

## **Proceedings of the 18th International Equitation Science Conference**

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*Published in:*

Proceedings of the 18th International Equitation Science Conference

*Publication date:*

2022

*This document version is the:*

Publisher's PDF, also known as Version of record

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*Citation for published version (APA):*

Williams, J. M. (Ed.), Cameron, L. (Ed.), & Hayward, M. (2022). Proceedings of the 18th International Equitation Science Conference. In *Proceedings of the 18th International Equitation Science Conference* Hartpury University Press.



INTERNATIONAL SOCIETY FOR  
EQUITATION SCIENCE 2022  
HARTPURY UNIVERSITY

The International Society for Equitation Science

Presents the

18th International Equitation Science Conference

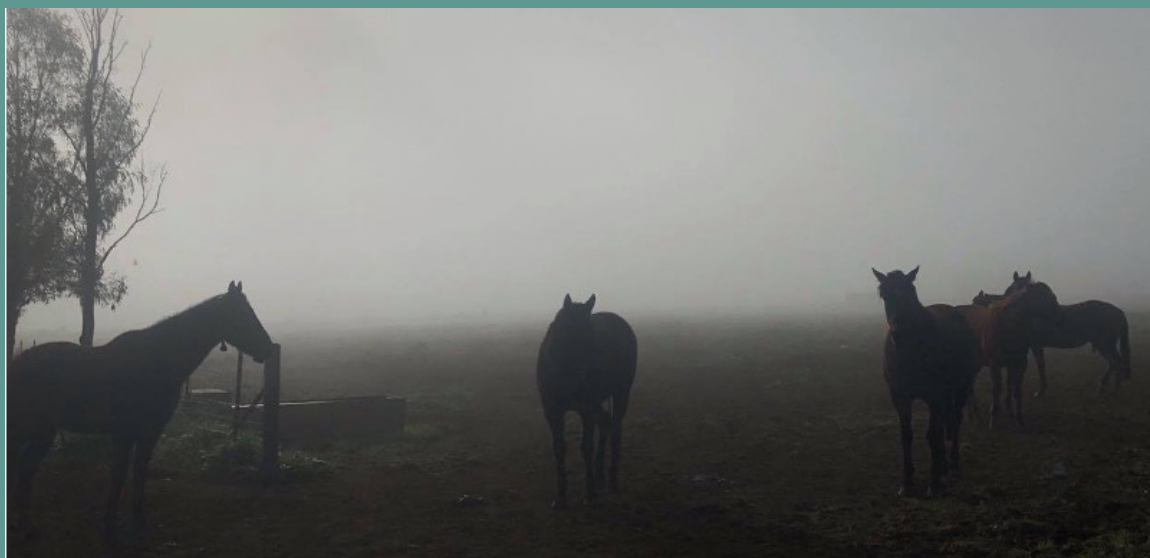
#HARTPURYISES22

**9-12 AUGUST 2022**



International Society  
for Equitation Science

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# NOTES

**Proceedings edited by Lorna Cameron, Jane Williams, Hayley Randle  
and Mark Hayward**

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Design: M. Hayward, Hartpury University

First published, 2022

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# ISES MEMBERSHIP

6 LEVELS - HORSE ENTHUSIAST TO ACADEMIC

**MEMBER EXCLUSIVE CONTENT  
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Membership  
Details



New content on  
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# HELLO AND WELCOME

It is my pleasure as Honorary President of the International Society for Equitation Science and Chair of the Local Conference Organising Committee to finally welcome you all to Hartpury University! The lead into the conference has definitely had its challenges with a global pandemic definitely not one of those we had planned for when we originally bid to host ISES back in Guelph in 2019. But at last we here, and are able to catch up with old friends, meet new ones and engage in face-to-face debate about the latest research in Equitation Science.

ISES promotes and encourages the application of objective research and advanced practice, which will ultimately improve the welfare of horses in their associations with humans. The theme of this year's conference: Succeed with Science: Performance, Practice and Positive Partnerships explores key pillars which underpin horse-human relationships across all equestrian activities. Performance should not be a domain reserved for competition and sport; a performance is an external representation of an individual's ability (be that horse or human) and the combined ability of the horse and human partnership to execute a set task. This could be winning a gold medal at the Olympic Games, completing a fun ride, learning a new dressage movement or being able to lead your horse calmly to the field. Successful performance is built on preparation and practices that support the health and welfare of the athlete to enable them to have the tools to be able to perform to their best, combined with a network of positive partnerships to support success. To evaluate performance, in sports science we break down 'the task' into the multiple components that combine together to produce a successful outcome; across the conference we will hear examples of how evidence-informed practice, behavioural assessment and the use of analytical techniques are being used to enhance the health and welfare of horses in competition environments, as well as exploring how these are managed in leisure horses and broader equine assisted activities.





Practice is a key element that underpins success, without which performance goals could not be achieved. Practice encompasses how we manage the physical and psychological health and wellbeing of horses; we will hear how emerging research is progressing practice and giving horse owners the tools to make informed decisions and demonstrate how they meet their duty of care to the horse, as well as promoting different approaches to equine management that place the horse's quality of life as their key performance goal. Alongside this, we will apply a critical lens to the rider, evaluating how rider performance, fitness and decision-making can influence equine health, performance and welfare.

The majority of people who breed, produce, train and ride horses for pleasure or sport are genuinely invested in the welfare of the horses they care for. However, how we manage and train horses is often founded on traditional practices, based on anecdotal suggestions from peers, or our own previous experiences with horses. The horse-human relationship is complex, with the experience of the owner/rider influencing handling and riding, decision-making and management of equine health and welfare. Developing and maintaining positive partnerships can promote welfare, management, and performance, while the breakdown of these relationships is often associated with deficits within equine management and training systems, as well as potentially compromising the health and safety of horses and humans. Throughout the research presented here, the practical impact of gaining increased insight into common equestrian practices and increasing our understanding of what makes a positive partnership, from both human and equine perspectives will be explored. Understanding more about how human behaviour influences equestrian practice and informs owner/rider decision-making has the potential to develop interventions, and enhance education and dissemination strategies to improve equine welfare through human behavioural change.

In a time when equestrian sports, and equestrian practice more generally, are becoming subject to increasing public scrutiny, it is critical that researchers and industry work together to apply a pragmatic approach to research. Combining industry and academic expertise will ensure validity, reliability and credibility are embedded in studies to further develop the existing evidence-base to conduct projects whose results can be translated successfully to inform performance and practice, and generate a good life for horses, and positive partnerships across all engage with them. As someone more insightful than me once said...

"Start by doing what's necessary, then what's possible, and suddenly you are doing the impossible"  
Francis of Assisi

We hope you enjoy the conference!

Jane

Dr Jane Williams, on behalf of the Local Conference Organising Committee

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On behalf of the Local Conference Organising Committee, I would like to extend a huge and heartfelt thanks to all the unsung, and often invisible volunteers, without whom this conference would not have been possible – your help and support is truly appreciated.

From a personal perspective, I would like to thank my friends and colleagues on the LCOC and Scientific Committee for your time and support, on top of busy 'day jobs' to make this conference a success. An extra special thank you goes to Lorna, Hayley and Mark who have kept me sane throughout this process!

We would also like to extend our thanks to Gemma Pearson and Sally O'Neill for their fabulous support securing sponsorship and advertising the conference. As well as Clare Farmer and Philip Cheetham at Hartpury for helping to put on practical workshops alongside Hartpury Horse Trials – no mean feat!

We are also extremely grateful to Warren Lamperd for bringing his wonderful horses to Hartpury in the middle of coaching camps and a hectic competition schedule.

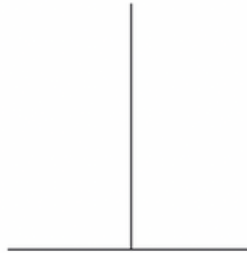
Jane

Dr Jane Williams on behalf of the Local Conference Organising Committee



Thank you

The text "Thank you" is written in a large, elegant, cursive script. The word "Thank" is in a light blue color, and "you" is in a light red color. The text is set against a white background with a soft, glowing effect. At the bottom of the page, there is a decorative graphic consisting of a red wave on the left and a blue wave on the right, meeting in the center.



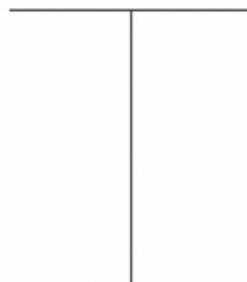
**We are Hartpury University and Hartpury College, specialist land-based and sports institutions on a beautiful 360-hectare campus. Our students and staff absorb themselves in what they love, whether that's horses, agriculture, animals or sport.**

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Our offer is unique - students can join us to study A-levels or a diploma and progress right through to an undergraduate bachelor's degree, master's degree and then a PhD.

They can also train as sports and equestrian athletes alongside their studies, with many achieving world-class sporting success in their careers.

Others progress into successful careers with organisations such as the British Horseracing Authority, Formula 1, Grandstand Media, The Blue Cross, Agrii, Ecotricity and Coca Cola.





**of graduates in employment,  
further study or other  
purposeful activity**  
(Graduate Outcomes 2022)



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(WUSCA 2022)



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Teaching (NSS 2022)**

**We're number  
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postgraduate student  
satisfaction (full-time  
students, PTES 2021)**



**progression to employment, university or  
further study (Hartpury 2021)**

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**highest achieving land-based college  
in England (DfE 2018-19)**



**HARTPURY  
COLLEGE**

\*Reflects graduates from 2018/19



HARTPURY



- Animal and Veterinary Nursing**  
*Students also use equine and agriculture facilities*
- 1 Veterinary Nursing Clinical Skills Centre (VN)
  - 2 Veterinary Nursing Offices
  - 3 Animal Management Centre (AM)
  - 4 Invertebrate and Reptile Room (AIRB)
  - 5 Aquatics Room (AHA)
  - 6 Animal Science Laboratories (AS)
  - 7 Walked Animal Collection (WG)
  - 8 Aviary
  - 9 Small Animal House
  - 10 Orchard Paddock (AORCH)
  - 11 Canine Hydrotherapy Centre/Cotswold Dog Spa (EQ)
  - 12 Equine and Llama Paddock
  - 13 Dog Agility Arena (DAA)

- Agriculture (EM)**
- 1 Home Farm
  - 2 CLAAS Machinery Workshop
  - 3 Malcolim Wharton Centre (MW)
  - 4 Machinery Workshops
  - 5 Welding Workshop
  - 6 Estate Skills Workshop
  - 7 University Agricultural Centre
  - 8 Bulling Heifer Shed
  - 9 Calf Unit
  - 10 Short Course Classrooms
  - 11 Dairy Unit and Cubicle Housing
  - 12 Heifer Bearing Shed
  - 13 Hutch Barn and Shuck Bar
  - 14 Reception (AT)\*
  - 15 Agri-Tech Centre, Beef and Lamb
  - 16 Agri-Tech Centre, Livestock Handling Facility (AT)\*
  - 17 Miniature Rifle Range / Clay Pigeon Shooting

- Equine (EQ)**
- 1 International Arena
  - 2 Cows Arena
  - 3 FEI Cross-Country Course
  - 4 Hartpury Arena
  - 5 Hartpury Arena Reception
  - 6 Equine Restaurant
  - 7 Equine Performance Centre
  - 8 Equine Therapy Centre
  - 9 Indoor Arenas 1 and 2
  - 10 Equine Science Laboratories
  - 11 Equine Equitation Shop
  - 12 Equine Yard Reception
  - 13 Stables
  - 14 Hay Barn
  - 15 Home Farm Stables

- Equine (EQ)**
- 1 Equine Upper Car Park
  - 2 Equine Lower Car Park
  - 3 Equine Assisted Activities Area (EAAA)\*
  - 4 Hacking Tracks
  - 5 Student Lorry Park
- \* Open in 2020
- Sport (SA)**
- 1 Sports Academy (Labs, Gyms, Sports Halls)
  - 2 Hartpury RFC Club House
  - 3 Gloucester Rugby Training Centre
  - 4 Gloucester Rugby Academy
  - 5 Sports Injury Clinic
  - 6 Modern Penetration Shooting Range
  - 7 Golf Driving Range and Short Game Area

- Sport (SA)**
- 1 3G Rugby Rubber Crumb Pitch
  - 2 Rugby Pitch 1
  - 3 Rugby Pitch 2
  - 4 Rugby Pitch 3
  - 5 3G Football Rubber Crumb Pitch
  - 6 Football Pitch 1
  - 7 Football Pitch 2
  - 8 Gloucester Rugby Training Pitch 1
  - 9 Gloucester Rugby Training Pitch 2
  - 10 Sports Academy Car Park

- Other**
- 1 College Learning Centre (FEC/CLC) / Student Support
  - 2 University Learning Centre (ULC)
  - 3 Postgraduate Unit
  - 4 Mark Dickson Teaching Centre (MDC) / Achievement and Success Centre (ASC)
  - 5 Graze Restaurant
  - 6 Red & Black Cafe
  - 7 Innovation, Careers and Enterprise (ICE) Centre
  - 8 Student Zone (Wellbeing, Transport, Accommodation)
  - 9 Residential Student Wardens
  - 10 Hartpury House (A-HH)
  - 11 Hartpury House Gardens
  - 12 Pitch and Path Golf Course
  - 13 Reception and Student Services
  - 14 Courtyard Classrooms (CY)
  - 15 English and Maths Classrooms (EM)

- Other**
- 1 Legends Bar / Uni Study Lounge
  - 2 Heroes Common Room
  - 3 Students' Union Office
  - 4 Main Campus Car Park
  - 5 Mark Dickson Teaching Centre (MDC) / Achievement and Success Centre (ASC)
  - 6 Graze Restaurant
  - 7 Bus Stop
  - 8 Taxi Drop-off and Collection Point
- Halls of Residence and Laundries**
- College**
- 1 New Vicarage
  - 2 Library
  - 3 Hartpury House
  - 4 Laundry
- University**
- 1 Catering
  - 2 Bridgely
  - 3 Dining
  - 4 New Vicarage
  - 5 Laundry

\* Open in 2019

# CONFERENCE PROGRAMME



# CONFERENCE PROGRAMME

## 9 AUGUST | PRE-BOOKED PLACES ONLY

Time zone BST

1000 – 1100

Sponsor: **Hartpury University**

**Ethics and Wellbeing of horses used in sport workshop: Part 1 (70 places)**

1100

**Break**

*TEA / COFFEE / JUICE / WATER / BISCUITS*

1130 – 1230

**Ethics and Wellbeing of horses used in sport workshop: Part 2**

1300

**Registration open: Hartpury House**

**Hartpury orientation tours.**

1345

Sponsor: **The Horse Trust**

**Workshop 1: Inside the horse's mind: a head-first approach to equine management and training (50 places)**

Linda Greening and Dr Andrew Hemmings

1445

Sponsors: **The Horse Trust & The Mare & Foal Sanctuary**

**Workshop 2: Human Equine Interaction – Setting the Standards (50 places)**

Mr Ed Bracher and Ms Anna Collins

1530

**Break**

*TEA / COFFEE / JUICE / WATER / CAKE*

1600

Sponsor: **The Horse Trust**

**Workshop 3: Application of learning theory in the ridden horse (100 places)**

Dr Marc Pierard

1700 – 1800

**Registration open: Hartpury House**

### **EVENING EVENTS**

1700 - 2000

Sponsor: **Equine Register**

**Welcome to Hartpury: Hartpury House & Gardens**

*Drinks and fish & chips*

*Strawberries and cream for dessert*

**Lanyard sponsor: University of Edinburgh**

# CONFERENCE PROGRAMME

## DAY ONE | 10 AUGUST

0900 †		<b>Welcome to Hartpury:</b> Hartpury VC Rosie Scott-Ward <b>Conference opening address:</b> ISES Hon. President Dr Jane Williams
Chair for morning session		Dr Camie Heleski
0915 † Sponsors: <b>World Horse Welfare &amp; The Natural Animal Centre</b>	CH	<b>Clever Hans Lecture: Machine vision in Agriculture</b> Dr Wenhao Zhang ( <i>Bristol University Vision Laboratory</i> )
1015 † Sponsor: <b>World Horse Welfare</b>	K1	<b>Keynote: Defining and measuring performance in equestrian sport</b> Dr David Marlin
1100		<b>Break</b> TEA / COFFEE /JUICE/ WATER / CAKE
1130 † Sponsors: <b>World Horse Welfare &amp; The Horse Trust</b>	PA1	<b>Panel: The use of horses in sport.</b> Chair: Prof. Natalie Waran
1230 † Sponsor: <b>World Horse Welfare</b>		<b>PERFORMANCE invited talks</b>
	IT1	<b>Bridging the gap between horse welfare research and practical applications in equine.</b> G Dalin
	IT2	<b>Behaviourally assessed equine personality is not predictive of physiological stress sensitivity.</b> Aurelie Jolivald
1310		<b>Lunch (provided)</b>
Chair for afternoon session		Dr David Marlin
1400 † Sponsors: <b>World Horse Welfare &amp; Equine Register</b>	PL1	<b>Plenary Using science to enhance equine performance: competitive success, health, and welfare.</b> Prof. Tim Parkin
1500 † (Room 1) Sponsor: <b>World Horse Welfare</b>		<b>PERFORMANCE Research presentations</b>
Chair for research presentations		Linda Greening

