: No significant differences were observed between the disciplines in any measure of the strength, endurance, or OTT performance. Middle- and lower-body maximal strength and endurance performance of the riders were lower than the values reported for untrained Finnish women of similar age, but hand grip

strength was above average. Explosive jumping performance and rapid isometric force production levels of the legs were also below the reference values reported for age- and sex-matched untrained Finnish women. No left–right asymmetries in strength were detected. Baseline VO_2max averaged 32.1 ± 4.5 ml/kg/min, which is below the ~35 ml/kg/min recommended for novice riders and well below the ~50 ml/kg/min suggested for international-level riders. Occasional lower back pain was reported by 82% of the participants. During OTT, riders operated at approximately 100% of maximal heart rate and over 90% of VO_2max indicating rather a high cardiorespiratory load level.

The average adherence to the 12-week training program for the whole group was 77%. After the training intervention the S group demonstrated significant improvements in bilateral leg press (9.0 ± 8.0%, $p < 0.01$) and trunk extensor strength increasing by (2.6 ± 11.0%, $p < 0.05$), whereas no significant changes were observed in maximal strength in the other groups. Rapid force production remained unchanged across all groups.

VO_2max increased significantly both in the E group (6.5 ± 7.7%, $p < 0.05$) and the SE group (7.5 ± 8.3%, $p < 0.01$), with gains evident both in the cycle ergometer test and OTT riding. These aerobic improvements enhanced OTT performance, with E and SE riders completing the course faster and showing lower oxygen uptake (decreases of 9.7% and 6.4%, respectively) and lower blood lactate levels in E riders (decrease of 16.4%). However, even after training, OTT performance still required riders to operate at approximately 100% HRmax and over 90% VO_2max.

The lack of significant strength adaptations except for the S group may be explained by the relatively low volume of maximal strength training, suboptimal adherence to the prescribed program, and possible interference effects arising from the high volume of concurrent riding training. These observations highlight the importance of evidence-based, carefully periodized training programs to optimize overall physical performance in equestrian athletes.

Conclusion and Implications: This study demonstrates that competitive riders, while technically proficient, may have lower aerobic capacity, maximal and explosive strength, and endurance than non-athletic women, with the exception of hand grip strength. Such deficits may limit neuromuscular efficiency, impair the precision and speed of aids, and increase injury risk, while also potentially adding strain to the horse. Well-designed and systematically implemented off-horse conditioning programs are essential for optimal rider development. Strength training should be emphasized in the off-season, maintained during the general preparation phase of training, and complemented with peak power work in the pre-competitive phase. Endurance training should aim to increase VO_2max toward values reported for elite international riders. Evidence-based, periodized training tailored to the rider's discipline and total workload can improve performance, reduce injury risk, enhance rider–horse communication, and promote horse welfare.

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What is coaching for an elite equestrian rider?

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Keywords: Horse sports, coaching practice, eventing, dressage, showjumping

Introduction: Elite equestrian riders have experienced skill acquisition and refinement to a high level. As a result, they possess a developed perspective of coaching and what they want from the coaching process generally or focused for specific events such as championships where the goal is to optimise performance on a single occasion. Coaching practice needs to adapt to support competing as an individual, with their own learning priorities and systems, or when competing in a squad situation for a national team, where they have to adapt to different coaching environments and priorities. Many elite riders progress in their career to coach their peers and developing riders. Therefore, their experiences of the coaching process can provide a unique perspective and valuable insight into equestrian coaching for the rest of the riding population. The aim of this study was to explore the role of the coach and coaching in skill development in senior elite equestrian riders coaching: What it means to them, what form it takes and what they expect from the coaching experience.

Materials and Methods: Eight international riders who had previously competed within Olympic equestrian disciplines, and who also currently coached other equestrians participated in semi-structured interviews utilising open questions and prompts. Participants (n=8; 6 males and 2 females; $\bar{x}$ age = 42±11 years) were asked for their experience and views on how as riders and coaches they refined their existing skills, supported learning or learnt new skills, to describe their own development through coaching, and to outline their perception of what role coaches play in these processes both formally and informally. Interviews were conducted on a face-to-face basis with the lead researcher. Audio-recordings were transcribed verbatim and analysed using manual inductive thematic analysis via a grounded theory approach. Triangulation validated emergent themes. Ethical approval was provided by Hartpury University Ethics Committee.

Results and Discussion: Five central higher order themes emerged from the data: 1) utilising numerous information sources, 2) analysis based on riders' systems, 3) utilising the coach as a filter / observer in the moment 4) an understanding of what is required to achieve their goal and 5) requirement for mutual respect and trust (Table 1).

Riders consistently inferred that influential coaches exerted a positive impact on their own initial learning and skill development, benefitting from these individuals being able to guide and establish a good technical foundation at the start of their careers. As an elite rider and a coach, participants felt that *good coaching* required a focussed, inspirational and interactive approach that facilitates trust and respect, and leads to a productive and positive coaching relationship for both parties. As an elite rider, they wanted someone coaching them to provide support, guidance, and to be able to understand the sport and appreciate partnerships' long-term goals.

Table 1: Higher and lower order themes participants (n=8) self-identified as key aspects of elite rider coaching and skill development

Utilising numerous information sources	Identify specifics to promote marginal gains Able to break things down Can see bigger picture
Analysis based on riders' systems	Sounding board Positive impact on skills development Reminder of what rider has forgotten Stimulates ideas Logical
Utilising coach as a filter/ observer in the moment	Able to break things down and challenge Sounding board Trusted support Provide positive and constructive feedback Questioning
Understanding what is required to achieve goal/s	Challenge for improvement Think like a horse Support Experimental and adaptable Able to contextualise feedback
Requirement for mutual respect and trust	Personality Experience Positive and productive working relationship Open and honest Analytical, experimental and stimulating

As coaches themselves, there was an expectation that their students would take responsibility for their own learning, be disciplined, apply a systematic approach to their practice, understand their place in the relationship, and should enjoy the coaching process. In their own coaching practice, elite riders learnt from analysis of feedback on their coaching from varying sources and concentrated on applying a process-based approach built upon a strong technical foundation. They felt a productive coaching environment needed to be interactive, allow experimentation, provide feedback, and give direction to the person being coached. Coaching support varied from personal arrangements with individual coaches as part of a personalised training program to suit the individual's specific needs, where the rider chooses the coach, to team or squad environments, where the coach/es are provided in situ tailoring coaching to the teams' needs with the aim of producing a result for the country. Participants felt rider and the coach expectations can vary depending on the situation, with the coach shaping their practice to the rider's or team's requirements. From a coach the rider may be looking for eyes on the ground to give them feedback as much as for the coach to be challenging their riding depending on the focus. While at other times the rider will not want to have their system altered as they don't need to be thinking about how to ride in a competition, and this coaching would be more suited to the off season. The insights gained from elite coaches can inform equestrian coach development. Across all levels, establishing a positive coaching environment where the coach and student goals are clear and aligned for a particular session, and for short term perfo rmance versus long term development is recommended. Whilst in team situations, the coaching role acts as more of a facilitator at and around competition goals, and for both scenarios, developmental coaching works best when focussed outside of core competition seasons.

Conclusion*:* Elite rider perspectives demonstrate the importance of clarity and establishing a positive coaching relationship in elite performance between the coach and rider, and the precarious balance that must be achieved to achieve results both in the short term and the long term while developing the athletes, both human and equine. These facets can help inform equestrian coaching across all levels of performance.