# CONFERENCE PROGRAMME

## DAY ONE | 10 AUGUST

Room 1: Live oral presentations	RP1	<b>Anticipation of trotting: effect of rider anxiety on physiological and behavioural measures in the horse.</b> Sarah Reega
	RP2	<b>Investigating spontaneous eye blink rate as a predictor of performance in a reversal learning challenge.</b> Louise Evans
	RP3	<b>Prevalence of conflict behaviour in Icelandic horses during elite competition.</b> Janne Winther-Christensen
	RP4	<b>Whip use in harness racing: Is whip use increasing speed?</b> Agneta Sandberg
Room 2: Pre-recorded oral presentations	RP5	<b>Perceptions and measurements of noseband fit by Canadian Equestrians.</b> Katrina Merkies
	RP6	<b>Fake It 'til You Make It: A Preliminary Exploration of Congruence Between Physiology and Behavior in Horses During Horse-Human Interactions.</b> Christine Rudd
	RP7	<b>Towards an evidence-based predictive model for success in Eventing.</b> Euan Bennett
1600	<b>Break</b> TEA / COFFEE /JUICE/ WATER / CAKE	
1630† Sponsor: <b>World Horse Welfare</b>		<b>PERFORMANCE</b> Lightning Talks
	LT1	<b>Horses' voluntary acceptance of rein tension and discomfort-related mimic with single- vs. double-jointed snaffles.</b> Uta König von Borstel
	LT2	<b>Biosecurity and the livery yard: comparing attitudes to horse versus human risk in relation to Covid and Strangles.</b> Tamsin Furtado
	LT3	<b>Effect of circle, speed and surface on head and pelvis movement in horses with pre-existing straight-line movement asymmetries.</b> Eva Marunova
	LT4	<b>The effects of plaiting on stress and scoring in dressage horses: A preliminary study.</b> Marc Peirard
	LT5	<b>Resting behaviour in horses normally housed in an open barn during acclimatization to single boxes.</b> Linda Kjellberg
	LT6	<b>Conflict behaviours displayed by horses during dressage tests and their relationship to performance evaluation.</b> Kathryn Hamilton
	LT7	<b>Determination of tongue-tie use in Raza Chilena breed horses</b> Marianne Werner



# CONFERENCE PROGRAMME

## DAY ONE | 10 AUGUST

	LT8	<b>A preliminary study investigating auditory stimulation of the horse at pasture; behavioural responses to the colours of noise.</b> Rose Scofield
	LT9	<b>Retired thoroughbred racehorses: a survey to explore factors concerning success in secondary careers.</b> Jasmine White
	LT10	<b>Recreational horses' face expression in working like situation.</b> Kasia Olczak
	LT11	<b>Changes of behaviour in equids exposed to novel objects when wearing liquid titanium head masks.</b> Rose Scofield
	LT12	<b>Pilot study testing a mobile measuring system for horse arena surfaces.</b> Menke Steenbergen
	LT13	<b>The use of EquiFACS and physiological measures to indicate equine affective state during rest, grooming and tacking up.</b> Linda Greening
	LT14	<b>Effect of number of repetitions of a negative reinforcement task per training sessions on horses' learning performance.</b> Uta König von Borstel
1745		<b>Day 1 Closing Remarks</b> Dr Jane Williams
1800 – 1900		<b>Cheese and Wine Networking</b>
Sponsor: <b>Jacamast</b>		
1930 EVENING ENTERTAINMENT		<b>Optional transport (pre-booked only) to Gloucester Quays: multiple dinner options</b>

# CONFERENCE PROGRAMME

## DAY TWO | 11 AUGUST

0800		<b>Student/ PhD / ECR (net)working breakfast (pre-booked)</b>
Sponsor: <b>The National Equine Welfare Council</b>		Chair: Gill Keegan
0900		<b>Introduction to Day 2</b> Lorna Cameron
Chair for morning session		Prof. Natalie Waran
0915†	K2	<b>Keynote Using learning theory to ensure your horse gets his medicine.</b> Dr Gemma Pearson
Sponsors: <b>Redwings Horse Sanctuary &amp; Boehringer Ingelheim</b>		
1000		<b>Workshop session 1 – pre-booked sessions</b>
Sponsors: <b>Redwings Horse Sanctuary &amp; The British Horse Society</b>		
1100		<b>Break</b> TEA / COFFEE / JUICE / WATER / CAKE
1130		<b>Workshop session 2 – pre-booked sessions</b>
Sponsor: <b>Redwings Horse Sanctuary &amp; The British Horse Society</b>		
1300		<b>Lunch (provided)</b>
Chair for afternoon session		Dr Jane Williams
1400	PL2	<b>Plenary: A personal philosophy for training horse and rider partnerships</b> Christopher Bartle
Sponsors: <b>Redwings Horse Sanctuary &amp; British Equestrian</b>		
1515		<b>ISES update</b> Dr Jane Williams <i>ISES Honorary President</i> Dr Orla Doherty <i>ISES Senior Vice President</i>
1530		<b>Break</b> TEA / COFFEE / JUICE / WATER / CAKE
1600†	K3	<b>Keynote: Equine laterality or functional asymmetry: is there a difference?</b> Dr Russell MacKechnie-Guire
Sponsors: <b>Redwings Horse Sanctuary &amp; British Equestrian</b>		
1645	IT3	<b>PRACTICE Invited Research presentation: Doing things differently: exploring the experience of livery yard managers offering “alternative” livery options, such as track systems and Equicentral.</b> Dr Tamzin Furtado
Sponsors: <b>Redwings Horse Sanctuary &amp; the Equine Register</b>		
1705†		<b>PRACTICE Research presentations</b>
Sponsor: <b>Redwings Horse Sanctuary</b>		

# CONFERENCE PROGRAMME

## DAY TWO | 11 AUGUST

	RP8	<b>Equine Assisted Services horses: What do practitioners think about using post-racing Thoroughbreds?</b> Clare Neveux
	RP9	<b>Stable design influences vigilance behaviour in horses during short isolation bouts.</b> Gemma Pearson
	RP10	<b>The impact of bedding practices on quantity of sleep and its relationship to cognitive bias in the horse.</b> Amber Matthews
1705	IT4	<b>Equine educators; workshop: benchmarking equestrian degrees</b> <i>Rosie Scott Ward</i>
Sponsor: Redwings Horse Sanctuary		
1750		<b>Day 2 Closing remarks</b> Lorna Cameron
1930		<b>Conference Dinner</b> <i>(pre-booking only: including karaoke and disco)</i>

# CONFERENCE PROGRAMME

## DAY TWO | 11 AUGUST (PRACTICAL WORKSHOPS)

1000 – 1030	1030 – 1100	1100 - 1130	1130 – 1200	1200 - 1230	1230 - 1300
Using equitation science and positive reinforcement in horse handling and training Dr Marc Pierard <i>Indoor school 1</i>		<b>BREAK</b>			
Assessing rider fitness Dr Jenni Douglas (participatory) <i>Rider Performance Centre Gym</i>				Assessing rider fitness Dr Jenni Douglas (participatory) <i>Rider Performance Centre Gym</i>	
Meet the ISES expert: Dr Orla Doherty <i>Legends</i>	Meet the ISES expert: Dr Camie Heleski <i>Legends</i>		Meet the ISES expert: Prof. Natalie Waran <i>Legends</i>	Meet the ISES expert: Dr Andrew McLean <i>Legends</i>	Meet the ISES expert: Dr Janne Winther Christensen <i>Legends</i>
			Poor performance or pain, assessing welfare in the ridden horse Dr Gillian Tabor <i>Indoor school 1</i> <b>Sponsor:</b> <i>Boehringer Ingelheim</i>		Poor performance or pain, assessing welfare in the ridden horse Dr Gillian Tabor <i>Indoor school 1</i> <b>Sponsor:</b> <i>Boehringer Ingelheim</i>
			Introduction to equine therapy: training and rehabilitation at Hartpury Dr Kathryn Nankervis <i>Equine Therapy Centre</i>		Introduction to equine therapy: training and rehabilitation at Hartpury Dr Kathryn Nankervis <i>Equine Therapy Centre</i>
Exploring skill acquisition and adaptation in equestrian sports (or 'the horse-human dyad'): An ecological dynamics perspective Marianne Davies <i>Room TBC</i>			Exploring skill acquisition and adaptation in equestrian sports (or 'the horse-human dyad'): An ecological dynamics perspective Marianne Davies <i>Room TBC</i>		
			Rider performance assessment Dr Celeste Wilkins (participatory) <i>Rider Performance Centre</i>	Rider performance assessment Dr Celeste Wilkins (participatory) <i>Rider Performance Centre</i>	

# CONFERENCE PROGRAMME

## DAY THREE | 12 AUGUST

0900	<b>Introduction to Day 3</b> Dr Jane Williams
Chair for morning session	Dr Roly Owers
0915† Sponsors: <b>World Horse Welfare, The Horse Trust &amp; Via Nova</b>	PL3 <b>Plenary: Positive partnerships – horses and humans, different perspectives, shared goals?</b> Prof. Natalie Waran
1015† Sponsor: <b>World Horse Welfare</b>	<b>Research Positive Partnerships invited talks</b>
	IT5 <b>Do you want a lunge line? An investigation into problem loading behaviour in the U.K. horse population.</b> Dr Gemma Pearson
	IT6 <b>UK horse owners' experiences of planning for and making decisions about euthanasia and End-of-Life care.</b> Amelia Cameron
1100	<b>Break</b> <i>TEA / COFFEE /JUICE/ WATER / CAKE</i>
1130† (Room 1) Sponsors: <b>World Horse Welfare &amp; The Blue Cross</b>	<b>POSITIVE PARTNERSHIPS Research presentations</b>
Chair for research presentations	Clare Thomas Pino
Room 1: Live oral presentations	RP11 <b>Development and Validation of the Human-Equine Attachment Scale.</b> Stephanie Evans.
	RP12 <b>A short intervention on the correct use of negative reinforcement (R-) can increase handler knowledge and understanding in college students.</b> Mari Turunen
	RP13 <b>Factors associated with falls or riders, or riders and horses.</b> David Marlin
Room 2: Pre-recorded oral presentation	RP14 <b>Industry Perceptions and Understanding on Australian Feedlot Working Horses.</b> Karly Liffen
	RP15 <b>An initial training method of sport horses including positive reinforcements.</b> Alice Ruet

# CONFERENCE PROGRAMME

## DAY THREE | 12 AUGUST

1215 † (Room 1) Sponsor: <b>World Horse Welfare</b>	<b>POSITIVE PARTNERSHIPS</b> Poster lightening presentations
Chair for poster lightening presentations	Clare Thomas Pino
Room 2: Pre-recorded poster lightening presentations	LT15 <b>Bayesian multilevel region-specific investigation of risk factors for elimination from FEI endurance rides due to irregular gait and metabolic problems.</b> Tom Zuffa
	LT16 <b>Investigating equine personality: A mixed methods study.</b> Loni Loftus
	LT17 <b>Does sex of the jockey influence racehorse physiology and performance.</b> Charlotte Schrurs
	LT18 <b>Rein tension and aversion behaviours in horses when led with a halter or bitted bridle: Is there a difference?</b> Cecily Roden
1300	<b>Lunch</b> ( <i>provided</i> )
Chair for afternoon session	Dr Orla Doherty
1400 Sponsor: <b>World Horse Welfare</b>	<b>THE OTHER 23 HOURS</b> Research presentations
Chair for research presentations	David Marlin
Room 1: Live oral presentations	RP16 <b>Breeding for durability – Equine monitoring at pasture using halter attached HoofStep® AI sensors.</b> Hanna Sassner
	RP17 <b>A nocturnal investigation of equine behaviour between the field and stable.</b> Jennifer Nash
	RP18 <b>Do play, social companionship and age protect foals from weaning stress?</b> Aline Bouquet
	RP19 <b>Jockey perceptions of horseshoe and surface conditions: A comparison to objective biomechanical data.</b> Kate Horan
	<b>THE OTHER 23 HOURS</b> Poster lightening presentations
Room 1: Live oral presentations	LT19 <b>Rider perceptions of their own wellbeing as an influencing factor on ride experience and equine welfare: A pilot study.</b> Antonia Stringer
	LT20 <b>Horse industry stakeholders' attitudes towards bit-related oral lesions in harness racing horses: A pilot study.</b> Kati Tuomola
	LT21 <b>Practitioner safety and the application of learning theory in equine physiotherapy: A worldwide survey.</b> Gillian Tabor
	LT22 <b>The good life? An ethno-phenomenological exploration of sustainability and wellbeing in the UK horse industry.</b> Debbie Busby
	LT23 <b>A preliminary study into equine sleep quality using behavioural measurements.</b> Eleanor Taylor

# CONFERENCE PROGRAMME

## DAY THREE | 12 AUGUST

	LT24	<b>A pilot study into investigating a novel grid to measure equine recumbent lateralisation and location within the stable.</b> Eleanor Taylor
Room 2: Pre-recorded poster lightning talk presentations	LT25	<b>Rethinking horse falls: working towards eventing sport safety.</b> Heather Cameron-Whytock
	LT26	<b>Equine body condition: horse owners' perceptions.</b> Jane Williams
	LT27	<b>Are we all on the same page? Variation in the description and application of horse training methods within scientific literature.</b> Ella Bartlett
	LT28	<b>Equestrian coach and judge perceptions of the ideal body shape of female horse riders.</b> Sofia Forino
	LT29	<b>Beer and urine? Treatment of common health problems seen within working equid populations in Colombia.</b> Jessica Burridge
	LT30	<b>A picture is not good enough: Calming effects on horses inside trailers.</b> Ida Jormhed
1500† Sponsors: <b>World Horse Welfare &amp; The Mare and Foal Sanctuary</b>	PA2	<b>Panel: Science communications: changing hearts and minds!</b> Chair: Dr David Marlin
1545		<b>Afternoon Break &amp; networking</b> <i>TEA / COFFEE / JUICE / WATER / CREAM TEA</i>
1645† Sponsors: <b>World Horse Welfare, The Horse Trust &amp; Via Nova</b>	K4	<b>Keynote: Ethical equitation - promoting performance and positive partnerships through evidence-informed practice.</b> Dr Jane Williams
1730		<b>Conference closing ceremony and prizes</b>
1800		<b>Day 3 and conference close</b>

# SCIENTIFIC PROGRAMME





# SCIENTIFIC PROGRAMME

## DAY ONE | 10 AUGUST

### Performance Invited Extended Talks

	PRESENTING AUTHOR	TITLE
IT1	Goran Dalin	Bridging the gap between horse welfare research and practical applications in equine sports
IT2	Aurelie Jolivald	Behaviourally assessed equine personality is not predictive of physiological stress sensitivity

### Performance Oral Presentations (Room 1)

	PRESENTING AUTHOR	TITLE
RP1	Sarah Reega	Anticipation of trotting: effect of rider anxiety on physiological and behavioural measures in the horse
RP2	Louise Evans	Investigating spontaneous eye blink rate as a predictor of performance in a reversal learning challenge
RP3	Janne Wither Christensen	Prevalence of conflict behaviour in Icelandic horses during elite competition
RP4	Agneta Sandberg	Whip use in harness racing: Is whip use increasing speed?

### Pre-recorded Oral Presentations (Room 2)

RP5	Katrina Merkies (Extended talk)	Perceptions and measurements of noseband fit by Canadian Equestrians
RP6	Christine Rudd	Fake It 'til You Make It: A Preliminary Exploration of Congruence Between Physiology and Behavior in Horses During Horse-Human Interactions
RP7	Euan Bennett	Towards an evidence-based predictive model for success in Eventing

# SCIENTIFIC PROGRAMME

## DAY ONE | 10 AUGUST

### Poster Lightning presentations:

	PRESENTING AUTHOR	TITLE
LT1	Uta Konig van Borstel	Horses' voluntary acceptance of rein tension and discomfort-related mimic with single- vs. double-jointed snaffles
LT2	Tamsin Furtado	Biosecurity and the livery yard: comparing attitudes to horse versus human risk in relation to Covid and Strangles
LT3	Eva Marunova	Effect of circle, speed and surface on head and pelvis movement in horses with pre-existing straight-line movement asymmetries
LT4	Marc Pierard	The effects of plaiting on stress and scoring in dressage horses: A preliminary study
LT5	Linda Kjellberg	Resting behaviour in horses normally housed in an open barn during acclimatization to single boxes
LT6	Kathryn Hamilton	Conflict behaviours displayed by horses during dressage tests and their relationship to performance evaluation
LT7	Marianne Werner	Determination of tongue-tie use in Raza Chilena breed horses
LT8	Rose Scofield	A preliminary study investigating auditory stimulation of the horse at pasture; behavioural responses to the colours of noise
LT9	Jasmine White	Retired thoroughbred racehorses: a survey to explore factors concerning success in secondary careers
LT10	Kasia Olczak	Recreational horses' face expression in working like situation
LT11	Rose Scofield	Changes of behaviour in equids exposed to novel objects when wearing liquid titanium head masks
LT12	Menke Steenbergen	Pilot study testing a mobile measuring system for horse arena surfaces
LT13	Linda Greening	The use of EquiFACS and physiological measures to indicate equine affective state during rest, grooming and tacking up.
LT14	Uta Konig van Borstel	Effect of number of repetitions of a negative reinforcement task per training sessions on horses' learning performance

# SCIENTIFIC PROGRAMME

## DAY TWO | 11 AUGUST

### Practice Oral Presentations

	PRESENTING AUTHOR	TITLE
RP8	Clare Neveux	Equine Assisted Services horses: What do practitioners think about using post-racing Thoroughbreds?
RP9	Gemma Pearson	Stable design influences vigilance behaviour in horses during short isolation bouts
RP10	Amber Matthews	The impact of bedding practices on quantity of sleep and its relationship to cognitive bias in the horse

### Practice Invited Extended Talk

	PRESENTING AUTHOR	TITLE
IT3	Tamzin Furtado	Doing things differently: exploring the experience of livery yard managers offering "alternative" livery options, such as track systems and Equicentral

# SCIENTIFIC PROGRAMME

## DAY THREE | 12 AUGUST

### Positive Partnerships Invited Extended Talks

	PRESENTING AUTHOR	TITLE
NOTE Rosies education talk is IT4....		
IT5	Gemma Pearson	Do you want a lunge line? An Investigation into Problem Loading Behaviour in the U.K. Horse Population
IT6	Amelia Cameron	UK Horse Owners' Experiences of Planning for and Making Decisions About Euthanasia and End-of-Life Care

### Positive Partnerships Oral Presentations (Room 1)

	PRESENTING AUTHOR	TITLE
RP11	Stephanie Evans	<b>Development and Validation of the Human-Equine Attachment Scale.</b>
RP12	Mari Turunen	<b>A short intervention on the correct use of negative reinforcement (R-) can increase handler knowledge and understanding in college students.</b>
RP13	David Marlin	<b>Factors associated with falls or riders, or riders and horses.</b>

### Pre-recorded Oral Presentations (Room 2)

	PRESENTING AUTHOR	TITLE
RP14	Karly Liffen	Industry Perceptions and Understanding on Australian Feedlot Working Horses
RP15	Alice Ruet	An initial training method of sport horses including positive reinforcements
	POSTERS	
LT15	Tom Zuffa	Bayesian multilevel region-specific investigation of risk factors for elimination from FEI endurance rides due to irregular gait and metabolic problems
LT16	Loni Loftus	Investigating equine personality: A mixed methods study
LT17	Charlotte Schrurs	Does sex of the jockey influence racehorse physiology and performance
LT18	Cecily Roden	Rein tension and aversion behaviours in horses when led with a halter or bitted bridle: Is there a difference?