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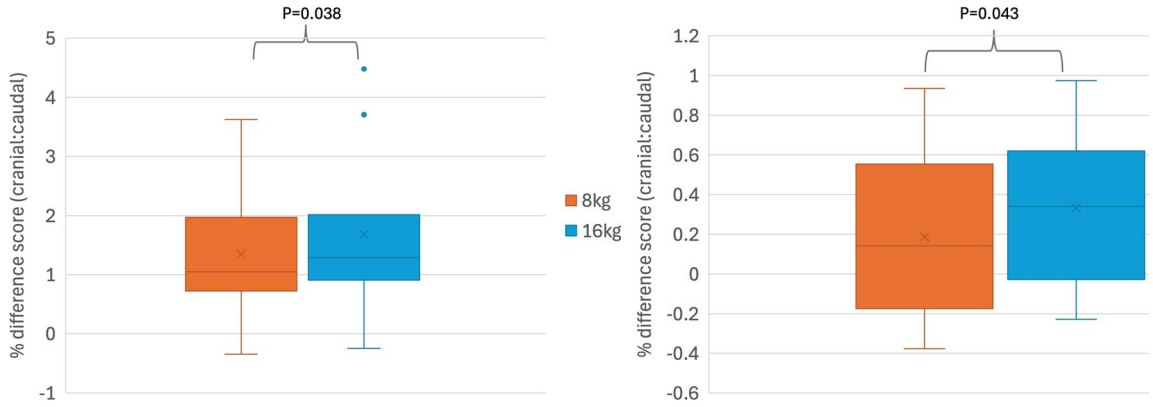
Keywords: riding, exercise, equestrian, biomechanics, tack

Introduction: The pressure and force under a range of "standard" girths and an anatomical girth design were investigated using a pressure mat under the girth in ridden horses (Murray et al., 2013). Maximum force on the left side of the horse under the girth for the standard and anatomical girth was 344 N and 281 N, respectively, and for the right side was 328 N and 288 N, respectively, and these were significantly different. Girth placement also has a significant effect on saddle pressures, with traditional placement seeming equally good if not better than the V-system, and should thus be considered in saddle fitting (Byström et al., 2010**)**. It is also important to recognise that the size of the girth (length and width) needs to be suitable for each individual horse and that the shape of the horse's thorax influences where the girth sits, how pressure is distributed, and therefore how it might influence the gait (Dyson and Greve, 2010). To our knowledge, this is the first study to understand the impact of girth tension on saddle pressure, an important welfare parameter during ridden work, and its associated effects on forelimb kinematics. The aim of the present study was to investigate the interaction between girth tension and girth type using a standard straight material girth and a leather anatomical girth at initial tensions of 8 and 16 kg.

Materials and Methods: Ethical approval was provided by the Agriculture, Animal, and Environmental Sciences Research Ethics Panel, reference number 1717. Informed owner consent was obtained, and each rider completed a physical activity readiness questionnaire (PAR-Q, short version) prior to the commencement of data collection.

Eight healthy sport horses (mean age 9 ± 2.1 years) were selected. Each horse was fitted with a correctly fitted jumping saddle. Two girth types were compared: (1) traditional straight leather girth, and (2) anatomical ergonomic girth. Two levels of tension (8 and 16 kg) were applied using a calibrated tension gauge. Treatments were randomized, in a cross-over design. Pressure distribution was assessed with a Tekscan pressure mat, placed under the saddle. Peak pressure, mean pressure, and pressure distribution patterns were recorded. Stride kinematics were captured using a 2D motion capture system (120 Hz) with reflective markers on the forelimb joints. Each trial consisted of 60 seconds of rising trot. Horses were allowed a 10-minute warm-up. Two-way repeated measures ANOVA was used to analyse the data, with $p<0.05$ set as significant.

Results and Discussion: There was no significant effect of girth type, girth tension, or girth type*tension interaction for any of the measured variables, with the exception of carpal flexion, which was significantly greater for A8 (median: 103°, 25th–75th percentile: 100–112°) than S8 (101°, 96–106°; $p = 0.043$). There was no effect of girth type (A or S) on mean saddle pressure for either cranial or caudal regions ($p > 0.05$), but caudal average pressure was significantly lower than cranial average pressure both at 8 and 16 kg tensions ($p < 0.05$). For both mean and peak pressure, the ratio cranial: caudal was significantly higher with 16 kg tension ($p < 0.05$) (Figure 1), indicating that as the girth tension increases, the pressures shift towards the cranial aspect.



(**B**)

Figure 1. Mean (**A**) and peak (**B**) saddle pressure difference score cranial: caudal (%) for all girths combined with 8 kg and 16 kg of tension. Median, 25th and 75th percentiles, minimum and maximum. Horizontal line represents median and "x" represents mean. *n* = 6 horses. Cranial area of the saddle = cranial half of the contact area of panels; caudal area of the saddle = caudal half of the contact area of panels.

As far as we are aware, this is the first study to investigate the effect of different girth tensions on saddle pressures. Neither average nor peak saddle pressure was affected by girth tension, despite quite a large difference (8 kg versus 16 kg) and the fact that we had anticipated that an increase in girth tension would result in an increase in pressure between the saddle and horse. However, we have observed a significant shift in the mean and peak pressures towards the cranial part of the saddle as the tension increased. The rationale for expecting an increase is that the saddles and girths used effectively produce a largely inflexible "ring" around the horses' frontal thorax. The pressure concentration over the cranial aspect of the saddle has led to a less homogeneous pressure distribution under the panels, potentially decreasing local flexion-extension range of motion which can have an impact on welfare and performance. This highlights the need to adjust the girth with welfare considerations. Trainers and riders should be cautious in tightening practices, avoiding the misconception that tighter girths always enhance saddle stability.

Conclusion and Implications: In conclusion, girth tension and girth type had minor effects on limb kinematics, and regarding kinetics, the main effect seemed to be a significant shift in the mean pressure and peak pressure towards the cranial aspect of the saddle in non-elite horses and riders in rising trot.

This study supports moderate girth tensions and advocates for widespread rider education on girth fitting. Findings contribute to evidence-based tack selection and support regulatory guidance for welfare-focused equestrian sport.

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Pressure Distribution when Riding Horses with a Saddle Compared to a Bareback Pad in Walk and Sitting Trot

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Keywords: bareback, equitation science, pads, pressure

Introduction: Bareback riding has grown in popularity as a cost-effective alternative to saddles, often perceived as improving balance and rider connection. However, bareback pads lack the structural support of a tree, raising welfare concerns. Concentrated pressure under the rider's seat bones may contribute to back pain or injury in horses. Saddles are designed to distribute load, but poorly fitted saddles can also cause harm. Limited research has been conducted into the effects of bareback riding on pressure distribution. However without the structure of a tree to evenly distribute pressure and protect the spine, research from treeless saddles can be used as a comparison, particularly since Belock *et al.* (2012) found that profile pressures observed when riding with treeless saddles are similar to that of bareback riding. This concentrated pressure can result in back pain, which in turn affects locomotion by shortening stride length and limiting the flexion and extension of the spine (Wennerstrand *et al.*, 2004). Clayton *et al.*, (2013) researched the forces and pressures on the horse's back during bareback riding and found that bareback riding led to smaller areas of loading, with most force being exerted behind the rider's seat bones and even with a lightweight rider, mean pressure exceeded the threshold value of 11kpa, which is highly associated with a risk of causing back pain. Likewise, Nuchprayoon *et al.*, (2021) measured the effects of bareback riding on spinal kinematics in native Thai ponies and found a reduction in lateral bending and spinal range of motion.

This study compared pressure distribution between saddles and bareback pads at walk and trot, focusing on cranial and caudal thoracic regions. We hypothesised significant effects of tack, gait, and thoracic region on pressure variables.

Materials and Methods: Prior to starting the research trial, ethical approval was obtained from Anglia Ruskin University Research Ethics Committee by the School Research Ethics Panel (SREP) on the 3rd December 2024, under the research number ETH2425-1332. Eight clinically sound horses, accustomed to both saddle and bareback work, were recruited. A lightweight, experienced rider rode all trials. Each horse was ridden in both saddle and bareback pad (Figure 1) conditions, in a randomized order, in walk and sitting trot. The data was collected only on straight lines. Each horse has used their own saddle, fitted within the last 3 months, and all horses used the same bareback pad with the same girth (QHP Bareback Saddle Pad with a HyCOMFORT Waffle Dressage Girth). A Tekscan CONFORMAT pressure mat (1024 sensors, 100Hz sampling rate) was placed under each tack condition. Data were collected for 1000 frames per trial and averaged using Tekscan software. Regions of interest were defined as cranial and caudal thoracic areas. Peak pressure (kPa), mean pressure (kPa), and contact area (cm^2) were analysed. Statistical analysis employed three-way repeated measures ANOVA (tack × gait × thoracic region). All data was normally distributed as assessed by a Shapiro-Wilk test ($p>0.05$). Data is presented

as mean ± standard deviation.

Figure 1: Bareback pad used in the study.

Results and Discussion: Statistical analysis revealed that tack type did not significantly affect peak pressure or contact area, although mean pressure was significantly higher in the saddled condition. Gait had a significant effect on all three variables, with walking producing significantly higher peak and mean pressures, and trot having a larger contact area. Peak pressure and contact area were highest in the cranial thoracic region, particularly when using a bareback pad. Tack type did not significantly affect peak pressure ($p=0.290$) or contact area, but saddles produced significantly higher mean pressures ($p=0.010$). Gait had a stronger influence, with walk producing significantly greater peak and mean pressures than trot ($p=0.023$, $p=0.005$). Contact area was greater in trot, reflecting stride dynamics. Cranial thoracic regions consistently showed higher pressures than caudal regions. Bareback pads produced the highest cranial peak pressures (41.09±8.83 kPa), compared to saddles (23.47±2.81 kPa). Interaction analysis confirmed tack × thoracic region effects were significant, highlighting cranial loading under bareback conditions.

Similarly, mean pressure had a significant main effect of the tack (saddle vs bareback pad) ($F(1, 6) = 14.036$, $p=0.010$) with the saddle showing a statistically significant higher mean pressure (7.32±0.51 KPa) than the bareback pad (4.83±0.34 Kpa). Likewise, there was a main effect of gait ($F(1, 6) = 18.505$, $p=0.005$) with walk (6.96±0.43Kpa) showing higher mean pressures than trot (5.18±0.23). However, there was no significant main effect of the thoracic area (cranial vs caudal) ($F(1, 6) = 3.507$, $p=0.110$). The interaction effects of tack*thoracic area ($F(1, 6) = 6.054$, $p=0.049$) were statistically significant and the saddle on the caudal area had the highest mean pressure, whilst the lowest one was bareback on the cranial. Likewise, the gait*thoracic area has shown statistically significant interaction effects ($F(1, 6) = 13.782$, $p=0.01$) with walk on caudal area having the highest mean pressures whilst trot on cranial had the lowest. And finally, the interaction effects of tack*gait*thoracic area were not significant ($F(1, 6) = 0.012$, $p=0.916$).

Lastly, for contact area the main effect of the tack (saddle vs bareback pad) was not significant ($F(1, 6) = 2.992$, $p=0.134$). However, the main effect of gait was statistically significant ($F(1, 6) = 63.600$, $p<0.001$), with the contact area being highest in trot (610.25±10.52cm^2) compared to walk (562.27±11.19cm^2). Likewise, there was a main effect of the thoracic area (cranial vs caudal) ($F(1, 6) = 18.813$, $p=0.005$), with the contact area in the cranial region (677.45±20.22cm^2) being higher than the caudal region (495.06±26.327cm^2). Figure 10 shows the comparison of contact area between the cranial and caudal regions in each condition. The interaction effects of tack*gait were

not significant ($F(1, 6) = 0.905$, $p=0.378$). Similarly, the interaction effects of tack*thoracic area ($F(1, 6) = 1.216$, $p=0.312$) were not significant. Gait*thoracic area have shown statistically significant interaction effects ($F (1, 6) = 25.468$, $p=0.002$), with trot in the cranial area having the highest contact area (718.53±21.83cm^2) and walk in the caudal having the lowest contact area (488.17±28.24cm^2). Finally, the interaction effects of tack*gait*thoracic area were not significant ($F (1, 6) = 0.821$, $p=0.400$).

The study found that tack type (saddle vs bareback) did not significantly affect peak pressure across all conditions ($p = 0.290$), suggesting that the peak pressure applied to the horse's thoracic region during ridden work may not solely be influenced by these two tack types, which challenges common assumptions that saddles distribute peak force more effectively than riding bareback due to the addition of a saddle tree (MacKechnie-Guire *et al.*, 2019). However, this finding is supported by previous research, which has found that the variability within spinal anatomy and gait has a more influential role on pressure distribution than tack itself (Kotschwar *et al.,* 2010). Our study confirms that gait exerts a greater influence on pressure distribution than tack, though tack effects were evident in cranial thoracic loading. The elevated cranial pressures under bareback pads support welfare concerns, aligning with previous studies of treeless saddles. Saddles, despite slightly higher mean pressures, distributed forces across larger contact areas, reducing focal loading. The finding that walk produces higher pressures than trot is consistent with biomechanical principles, as stride duration in walk increases stance-phase loading. These outcomes emphasise that while bareback riding is useful for rider development, prolonged use poses risks to equine welfare. Dynamic saddle fitting remains essential, as even saddles can produce problematic pressures if ill-fitted. The results contribute to evidence-based recommendations for limiting bareback riding duration and prioritising fitted saddles.

Conclusion and Implications: Although tack did not affect all pressure metrics, bareback pads elevated cranial thoracic pressures, a region vulnerable to back pain. Saddles more effectively distributed load, despite higher mean pressure overall. These findings highlight that gait is the dominant factor in pressure outcomes, but tack choice has critical welfare implications. Rider education and dynamic saddle fitting are vital to safeguard horse welfare, while bareback riding should be used cautiously.

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Equestrian Coaches' Use of Positive Pedagogy and Game-Based Approaches to Develop Decision-Making in Riders

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Keywords: Decision-making, positive pedagogy, game-based learning, rider autonomy, psychological safety, resilience, horse welfare, equestrian coaching

Introduction: Decision-making is a core component of successful performance in all sports, but in equestrian disciplines it carries added complexity due to the presence of a sentient partner—the horse. Riders must make rapid, ethical, and emotionally intelligent decisions in dynamic contexts, often under pressure. Traditionally, equestrian coaching has been dominated by coach-led approaches focused on technical skill acquisition and error correction. However, contemporary pedagogical thinking in sport promotes athlete-centred models that foster autonomy, adaptability, and resilience. This study explored how equestrian coaches are using positive pedagogy and game-based approaches to enhance rider decision-making, confidence, and welfare awareness. Positive pedagogy focuses on learning through encouragement, reflection, and psychological safety, while game-based learning (GBL) uses realistic, scenario-driven activities to replicate the demands of competition. Both models promote problem-solving and adaptive thinking—skills, which are vital for riders navigating the unpredictability of horse behaviour. The study also aimed to highlight how these coaching approaches, even when applied intuitively, can strengthen the horse–rider partnership and support safer, more autonomous participation in equestrian sport.