# SCIENTIFIC PROGRAMME

## DAY THREE | 12 AUGUST

### The Other 23 Hours Oral Presentations

	PRESENTING AUTHOR	TITLE
RP16	Hanna Sassner	Breeding for durability – Equine monitoring at pasture using halter attached HoofStep® AI sensors
RP17	Jennifer Nash	Investigation into equine nocturnal behaviour between the field and stable
RP18	Aline Bouquet	Do play, social companionship and age protect foals from weaning stress?
RP19	Kate Horan	Jockey perceptions of horseshoe and surface conditions: A comparison to objective biomechanical data

### Poster Lightening Presentations

#### Room 1

	PRESENTING AUTHOR	TITLE
LT19	Antonia Stringer	Rider perceptions of their own wellbeing as an influencing factor on ride experience and equine welfare: A pilot study
LT20	Kati Tuomola	Horse industry stakeholders' attitudes towards bit-related oral lesions in harness racing horses: A pilot study
LT21	Gillian Tabor	Practitioner safety and the application of learning theory in equine physiotherapy: A worldwide survey
LT22	Debbie Busby	The good life? An ethno-phenomenological exploration of sustainability and wellbeing in the UK horse industry
LT23	Eleanor Taylor	A preliminary study into equine sleep quality using behavioural measurements
LT24	Eleanor Taylor	A pilot study into investigating a novel grid to measure equine recumbent lateralisation and location within the stable

#### Room 2

LT25	Heather Cameron-Whytock	Rethinking horse falls: working towards eventing sport safety
LT26	Jane Williams	Equine body condition: horse owners' perceptions
LT27	Ella Bartlett	Are we all on the same page? Variation in the description and application of horse training methods within scientific literature
LT28	Sofia Forino	Equestrian coach and judge perceptions of the ideal body shape of female horse riders
LT29	Jessica Burrige	Beer and urine? Treatment of common health problems seen within working equid populations in Colombia
LT30	Ida Jormhed	A picture is not good enough: Calming effects on horses inside trailers

# LOCAL ORGANISING COMMITTEE

Jane Williams, Head of Research, Hartpury University  
Lorna Cameron, Equine Dept., Hartpury University  
Rosie Scott-Ward, Pro-Vice Chancellor, Hartpury University  
Aisling Carroll, Equine Dept., Hartpury University  
Mark Hayward, Press Officer at Hartpury University, CEO at Northern Hive  
Hieke Brown, Equine Dept., Hartpury University  
Marc Pierard  
Linda Greening, Head of Inclusivity, Hartpury University  
Clare Pino-Thomas, Animal and Agriculture Dept., Hartpury University

## Conference Chairs:

Natalie Waran, Eastern Institute of Technology, New Zealand  
Roly Owers, World Horse Welfare, UK  
Camie Heleski, University of Kentucky, USA  
Orla Doherty  
David Marlin, AnimalWeb Ltd, UK  
Jane Williams, Hartpury University, UK  
Lorna Cameron, Hartpury University, UK  
Clare Thomas Pino, Hartpury University, UK

## Panel members:

Gorin Dalin	Christa Lesté-Lasserre
Victoria Lewis	Jo Hockenhull
David Marlin	Inga Wolfram
Roly Owers	Merete Haahr
Natalie Waran	

## Online Support:

Gary Dennett  
Michael Carpenter  
Michael Walter

## Riders and Horses

Martha Hurrell and Farley  
Hartpury's own - Scooby  
Tilly Parry and New Leaf  
Warren Lamperd and Peanut

## Student Research Prize Coordinator

Uta Konig von Borstel, Giessen University, Germany

## Staff Volunteers

Kate Baldwin  
Talitha Corbett  
Emma Davies  
Lucy Dumbell  
Steph Evans  
Nicky Hewer  
Debra Johnston  
Kirsty Lesniak  
Jenny Paddison  
Anke Twigg-Flesner

## **Student Helpers**

Sofia Forina – Sparsholt College and University Centre

Louise Hewett – Hartpury University

Alexander Kienast – Hartpury University

Robyn Mackenzie – Sparsholt College and University Centre

Amber Matthews – Hartpury University

# **SCIENTIFIC COMMITTEE**

## **Chairs:**

Jane Williams, Head of Research, Hartpury University

Hayley Randle, Charles Sturt University

Lorna Cameron, Equine Dept., Hartpury University

## **Reviewers:**

Jessica Berry

Jenny Paddison

Kirsty Lesniak

Hieke Brown

Katrina Merkies

Fiona Bloom

Annette Bowen

Ella Bradshaw-Wiley

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Charlotte Brigden

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# THE ISES 10 TRAINING PRINCIPLES

## 1.Regard for human and horse safety

- Acknowledge that horses' size, power and potential flightiness present a significant risk
- Avoid provoking aggressive/defensive behaviours (kicking /biting)
- Ensure recognition of the horse's dangerous zones (e.g hindquarters)
- Safe use of tools, equipment and environment
- Recognise the dangers of being inconsistent or confusing
- Ensure horses and humans are appropriately matched
- Avoid using methods or equipment that cause pain, distress or injury to the horse

"Disregarding safety greatly increases the danger of human-horse interactions"

## 2.Regard for the nature of horses

- Ensure welfare needs: lengthy daily foraging, equine company, freedom to move around
- Avoid aversive management practices (e.g. whisker-trimming, ear-twitching)
- Avoid assuming a role for dominance in human/horse interactions
- Recognise signs of pain
- Respect the social nature of horses (e.g. importance of touch, effects of separation)
- Avoid movements horses may perceive as threatening (e.g jerky, rushing movements)

"Isolation, restricted locomotion and limited foraging compromise welfare"

## 3.Regard for horses' mental and sensory abilities

- Avoid overestimating the horse's mental abilities (e.g. "he knows what he did wrong")
- Avoid underestimating the horse's mental abilities (e.g. "It's only a horse...")
- Acknowledge that horses see and hear differently from humans
- Avoid long training sessions (keep repetitions to a minimum to avoid overloading)
- Avoid assuming that the horse thinks as humans do
- Avoid implying mental states when describing and interpreting horse behaviour

"Over- or underestimating the horse's mental capabilities can have significant welfare consequences"

## 4.Regard for current emotional states

- Ensure trained responses and reinforcements are consistent
- Avoid the use of pain/constant discomfort in training
- Avoid triggering flight/fight/freeze reactions
- Maintain minimum arousal for the task during training
- Help the horse to relax with stroking and voice
- Encourage the horse to adopt relaxed postures as part of training (e.g. head lowering, free rein)
- Avoid high arousal when using tactile or food motivators
- Don't underestimate horse's capacity to suffer
- Encourage positive emotional states in training

"High arousal and lack of reinforcement may lead to stress and negative affective states"

# THE ISES 10 TRAINING PRINCIPLES

## **5. Correct use of habituation/desensitization/calming methods**

- Gradually approach objects that the horse is afraid of or, if possible, gradually bring such aversive objects closer to the horse (systematic desensitization)
- Gain control of the horse's limb movements (e.g. step the horse back) while aversive objects are maintained at a safe distance and gradually brought closer (over-shadowing)
- Associate aversive stimuli with pleasant outcomes by giving food treats when the horse perceives the scary object (counter-conditioning)
- Ignore undesirable behaviours and reinforce desirable alternative responses (differential reinforcement)
- Avoid flooding techniques (forcing the horse to endure aversive stimuli)

"Desensitization techniques that involve flooding may lead to stress and produce phobias"

## **6. Correct use of Operant Conditioning**

- Understand how operant conditioning works: i.e. performance of behaviours become more or less likely as a result of their consequences.
- Tactile pressures (e.g. from the bit, leg, spur or whip) must be removed at the onset of the correct response
- Minimise delays in reinforcement because they are ineffective and unethical
- Use combined reinforcement (amplify pressure-release rewards with tactile or food rewards where appropriate)
- Avoid active punishment

"The incorrect use of operant conditioning can lead to serious behaviour problems that manifest as aggression, escape, apathy and compromise welfare"

## **7. Correct use of Classical Conditioning**

- Train the uptake of light signals by placing them BEFORE a pressure-release sequence
- Precede all desirable responses with light signals
- Avoid unwanted stimuli overshadowing desired responses (e.g. the horse may associate an undesirable response with an unintended signal from the environment)

"The absence of benign (light) signals can lead to stress and compromised welfare"

# THE ISES 10 TRAINING PRINCIPLES

## 8. Correct use of Shaping

- Break down training tasks into the smallest achievable steps and progressively reinforce each step toward the desired behaviour
- Plan training to make the correct response as obvious and easy as possible
- Maintain a consistent environment to train a new task and give the horse the time to learn safely and calmly
- Only change one contextual aspect at a time (e.g. trainer, place, signal)

“Poor shaping leads to confusion”

## 9. Correct use of Signals/Cues

- Ensure signals are easy for the horse to discriminate from one another
- Ensure each signal has only one meaning
- Ensure signals for different responses are never applied concurrently
- Ensure locomotory signals are applied in timing with limb biomechanics

“Unclear, ambiguous or simultaneous signals lead to confusion”

## 10. Regard for Self-carriage

- Aim for self-carriage in all methods and at all levels of training
- Train the horse to maintain:
  - o gait
  - o tempo
  - o stride length
  - o direction
  - o head and neck carriage
  - o body posture
- Avoid forcing any posture
- Avoid nagging with legs, spurs or reins i.e. avoid trying to maintain responses with relentless signaling.

“Lack of self-carriage can promote hyper-reactive responses and compromise welfare”

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# CUTTING EDGE



MEETS

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# ABTC

ANIMAL BEHAVIOUR  
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# SPEAKERS



## DR DAVID MARLIN

### Bachelor of Science in Environmental Studies

David Marlin studied at Stirling University from 1978-1981. He then trained with dressage rider and coach Judy Harvey (FBHS and FEI International dressage judge). He obtained his PhD from Loughborough University in 1989 on the response of Thoroughbred racehorses to exercise and training. From 1993-1996 he undertook studies on thermoregulation and transport of horses in the build-up to the 1996 Atlanta Olympic Games. He was also involved in advising on air-conditioning and cooling for horses at the Athens 2004, Beijing 2008 and the Tokyo 2020 Olympic Games.

From 1990-2005 David held the position of Senior Scientist and Head of Physiology at the Animal Health Trust. His main areas of professional interest are exercise physiology, including nutrition, fitness training, thermoregulation, anhidrosis, competition strategy, transport, respiratory disease and EIPH and has published over 200 scientific papers in these areas.

He has worked as a consultant to the British Equestrian Federation since 1994 and is a member of the BEF's World Class Performance Scientific Advisory Group. Between 1996 and 2000 he was trainer for the British Endurance team when they won a silver medal at the World Championships in Compiègne, France in 2000.

David has a strong interest in equine welfare and has been involved in many projects, including working with World Horse Welfare to improve the conditions for horses transported for meat in Europe. Recent projects include the impact of COVID-19 on horse owners and horse welfare, protective boot testing, the safety of headcollars, performance analysis, saddle tree design, saddle pads function, quantification of headshaking, safety of horses and riders and a large number of nutritional projects.

David is a past Chair of the International Conference on Equine Exercise Physiology (ICEEP), editor of Comparative Exercise Physiology, author of Equine Exercise Physiology, President of the UK National Equine Welfare Council and President of the newly established Sporthorse Welfare Foundation. He has also been the FEI's climate advisor since 1996 and currently runs his own equestrian community under [DrDavidMarlin.com](http://DrDavidMarlin.com).



## CHRIS BARTLE

### Bachelor of Science in Zoology

For 16 years up to 2016, Christopher was National Coach to the German Olympic Three Day Event Team - Winners of Team Silver and Individual Gold at the 2016 Olympic Games in Rio de Janeiro, Team and Individual Gold medals at the London Olympics in 2012 and previously at the Beijing Olympics in 2008. Christopher has been British Eventing Team's High Performance Coach since 2017. The GB Team were winners of the Team and Individual Gold medals at the World Equestrian Games in 2018. Team GB won the Team Gold Medal and Individual Silver Medal at the Tokyo 2020 Olympic Games staged in 2021. Team GB also won the Team and all Individual Medals at the European Championships at Avenches (Switzerland) in 2021. Chris is a former Badminton Horse Trials winner and Olympian as well as Managing Director of the Yorkshire Riding Centre.

# SPEAKERS



## DR JANE WILLIAMS

Associate Professor and Head of Research, Hartpury University

Jane is an experienced researcher with a passion for enhancing equine performance and wellbeing through industry-informed, real-world research that generates change. Jane qualified as a veterinary nurse then gained her Masters in Equine Science before completing her doctorate exploring the application of surface electromyography as a tool to assess muscle adaptation during training in racehorses and sport horses.

Her main areas of professional interest including scientific evaluation of equestrian performance, training and wellbeing, rider impacts on equitation, reliability assessment across equestrian science, and human-animal interaction. Jane co-edited and authored 'Training for Equestrian Performance', to showcase how science and research can be applied practically to improve performance for horses and their riders and has published over 100 research articles as well as regularly presenting at international equine conferences. She is currently Honorary President for the International Society of Equitation Science and is a founding member of the Sport Horse Welfare Foundation.



## DR MARC PIERARD

Independent Researcher, Applied Ethology and Equitation Science

Marc obtained an MSc in behavioural biology at the Antwerp University and a PhD in applied ethology at the KULeuven. His PhD included studies on the social behaviour of horses, on personality based selection tests for police horses and on the development of descriptive definitions of horse behaviour.

Between March 2019 and April 2022 he was a lecturer at Hartpury University, where he focused on teaching and research of equine behaviour and welfare. He is a former council member of the International Society for Equitation Science. He is regularly invited as a guest lecturer regarding behaviour, management, training and welfare of horses in a range of countries.



## DR JENNI DOUGLAS

Senior Lecturer and Programme Manager, Hartpury University

Jenni is a Senior Lecturer in Applied Sports Sciences at Hartpury University with a research focus on equestrian sports performance. Jenni's interdisciplinary nature lends her interest in applied exercise physiology to deliver and support teaching and research practise across departments and disciplines from 1st year study to doctoral supervision. Jenni has a PhD in Applied Exercise Physiology, PGCE's in Research Methods and Adult Education and MSc and BSc degrees in Equine Sciences.

In addition to her academic work Jenni is an active practitioner and is the founder and head coach at EventFit Equestrian Performance, and online coaching platform that supports horse-riders with their off horse physical preparation. Jenni has completed level 3 personal training qualifications and a foundation Strength and Conditioning certification from the UKSCA which has supported the development of her own business alongside her academic and research profile.



# SPEAKERS



## DR ANDREW HEMMINGS

Associate Professor of Equine Science and Head of Equine Management and Science School, Royal Agricultural University

Dr Hemmings has worked at the Royal Agricultural University for just over 21 years, where he leads an academic department that specialises in equine management and science.

His principal research topic area is horse behaviour and welfare, with a focus on the brain and how this complex organ controls behavioural output. Andrew is passionate about making neuroscience accessible to a broader audience, and this remit takes him to all corners of the UK where he gives talks and seminars to horse owners and trainers.



## ED BRACHER

Chair, Human Equine Interactions Steering Group

Ed was educated at Marlborough College and Exeter University and after a brief (and enjoyable!) spell working for Moët & Chandon, went on to work in the voluntary sector since 1991. He worked with Afghan refugees and then on volunteer programmes in Asia before returning to the UK to run the World Public Speaking Championships. From 2004 to early 2022 Ed was CEO of RDA, focusing on the therapeutic benefits of bringing disabled people and horses together. During that time the organisation grew significantly, and Ed spearheaded the campaign to create the charity's first National Training Centre near Warwick, which opened in June 2019.

Currently he is Chair of the Human Equine Interactions Steering Group – which aims to bring together practitioners and organisations in the UK which are involved in the field in order to provide quality assurance for all concerned and strengthen the industry through collaboration. Ed is also Chair of the Dame Kelly Holmes Trust and a founding Trustee of Level Water, which teaches young disabled children to swim.

# SPEAKERS



## LINDA GREENING

Head of Inclusivity, Hartpury University

Linda graduated with a BSc (Hons) Equine Science in 2003 and completed her Masters in the same topic in 2006. She has lectured at Hartpury since 2006 and currently leads on equality, diversity and inclusivity as Head of Inclusivity.

From 2013-2017, Linda held roles on the International Society for Equitation Science Council, and currently chairs the Equity, Diversity, Inclusivity and Accessibility committee for the International Society for Applied Ethology. Her principal research topic areas are equine behaviour and welfare, with particular interest in the fields of equine stereotypic behaviour thinking about neuroanatomy, and more recently equine sleep and nocturnal behaviour.



## DR KATHRYN NANKERVIS

Associate Professor and Equestrian Performance  
Research Centre Lead, Hartpury University

Kathryn Nankervis set up the Equine Therapy Centre at Hartpury in 1999 and oversees all the commercial, teaching and research activity within the Equine Therapy Centre and the Margaret Giffen Centre for Rider Performance. The Therapy Centre offers rehabilitation for horses recovering from limb lameness and/or back pain, with cases referred from equine practices within the South West region and beyond. The Centre also provides water treadmill exercise as part of the training programmes of dressage and event horses, including the London and Rio Olympic Gold medalist, Valegro.

She is co-author, with Dr David Marlin of 'Equine Exercise Physiology' and she completed a DPhil on the subject of 'Physiology and Biomechanics relating to Equine Physical Therapy' in 2013. She lectures on equine therapy and exercise physiology at Post Graduate level, and has contributed to M.Sc. Veterinary Physiotherapy programmes at the Royal Veterinary College, Liverpool University and Hartpury University. Her recent research work has focused on water treadmill exercise in horses; particularly the effects on limb and back movement and she co-authored 'Guidelines for Water Treadmill Use' as part of the Equine Hydrotherapy Working Group.

# SPEAKERS



## DR WENHAO ZHANG

Senior Lecturer, University of the West of England (UWE Bristol)

Dr Wenhao Zhang is a research-active Senior Lecturer at the University of the West of England (UWE Bristol). Wenhao is affiliated to the Centre for Machine Vision at the Bristol Robotics Laboratory which is a joint venue between the University of Bristol and UWE Bristol. The current research interest of Wenhao is agriculture technology and health technology using computer vision and machine learning. He has led a number of projects in these areas closely working with academic and industrial partners conducting inter-disciplinary research. Examples of recent projects include weed detection in pasture, automated pig tracking and monitoring, 3D plant phenotyping, eye tracking for early diagnosis of neurodegeneration and automated assessment of cow hoof conditions.

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## MARIANNE DAVIES

Senior Coach Developer, UK Coaching

Marianne's coaching and coach development experience includes more than 25 years of working in sports, academic and corporate environments. Marianne works as a Senior Coach Developer for UK Coaching. Her role includes collaboratively designing evidence based and research informed learning and development programmes for coach education & coach development workforces in all sports. Alongside her full-time work, Marianne is currently a PhD Candidate researching Developing a Nonlinear Pedagogy in Equestrian Coaching, at Sheffield Hallam University with external supervision from Hartpury University. Marianne's previous research has focussed on skill acquisition and motivation [MRes. (Distinction) Sport & Exercise Science (Motivation & Skill Acquisition). BA (Hons), Sport, Health, and Physical Education, both from Bangor University, Wales].

Learning and adapting in high-risk sports and environments are a core thread throughout her coaching practice and research. Marianne worked for many years as a full-time senior adventure sports coach, alongside training and assessing coaches, and is experienced in a broad range of recreational, expedition and competitive adventure sports. She has also always been a keen equestrian, coaching riders and starting and bringing on horses.

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## DR CELESTE WILKINS

Lecturer, Hartpury University

Celeste investigated equestrian rider biomechanics with a focus on rider coordination in her PhD. She is a Lecturer in Sport and Equine Biomechanics at Hartpury University; her role also includes research and commercial activity in the Margaret Giffen Rider Performance Centre at Hartpury. She has coached riders and delivered workshops to all ages in Canada and the UK. As a rider, she enjoys showjumping, dressage and forming a bond with a horse.

# SPEAKERS



## ANNA COLLINS

Human Equine Interaction Register UK Project Manager

Anna is a Fellow of the Chartered Institute of Marketing and an Associate of the Consultation Institute and a freelance project manager with experience of public sector service change programmes. She was previously Director of Communication & Corporate Affairs in the NHS and Communication and Engagement Manager in policing.

Anna has been riding since the age of 6 and competes her former racehorses in endurance. She is the national liaison between Retraining of Racehorses and Endurance Great Britain and was the RoR Elite Endurance Champion in 2017.

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## DR GILLIAN TABOR

Chartered Physiotherapist (ACPAT)  
Senior Lecturer/Programme Manager, Hartpury University

Dr Gillian Tabor is a Chartered Physiotherapist (ACPAT) and Senior Lecturer/Programme Manager – MSc Veterinary Physiotherapy (Hartpury University).

As well as teaching students and horse owners, she undertakes research and runs her own physiotherapy practice in Devon, with the focus on treatment and rehabilitation of leisure and competition horses.

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## DR TIM PARKIN

Head of School and Professor of Veterinary Epidemiology at Bristol Vet School

Tim Parkin is Head of School and Professor of Veterinary Epidemiology at Bristol Vet School. He qualified from the University of Bristol with degrees in Zoology (1992) and Veterinary Science (1998).

He immediately took up a position at the University of Liverpool and completed his PhD on the epidemiology of fractures in racehorses in 2002. He is a Diplomate of the European College of Veterinary Public Health and was awarded Fellowship of the Royal College of Veterinary Surgeons in 2018.

# SPEAKERS



## DR HAYLEY RANDLE

Assoc. Prof. Equine Science Charles Sturt University

Hayley is Associate Professor of Equine Science at Charles Sturt University, Australia. Before emigrating to Australia in 2016 she worked at Duchy College and Plymouth University in the UK, as an Academic Lead and Researcher. She has made significant contributions to the Quality Assurance of degree level courses in the UK through her work as a QAA reviewer for over a decade. She is passionate about animal welfare and makes national and international contributions. She has an Australian government appointed Animal Welfare advisory role, is an active member of The National Primary Industries Animal Welfare Research, Development and Extension Strategy (NAWDRES) and two international journal Associate Editor (equine specialism) roles. She has been with ISES since its inception and has held the Honorary roles of Secretary, Junior Vice President, President and Senior President. She is now an ISES Honorary Fellow and ISES Trustee and has been actively involved in shaping the ISES strategies including as a Positive Influencer for the next five years. She has worked tirelessly with a very supportive Equine Science team at Charles Sturt University to produce a contemporary and very popular set of degree courses within the School of Agricultural, Environmental and Veterinary Sciences, where she is also an Associate Head of School. She likes nothing more than seeing her students thrive, and is very proud of both her undergraduates contributing to change in the equine industry and post graduate students engaged in cutting edge equitation science research. In her spare time she enjoys spending time with her two horses and three ponies, two kelpies and border collie and trying to be creative making social media videos of her dirt bike crazy son.



## DR GEMMA PEARSON

Veterinary Surgeon and Director of Equine Behaviour  
at The Horse Trust

Gemma combines her time between research and outreach on behalf of the The Horse Trust and seeing clinical equine behaviour cases where she is based at the University of Edinburgh. After working in ambulatory practice Gemma moved to the Dick Vet where she completed a rotating residency programme in the equine hospital, completing her Cert AVP (EM), alongside an MScR investigating horse veterinarian interactions. Subsequently she completed her CCAB (certified clinical animal behaviourist) and her PhD thesis 'Stress in equids undergoing veterinary care and the development of interventions that positively influence the horses' experience'. As the Veterinary Liaison Officer for the International Society for Equitation Science, Gemma is passionate about improving interactions between horses and people, specifically regarding the application of learning theory. In her spare time she has competed up to advanced level endurance on a homebred horse as well as enjoying competing in affiliated dressage and eventing. Currently she is retraining a Horse recently retired from racing.

# SPEAKER ABSTRACTS



# MACHINE VISION IN AGRICULTURE

Dr Wenhao Zhang

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This presentation introduces a wide range of research works at the Centre for Machine Vision (CMV) in the Bristol Robotics Laboratory at the University of the West of England Bristol. As well as giving an overview of selected CMV works on manufacturing, security, biometrics, and healthcare, this presentation places a focus on agriculture technology enabled by machine vision. The increasing demand for crop yield and efficiency associated with a lower labour cost has given rise to many new and inter-disciplinary opportunities. Offering expertise such as 3D and hyperspectral computer vision, machine learning including deep learning, and development of solutions in real-world scenarios, the CMV has contributed to the agri-food sector through fundamental and applied research, and collaboration with academic and industrial partners. Some representative examples include automated assessment of body condition scores of dairy cows, detection of lameness, detection of different cow hoof conditions, plant phenotyping, and crop recognition, sizing, and grading.

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# Defining and Measuring Performance in Horse Sport

David Marlin, Cambridge, UK

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The term "performance" is usually used in the context of how well a task is done or how well an individual compares with pre-defined criteria for a population. There are numerous examples of performance in a wide variety of contexts. For example, growth performance of new-born babies against the well-established "normal" of expected growth curves, milk production performance in the dairy industry, and the performance of cars or computers. For the latter, an engine performance is measured against well-established and understood industry standards such as torque or fuel efficiency. For computers, the performance is usually referred to as benchmarking and involves running a series of standardised tests and measuring the speed at which these can be completed.

Performance in human sport involves a complex interaction between innate (genetic) characteristics, training and fitness, health, emotion/behaviour/psychology and in competition strategy. In equestrian sport the complexity is even higher due to the combination of the rider and the horse, with the horse also essentially subject to most of the same performance influences.

In the equestrian world, perhaps with the exception of breeding, performance is almost always defined in a competitive environment. But whilst in most human sport performance is objective or quantitative, equestrian performance often involves some degree of subjectivity/qualitative analysis or is wholly subjective/qualitative. Showing, vaulting, dressage and reining for example are all "judged" and the winner is based on opinion, which is clearly subjective. At the other end of the spectrum we have showjumping which has very clear and defined performance criteria used to determine the winner i.e. fastest time over the course without penalties (knockdown, refusal, etc). Other equestrian disciplines have both components of subjectivity and objectivity. For example, in endurance whilst the speed is measured objectively, the veterinary examinations are subjective. Similarly, in racing, performance may be subjective or objective. In trotting racing, the mile time is the prime performance determinant. However, in flat-racing, whilst the time is recorded, a horses rating is often based on subjective criteria or prize-money rather than speed.

Within equestrian competition, measuring and tracking performance can be challenging due to the specific nature of competition. For example, whilst performance in showjumping is objective, course design is individual such that no two courses are likely ever the same due to fence types, distances between jumps and order in the course. Similarly, in dressage, a combination of subjective evaluation of performance and the large variety of tests make tracking performance very challenging. In eventing the cross-country in particular can be extremely variable between events due to factors such as fence type and design, terrain and climate.

Measuring performance in equestrian sport is clearly beneficial for tracking and optimising performance for individual riders and or teams or owners. However, for organisers, course designers, governing bodies and other stakeholders it is also vital that they assess and track performance to ensure competitive demand is appropriate to differentiate horses whilst at the same time minimising the risk of injury.

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## Positive 'partnerships' – horses and humans, different perspectives, shared goals?

Nat Waran (a), Jane Williams (b), Hayley Randle (c)

(a) Eastern Institute of Technology, New Zealand.

(b) Hartpury University, United Kingdom.

(c) Charles Sturt University, Australia.

Horse and human have had a long association; initially as a source of food, then for utility as transport and traction and now increasingly valued for leisure and sport. Over time the role of the horse in many societies may have changed, but arguably the horse still remains a service or utility animal, often much loved and valued, but where the power differential is such that the horse is not our equal. The question is, does this matter from the horses' point of view?

The way we describe a relationship will influence our expectations, attitudes and behaviours. Relationships take many forms including; personal, social and transactional and they may be positive and/or negative. The concept of agency is an attempt to recognise animals as subjects, that is sentient beings who are capable of having subjective experiences and relationships, and who have a right to give and withdraw their consent to engage with us. So how should we describe the relationship we have with horses? In equestrian circles, it's common to hear this described as a partnership with both parties working in harmony with each other, even sharing the same goals. However, the term 'partnership' implies mutual consent, that the horse has agency and shares equal rights, and has the ability to end the relationship. In addition, the significant power differential between human and horse makes the horse vulnerable and especially at risk where the choices made regarding them are entirely in the hands of the human who may prioritise performance goals and prizes. This makes the horse a vulnerable party in the relationship.

We argue that rather than assuming we know how a horse experiences their interactions with us, we should acknowledge the important role horses play in our lives, the service they provide to us, and recognise that this is provided in exchange for some form of compensation. To be a good partner in this relationship, we must strive to define and promote a good life for horses including positive relationships between horse and humans is based on mutual benefit, trust, co-operation, predictability and equine-centred care, and where there is provision for horses to express their agency, with their species specific and individual needs enabled. This will rely upon consideration of the appropriate nature of the living and working environment they experience, including the attitude, expectations and actions of their rider/handler. We need human actors to be accountable to in the relationship, and in their interactions to consider "what's in it for the horse?"

Horses and humans may or may not share similar goals in relation to performance or everyday life—our ability to communicate is limited, however as the main beneficiary in the relationship and with the horse dependent upon us for their needs to be met, we must realise that whilst we have different perspectives, we have a shared goal and that is to live a good life.

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# ETHICAL EQUITATION - PROMOTING PERFORMANCE AND POSITIVE PARTNERSHIPS THROUGH EVIDENCE-INFORMED PRACTICE

J.M. Williams (a) and H. Randle (b)

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Equestrianism is popular worldwide, with millions of horses and riders participating in competitive horse sports and non-competitive leisure riding. Horse riders, owners and trainers are responsible for the management of their horses and have a duty of care to engage in practices which optimise equine health and welfare, and that promote ethical equitation approaches. However, many of the common practices and approaches used in the management and training of horses are often founded on tradition, based on anecdotal suggestions from peers, and/or trial and error learning during our own experiences with horses. The reliability of historic and anecdotal training practices used for the horse have been examined by equitation scientists for over a decade, and are now increasingly being challenged by the wider public. There is therefore a need for objective, evidence-informed practice in horse (and rider) training across all equestrian activities and sports. However, the horse-rider relationship is complex, with the experience of the owner/rider and the environment they are within influencing riding capabilities, decision-making and management of the health and welfare of the horses in their care.

Developing and maintaining a strong positive horse-human partnership can promote optimal welfare, management, and performance. Conversely the breakdown of this relationship is often associated with deficits in equine management and training systems, and can compromise horse and rider safety. Added to this, the equestrian sector is complex, with multiple stakeholders and freely expressed perspectives, and whilst common goals do exist, at a user level, individuals can be invested in preserving the traditional approaches or prioritising change for their community. Despite this, horse people are commonly united by their love of the horse and the majority want to do the best they can for the horses in their care. However, they may not know what this is because they cannot access the latest research, or perhaps we as researchers are not always providing this information in a manner which encourages engagement from the wider equestrian sector. This presentation will focus on how we can succeed with science, exploring how industry and researchers can work together to engage in projects and promote effective dissemination to horse owners and trainers. Alongside this it will assess barriers that can preclude engagement from equestrian stakeholders, as well as evaluating how the human 'animal' can shape the horse-human relationship. Overall, it will showcase how adopting evidence-informed, ethical equitation and management practices can improve the partnerships we have with our horses, and can positively impact performance to ensure horses have a good life.

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# PRESENTATIONS AND ABSTRACTS



## KEY INFORMATION ABOUT ISES 2022 PRESENTATIONS AND ABSTRACTS

**Plenaries are denoted by PL.**  
**Research presentations are denoted by RP.**  
**Keynote presentations are denoted by K.**  
**Lightning talks are denoted by LT.**



# ISES MEMBERSHIP

6 LEVELS - HORSE ENTHUSIAST TO ACADEMIC

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The  
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## ABOUT EQUINE REGISTER

Equine Register is recognised as a global leader in animal lifetime traceability, registration, identification, biosecurity technology and database solutions. We are Defra's trusted partner in delivering and managing the Central Equine Database (CED) and National ChipChecker on behalf of the UK government and devolved administrations. The CED holds over 1.5 million equine records from the 81 UK passport issuing organisations.

## ABOUT THE BRITISH HORSE SOCIETY

### ***Our values***

- Horses First - The horse is at the heart of all we do
- One Team - We collaborate with and value our employees, members, supporters, volunteers and partners
- Respect - We deliver with respect, integrity, dedication and passion
- Supportive - We support horses and people to enjoy life together safely
- Excellence - We strive for excellence in everything we do

### ***Our primary objectives, as published in the constitution, are:***

- To promote and advance the education, training and safety of the public in all matters relating to the horse
- To promote the use, breeding, well-being, safety, environment, health and management of the horse for the public benefit
- To promote community participation in healthy recreation involving the horse
- To promote and facilitate the prevention of cruelty, neglect or harm to horses and to promote the relief, safety, sanctuary, rescue and welfare of horses in need of care, attention and assistance
- To promote and secure the provision, protection and preservation of rights of way and of access for ridden and driven horses over public roads, highways, footpaths, bridleways, carriageways, public paths and other land."

## ABOUT BRITISH EQUESTRIAN

As a National Governing Body, British Equestrian works on policy issues with the FEI. It coordinates the British calendar of international events, disciplinary procedures and doping control, and oversees the training of British international judges, stewards, vets and course designers. British Equestrian supports the research work carried out by ISES which informs better equine wellbeing

## BRIDGING THE GAP BETWEEN HORSE WELFARE RESEARCH AND PRACTICAL APPLICATIONS IN EQUINE SPORTS

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### Abstract:

One objective of the Swedish Equestrian Federation states that *"Ensuring the horse's welfare has been, is and will in the future be the single biggest challenge for a quality-assured and sustainable development in equestrian sports at all levels"*.

The Federation has 155 thousand members. About 450 riding schools are affiliated to the Federation, with 10,700 horses and ponies, ie. in average 24 horses/ponies each. Competition activities involve approximately 25,000 licensed riders and 35,000 horses/ponies. In addition, there are many recreational riders with their own horses, who do not participate in competitions.

One main goal for the Swedish Equestrian Federation is that everyone responsible for care and handling of horses should have a good understanding of the basic requirements for good horse welfare. In 2019, the Federation therefore decided to establish its own Horse Welfare Council with the task of strengthening and developing the Federation's efforts for horse welfare (including social licence to operate, SLO).

The Council shall provide advice on an ethically conscious approach to the horse, where knowledge, skills, reflection and understanding are important components. Representatives of science and proven experience have been appointed to the Council, including veterinarians, ethologists, ethicists, trainers, riding instructors, competition riders and an independent horse welfare group.

As a starting point, the Board of the Federation decided that *"The work within the Council should be based on the five domains nutrition, environment, behaviour, health and emotional well-being"*.