Material and Methods: This was a qualitative, interpretive study designed to explore coaches lived experiences and reflective practices. Ten experienced equestrian coaches (one male, nine female) across various disciplines—including eventing, show jumping, dressage, and endurance—were recruited through the Connected Coaches Facebook group. The participants held qualifications ranging from UKCC Level 2 to BHS Performance Coach and had between 5 and 45 years of experience. Data were collected through semi-structured online interviews, each lasting 15–30 minutes. The interview guide focused on coaches' philosophies, applications of positive pedagogy and game-based learning, and their methods for developing rider decision-making while ensuring equine welfare. Interviews were recorded, transcribed verbatim, and anonymized. The data was then analyzed thematically using Braun and Clarke's (2021) six-phase framework. This iterative process involved familiarization, coding, theme development, and refining interpretations. No statistical tests were used, as the focus was qualitative exploration rather than quantitative measurement. To enhance trustworthiness, reflexivity, peer review, and transparent coding were employed throughout. Ethical approval was granted by the University of Gloucestershire Research Ethics Committee, and informed consent was obtained from all participants prior to data collection.

Results and Discussion: Three main themes emerged from the analysis, each highlighting how coaches integrate positive pedagogy and game-based learning—sometimes instinctively—into their daily practice.

1.Creating conditions for decision-making through psychological safety and autonomy: Coaches consistently emphasised the need to create safe learning environments in which riders feel free to experiment, make mistakes,

and reflect constructively. Many described replacing directive correction with guided discovery, open questioning, and strengths-based reflection. Such approaches mirror the principles of positive pedagogy (Light & Harvey, 2015) and the growth mindset model (Dweck, 2006). Coaches also recognised that their tone, feedback, and even the physical environment contributed to riders' sense of safety and focus.

2.Game-based design to develop adaptability and real-time decision-making: All participants reported using some form of game-based or scenario-driven training. Common examples included timed jumping courses, variable routes, or constraint-based tasks requiring riders to choose pace, line, and approach. These practices reflect game sense and constraints-led approaches that promote perception–action coupling, adaptability, and tactical thinking (Davids et al., 2008; Pill, 2018). Importantly, coaches linked these methods not only to improved performance but also to enhanced horse welfare.

3.Reframing mistakes and managing risk to build resilience: The third theme centred on mistake tolerance and risk management. Coaches described normalising errors and reframing them as opportunities for growth, echoing resilience-based frameworks in sport (Galli & Vealey, 2008). They also described layering decision-making challenges to match readiness, promoting confidence while maintaining safety.

Conclusion and Implications: This study found that equestrian coaches are already, often intuitively, applying the principles of positive pedagogy and game-based learning. Their practices emphasise trust, reflective dialogue, controlled challenge, and welfare-conscious decision-making.

Key implications for practice include:

1. Prioritising psychological safety through environments that encourage exploration and mistake-making.
2. Incorporating game-based tasks that simulate competition to promote adaptive decision-making.
3. Embedding strengths-based reflection to reinforce confidence and learning.
4. Balancing autonomy and welfare through ethical challenge progression.
5. Integrating these principles formally into equestrian coach education programmes.

By embracing these approaches, coaches can enhance rider independence, safety, and confidence while deepening the ethical and empathetic bond between horse and rider.

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Ethics Approval: This research was approved by the University of Gloucestershire Research Ethics Committee All participants provided informed consent.

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An investigation into how British Showjumping coaches assess and promote "A Good Life for a Horse" in training sessions

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Introduction: The welfare of horses in sport is under increasing public and academic scrutiny, prompting renewed interest in what constitutes a 'good life' for equine athletes. While veterinary and behavioural sciences have contributed significantly to welfare assessment frameworks such as Mellor's Five Domains model (Mellor et al., 2020) and the FEI Ethics and Well-being Framework (FEI, 2022), little is known about how welfare is understood and applied by those working closely with horses in everyday practice at grassroots level. This study explores how British Showjumping coaches at grassroots level define and promote a good life for horses, focusing on their lived experiences, values, and decision-making processes.

Materials and Methods: Adopting an interpretivist qualitative methodology underpinned by a constructivist ontology and subjectivist epistemology (Braun & Clarke, 2019; Creswell, 2013), the research involved semi-structured online interviews with five British Showjumping coaches of varying qualifications (UKCC Levels 2–4) and professional backgrounds, all working primarily at grassroots level. Data were transcribed verbatim and analysed using reflexive thematic analysis (Braun & Clarke, 2006; 2019) to identify patterns of meaning across participants' narratives. The process involved iterative familiarisation, coding, theme development, and refinement through a reflexive lens, recognising the researcher's active role in interpretation. Trustworthiness was supported through member checking, maintenance of an audit trail, and triangulation of participant perspectives (Lincoln & Guba, 1985). Ethical approval was obtained from the University of Gloucestershire Research Ethics Committee (SP7003, July 2025).

Results and Discussion: Findings revealed that coaches hold deeply rooted welfare-led values, often prioritising empathy, trust, and emotional awareness in the horse–rider relationship. Participants consistently considered the horse's experiences beyond the training session and sought to embed ethical decision-making in daily routines, reflecting principles of positive welfare and agency (Mellor et al., 2020; Waran et al., 2007). Despite not being familiar with formal welfare frameworks, coaches' practices closely aligned with key principles from these models, suggesting an emerging culture of values-led, context-sensitive welfare approaches. Coaches frequently referenced the importance of observing subtle behavioural indicators of well-being, echoing studies of equine emotional expression and pain assessment (Dyson, 2017). Challenges identified included client resistance, emotional labour, and limitations in formal welfare education, consistent with barriers recognised in broader equestrian welfare research (FEI, 2022). Participants also highlighted the importance of experiential learning for professional development, underscoring the significance of reflective practice and continuing education (Braun & Clarke, 2019).

Conclusion and Implications: This study contributes to contemporary welfare debates by exploring how grassroots British Showjumping coaches define and promote a good life for horses. Findings demonstrate that coaches uphold strong welfare-centred values aligned with contemporary frameworks (Mellor et al., 2020; FEI, 2022), even without formal engagement. Their relational and empathetic approaches indicate a cultural shift toward values-led welfare within equestrian coaching. These findings highlight the need for coach education programmes to integrate welfare science more explicitly while recognising the experiential knowledge coaches bring.

Governing bodies should provide clearer welfare guidance and ongoing professional support to assist coaches in navigating ethical dilemmas. However, this study has limitations, including a small, self-selecting sample and the potential for confirmation bias, as participants were unlikely to express views opposing welfare promotion. The researcher's professional background in equine welfare may also have influenced interpretation despite reflexive awareness. Future research should engage a broader range of disciplines and coaching levels and could triangulate interview data with observational or quantitative evidence. Embedding relational and context-sensitive welfare practices will be essential for sustaining equestrian sport's social licence and ensuring genuinely good lives for horses.

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Ethics approval: Approved by the University of Gloucestershire Research Ethics Committee (SP7003, July 2025).