The Federation has the objective that all members should have knowledge of "the five domains" and what they mean for horse welfare. An education intervention was launched in 2021 and so far twelve virtual training sessions have been completed. Approximately 150 employees and members have taken part, starting with the Federation's central bodies and the nineteen Regional districts. The long term aim is to reach all clubs and members. In 2022, this will continue parallel with an in-depth training in the domain of horse behaviour.

The intention is to carry out five in-depth training interventions in 2022-2024;

- Horse behaviour, including riders' safety.
- Horse health, including preventive health care and biosecurity.
- Horse environment, including injury prevention.
- Horse feeding (nutrition), emphasis on roughage.
- Horse emotional well-being.

The Federation has also commissioned an external expert to review training and information materials as well as competition rules.

### Lay person's message:

The Swedish Equestrian Federation places the horse's welfare first in all activities. Thus, the Federation Board has recently decided on three important steps that are now being implemented;

1) Directly under the Board, an advisory Horse Welfare Council has been established consisting of scientists and practitioners.

2) A comprehensive education initiative on horse welfare based on the "Five Domains" is carried out in five steps. Current knowledge shall reach out to employees, Federation committees, professionals and individual members.

3) An external horse welfare expert reviews the Federation's regulations, training and information materials to rule out direct errors or contradictions.

**Keywords:** horse welfare, social licence, equestrian federation, five domains, knowledge transfer

## BEHAVIOURALLY ASSESSED EQUINE PERSONALITY IS NOT PREDICTIVE OF PHYSIOLOGICAL STRESS SENSITIVITY

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### Abstract:

Objective equine personality tests enable the selection of horses for roles based on their typical behavioural responses to challenges. In humans and rodents, non-behavioural correlates of personality such as physiological reactivity to stressors have been identified. These traits are relevant to equine welfare and sustainability, yet little is known about their relationship with equine personality. Therefore, it is currently unclear what impact selection for personality has on these factors.

To address this gap, potential neurophysiological correlates of equine personality were explored in a sample of university-owned horses (n=25). Personality was assessed by 3 familiar raters using the Equine Personality Test (EPT), which produces valid and reliable (intra-class correlations: all ICC > 0.7) evaluations of the equine personality factors Agreeableness, Neuroticism and Extraversion. Autonomic and HPA axis reactivity to stressors were assessed through mean heart rate, heart rate variability and salivary cortisol responses to exposure to three mild, acute stressors (novel object, startling stimulus, sham clipping). In addition, hair cortisol concentration was assayed as a biomarker of chronic HPA axis activity.

Agreeableness, Neuroticism, and Extraversion were not significantly correlated with either autonomic or HPA axis reactivity to stressors (Spearman's rank correlations: all  $p > 0.05$ ). This suggests the EPT did not have predictive validity for physiological reactivity to stressors, and that horses identified as non-reactive to stressors on a behavioural basis may not have equally low physiological stress sensitivity. By contrast, hair cortisol concentration was positively associated with Agreeableness (GLMM:  $t=2.7$ ,  $p=0.01$ ), suggesting that habitually compliant horses may experience greater chronic HPA axis activity.

These results raise concerns on the welfare of compliant, non-behaviourally reactive horses. Should they be confirmed by future research, these findings should inform the choice of methods used to select horses for roles, with a view to safeguard not only human safety but also equine welfare.

### Lay person's message:

Objective personality assessment tools are used in industry to select horses suitable for highly demanding roles (e.g. high performance sports horse, police horse) based on their habitual behavioural compliance, with the assumption that this reflects good coping with the demands of the role. However, this study suggests that personality traits assessed through behaviour do not reflect horses' physiological stress responses when confronted with a stressor, and that habitually compliant horses may experience higher levels of chronic stress. Therefore, selecting horses for demanding roles using behaviour-based personality assessment tools may not be sufficient to safeguard welfare in those roles.

**Keywords:** Equine personality; autonomic reactivity; HPA axis reactivity; hair cortisol concentration; coping; equine welfare

## ANTICIPATION OF TROTTING: EFFECT OF RIDER ANXIETY ON PHYSIOLOGICAL AND BEHAVIOURAL MEASURES IN THE HORSE

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### Abstract:

Research examining the effect of rider stress on the horse's physiological and psychological state remains limited. This study assessed the effect of novice rider anxiety resulting from anticipation of a walk-to-trot transition on potential horse stress, as quantified by changes in horse heart rate and behaviour. Seven novice riders who self-reported anxiety about trotting were recruited. Eleven horse-rider pairs (comprising four horses, seven novice riders, and one control rider) took part in ridden trials involving activities typical of a novice-level riding lesson. Riders were told that they would perform sitting trot for approximately five strides between a set of cones (repetitions = four). Horses were led by an experienced leader at all times. Horse and rider heart rate and horse behaviour were recorded continuously. Horse behaviours which may indicate stress (head toss, ears pinned, head raised, head down, head shake, head turn, moving tail, defecation, bite at leader) were quantified using Noldus Observer XT15 and heart rates were analysed using Kubios Standard. Novice rider HR was higher when being verbally introduced to trotting for the first time (at walk) compared to during warm-up (at walk) (Wilcoxon T=0.00;  $p<0.05$ ;  $109.15\pm 17.88$ bpm versus  $102.91\pm 19.10$ bpm). Rider HR was also higher (Wilcoxon T=0.00;  $p<0.05$ ) during the preparation to trot phase compared to during the introduction to trotting and to all other trial phases. No effects were seen with the control rider (all  $p>0.05$ ). Neither horse HR nor behaviour differed significantly between phases of the trials with novice riders (all  $p>0.05$ ). Overall, novice rider anxiety regarding trotting did not have a significant effect on the horse's physiological or psychological state based on the parameters measured. One possible reason for the absence of observable effect on the horse was the lack of direct physical influence which nervous riders had on the horse due to the presence of a horse leader and the rider holding the reins at a consistent, pre-determined rein length. This contrasts with previous research which showed an effect; however, riders determined rein length in previous work, and shortening the reins may have induced a stress response in the horse. Contrary to common belief, anxious/fearful riders did not have a negative impact on the horse. The lack of apparent stress in horses observed in this study has positive implications in relation to equine welfare when rider influence over the horse is managed. These findings are directly applicable to practice and positive wellbeing in horse-rider interactions.

### Lay person's message:

Currently, the effect of rider anxiety on the horse is unclear. This study found that although novice riders showed an increase in heart rate when anxious about trotting for the first time, this did not cause significant changes in the ridden horse's behavior or heart rate. This may have been due to the riders having a loose rein whilst being led. These findings, which suggest horse welfare is not negatively impacted by novice riders when being managed by a leader, may apply to similar led-riding contexts such as adaptive/therapeutic riding, lead-line lessons, and children's guided pony rides.

**Key words:** heart rate, behaviour, welfare, stress, riding, leading, horse-rider interaction



# PREVALENCE OF CONFLICT BEHAVIOUR IN ICELANDIC HORSES DURING ELITE COMPETITION

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## Abstract:

Horse sport organisations are obliged to ensure the welfare of competition horses, and most organisations state that horse welfare is a top priority. Nevertheless, behavioural signs of potential discomfort or frustration shown by the horse during training and competition, such as opening of the mouth, sudden head movements, undesired gait changes or tail swishing, are often overlooked. Previous studies reported the prevalence of these types of behaviour (commonly presented jointly as 'conflict behaviour') in dressage and show jumping warmblood horses, whereas there is limited information on Icelandic horses. This study aimed to investigate the prevalence of conflict behaviour in Icelandic horses competing at elite, i.e. highest, level. Online video recordings from a competition in Iceland (MD22; Fivegait F1, n=25 horses, and Tölt T2, n=24 horses) were used to record previously described conflict behaviour, which may be a sign of discomfort and/or frustration. The recordings were viewed at slow speed (x0.25) enabling a detailed recording of the horses' behavioural expressions (inter-observer reliability:  $r_s=0.79-0.99$ ,  $P<0.001$ ). Mouth opening (defined as separation of the teeth) was the most frequently observed behaviour, and was more prevalent (frequency/minute, median and quartiles [25;75%]) in ambling pace (31 [17;48]) and tölt (30 [12;46]) compared to walk (6 [2;19]), trot (12 [5;30]) and canter (20 [6;38]) in Fivegait F1 (Friedman RM ANOVA on Ranks,  $\chi^2=27.0$ ,  $P<0.001$ ). In T2, mouth opening was more frequent in slow tölt (25 [18;36]) than during loose-rein tölt (4 [1;7],  $\chi^2=16.7$ ,  $P<0.001$ ). Sudden head movements (freq. range 0-25/min), tail swishing (0-38/min) and undesired gait changes (0-16/min) occurred less frequently. In addition, an elongated upper lip was observed in 12 of the 24 participating horses in T2, but only in slow tölt. It is concluded that mouth movements (open mouth and elongated upper lip) are common behavioural expressions in Icelandic horses competing at elite level. Further studies are required to reveal the significance of these behaviours in terms of horse welfare.

## Lay persons message:

The welfare of competition horses is of key relevance for continued public acceptance of the sport. Awareness of behavioural signs of potential discomfort or frustration (often labelled 'conflict behaviour') is an important first step towards welfare improvements. This study investigated the prevalence of conflict behaviour in Icelandic horses during elite competition. Mouth opening was the

most frequently occurring behaviour, shown by all but one horse. The causes of mouth movements and upper lip tension should be further scrutinised.

**Key words:** Conflict behaviour, Elite competition, Icelandic Horse, Performance, Welfare

## WHIP USE IN HARNESS RACING – IS WHIP USE INCREASING SPEED?

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### Abstract:

Whip use in equine sports is heavily debated, arguments for whips being; safety, correction of misbehavior (i.e. punishment), speed increase and speed maintenance. However, no evidence show that whips actually make horse racing safer. Studies of thoroughbred races indicated that whip use reduce velocity and performance but this might not apply to harness races with the driver in a sulky. At the end of a harness race drivers often hit the horses repeatedly, but if the horse loses its position, potentially due to fatigue, hitting stops. Operant conditioning (negative reinforcement) predict that drivers then effectively teach horses to slow down when hit. This is the complete opposite of the intended.

The aim of this study was to investigate whip effect on speed and if whip use may be an example of negative reinforcement of speed reduction.

Videotapes (whip use) and transponder position data (velocity m/s) from 16 higher level trotting races in 2018-2019, and 48 horse-driver dyads, were analysed. Top three drivers' whip use was registered during the last 800m of the race, divided in four track parts. Speed when hit, change in speed three seconds after the hit; number of previous hits and interactions between distance from goal and speed difference, were registered.

Effect of hit was modelled (mixed GLM; speed increase/decrease three seconds post hit) with distance to goal, velocity change in the three seconds before the hit, current speed, and number of previous hits as explanatory fixed factors. The horse-driver dyad and an AR(1)-component over time were random factors. Connection between number of hits and final position was tested in a one-way ANOVA, with number of hits as the explained variable, the finishing position as the explanatory factor, and race as a block.

Number of hits/horse averaged 5.6 (range 0-16). Five horses got no hits. Most horses slowed 3 seconds post hit compared to at-hit-speed; 106 decreased, 35 maintained speed and 82 increased. Decreasing v increasing in a binomial test  $p = 0.093$ . Number of hits did not affect speed change ( $p > 0.05$ ) or finishing position ( $p > 0.05$ ).

In conclusion hitting the horses was followed by speed reduction. It is possible that hitting the horses when tired and stop hitting when the horse reduce the speed may work as negative reinforcement teaching horses to slow down when being hit.

### Lay person's message:

Higher level trotting races and the horses placed 1-3 were studied. Whip use was connected with horses running slower at the end of the race. Whip use was not connected with speed increase or final position in the race. Speed changes of horses not being hit at all, and safety effects of whips remain to be studied.

**Keywords:** whip use, negative reinforcement, trotters, welfare, racing

## PERCEPTIONS AND MEASUREMENTS OF NOSEBAND FIT BY CANADIAN EQUESTRIANS

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### Abstract:

Recent concerns regarding horse welfare during competition have encouraged some countries to adopt regulations for noseband fit. Current rules are often vague, e.g. “noseband may never be so tightly fixed as to harm the horse.” To investigate the need and acceptance prior to any rule changes Equestrian Canada launched a pilot noseband measuring project. Nineteen officiating stewards measured noseband fit using the ISES taper gauge (TG) at equestrian events for dressage, para-dressage, jumping, eventing, and vaulting in 2021. Additionally, stakeholder surveys collected data from 1528 Equestrian Canada sport license holders (SLH) and 27 stewards regarding opinions and perceptions on noseband use, fit, measurement and rules. Descriptive and qualitative statistics were performed along with Pearson chi-squared to examine relationships between discipline and role in the equine industry, and opinions and perceptions on noseband use, fit, measurement and rules. Of the 551 horses tested with the TG, 71% (n=386) passed the 1.5cm (~2-fingers) measurement and an additional 19% (n=105) passed the 1cm (~1-finger) measurement. Almost half of the horses (49%, n=272) wore a standard cavesson with 21% (n=117) wearing a flash noseband, 8% wearing a crank (n=46), 5.4% wearing a figure 8 (n=30), 4% wearing a drop (n=20) and 21% wearing other (n=66) types of nosebands, mainly Mickles. Stewards unanimously (n=27) agreed that overtightened nosebands present a welfare issue although 63% (n=17) believed this to represent only a small subset of riders. While 60% (n=16) of stewards believed the current rules are sufficient, 40% (n=11) did not. Despite the fact that 84% (n=21) of stewards believe there should be a standardized fit across disciplines, 52% (n=13) felt the use of the TG should be at their discretion. The top three reasons riders indicated for using nosebands were discipline expectation (41%, n=626), requirement for competition (39%, n=596) or for control/safety (32%, n=489). Open comments referred to an option to not wear a noseband in competition. Professional riders (n=237) believed overtightened nosebands were less of a welfare issue than amateur riders (n=692) (76% vs 89% respectively;  $X^2=6.43$ ;  $p<0.025$ ) and correspondingly did not feel the TG was a fair method (44% vs 68% respectively;  $X^2=7.86$ ;  $p<0.001$ ). Slightly more than half of the respondents (51.5%, n=787) believed that measuring noseband fit on the frontal nasal plane was the appropriate location. More education is needed to inform stakeholders on the reasons for noseband measurements and appropriate fit.

**Lay person's message:** There is a concern for the welfare of competition horses and the issues presented by incorrect noseband fit. Over 70% of competition horse nosebands measured met the 2-finger rule. Riders expressed a desire for an option to not wear a noseband in competition. Professional riders were less accepting of using a taper gauge to measure noseband fit and did not feel overtightened nosebands were as much of an issue as amateur riders. More education is needed on the reasons for noseband measurements and appropriate fit.

**Keywords:** ISES taper gauge; competition; ethical training; equine welfare; competition rules

**FAKE IT 'TIL YOU MAKE IT: A PRELIMINARY EXPLORATION OF CONGRUENCE BETWEEN PHYSIOLOGY AND BEHAVIOR  
IN HORSES DURING HORSE-HUMAN INTERACTIONS**

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**Abstract:**

Are horses as honest as we think they are? Research suggests some horses may express behaviour that aligns with physiological stress markers, while other horses appear to modify their behaviour to mask an internal stress response. Previous studies indicate that horses may not always enjoy human contact from grooming; however, no research currently exists on whether horses mask their stress responses during grooming. Furthermore, grooming is a common horse care and relational activity used in Equine-Assisted Services (EAS). If EAS practitioners misinterpret the absence of observable stress behaviours as signs a horse is enjoying an activity, it is possible that the experience may impact the horse's wellbeing. Therefore, the purpose of this research was to test the concept of congruence between physiological and behavioral indicators of stress in a grooming activity (G) with unfamiliar humans. Researchers collected data during 60, 7-minute grooming sessions from 15 therapy horses. 13 of 15 horses participated in four grooming sessions, with 1–4 weeks ( $M = 3$ ) between sessions. Heart rate variability (HRV) and behaviours were recorded continuously with a Polar V800 and two GoPro cameras on either side of the horse. Eye temperature (ET) was recorded in the indoor research arena at baseline (BL) and after G with a FLIR T530 approximately 1m from the horse, at a 90° angle to the right eye; ambient temperature and humidity were recorded for inclusion in the analysis. A mixed effects model showed a significant decrease in HRV from BL to G ( $p = 0.04$ ), indicating sympathetic arousal, but no difference in ET. Behaviours were analyzed in Noldus Observer XT using rate per minute and percent duration for point and state behaviors, respectively. Spearman's rank testing showed no significant correlations between HRV, ET, and stress behaviours (i.e., neck above withers, ears tense) (HRV:  $\rho = -0.16$ ; ET:  $\rho = -0.24$ ) or neutral/positive behaviours (i.e., neck below withers, cocked hip) (HRV:  $\rho = -0.14$ ; ET:  $\rho = 0.27$ ). The lack of correlation between sympathetic activity and displayed stress behaviours suggests horses may not consistently demonstrate behaviours coinciding with physiological stress. Our results also suggest that physiological measures of stress may not always agree, which aligns with previous research. The apparent lack of congruence found may indicate that equine stress is underestimated in horse-human interactions like grooming, and further research is warranted to better understand the complex processes influencing equine behavioural expressions of stress during horse-human interactions.

**Lay Person's Message:** Horse-human interactions are a core component of Equine-Assisted Services (EAS). Therefore, it is important to understand how interactions such as grooming impact the horse. This analysis explored the co-occurrence of behavioural and physical indicators of therapy horse stress during a 7-minute grooming session. The results suggested that therapy horses did not appear to consistently show behaviours that mirrored their internal stress levels during the grooming activity. The implications for therapy horse welfare will be discussed.