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NUTRITION & FEEDING:

FEEDING HORSES IN THE FUTURE

Abstract Presentations:

Robert Furmage | Occurrence and Risk Assessment of Mycotoxins in UK Horse Feed

Simon Daniels | Feeding and management practices and Equine Gastric Ulceration Syndrome (EGUS) prevalence in UK TB racehorses

Jennifer Little | The Effect of Forage Bag Design on Rate of Hay Consumption in Horses

Occurrence and Risk Assessment of Mycotoxins in UK Horse Feed

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Keywords: mycotoxins, horse feed, risk assessment, contamination, LC-MS/MS

Introduction: One of the major challenges in food sustainability is the spoilage and contamination of crops by fungal secondary metabolites known as mycotoxins (Bennett and Klich, 2003). Mycotoxins are well recognised as a threat to the health and performance of humans and animals. Horses are among the most sensitive animals to mycotoxins with exposure associated with digestive upset, weight loss, reduced performance, and in severe cases neurological disease (Riet-Correa et al., 2013; Bischoff and Moiseff, 2018). Despite this, there are few published data describing mycotoxin contamination in equine feeds, particularly within the UK. The objective of this survey was to assess the occurrence of mycotoxins in feeds commonly used for horses in the UK and to evaluate their risk using equine-specific thresholds (Volac International Ltd, 2024).

Material and Methods: 268 feed samples were collected from commercial suppliers and customer submissions between February and September 2024. The dataset included compound feeds (n = 85, incl. pelleted and coarse mixes), forages (n = 67, incl. hay, haylage, and dried grass products), and raw materials (n = 102, incl. oats, barley, maize, and wheatfeed). Samples were sealed in polyethylene bags, stored at 4°C upon receipt, and analysed within five days.

All analyses were performed using Volac International Ltd's ISO 17025-accredited LC-MS/MS multi-mycotoxin method (Volac method refs. 1644916 and 1733290), validated for mycotoxins in feed materials. The method covers 18 mycotoxins across the major groups: type A and B trichothecenes, zearalenone, fumonisins, aflatoxins, ochratoxin A, and selected *Penicillium* toxins.

Results were normalised to equine-specific risk thresholds defined by the Mycocheck system (Volac International Ltd, 2024), which classifies contamination levels as low (< 0.25), medium (0.25–0.75), high (0.75–1.0), or very high (> 1.0) relative to species-specific toxicity threshold values. These thresholds represent relative risk of adverse health or performance effects in horses. Data were summarised using descriptive statistics (counts and percentages) in Microsoft Excel to show the frequency of contamination, toxin co-occurrence, and distribution of samples across risk categories.

Results and Discussion: Fourteen different mycotoxins were detected across all samples. 78 % of samples contained at least one mycotoxin. 28 % were categorised as medium risk or higher, and 10 % were classed as very high risk when fed without dilution. The toxin profile reflected a typical UK pattern dominated by Fusarium and Penicillium species (Liesener et al., 2009). T-2 and HT-2 toxins were the main contributors to total risk due to their prevalence and high toxicological weighting. Aflatoxin B1, patulin, penicillic acid, cyclopiazonic acid, and citrinin were also detected but each in fewer than 5 % of samples.

Compound feeds showed the highest overall contamination, with 96% testing positive and 74% containing three or more mycotoxins. Oat-based materials were particularly affected: 100 % of oat samples contained at least one

mycotoxin and 89 % were positive for three or more. Across all samples, the distribution among Mycocheck risk categories was 44 % low, 28 % medium, 18 % high, and 10 % very high. The upper risk groups were dominated by compound feeds and cereal-based raw materials. Co-contamination was widespread, occurring in more than half of positive samples, increasing the likelihood of additive or synergistic effects.

Although most concentrations were below individual toxin guidance levels, the cumulative exposure identified indicates a realistic potential for subclinical digestive and performance effects in horses, especially when contaminated feeds are used continuously without mitigation. These findings align with recent European surveys showing similar multi-toxin profiles and cumulative exposure risks (Kwaß et al., 2025).

Conclusion: This survey demonstrates that mycotoxin contamination is common in equine feeds and that a significant proportion of samples present a medium to high relative risk. Continued surveillance, improved industry awareness, and targeted mitigation strategies are needed to minimise exposure and protect horse health and performance.

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Feeding and management practices and Equine Gastric Ulceration Syndrome (EGUS) prevalence in UK TB racehorses

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Keywords: EGUS, feeding, forage, starch, racehorses, horse management

Introduction: Approximately 90% of Thoroughbred racehorses suffer with Equine Gastric Ulceration Syndrome (EGUS) compared to 11% of leisure horses. Traditionally racehorses have been fed diets low in fibre and supplemented with higher levels of cereal based complementary feeds. Traditional racehorse management has also involved limited pasture turnout to support intense exercise regimens. Collectively the combination of diet and management are believed to play a significant role in the increased prevalence of EGUS in racehorses. The aim of this study was to explore how trainers managed racehorses in light of risk factors for EGUS.

Material and methods: The study was approved by the RAU research ethics committee (20204819). Fifteen British racehorse trainers/assistant trainers were interviewed adopting a semi structured interview technique during spring 2021. Trainers profiles were collated from the British Horseracing Authority (BHA) website. The cohort represented both high-profile well-known trainers and trainers that were less well established. Training yards represented six flat trainers and nine national hunt trainers. Interviews were by telephone/video call and made use of AI transcription.

Trainers were asked about, feeding, exercise, horse management and any specific EGUS management. Transcripts were analysed by thematic analysis as described by Braun and Clarke (2006).

Results and Discussion: Three main themes were identified; feeding management, EGUS treatment and diagnostics (gastroscopy). Feeding management - of this study cohort 80% of trainers were feeding *adlib* forage and 67% were allowing horses pasture access on average three times per week. Pre-training 93% of trainers allowed access to forage and 40% allowed feed access prior to racing. Diagnostics - In this cohort 67% of trainers regularly had horses gastroscoped for EGUS diagnosis. Treatment – where EGUS was diagnosed typically horses were treated with courses of omeprozol. A variety of good practice was identified through the interviews including; reducing starch content of diets outside of racing, allowing forage prior to work, pasture turnout time, ~1g starch/Kg/BW/meal, encouraging foraging behaviour and regular endoscopy to check EGUS status.

Conclusion and Implications: The findings from this study suggest that within the racing industry there is a variety of good practice undertaken to manage horses to reduce EGUS prevalence. Unlike the public perception of feeding practices in racehorses, many trainers are ensuring horses have access to forage *ad libitum* alongside reducing starch content of meals outside of racing and feeding meals within the recommended safe starch limits. More trainers are allowing horses pasture turnout time and include diagnostics for EGUS on a regular basis to ensure optimum health and welfare of these equine athletes.

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The Effect of Forage Bag Design on Rate of Hay Consumption in Horses

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Keywords: Horse, hay, rate of consumption, forage, hay net

Introduction: Equines have evolved to consume small amounts of forage-based feeds throughout the day. Periods over 4 hours without forage can result in detrimental physiological and behavioural consequences, including gastric ulcers, increased colic risk, frustration and the development of stable vices (Glunk et al 2014; Ermers et al 2023). Modern management, which often involves long periods of stabling, can significantly reduce a horse's ability to perform normal foraging behaviours (Glunk et al 2014). When providing forage, consideration should go beyond the amount and type, but also how it is fed, to ensure sufficient time is spent chewing, which is of great importance to the health and wellbeing of horses (Ermers et al 2023). This is of particular importance with overweight horses, or those with insulin dysregulation, where feeding controlled or limited amounts of forage is required. The objective of this research was to investigate the impact of three forage bag designs on the rate of hay consumption.