**Key Words:** Equine-Assisted Services; horse-human interaction; heart rate variability; stress; quality of life

## TOWARDS AN EVIDENCE-BASED PREDICTIVE MODEL FOR SUCCESS IN EVENTING

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### Abstract:

The equestrian sport of eventing involves competing in three disciplines: dressage, jumping, and cross-country. Competitors are ranked at the end of all three phases according to the number of penalties they accrued; with those who have fewer penalties ranked higher. Understanding factors associated with good performance can help athletes and trainers plan strategically for success. This study, examined a large data set that included every horse start made at international level over an 11-year period. The objective of the study was to identify factors associated with completing the cross-country phase with zero penalty points. This retrospective cohort study included the detailed event-level and horse/athlete performance history of 187,602 horse starts in all international, championship, Olympics, and World Equestrian Games eventing competitions between 2008 and 2018. Potential risk factors were analysed using univariate logistic regression to identify candidates for the final multivariable model. A multivariable logistic regression model was constructed using a stepwise bidirectional process assessed for fit at each step. The final model was validated by testing for confounding, second-order interactions, and random effects. Sixteen factors at event-, horse, and rider-level were associated with completing cross-country with zero penalties. Factors included prior performance and experience of both horse and rider, event level, and performance in the dressage phase of the same competition. For example, combinations competing in 4\* events were less likely to run clear (odds ratio 0.65 [95% confidence interval 0.55-0.77]). Combinations with clear runs in their previous three competitions were more likely to run clear (1.54 [1.43-1.66]). Combinations who stepped up a level were less likely to run clear (0.82 [0.78-0.87]) while those stepping down a level were more likely to run clear (1.36 [1.28-1.44]). This study provides a framework for a predictive model which could help athletes and trainers to understand the appropriate level of competition for any particular horse/rider combination, given the competition history. Evidence-based advice for athletes and trainers is crucial to planning for future success. By assisting stakeholders in making sure they enter their horses into competitions at an appropriate level and with proper preparation, there may be an additional benefit in terms of safety and to equine welfare by reducing the likelihood of a combination falling during cross-country.



**Lay-person's message:**

Eventing is a challenging sport including three phases: dressage, show jumping, and cross-country. Cross-country involves riding at speed over a course of fences. Horse/athlete combinations are given penalty points if they commit a fault at a fence, including if the horse refuses to jump. The highest-ranked combinations often receive zero penalties, also called 'running clear'. Analysis of ride data covering an 11-year period found sixteen factors that helped the best competitors run clear. This is the starting point for establishing a scientific 'performance profile' which can help athletes and trainers plan for future success, and safeguard safety and welfare.

## HORSES' VOLUNTARY ACCEPTANCE OF REIN TENSION AND DISCOMFORT-RELATED MIMIC WITH SINGLE- VS. DOUBLE-JOINTED SNAFFLES

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### Abstract:

In practice, little objective information exists on the effects of different bits on horses. For example, while some consider a double- rather than single-jointed snaffle to be softer, others propose a painful 'nutcracker-action' of the double-jointed bit. Therefore, 12 leisure and/or low-level competition horses (n=5) or ponies (n=7), all usually ridden with a single- (n=6) or double-jointed (n=7; one horse was familiar with both) snaffle bit, were equipped in a cross-over design with their usual bridle and snaffle or the respective other bit fitted to each horse's size. In part A of the experiment, reins were equipped with a digital tension meter, fastened behind the withers to a lunging girth and adjusted to a length that allowed the horse to hold the forehead 5-10° in front of the vertical. Subsequently, horses were enticed with food to encourage them to stretch against the reins, while standing. This procedure was repeated a total of 7 times per horse and bit type, and maximum tension per trial was recorded. For part B of the experiment, six of the ponies were available and ridden by their regular riders in a simple dressage pattern involving halts, walk, trot and canter with each bit type. Using video-recordings, a total mimic score was assigned to each pony as a maximum score per gait using the Horse Grimace Scale (HGS; scoring 6 pain-related aspects of equine mimic) plus an additional score for mouth opening (all ranging from 0 (no discomfort /pain) – 2 (mimic pattern indicative of severe pain/discomfort)). Mixed model analysis revealed no significant difference in total mimic scores between single- vs. double-jointed snaffles or between the pony's' familiar vs. unfamiliar bits (both  $P > 0.05$ ). Similarly, there was no significant difference in maximum rein tension accepted with the different bit types ( $F_{1,153} = 0.00$ ;  $P = 0.9756$ ). However, horses tolerated increasingly stronger pressures over successive trials ( $F_{1,153} = 29.01$ ;  $P < 0.0001$ ) and accepted stronger pressures with their usual ( $86.1 \pm 14.6$  N) rather than the unfamiliar bit ( $70.1 \pm 14.7$  N;  $F_{1,153} = 9.16$ ;  $P < 0.0029$ ). Ponies tended to tolerate higher pressures compared to horses ( $F_{1,153} = 3.6$ ;  $P = 0.0596$ ). In conclusion, the present study showed that horses' acceptance of single- and double- jointed snaffles is comparable. Compared to bit-type, horses' familiarity with a given type of bit seems to play a more important role with regard to maximum pressures accepted by the horse. This should be kept in mind when trying out new bits as horses' initial reaction may not reflect their reactions in a long-term.

### Lay person's message:

Bit choice is a frequent topic of debate among riders/trainers. Aim of the present study was to compare single- and double-jointed snaffle bits. Horses' acceptance of the two bits was similar as they did not

differ with regard to rein tension tolerated voluntarily by horses when trying to reach a food reward nor with regard to pain-related mimic during riding. However, horses accepted higher rein tension with their familiar rather than the unfamiliar bit, regardless of bit type. Therefore, new bits should be tested over a longer period of time to obtain a realistic impression how the horse accepts it.

**Keywords:** Rein tension; bit; single-jointed snaffle; double-jointed snaffle; Horse Grimace Scale; discomfort behaviour

**BIOSECURITY AND THE LIVERY YARD: COMPARING ATTITUDES TO HORSE VERSUS HUMAN RISK IN RELATION  
TO COVID AND STRANGLES**

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**Abstract:** Biosecurity on livery yards is concern in the equine veterinary world, because of horse turnover, frequent mixing at riding club and competitions, and infrequent isolation practices. Comparing attitudes to human and animal health can provide insight into community values and behaviours. This study compared livery yard owner/manager (LYO/M) concerns around an international human disease outbreak (COVID-19) with a common equine disease outbreak (Strangles (*Streptococcus equi equi*)).

**Methods:** 40 LYO/Ms were interviewed about their experience of yard management, with reference to preventing and managing human and horse disease outbreaks. Semi-structured interviews were conducted, audio-recorded, transcribed, and analysed according to a constructivist Grounded Theory methodology. COVID-19 yard management was discussed via online interviews; Strangles yard management was discussed during in-person interviews, and additionally in COVID-19 interviews if those participants had experiences Strangles outbreaks also. In all, 10 yards had experiences Strangles outbreaks.

**Results:** Both COVID-19 and Strangles were constructed by most LYO/Ms as invisible, frightening threats to health which came from a risky “outside” (for example, a supermarket or horse show, respectively). In those outside environments, the behaviour of others was constructed as careless and dangerous. All LYO/Ms described similar strategies for horse and human biosecurity, including quarantine, segregation of high-risk groups, and additional hygiene practices. However, the degree to which they implemented such measures depended on their view of the severity of COVID-19/Strangles, and this varied across respondents. However, because of the invisible nature of both diseases, thorough and proactive risk management was generally only used in relation to tangible risk (for example, local or recent outbreaks). Risk mitigation behaviours were described as “strict” and “mean” because of limiting horse/human socialisation. Horse welfare (both physical and mental wellbeing) was almost always prioritised over biosecurity; for example, many yards decided not to quarantine new horses because isolation is considered stressful for horses. Human ill-health was considered significantly less important compared with horse wellbeing, and owners and LYO/Ms were willing to risk their own health in order to maintain their standard horse management.

**Conclusion:** Providing strategies for optimising equine wellbeing within biosecurity practices is likely to improve uptake of equine biosecurity practices.

**Lay-person message:** Biosecurity is important in managing disease outbreaks for humans and animals alike, and requires similar practices such as quarantine, segregation of at-risk groups, and good hygiene. Because of frequent human and horse movement, livery yards can be difficult environments for maintaining good biosecurity. This study found that yard managers were more likely to conduct extensive biosecurity only in relation to imminent risk, and biosecurity practices were negatively viewed – particularly when they might make horses more stressed (for example, when horses need to be isolated). People were willing to risk human infection in order to provide horse care.

**Keywords:** biosecurity; Covid-19, infectious disease, behaviour change; qualitative research

## EFFECT OF CIRCLE, SPEED AND SURFACE ON HEAD AND PELVIS MOVEMENT IN HORSES WITH PRE-EXISTING STRAIGHT-LINE MOVEMENT ASYMMETRIES

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### Abstract:

Lungeing is used to evaluate movement of horses yet better understanding is required of how different exercise conditions affect movement asymmetries. This study aimed to quantify how upper body movement asymmetries change for different combinations of speed, direction and surface. Movement asymmetries were quantified in 75 horses (lameness grade  $\leq 2$ , 0-5 scale) during trot in-hand (straight) and lungeing (d = 10m/15m) on two surfaces (hard, soft) at two speeds (slow, fast). Horses were grouped according to predominant forelimb or hindlimb asymmetry on the straight (slow, hard condition) based on the differences between vertical displacement minima or maxima of head ( $|HD_{min}|$ ,  $|HD_{max}| \geq 6\text{mm}$ ) and pelvis ( $|PD_{min}|$ ,  $|PD_{max}| \geq 3\text{mm}$ ). All asymmetries were normalised to the right limb (negative values inverted) and the lungeing direction was relabelled as 'inside' (right rein) and 'outside' (left rein) resulting in 5-level direction variable (straight, inside10/15, outside10/15). Four linear mixed models were implemented - outcome variable: head or pelvis movement asymmetry parameter; random factor: horse; fixed factors: surface, speed, direction and their interactions ( $P < 0.05$ , Bonferroni post-hoc correction). Compared to the straight line, horses became less asymmetrical during lungeing when the limb to which the predominant asymmetry was assigned to was on the inside ( $HD_{min}, p \leq 0.04$ ;  $HD_{max}, p = 0.03$ ) or on the outside ( $HD_{min}, p = 0.01$ ;  $PD_{min}, p < 0.001$ ;  $PD_{max}, p \leq 0.003$ ). The horses became more asymmetrical only for  $PD_{min}$  with the limb associated with the straight-line asymmetry on the inside ( $p < 0.001$ ). Neither the circle size nor speed significantly influenced asymmetry. Surface only affected  $PD_{max}$  with greater asymmetry on hard surface ( $p = 0.047$ ). Our results suggest that movement asymmetry is predominantly influenced by direction rather than surface, speed or circle size. Movement asymmetries observed on a straight line can decrease or increase during lungeing. Pelvic movement asymmetry showed consistent patterns while head movement was more variable reflecting individual movement strategies of the horses.

**Lay person's message:** Lungeing under different conditions is used to evaluate movement asymmetry in horses but better understanding is needed of how circular motion, speed and surface affect movement asymmetries. Our results suggest that movement asymmetry observed on a straight line can decrease or increase during lungeing. While pelvic movement asymmetry showed systematic changes, the head movement was more variable reflecting individual movement strategies. Surprisingly, surface, speed and circle size did not have a significant effect. Further studies of horses

with specific orthopaedic diagnoses are needed to establish whether evaluating horses under additional exercise conditions can provide further insights for the evaluator.

**Keywords:** movement asymmetry, gait analysis, equine welfare, kinematics, lungeing, equine lameness

## THE EFFECTS OF PLAITING ON STRESS AND SCORING IN DRESSAGE HORSES: A PRELIMINARY STUDY

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### Abstract:

Plaiting is common practice in dressage and showing, and may pose a welfare risk, as evidence has shown mane pulling induces a stress response in horses, and tight braiding has been found to be harmful to humans. This study aimed to investigate whether plaiting evokes changes in heart rate (HR) and performance of conflict behaviours in horses pre, during and post exercise, impacting performance and welfare. Six horses (mares = 3; geldings = 3) of varied breeds, a mean age of 12.6" years and different competition levels (BD Preliminary–BD Elementary), were observed, one day being plaited and performing a dressage test and another day, performing the same test unplaited. Data were collected during the plaiting procedure, warm-up, dressage test, and cool-down; HR was collected using a Polar Equine H10 Belt, frequency of conflict behaviours observed during the entire plaiting process and dressage test was recorded in an ethogram and a qualified judge scored the combinations as part of an online dressage competition. The tension applied by each plaiter was measured, in kilograms, using an analog Kraftmann 8034 Fish-Hook Scale. Statistical analysis was performed using IBM SPSS 26. A Paired Samples T-Test was used to test for differences comparing plaited and unplaited data, and Day 1 and Day 2 data; an Independent Samples T-Test for differences between sexes, plaiters and presence/lack of hay during the procedure; a Kruskal-Wallis Test for differences in breeds and competition levels; and a Spearman's Rank Correlation for age-related correlations. There were no significant ( $P < 0.05$ ) differences between plaited and unplaited conditions in terms of HR, conflict behaviours and dressage scores. However, on Day 2, regardless of plaiting, mares presented higher HR values compared to geldings ( $P = 0.016$ ), otherwise there were no significant results. No negative effects of plaiting on welfare and performance were observed; non-significant differences pose the possibility of the plaiting process and tension this created being akin to allogrooming, thus reducing levels of arousal, below that needed for optimal performance according to the Yerkes-Dodson law. This study was limited by its sample size, horses being accustomed to plaiting in order to gain institutional ethical approval, and the effect of movement on HR measurements. Further research could focus on the human perception of plaiting practices, measuring how long habituation to this process takes in naïve horses, and whether at tensions higher than presented in this study, it is stress inducing.

### Lay person's message:

Plaiting or braiding a horse's mane is common practice in the discipline of dressage and showing, but little is understood about its effect on welfare and performance. This study found that, when plaited, horses did not present abnormal stress or reduced performance. The tension applied when plaiting



was likely not enough to induce a stress response, considering the horses were used to plaiting, and this process, similar to grooming seen amongst horses, might have actually been tension-relieving. More information is needed on how humans perceive plaiting and whether higher tensions would negatively affect horses' welfare and performance, especially unhabituated ones.

**Keywords:** plaiting, stress, horse, dressage, equine welfare, performance

## Conflict behaviors displayed by horses during dressage tests and their relationship to performance evaluation

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### Abstract:

In the equestrian sport of dressage, it is important that the behaviour encouraged through judging is based on correct and welfare-centred training techniques. This study aimed to investigate the occurrence of equine conflict behaviours during Preliminary, Novice and Elementary level British Dressage tests, and to examine the relationship between these and performance evaluation by the judge. Data were collected from 449 movements within 75 dressage tests in November and December 2019. Each test was filmed, and the scores allocated by the judge were collected. Between five and seven movements within each test were analysed using an ethogram and the frequency of conflict behaviours displayed used to derive a conflict behaviour score for each movement. These behaviours were recorded in six subsections: head, ears, mouth, tail and whole body. Certain behaviours ('conflict behaviours') in the ridden horse can result from unclear or conflicting cues from the rider. These behaviours were seen in 97.6% of the movements analysed, with horses displaying two or more conflict behaviours in 83% of movements. Mean conflict behaviour score was  $4.35 \pm 1.997$  (where a score of more than two indicates the horse displayed at least two conflict behaviours) with a minimum of 0 and a maximum of 12. A linear mixed effects model found a weak relationship between judge score and conflict behaviour score ( $p < 0.001$ ; correlation coefficient estimate =  $-0.07 \pm 0.02$ ). Horses showing no whole-body conflict behaviours gained significantly higher judge scores than those who did ( $p < 0.001$ ; correlation coefficient estimate =  $-0.71 \pm 0.09$ ). Horses with their nasal plane on ( $p = 0.005$ ; correlation coefficient estimate =  $0.25 \pm 0.09$ ) or less than  $30^\circ$  behind ( $p < 0.001$ ; correlation coefficient estimate =  $0.39 \pm 0.10$ ) the vertical were awarded higher marks than those with their nasal plane less than  $30^\circ$  in front of the vertical. Judge scores were significantly higher for movements in which horses had their ears forward compared to those in which ears were held back ( $p = 0.003$ ; correlation coefficient estimate =  $0.32 \pm 0.11$ ). No associations were found between judge score and mouth or tail behaviour. Although conflict behaviours occurred in almost all the dressage movements analysed there was only a weak association with performance scores, and only when the behaviour involved the horse's whole body and/or the head and neck. Behavioural signs of conflict are indicative of compromised welfare in ridden horses and the results of this study suggest that a greater focus on such behaviour should be included in dressage judge training and be used in competition.

**Lay person's message:** Unclear or conflicting cues from a rider can result in horses displaying certain behaviours ('conflict behaviours'). This study looked at 449 movements within 75 British Dressage tests and found these conflict behaviours occurred in almost all of them, however, scores awarded by the judge were generally only associated with behaviours involving the whole body (e.g. bucking) or the head and neck. Conflict behaviours involving the mouth and the tail had no significant effect on judge score. These conflict behaviours are indicative of compromised welfare and therefore could be used to improve training of dressage judges.

**Keywords:** Equine, Welfare, Conflict behaviour, Dressage, Performance, Equitation

## DETERMINATION OF TONGUE-TIE USE IN RAZA CHILENA BREED HORSES

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### Abstract:

Equids have been used by humans for different purposes including equestrian sports. To increase control of horses, practices include the use of tongue-ties which restrict tongue movement. Social concern exists about the effect of this practice on horse welfare. The aim of this study was to determine tongue-tie practices in Raza Chilena breed horses, used during Chilean Rodeo competition. A telephone or direct interview survey was administered to 70 horse trainers and raiders. The survey included 4 general information questions, and 13 questions regarding application and use of tongue-tie. Respondents were on average 42.9 years old, with 97% being men. Most respondents (95.7%; n = 67) stated that tongue-ties were used to prevent movement of the tongue over the bit. In 92.5% of the cases, the practice was not recommended by a veterinarian. Most tongue ties were made from cloth (97% n=65) and 77.6% of respondents begin with this practice during backing. 89.5% of respondents reported tying the horse's tongue to train them, and leaving it tied from 30 minutes to 1 hour (70%). During competition, 79.1% reported competing in Chilean Rodeos with their horses' tongues tied and of these, 43.4% used a tongue tie every time competed. In competition, 75.5% of respondents answered they used a tongue tie for at least 20 minutes before the start of the competition, with 71.7% leaving the horse's tongue tied for more than 60 minutes. Most respondents (85%) said they have noticed performance changes in their horses when wearing a tongue tie, citing "calmer animals", horses were "more focused", "better control", "docile", and "soft". A further 64.2% responded have seen changes in the horse's tongue, including changes in color (52%) and inflammation (35%). This study found that tongue tie is a common practice, not associated to veterinary recommendation. During competition tongue tie use is frequent, remaining tied for long periods of time. Although the negative effects of this practice are recognized by respondents, its use is not associated with decreased welfare, which must move us to further increase welfare education for stakeholders.