Materials and Methods: Twelve horses, with an average body weight of 533kg (SD ± 61kg) were used in a multi-centre, replicated Latin Square design. Horses were fed in individual stalls either on the floor (control) or from one of three forage bags, 35mm mesh, 30mm mesh and 25mm mesh, manufactured by Trickle Net®. Horses were acclimated to treatments for 4 days, followed by 1 day of data collection, then 2 days where hay was supplied as normal prior to the study, before moving onto the next treatment. The protocol was followed for 4 weeks, with each horse eating from each treatment once. Prior to data collection 4kg (as fed) of hay was weighed and provided either on the floor or in one of the three designated forage bags. After 1 hour all remaining hay, loose or still within the forage bag was removed and weighed. The weight of hay consumed was then calculated. Post data collection all horses were returned to normal management and forage provisions. All data relating to horses displaying vices (box walking) or wasted hay (soaked with urine or drinking water) was excluded prior to analysis. Data was then analysed between the control and each treatment, using the Wilcoxon test for matched pairs (SPSS_Statistics_29_Win64). Results were considered significant at $P<0.05$.

Results: The median weight of hay consumed within the 1 hour was 1.52kg, 1.17kg, 0.78kg and 0.99kg for the control, 35mm, 30mm and 25mm, respectively (Figure 1). There was no significant difference in the weight of hay consumed from the 35mm forage bag compared with the control ($P>0.05$). However, there was significantly less hay consumed from the 30mm ($P<0.05$) and 25mm ($P<0.01$) forage bags (Table 1).

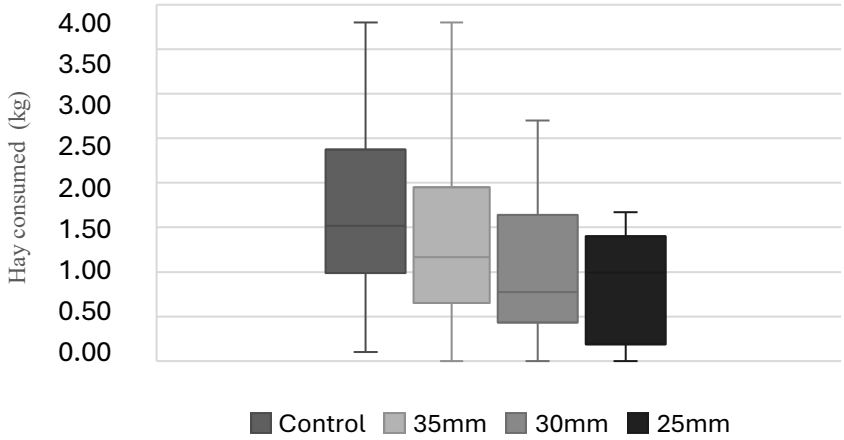

Figure 1. Hay consumed (kg) within 1 hour when fed from the floor and 35mm, 30mm and 25mm mesh forage bags.

Table 1. Hay consumed by horses (median ±SD) within 1 hour and the level of significance against control

Treatment	Hay consumed within 1 hour (kg) (Median ±SD)	P value
Control	1.52 ± 1.00[a]	
35mm	1.17 ± 1.00[a]	0.192
30mm	0.78 ± 0.78[b]	0.035
25mm	0.99 ± 0.60[c]	0.007

Values with the same superscript are not significantly different ([a]), values with superscript ([b]) $P<0.05$, values with superscript ([C]) $P<0.01$

Discussion: The horses consumed an average (mean) 43%, 34%, 25% and 22% of the 4kgs of hay within an hour when fed from the floor, 35mm, 30mm and 25mm forage bags, respectively. The results demonstrate that the amount of hay consumed from the 35mm forage bag was not significantly reduced, but when fed from the 30mm or 25mm forage bags it was significantly reduced. For many stabled horses or those requiring restricted forage intake, there is an increased risk of extended periods without access to forage, increasing the risk of behaviours associated with stress, reduced welfare and gastric ulcers (Mata et al 2024). This study showed that the 30mm and 25mm forage bags provide an effective tool for slowing the rate of consumption, ensuring an allocation of hay can last longer.

Conclusion: The 30mm and 25mm forage bags significantly reduced the amount of hay consumed by horses within an hour, providing a practical solution to extend the duration of available forage, to ensure sufficient chewing time, and to prevent or reduce periods of time where horses might be left without the ability to forage or trickle feed.

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HEALTH & DISEASE

Abstract Presentations:

Justyna Kalbarczyk | Animal Fascial Manipulation for ulcer problems in horses

Kirsty Gartland | Equine Neonatal Sepsis: The Ability of Equestrians to Identify Healthy Foal Parameters and their Confidence in Recognising Typical Clinical Signs

Maria Júdice da Costa | Antimicrobial Activity of Cannabinoids and Terpenes Towards Common Equine Wound Pathogens and their Biofilms

Cerys McMurray | "I don't know whether I'm doing the right thing or the wrong thing": a qualitative exploration of beliefs and practices in relation to equine parasite management in Northern Ireland

Animal Fascial Manipulation for ulcer problems in horses

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Keywords: fascial manipulation, equine gastric ulcers, movement therapy, behavioral improvement, complementary treatment

Introduction: Gastric ulcers affect a significant proportion of horses, particularly those in intensive training or competition. While conventional pharmacological treatments address the gastric pathology, residual movement restrictions and behavioral changes often persist. This study evaluated Animal Fascial Manipulation as a complementary therapy for horses recovering from ulcer disease, focusing on movement expression, behavioral changes, and overall recovery outcomes.

Material and methods: Following an initial survey of 97 horse owners, 27 horses were selected for fascial therapy based on confirmed ulcer diagnosis combined with movement restrictions, behavioral changes, and concurrent conditions. Each horse received three fascial therapy sessions over six weeks while continuing normal under-saddle work. Five horses remained on concurrent pharmacological treatment during the study period. Some owners discontinued supplements during the therapy period. Pre- and post-treatment assessments included movement evaluation, behavioral observations, and gastroscopic examination where applicable. Common areas of fascial restriction were identified around the sternum and withers regions.

Results and Discussion: Significant improvements in movement expression were observed after the first therapy session, particularly in hypermobile horses that had lost movement quality following ulcer recovery. Approximately 90% of horses demonstrated behavioral improvements, including enhanced social interactions within the herd and improved responses during grooming procedures. One case of Head Shaking Syndrome completely resolved following treatment. Gastroscopic evidence showed improved tissue healing in documented cases. The therapy appeared to address fascial restrictions that develop secondary to the primary gastric condition, suggesting a connection between visceral pathology and myofascial tension patterns. Pain reduction was particularly notable in the deep and superficial abdominal lines, contributing to faster recovery times.

Conclusion and implications: Animal Fascial Manipulation demonstrates effectiveness as a supportive treatment for horses with gastric ulcers, particularly addressing movement restrictions and behavioral changes that persist after conventional treatment. The therapy appears to restore movement expression in hypermobile horses and contributes to faster overall recovery. These findings suggest that incorporating fascial therapy into treatment protocols for equine gastric disorders may enhance patient outcomes and improve quality of life during recovery.

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Equine Neonatal Sepsis: The Ability of Equestrians to Identify Healthy Foal Parameters and their Confidence in Recognising Typical Clinical Signs.

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Introduction: Equine Neonatal Sepsis (ENS) is a dysregulated systemic response to infection and the most common cause of death in young foals with an average reported mortality rate of up to 60% (Eaton, 2023). Though mortality reports are frequent, morbidity rates are more challenging to estimate due to subtle and non-specific clinical signs (CS) (Table 1) (Wattal et al., 2020). While subtle clinical signs are widely reported, this study provides data on how this informs delayed diagnosis and treatment, and contributes to high mortality. Further, early recognition of neonatal sepsis as a critical factor in improving foal survival is emphasised.