### Lay person's message:

Raza Chilena horse trainers/riders frequently use tongue-tie during training and competition due to a tradition maintained over the years. This practice negatively affects the welfare of these breed. We need to further educate horse stakeholders in Chile about the negative effects of this practice, and the consequences, both physically and mentally, of using these devices. Not only social license to operate should concern us as equine industry stakeholders, but our focus should be horses' welfare promoting positive welfare states.

**Keywords:** horses, tongue-tie, equestrian sport, equine welfare.

## A PRELIMINARY STUDY INVESTIGATING AUDITORY STIMULATION OF THE HORSE AT PASTURE; BEHAVIOURAL RESPONSES TO THE COLOURS OF NOISE

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### **Abstract:**

Numerous studies continue to attempt to understand equine behaviour and the consequences to human and horse welfare, health, and lifestyle. As such, the constant development of human practices and technology form a host of new stressful stimuli. This study aimed to analyse the auditory stimulation of the horse using the colours of noise and understanding any potential application for reduction of stress. An observational study of behaviours in four horses of varying breeds and a mean age of 12 occurred over three consecutive days during January 2022. Behavioural ethograms were used to monitor and record the responses to each colour of noise; white, pink, grey, violet, and brown as well as a control (no sound). Each noise was played for 15 minutes for a total duration of 1 hour 30 minutes per day with intermittent behaviours recorded every 30 seconds. Maintenance behaviours were tallied and statistically analysed using One-Way ANOVAs. Defecation and urination were observed at a significantly higher rate ( $P < 0.05$ ) during the control than any other sound ( $F = 2.55$ ,  $d.f. = 5$ ,  $P = 0.036$ ). Eating behaviour was observed at a significantly higher rate ( $P < 0.05$ ) during brown noise than any other noise ( $F = 2.92$ ,  $d.f. = 5$ ,  $P = 0.019$ ). Despite lack of statistical significance, grazing was graphically prominent during white and brown noise, locomotion during pink noise, and vigilance during violet noise. Increased defecation and urination, often associated with stress responses, showed significance during the control and possibly the absence of these during auditory stimulation suggests decreased stress. The significance of eating behaviours is also indicative of reduced vision and hence increased vulnerability, then perhaps also reduction of stress. Based on the findings of this study, specific colours of noise may be used as a therapeutic technique to help reduce stress in horses as well as understand better turnout environments affecting welfare.

### **Lay person's message:**

The effect of different noise colours on horses in a field is not known. In this study horses appeared to be less stressed when exposed to any of the noise colours instead of just a background control of no unusual sound and grazed more when exposed to the brown noise. Grazing is seen as a measure of relaxation, as horses cannot detect danger as easily with lowered heads. It is possible the playing of noise colours to horses may relieve stress therefore further research is indicated.

**Keywords:** colours of noise, behaviour, white noise, auditory, stress, welfare

## RETIRED THOROUGHBRED RACEHORSES: A SURVEY TO EXPLORE FACTORS CONCERNING SUCCESS IN SECONDARY CAREERS

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### Abstract:

Research concerning retraining of ex-racehorses is sparse, only specifically being examined in recent times. There are studies exploring reasons for wastage, and a survey investigating which characteristics of ex-racehorses tend to influence people in choosing a horse to rehome. The welfare of ex-racehorses has been a recurring problem in the equine world and is the cause of public concern in an already scrutinised industry. Many organisations have been involved in rehabilitating and rehoming of ex-racehorses. However, there is limited research on compatibility of horse and rider as well as expectations they face in training for secondary careers. This study investigated factors involved in the retraining of ex-racehorses to find any correlation between high handicap ratings and potential success in secondary disciplines. An online survey distributed through multiple social media platforms gained 146 responses in a convenience sample – the only criterion being respondents lived in the United Kingdom and owned an ex-racehorse purchased for a secondary career. Both qualitative and quantitative data were collected using a variety of question designs allowing for data to be collected in an anonymous and confidential manner. Questions were asked about horses' final handicap rating, retraining issues and how well they performed in secondary careers. The data analysis was conducted using MiniTab19©. Results indicated a weak positive correlation between level of competition and previous handicap ratings ( $R=0.492$ ). Chi-Square 'Goodness-of-Fit tests revealed horses significantly exceeded their owner's expectations ( $\chi^2=10.8696$ , d.f.=3,  $P=0.012$ ) and were reported as being easier to retrain than imagined ( $\chi^2=16.6087$ , d.f.=4,  $P=0.002$ ). Non-significant data ( $P>0.05$ ) consisted of there being no significant choice of secondary career for ex-racehorses ( $\chi^2=9.04348$ , d.f.=5,  $P=0.107$ ) as well as no significant level of competition entered ( $\chi^2=7.91304$ , d.f.=4,  $P=0.095$ ). These are encouraging results and could possibly be an indicator that ex-racehorses are not as difficult to retrain into a secondary career as is often anecdotally thought. Further advancements into research concerning this subject should be considered to explore the unexpected result of ex-racehorses not being as difficult to train as respondents first thought. If this is discovered, it may help encourage the choice of an ex-racehorse for a variety of uses after their racing careers are over.

### Lay person's message:

Ex-racehorses are a big issue in the equine industry, and opinions about their use after their exit from racing are divided. This survey discovered that owners of ex-racehorses underestimated the ease of

their retraining, and reported they exceeded the expectations these owners had for them. This information may be reassuring for those looking to rehome ex-racehorses, however more research is needed to fully explore the ease of retraining ex-racehorses for second careers.

**Key words:** Thoroughbred, secondary careers, ex-racehorse, training, rehoming



## RECREATIONAL HORSES' FACIAL EXPRESSIONS PRIOR TO MOUNTING

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### Abstract:

The last decade brought vast knowledge about horses' facial expression. Recognition of subtle signals may lead to better communication between people and horses, which is essential to ensure safety of both. In this study we aimed to evaluate recreational horses' facial expression and emotional state during leading to the mounting block. Eleven recreational hucul horses from 6 to 12 years old (mean  $\pm$  SD: 7.92  $\pm$  2.39) were tested. Pictures of horses were taken in four situations - two without saddle: leading (L) and standing next to the mounting block (M), and two with the saddle: leading (LS) and standing next to the mounting block (MS). Photographs were taken every 5 seconds (3 images) during leading and 3 shots when standing next to the mounting steps. Photographs were scored by two observers. Based on HGS each of the following signals were scored from 0 (not present) to 2 (obviously present) and were added together for final score for each horse: lowered ears, contraction of *m.levator anguli oculi medialis*, tensed facial muscles, tensed muzzle, strained and dilated nostrils, eyelid cover over half of the eye. Mean score for each horse was calculated for further analysis. The Spearman Rank Correlation was used to establish reliability between and within observers. Between observer correlations were strong except for L. Within observer correlations were strong, up to perfect  $r=1.00$ ,  $P=0.00$  for M and LS. Median [25%,75%] for each situation: L: 1.6[1.33, 3.66], LS: 6.00[4.00, 7.33], M: 3.33[2.66, 4.33], MS: 7.00[3.00,7.83]. Data from different situations were analyzed with the Wilcoxon signed rank test. No significant differences were found for: L–LS( $Z=1.33$ ,  $P=0.18$ ), M–MS( $Z=0.56$ ,  $P=0.58$ ), which suggests that saddle itself had no impact on horses. Statistically significant differences were found for: L–M( $Z=2.8$ , $P=0.01$ ) and LS–MS( $Z=2.67$ , $P=0.01$ ). Horses' facial expression changed significantly from non-stressed to stressed when horses were brought to the mounting block. These results suggest that horses may have negative associations with the mounting block caused by unpleasant mounting and/or riding.

### Lay person's message:

Horses' facial expression during leading and standing next to the mounting block was evaluated and compared. Results indicated that horses standing next to the mounting block show signs of stress/discomfort. It could be that mounting by inexperienced people may be unpleasant for horses leading to negative associations with mounting block. Horse riding instructors should pay more attention to horse-friendly mounting and riding to ensure good welfare of working horses.

**Keywords:** horses' emotions, facial expressions, mounting block, equine welfare, working horses.

## CHANGES OF BEHAVIOUR IN EQUIDS EXPOSED TO NOVEL OBJECTS WHEN WEARING LIQUID TITANIUM HEAD MASKS

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### Abstract:

Recent research found liquid titanium detects dopamine in a physiological solution. The Liquid Titanium Far InfraRed mask from Fenwick Equestrian© claims to produce negative ions linking to reduced anxiety and stress. Considering dopamine is involved with the brain's reward system and mood control, it is possible that liquid titanium affects its pathway, hence the ease in detection. However, there is no research supporting its effect in reducing stress in horses. The aim was to observe any effect of the Liquid Titanium Far InfraRed mask on behaviour responses in horses during a novel object (NO) test. College horses (n = 8) with a mix of breed, age and sex experienced all three conditions: control (no mask) (CM), titanium (titanium mask) (TM) and hood ('fake' mask constructed similarly to the TM) (HM). Experimentation happened in a covered arena familiar to the subjects with known handlers/observers. All horses underwent a mask habituation period in their usual stable immediately prior to testing. Unfamiliar NO were selected and positioned inside the arena track at letter B. Nine different NO were used including a toy stuffed animal, inflatable object and a dog agility tube. Horses were exposed to the selected NO for 10 minutes in random order but were not exposed to the same NO more than once. 12 replications of each TM, CM and HM were observed (n=36) per horse. Horses were led in pairs from the yard to the arena, and each one released into the arena in turn wearing TM or HM, or CM, to experience the placed NO. Multiple observers used a predetermined ethogram to assess behaviours by tally onto a spreadsheet. Results were analysed using Minitab 19©. A series of ANOVAs showed the behaviours 'walk around arena' and 'look at object' were observed in significantly greater numbers than others (HM:  $F=26.54$ ,  $d.f.=9$ ,  $P=0.001$  NM:  $F=17.74$ ,  $d.f.=9$ ,  $P=0.001$ ; TM:  $F=16.28$ ,  $d.f.=9$ ,  $P=0.001$ ). A series of ANOVAs were then used to compare each behaviour across all measures. There was no significant difference between any measure excepting 'look at object' for TM ( $F=6.54$ ,  $d.f.=2$ ,  $P=0.004$ ). Walking around the arena and looking at the NO were the behaviours seen most regardless of the measure, although when measures were separated only 'look at object' showed reduction when horses wore the TM. This result needs investigating: whether it is causing a reduction in stress as horses experienced less need to observe the NO remains to be confirmed, and therefore if use of the mask can positively impact performance.

**Lay Person Message:** Presenting strange objects to horses can cause fear and stress. The ability to use equipment that may lessen the effect would be beneficial. The Liquid Titanium Far InfraRed mask from

Fenwick Equestrian© claims to reduce stress and anxiety in horses. These results do point towards a difference in horses' behaviour when wearing the mask, seen as a reduction in visual observation, however interpretation of this as the horse experiencing less stress is inconclusive.

**Keywords:** behaviour; novel objects; titanium; stress reduction; titanium mask

## PILOT STUDY TESTING A MOBILE MEASURING SYSTEM FOR HORSE ARENAS SURFACES

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### Abstract:

Research has shown that the quality of equine surfaces is one of the risk factors in the development of injuries. Main performance characteristics of a surface are monitored and improved in order to obtain the optimal conditions for equestrian sports. For the purpose of preventing injuries and increasing horse welfare, objective insights in the properties of equine surfaces should be gained on a regular basis. This calls for an accessible, affordable, and mobile measuring solution. The aim of this pilot study is to verify if the HiPster (Hi Pitch Screener), a system currently used in measuring football (soccer) fields, can also measure relevant characteristics of equine surfaces. The HiPster is a mobile measuring tool developed to assess football pitches (grass) on various characteristics. Being about the size of a domestic lawn mower the HiPster is easily manoeuvrable across a horse arena and can measure five characteristics which are potentially relevant for equine surfaces: Rotational resistance [Nm], hardness [G], shock absorption [%], energy resistance [%] and vertical displacement [mm]. In this pilot study three horse arenas with different surface characteristics were measured. At each arena 7-13 locations were measured. The data has been analysed and visualised using basic statistics. Other qualitative observations regarding the measurement procedure have been gathered to improve the usability and measurement protocol. The results show that the current rotational resistance set-up on the HiPster needs to be adapted to become suitable for measuring horse arenas. The HiPster was able to determine the other four variables (hardness, shock absorption, energy resistance and vertical displacement). Data analysis shows that large differences were measured within a single arena: the largest measurement variation on an arena were mean 20,0g (SD  $\pm$  3,5g) for hardness, mean 39,1% with (SD  $\pm$  10,3%) for shock absorption, mean 24,1% with (SD  $\pm$  7,8%) energy restitution and mean 5,4mm with (SD  $\pm$  1,5mm) for vertical displacement. Part of this variation can be assigned to differences between properties measured on locations on the track versus outside of the track. Also, across the three arenas differences are visible in absolute values and level of measured variation. Beside that the level of correlation between the variables differ between the measure surfaces. For instance, one arena having a higher hardness and higher vertical deformation in the track compared to outside of the track (24g and 5,3mm versus 23g and 4,0mm) whereas another area had a higher hardness but lower vertical deformation in the track compared to outside of the track (21,5 g and 4,8mm versus 17,2 g and 6,6mm). Further work is needed on measuring different and a wider range of surfaces, measuring the effect of weather and usage over time and the effect of maintenance activities on surface quality.

**Lay person's message:** This pilot study shows that it is possible to measure relevant characteristics of equine surfaces with a mobile device used in soccer. Research has shown the relationship between the quality of equine surfaces and horse injuries. It would be beneficial if the key performance parameters of a surface could easily be measured on a regular basis so actions regarding maintenance of the surface can be data driven. This will improve the overall surface quality in horse arenas.

**Keywords:** Equine surfaces quality, lameness, injuries, mobile measurement system, horse welfare, prevent overloading. Equine surfaces, Measurement tools, injury prevention.

## CAN EQUIFACS BE USED TO INDICATE EQUINE AFFECTIVE STATE?

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### **Abstract:**

Measurements of animal welfare commonly include observed behaviours e.g. spontaneous blink rate, and physiological responses e.g. eye temperature, in the context of the external environment. More recently, measurements of affective state have been incorporated into animal welfare research. For example, eye core temperature (ECT) has been used to assess emotional state in dogs in terms of arousal, whilst spontaneous blink rate (SBR) has been used to measure stress responses. This study set out to investigate whether these physiological measures would correlate with behavioural units from the equine facial activity coding system (EquiFACS) to determine whether facial activity patterns could provide further insights into welfare and affective states. Fifteen horses (mixed age, breed, sex) were observed for five minutes in each of three conditions; control, manual grooming and being tacked up. Video recording enabled retrospective collection of frequency data using continuous focal sampling for SBR (amount of blinks) and EquiFACS units (present/ absent). ECT was recorded at one-minute intervals. The observer had completed training to become a certified EquiFACS coder. Shapiro-Wilk test indicated that only ECT data was non-parametric. Paired sample t-tests and Wilcoxon Signed test were used to identify differences between different conditions. Mean SBR whilst tacking up ( $9.3 \pm 4.17$  blinks) was significantly higher ( $P < 0.05$ ) compared to control conditions ( $8.8 \pm 5.04$  blinks) and grooming conditions ( $7.9 \pm 4.27$  blinks). Mean ECT under control conditions ( $32.1 \pm 0.86$  °c) was significantly lower ( $t = 2.36$ ,  $p = 0.034$ ) than when tacking up ( $32.7 \pm 0.91$  °c). Spearman's correlation test revealed many significant positive correlations between facial movements including *half blink* and blink rate. However, facial activity did not significantly differ across the conditions. Results suggest that tacking up altered the physiological state of the horse compared to control and grooming conditions. Relationships were detected between measurements of arousal and some EquiFACS units, however these were not specific to different conditions. Equine facial activity maybe a useful indicator in day to day management of domestic horses but further research is necessary to determine how they are symptomatic of equine affective state.

### **Lay persons' message:**

This study investigated facial expressions seen in horses during everyday activities that are part of domestic horses' routines. Frequency of horses' facial expressions were found to correlate with physiological measurements however more research is required to understand how these might be indicative of equine emotion. Physiological changes indicative of arousal were recorded during tacking up compared to rest and grooming.