Table 1: Healthy and septic foal parameters.

Parameter	**Healthy foal**	**ENS-affected foal (potentially)**
Demeanour	Alert and active	Depressed and inactive
Sleep	10-12 hours per day	>12 hours per day
Nursing frequency	6-8 times per hour	<6 times per hour
Mucous membranes	Salmon-pink, moist, CRT 1-2 seconds	Pale, dry, CRT >2 seconds
Resting heart rate	80-120bpm	>120bpm
Resting respiration rate	20-40bpm	>40bpm
Extremity temperature	Warm	Cool
Rectal temperature	37.5-38.9°C	<37.5°C

Materials and Methods: A questionnaire produced via Microsoft Forms was distributed to gather data on the ability of equestrians to identify healthy parameters in neonatal foals, and their confidence in recognising possible clinical signs of ENS. Data collection took place over 8 weeks from January – March 2025. Respondents were predominantly recruited via equestrian Facebook groups, leading to a total of 481 responses. From this, 11 were excluded, resulting in 470 included responses. Analysis was carried out in SPSS, and consisted of Chi-square, Kruskal-Wallis, and Mann-Whitney U testing. Bonferroni corrections were made to avoid Type I errors.

Results and Discussion: Those with veterinary experience performed poorly for identifying all three aspects of healthy mucous membranes (0% compared to 0-3% for other groups) and healthy resting HR (14% compared to 16-27% for other groups). For most other questions, vets answered correctly a similar proportion to other groups. A potential explanation could be provided by Nichols et al. (2022) who found that 75% of equine vets who reported areas of weakness in their knowledge did not pursue continued education to fill this gap. These findings could elucidate as to why ENS is often not diagnosed in the earlier stages, however, it is important to note that the veterinary group in this study included only seven individuals, which limits results generalisability.

Generally, older age groups and those with more years of experience felt more confident in recognising CS of ENS than younger age groups and those with fewer years of experience ($p<0.001$-0.002), but most often this was not reflected in answer accuracy ($p=0.079$-0.981). Although results showed that respondents with a Doctorate were significantly more confident in recognising tachycardia than those with a Bachelor's degree ($p=0.002$), no significant differences were found in their actual performance on questions related to healthy neonatal parameters ($p=0.083$-0.817), nor in confidence for other CS after Bonferroni correction (adjusted $p=0.00238$). These findings contrast with Nguyen *et al*. (2018), who reported a positive correlation between academic qualifications and clinical confidence, but a possible explanation could be that general academic qualifications may not directly translate to equine-specific clinical knowledge.

Those with veterinary qualifications, despite reporting significantly higher confidence across multiple CS ($p<0.001$–0.005), did not consistently outperform other groups. For example, 86% of vets were confident or extremely confident in their ability to recognise tachycardia, but their accuracy for the healthy resting HR was only 14%, making them the least correct group. Similarly, vets were confident or extremely confident in their ability to recognise a lack of nursing 86% of the time but could only state the healthy nursing frequency 29% of the time and were doubly as likely to underestimate. In comparison, those with equine academic and industry qualifications were confident or extremely confident in their ability to recognise excessive sleeping just 9% of the time but could correctly identify hours of sleep 59% of the time. The discrepancy between confidence and performance may reflect the Dunning-Kruger effect—a cognitive bias where individuals with limited knowledge overestimate their competence, while more knowledgeable individuals may underestimate theirs (Dunning, 2011). While previous research (Marlin *et al.,* 2018) has suggested that equestrians tend to overestimate their knowledge, these findings suggest this may only occur in highly qualified professionals. Overconfidence bias may also play a role—where familiarity with a condition increases perceived competence, even if actual knowledge remains limited (Van Der Wege *et al*., 2021).

Conclusion and Implications: Due to the subtle and non-specific nature of ENS CS, it is crucial that handlers of neonatal foals are familiar with healthy parameters so that any abnormality can be quickly identified and treated as necessary. The study's results showed that equine vets often performed poorer than less qualified respondents, and vets felt more confident in their abilities to answer correctly than they were actually able to. The incompatibility between the importance of early diagnosis and low ability of equestrians to identify healthy foal parameters is suggested to be a primary cause for high ENS mortality rates. Further research should prioritise making early diagnoses of ENS, in turn reducing the number of deaths from ENS.

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Antimicrobial Activity of Cannabinoids and Terpenes Towards Common Equine Wound Pathogens and their Biofilms

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Keywords: antimicrobial, cannabinoids, terpenes, equine, wounds, biofilms

Wounds are a major welfare problem and the second most common cause of death/euthanasia in horses (Owen et al., 2012; Theoret et al., 2015; USDA, 2016). Equine wounds often heal poorly and are prone to infections, with 62% of infected wounds forming biofilm (Westgate *et al.*, 2011). Infected wounds are typically treated with antimicrobials; however, rising antimicrobial resistance is a global concern (Weese and Lefebvre, 2007). Cannabinoids, in particular cannabidiol (CBD) and cannabigerol (CBG), have shown potential as antimicrobials, particularly against Gram-positive bacteria. This study aimed to test the antimicrobial activity of crude hemp extract (CE), CBD, CBG and seven terpenes (β-myrcene, β-caryophyllene, terpinolene, α-pinene, β-pinene, β-ocimene and α-humulene) against common equine wound pathogens and their biofilms.

The pathogens used were selected based on the literature regarding the equine wound microbiome and/or clinical relevance: *Bacillus subtilis, Dermatophilus congolensis, Enterococcus faecalis, Escherichia coli, Pseudomonas aeruginosa, Serratia marcescens, Staphylococcus aureus, Staphylococcus epidermidis* and *Streptococcus equi subsp. equi* (Afonso et al., 2023; Carnwath et al., 2014; Freeman et al., 2009; Love & Mair, 2012; Marsella, 2014; Westgate et al., 2011). The antimicrobial activity of the cannabinoids and terpenes was determined according to the Clinical and Laboratory Standards Institute (CLSI) (CLSI, 2018), using a minimum inhibitory concentration (MIC) assay. Briefly, bacteria were cultured in Luria Broth (LB) at 37 °C overnight and diluted to an optical density (OD) 620nm of 0.1. The cannabinoids and terpenes were diluted in LB to a starting concentration of 255 µM and serially diluted until the MIC was determined. The diluted cannabinoids/terpenes and the diluted bacteria were added to a 96-well plate and incubated for 24 hours at 37 ◦C. The OD_{620nm} was measured at 0 and 24 hours to assess bacterial growth. A minimum bactericidal concentration (MBC) assay was used to determine if the compounds that showed an inhibitory effect were bactericidal or bacteriostatic (CLSI, 2018). A minimum biofilm prevention concentration (MBPC) and a minimum biofilm eradication concentration (MBEC) assay were conducted to determine whether cannabinoids and terpenes prevented biofilm formation and/or disrupted formed biofilm, respectively (CLSI, 2018; Blaskovich *et al.*, 2021). Each of the tested concentrations of each cannabinoid/terpenes was added to the plate in triplicate, and each plate was repeated three times. The MIC was defined as the lowest concentration of each compound that reduced growth by more than 50 % while the MBPC and the MBEC were defined as the lowest concentration that prevented biofilm formation and/or eradicated pre-formed biofilm by more than 70 %. The MBC was determined as the lowest concentration at which a compound prevented colony formation.

All MIC_{50} results can be found in Table 1. CBD inhibited the growth of all the tested Gram-positive bacteria with MIC_{50} values ranging between 6-64 µM. CBG inhibited the bacterial growth of *S. aureus*, *S. epidermidis* and *S. equi* with MIC_{50} values ranging between 16-128 µM. Overall, the MIC_{50} values obtained for CBD and CBG were lower than those obtained for the antibiotic controls.

Table 1 – Cannabinoids and terpenes Minimum Inhibitory Concentration (μM). Cannabinoids tested: Crude hemp extract (CE), Cannabidiol (CBD), Cannabigerol (CBG). Terpenes tested: β-myrcene (T1), β-caryophyllene (T2), terpinolene (T3), α-pinene (T4), β-pinene (T5), β-ocimene (T6) and α-humulene (T7). Positive controls: Kanamycin (Kan.), Spectinomycin (Spec.), Tetracycline (Tetra.) and Ampicillin (Amp.). (x) - compounds that did not inhibit bacterial growth at the tested concentrations. (-) – Antibiotic not used as a control.

	Cannabinoids			**Terpenes**							**Positive controls**			
	CE	**CBD**	**CBG**	**T1**	**T2**	**T23**	**T4**	**T5**	**T6**	**T7**	**Kan**	**Spek**	**Tetra**	**Amp**
B. subtilis	X	6	X	X	255	X	X	X	X	X	21	30	-	-
D. congolensis	X	64	X	X	X	X	X	X	X	X	-	-	-	229
E. coli	X	X	X	X	X	X	X	X	X	X	21	-	-	-
E. faecalis	X	64	X	X	X	X	X	X	X	255	-	-	-	0.43
P. aeruginosa	X	X	X	X	X	X	X	X	X	X	X	-	23	-
S. aureus	X	16	32	X	255	X	255	255	X	X	41	120	-	-
S. epidermidis	X	16	16	X	X	X	X	X	X	X	-	X	X	-
S. equi	225	32	128	X	X	X	X	X	X	X	-	-	-	114
S. marcescens	X	X	X	X	X	X	X	X	X	X	-	-	X	-

The tested terpenes showed little antimicrobial activity towards common equine wound pathogens at the tested concentrations, with the exception of β-caryophyllene, which inhibited *B. subtilis* and *S. aureus* growth at 255 μM. Similarly, α and β pinene inhibited *S. aureus* growth at 255 μM, and α-humulene inhibited *E. faecalis* at 255 μM. None of the tested cannabinoids or terpenes showed antimicrobial activity against Gram-negative bacteria, and CE had no effect on any of the tested bacteria, with the exception of *S. equi* (MIC50 255 μM). CBD prevented *S. epidermidis, S. aureus* and *S. equi* colony formation at 32, 64 and 255 μM, respectively. CBG only prevented *S. epidermidis* colony formation with an MBC of 32 μM. Overall, both CBD and CBG prevented biofilm formation of Gram-positive bacteria at similar concentrations to their MIC_{50} values (data not shown). However, neither B. subtilis nor S. equi formed biofilm in vitro. Finally, CBD disrupted S. aureus and S. epidermidis pre-formed biofilm at 128 and 65 μM, respectively, and CBG disrupted S. epidermidis biofilm at 64 μM. Neither CBD nor CBG disrupted E. faecalis pre-formed biofilm at the tested concentrations.

In the present study, CBD and CBG demonstrated antimicrobial activity against Gram-positive bacteria found in horse-infected wounds and their biofilms. To the author's knowledge, this is the first study to show the antimicrobial activity of CBD and CBG against *B.subtilis*, *S. equi* and *D. congolensis*. Our results suggest that cannabinoids and CBD in particular, are promising antimicrobials against Gram-positive equine wound pathogens. Further research is needed to understand how cannabinoids can be used as a topical treatment in equine wounds.

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"I don't know whether I'm doing the right thing or the wrong thing": a qualitative exploration of beliefs and practices in relation to equine parasite management in Northern Ireland

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Introduction: Endoparasites pose a significant threat on the health and welfare of horses, causing diseases such as colic, failure to thrive, and in some cases, death (Lawon et al, 2023; Proudman et al, 1998). Unfortunately, resistance to deworming drugs is an increasing problem due to their overuse (Rendle et al, 2024). Therefore, it is important that a shift in the mindset of parasite management from traditional, chemotherapeutic methods towards more sustainable approaches across all sectors of the equine industry. Northern Ireland has been largely overlooked in new guidance about parasite management, with the perceived assumption that it is similar to UK mainland and Republic of Ireland (ROI). However, N. Ireland has its own equestrian culture that differs to the mainland and ROI, and this along with extensive movement of horses across the border between N. Ireland and the Republic, means that failure to consider these factors is potentially problematic.

In previous studies, qualitative research has identified behavioural drivers of current practices, and highlighted areas for bringing about change (Walshe et al, 2023). This project is an exploratory study into the perceptions of horse owners and professional stakeholders in NI on their approach to parasite management and their understanding of the risk of anthelmintic resistance.

Materials and Methods: A qualitative methodology was used, with individual or paired semi-structured interviews. Participants were recruited via social media, flyers in local tack shops and livery yards, and snowballing. All but one of the interviews occurred online, with the other taking place in person. All were recorded and then transcribed and anonymised. The data was then analysed using an inductive thematic analyses in order to identify common themes in the data (Braun and Clarke 2006). In total, 10 participants were interviewed including eight professionals (six vets, two parasitologist) and two horse owners.

Results and Discussion: Participants unanimously described a change in advice around parasite management in recent years, but reported that this had not necessarily led to a change in practice. Interest in keeping up-to-date with parasite management was perceived by professional stakeholders to be relatively low, and the majority of owners reportedly still utilised routine worming regardless of changing advice to move toward diagnostic-led approaches. The theme "barriers to change" included issues such as: confusion around parasite management generally, particularly as a result of conflicting social media advice; poor advice in farm/tack shops which sell deworming products; the cost of diagnostics and vet fees; and the fact that using a dewormer is cheaper (in the short term) than a diagnostic led approach. Additionally, resistance was perceived to be an industry issue, rather than one that could affect (or be affected by) individuals.

The “drive to worm” theme identified that giving a dewormer in the absence of diagnostics was perceived to be a quicker, safer course of action which seemed to benefit horse welfare. In terms of Norther-Ireland specific culture, participants described a proliferation of leisure horse owners who keep horses individually or on livery yards with little broad, industry support or guidance. However, as a result of the relatively small equestrian population, stakeholders such as the British Horse Society held potential to influence practice, compared to nations with more disparate authoritative voices.

Conclusions and Implications: This exploratory study provides valuable insights to informfurther research and strategies for producing targeted parasite information that is contextualised for Northern Irish equestrians. In particular, this research finds that interest in the resistance to antiparasitic drugs is lower in Northern Ireland than elsewhere. The concept of “short-termism”, or the drive to focus on the short-term consequences and put off the long-term risks (Fusso, 2012), was described strongly. As other countries have begun to overcome this issue with reported changing practice (Shrubb et al. 2025), we suggest that Northern Ireland requires specific attention. Further involvement of stakeholders from Northern Ireland in both guidance creation and policy making could make a significant difference to current practices, moving towards a more sustainable approach to parasite control practice that is specific and implementable in the Northern Irish equine establishments. to ensure that guidelines and advice promote a unified message in an engaging and pragmatic manner. (By the people for the people)

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