**Key words:** Arousal, eye temperature, SBR, facial expression

**MORE (6 VERSUS 3) REPETITIONS OF A TASK WITHIN A GIVEN TRAINING SESSION DO NOT IMPROVE PERFORMANCE WHEN TRAINING HORSES VIA NEGATIVE REINFORCEMENT**

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**Abstract:**

Trainers and riders often rely on their gut feeling when deciding on training schedules for a given horse and task, but little objective data exists on optimal training schedules. The aim of the present study was to compare the effect of number of repetitions (3 vs. 6) of training tasks on learning performance. To this end, we (FF) trained 20 horses via negative reinforcement to perform the following tasks: back up, lowering head, lifting hind leg, turning head. Before onset of training, horses were unfamiliar with the specific cues for these tasks (pressure exerted on body parts previously not used for training these horses). Training ensued twice per week and was split into two sections of six weeks each: 1st), horses were trained to back up and to lower the head, with 10 horses receiving 3 repetitions per training session, and the other half 6 repetitions, each in direct succession within one training session. 2nd), the training intensity was revised for the two groups of horses using the remaining two tasks (lifting leg, turning head). Horses' learning performance was evaluated using a score (1 (no or incorrect response) – 6 (task fully completed)), subjective assessment of the pressure (scores 1 ( $\geq 20$  N) to 6 ( $<0.1$  N)) required to elicit a response and measurement of the time to show the first correct response. According to (generalized) linear mixed model analysis, with either training regimen, horses performed better, required less pressure, and were faster to respond in the 12th rather than first training session (all  $P < 0.0001$ ). In the 1st training session, horses performance was slightly better after 6 repetitions ( $3.0 \pm 1.8$  scores) rather than 3 repetitions ( $2.6 \pm 1.8$  scores;  $DF=914$ ,  $t=-2.00$ ;  $P=0.0456$ ). However, in the final (12<sup>th</sup>) session, there were no significant differences between the two training regimens with regard to the time to first correct response ( $DF=914$ ,  $t=-0.42$   $P=0.6769$ ), the pressure required to elicit a response ( $DF=914$ ,  $P=0.0886$ ) or the quality of the response ( $DF=914$ ,  $t=-0.22$ ;  $P=0.8240$ ). Differences between tasks were apparent ( $P < 0.05$ ) but not uniform across measured parameters and training regimens.

Although initially training performance may be better with more repetitions, in the long term, three rather than six repetitions of a give task per training session yield similar levels of performance. Future research should look into the effect of different numbers of repetitions on long-term retention and habit formation as well as potential negative welfare effects of unnecessary repetitions such as frustration and/or boredom.



**Lay person's message:**

Twenty horses were each trained via negative reinforcement to perform simple tasks, using either three or six repetitions per task and training sessions. The aim was to compare learning performance with these training schedules over a period of six weeks (2 training sessions/week). Except for the initial training sessions, horses showed similar levels of performance when a task was repeated three rather than six times per training session. Therefore, for achieving a given level of performance after a couple of training sessions, time (and possibly frustration and/or boredom) may be saved by repeating a task only three times per training session.

**Keywords:** Negative reinforcement; training; repetitions; learning performance; pressure

## EQUINE ASSISTED SERVICES HORSES:

### WHAT DO PRACTITIONERS THINK ABOUT USING POST-RACING THOROUGHBREDS?

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**Abstract:** The aftercare of racehorses is a highly topical issue. Post-racing Thoroughbreds (TB) are often retrained for sport or leisure purposes and are increasingly being considered for Equine Assisted Services (EAS) but have not yet been widely evaluated. Thoroughbred horses are considered to be very reactive and anxious. To evaluate the selection criteria of EAS horses as well as the current and future use TB in EAS, we distributed a detailed online survey on social networks from November 2021 to April 2022 aimed at EAS practitioners. In total, 129 people responded, including 42 from the United States (32.6%), 36 from France (27.9%), 20 from the United Kingdom (15.5%), 5 from the Republic of Ireland (3.9%), and 26 from other countries (20.2%). Respondents were mostly women (89%, n=115). Participants provided detailed information about the 5 horses they use the most and we obtained such data on 427 EAS equids. These were composed of 31.5% ponies (n=134), 28.7% warmbloods (n=122), 16.7% hot bloods/half-bloods (n=71; 13.5% being TB, n=57), 11.1% crossbreds (n=47), 8.9% cold bloods (n=38), 2.4% unknown origins (n=10) and 0.7% donkeys (n=3). Our sample was mainly composed of geldings (61.5%, n=260) with a 16-year-old median age (Min=0.6yo, Max=35yo). From a longer list, the three most commonly selected criteria as being important for EAS horses were: Showing a good temperament, Absence of kicking/biting propensity, Enjoying the work. Thirty-one percent of the respondents work with post-racing TB (n=39) and 74.4% of the remaining would consider working with TB (n=64). When directly asked, 56.3% (n=71) of our participants also agreed that TB have specific characteristics making them especially interesting for EAS. They particularly mentioned their sensitivity, their responsiveness, their intelligence, and their background experience. These results move towards an understanding of the key features of EAS horses and emphasize that TB could be more considered in the future by EAS practitioners. However, a better knowledge of the behavioural characteristics of Thoroughbreds is also necessary to clarify their adaptability to this new career as well as horse welfare and human safety. The next phase of the project will compare EAS horses and TB characteristics and will involve personality and reactivity to human tests as well as a 12-month monitoring period.

**Lay person message:** The retraining and welfare of post-racing Thoroughbreds (TB) is a highly topical issue and Equine Assisted Services (EAS) could be considered as a next career. In our survey, EAS

practitioners specified the key features of EAS horses and over half of them think that TB have some relevant characteristics for this career, such as their sensitivity or their responsiveness. However, further work will be undertaken to clarify EAS horses' personality and TB adaptation to this new career.

**Keywords:** racehorse; retraining; personality; reactivity

## STABLE DESIGN INFLUENCES VIGILANCE BEHAVIOUR IN HORSES DURING SHORT ISOLATION BOUTS

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### Abstract:

Domesticated horses are often housed in individual stables for long periods where physical contact with conspecifics is frequently not possible. Although common, this form of stable design is known to be detrimental to horse welfare. What has not previously been investigated is the effect of this stable design for short periods of time in a population of horses that otherwise live in social groups at pasture. This study investigated the impact of short-term stabling (1 hour bouts) on indicators of positive affective states, such as standing resting and standing dosing, and negative affective states, such as near aggression and vigilance. Three stable conditions of a full wall, a barred window wall and a half wall between paired horses were used. A within-subjects design study was carried out in horses (N = 18), where staff members of The Horse Trust assigned horses to pairs, based on their usual closest companions when grazing, in adjoining stables. During each stable condition, behavioural observations of indicators of positive and negative affective states were continuously collected for a total of one hour using camera footage installed within the stables. Subsequent analysis of video footage were performed by the corresponding author only. Percentage of time for duration behaviours such as vigilance and standing resting, along with the total number of frequency behaviours such as touch and vocalisation. A general linear mixed model was used to analyse the results. Horses spent more time standing vigilant when in the full wall stable with the highest amount of social isolation ( $F_{(2, 25.07)} = 7.17$ ,  $p = 0.003$ ). When horses were in the half wall stable (which allowed for physical contact with conspecifics) they spent more time standing resting ( $F_{(2, 24.83)} = 10.58$ ,  $p < 0.001$ ) and were shown to engage in social behaviours such as touch and rest near. No significant effects were found between stable conditions in box walking behaviours ( $p = 0.654$ ) or standing restless ( $p = 0.301$ ). Results indicate that even during short bouts of stabling horses were more relaxed when stable design allowed them to engage in social behaviours with conspecifics, and more vigilant then when the stable design left them physically isolated from conspecifics. This highlights the strong need for social contact in horses, even over very short time periods, and a possible strategy for accommodating this in management and building design which could improve horse welfare.

### Lay person's message:

The housing and management systems of domestic horses contributes towards their welfare. This study looked at the effects of different stable conditions for 1 hour bouts. When horses were stabled alone without contact to a companion, they show more alert behaviours indicating a negative

behavioural state. Results of this study also found horses would engage in social behaviours such as touching and resting near each other when stabling allowed for social contact. Social interactions have been shown to induce relaxation and were performed when stabled, despite the fact these horses are living together for the other 23hrs a day.

**Keywords:** Horse, Behaviour, Social, Housing, Stable, Management.

# THE IMPACT OF BEDDING PRACTICES ON QUANTITY OF SLEEP AND ITS RELATIONSHIP TO COGNITIVE BIAS IN THE HORSE.

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## Abstract:

Lack of sleep in human research is known to result in mood disturbances, seen also in canines, and low mood as a result of sleep disruption has been associated with inhibited performance in humans and rodents. In horses, sleep can be affected by bedding depth within the stable, however, little is known about the relationship between sleep and equine mood. This study aimed to utilise bedding depth to manipulate equine sleep and determine whether cognitive bias was also affected. Six riding school horses of mixed breeds (14.8±4.6 years) were randomly split into two groups in a cross-over design, with each group experiencing control bedding conditions (5cm deep/ 2m from the front of the stable) and treatment bedding conditions (15cm deep/ 1m from the front of the stable) for five consecutive nights separated by a wash out period. Horses were recorded by infrared CCTV equipment between 19:00 and 07:00. Continuous focal sampling was used to record duration of lateral recumbency indicating rapid eye movement sleep (REM), sternal recumbency for REM sleep and non-REM (NREM) sleep, and standing NREM sleep, using a pre-determined ethogram. Horses were trained to receive a reward from one (positive) location and to associate no reward with another (negative) location. After five nights in each bedding condition, latency to approach an ambiguous location between positive and negative locations was recorded. Duration of interaction with the bucket in the ambiguous location was also measured. Wilcoxon signed rank tests and Paired T-Tests determined differences in sleep duration between bedding conditions. Duration of lateral/sternal REM and sternal NREM were significantly higher ( $P<0.05$ ) for horses on treatment bedding conditions. Latency to approach was lower and duration of interaction was higher when on treatment bedding suggesting a more optimistic outlook but findings were not significant. The present study supports existing evidence of the impact of bedding depth on equine sleep and suggests a link between sleep and equine mood based on the results of the judgement bias test, however a larger scale study is required.

## Lay person's message:

The depth of bedding in the stable affects the nighttime behavioural profile of horses and how much sleep is achieved. This study suggests a further link between sleep and mood exists, specifically that less sleep appears to result in a more pessimistic outlook. Links between pessimism and training performance are yet to be determined.

**Key words:** Horse, Sleep, Cognitive bias, Bedding, Welfare, Affective state.

**DOING THINGS DIFFERENTLY: EXPLORING THE EXPERIENCE OF LIVERY YARD MANAGERS OFFERING “ALTERNATIVE”  
LIVERY OPTIONS, SUCH AS TRACK SYSTEMS AND EQUICENTRAL**

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**Abstract:** Around 60% of the UK’s horses are kept on livery yards, and previous studies have highlighted the extent of livery yard manager influence on equine care practices. Livery yard managers and owners (LYM/Os) therefore represent an important stakeholder in equine welfare; however, they have been overlooked in research. This study explored the experience of LYO/Ms, with particular reference to those who have altered their practice and business models in order to provide what they consider to be “horse-centric” environments; for example herd turnout, open barns (as opposed to individual stabling), horse choice, enriched environments, and free-access to forage. Those yards include, for example, track systems and Equicentral systems. Exploring the experience of LYO/Ms who move to these alternative livery options could illuminate pathways for encouraging the uptake of horse-centred practice. 34 LYO/Ms were recruited through social media and snowball sampling; 9 of these described their yard management according to “horse-centric” principles. Qualitative, semi-structured interviews were conducted, either using video-call, or in-person yard visits. Interviews explored the reasons for LYO/MS moving toward alternative set-ups, the challenges of conducting this move, and the ways horses were managed compared to traditional set-ups. Data were audio-recorded, transcribed, and analysed according to a constructivist Grounded Theory methodology. LYO/Ms who offered “alternative” livery unanimously did so after owning a horse who had health or wellbeing problems when managed in a traditional (stable/paddock) setting, leading the LYO/M to consider alternative practices. These LYO/Ms redesigned the yard in ways which they considered better met equine needs in relation to access to “friends, forage, and freedom” for horses. In these set-ups, horses tended to be managed in a herd, leading to altered livery management packages and greater attention to aspects such as herd cohesion, enrichment, and the introduction of new herd members. Comparatively, traditional set-ups also aimed to create environments offering optimised equine welfare, with LYO/Ms constructing their ideas of welfare individually (for example, some prioritised safety and comfort). Across all types of livery, managing conflict with livery yard clients was considered the most challenging component of management, and inhibited potential changes to practice. Each LYO/M described offering what they viewed as an idealised environment (within the confines of real life practicalities such as space and finance availability) for their horses, though this resulted in very different environments with some LYO/Ms entirely altering their livery offering based on their changing perception of ideal welfare. Major changes to practice usually followed experiences with particularly complex horse health and behavioural issues.

**Layperson message:** Livery yards play an important part in horse welfare by shaping the environments horses experience. Livery yard managers design their businesses according to their perception of horse needs; while most provide a combination of stable and paddock turnout, others redesign the environment to provide complex enriched turnout systems in which horses can live in herds and have constant access to forage. Exploring the diverse approaches to offering livery could help us to find ways to improve livery yard standards across the board.

**Keywords:** livery; quality of life; track system; wellbeing; behaviour change; qualitative research



## DO YOU WANT A LUNGE LINE? AN INVESTIGATION INTO PROBLEM LOADING

### BEHAVIOUR IN THE U.K. HORSE POPULATION

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#### Abstract:

Loading is the most stressful aspect of transporting horses, and where injuries are most likely to occur. This study aimed to investigate the prevalence of problem loading behaviours (PLB) in the U.K., associated risk factors and the impact of PLB on the horse human relationship. Voluntary participation, via an online survey, generated 1039 responses which were included in the final analysis. Most respondents were female (96%, n=1000) aged 36-55yrs (46%, n=480). Horses were mainly geldings (58%, n=601) used for hacking (33%, n=346) and aged 11-15yrs (38%, n=394). A variety of breeds were described. The majority of horses (70%; n=720) were transported at least monthly, for trips of <1 hour (62%, n=639), in a trailer (63%, n=655). 30% (n=305) of horses did not load straight away, with the most common PLB observed planting on the ramp and refusing to move forwards (94%, n=285 of horses showing PLB). Of horses reported to load straight away (n=734), 98% (n=722) displayed behavioural signs indicative of stress. Owners who reported PLB were more likely to use a different head collar ( $X^2=129.358$ ,  $df=4$ ,  $p<0.0004$ ), lunge line ( $X^2=157.04$ ,  $df=4$ ,  $p<0.000$ ) food to lure the horse in ( $X^2=239.634$ ,  $df=4$ ,  $p<0.0004$ ) and to give them a treat once loaded ( $X^2=81.103$ ,  $df=4$ ,  $p<0.0004$ ). When asked how PLB's made them feel 76% (n=315) had been made to feel uncomfortable by others. 23% (n=234) of owners and 6% (n=64) of horses had been injured whilst loading. Regarding buying a horse, 42% (n=1039) of owners said PLB would influence their purchase decision, whilst 58% (n=609) believed PLB impacts the horse's financial value. In conclusion PLB was reported in 1 out of 3 horses and associated with use of a variety of different strategies and equipment. PLB can have a detrimental impact on the horse human relationship. Further research and education is recommended to minimise the occurrence of PLB in the UK.

#### Lay person's message:

Previous research has found loading horses to be the most stressful aspect of travelling for them, with loading associated with injuries to handlers, and to horses. This survey found at least 30% of horses in the UK do not load straight into a trailer, with planting and refusing to move forwards being the most common unwanted behaviour. Encouragingly, food was used more commonly than punishment when

loading horses. Further education of horse owners on how to train horses to load quickly and safely is recommended.

**Keywords:** injury, horse, unwanted behaviours, stress, transportation.

**UK HORSE OWNERS' EXPERIENCES OF PLANNING FOR AND MAKING DECISIONS ABOUT EUTHANASIA  
AND END-OF-LIFE CARE**

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**Abstract:** Delayed euthanasia has been identified as a prominent and serious welfare issue for horses. However, planning for end-of-life and recognising the right time for euthanasia is often difficult and stressful for owners. This study aimed to investigate the experiences of owners when preparing for and making end-of-life decisions. An online survey shared on equine-related Facebook groups gathered a convenience sample of 430 UK equid owners. Participants were asked about their experiences of planning for and making end-of-life decisions, and answered behaviour change questions based on the Trans Theoretical Model (TTM) and Theory of Planned Behaviour. Questions were analysed on SPSS using descriptive statistics and non-parametric tests (as data were non-normally distributed). The majority of respondents were female (91.1%), had been involved in the horse world >25 years (67.0%), had no formal equestrian qualification (52.3%), were the sole person responsible for emergency decision-making (65.8%), and had made at least one end-of-life decision (75.8%). Of those who involved a veterinarian in their most recent end-of-life decision (81.3%), 81.1% felt supported. Whether a respondents' decision was in an emergency (35.9%) or non-emergency (62.9%) situation was not significantly associated with how supported they felt by their veterinarian (rated on a Likert scale from strongly disagree-strongly agree) (Mann-Whitney U:  $U=9225$ ,  $z=-1.724$ ,  $P=0.085$ ). While 87.3% agreed that regularly monitoring quality of life (QOL) would help them identify issues and intervene more quickly, 81.1% did not regularly assess and record QOL. Most respondents (78.6%) had their horse examined by a veterinarian at least once per year. Several resources to support end-of-life decisions exist, but only a minority of participants had heard of these, and even fewer had used them. Those who had used them typically found them useful. These results suggest veterinary involvement in end-of-life decisions is the norm, and most owners found this supportive. However, this positive experience was not universal. In some cases, owners' beliefs did not align with their behaviours. The majority were in the TTM precontemplation stage, indicating they did not intend to assess and record QOL despite believing monitoring QOL would be beneficial. Further research into engaging owners in behaviour change and additional promotion of available support resources would be beneficial.

**Lay Person's Message:** Few UK horses die naturally; most are euthanased, often to prevent poor welfare. Planning for a horse's end-of-life care and deciding on the right time for euthanasia can be

difficult and stressful for owners. This survey found veterinarians frequently contribute to euthanasia decisions, and most owners found them supportive. Although the majority of owners thought regular quality of life monitoring would be beneficial, most did not regularly do and record this. Despite the availability of resources to support owners with end-of-life planning, these were not well known or used, the few owners who did use them found them helpful.

**Keywords:** Equine Welfare; Euthanasia; Decision-making; End-of-life Plan; Behaviour Change; Veterinarian-owner Relationship

## DEVELOPMENT AND VALIDATION OF THE HUMAN-EQUINE ATTACHMENT SCALE

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### Abstract:

Research on human-animal interactions has established that numerous benefits can result from human relationships with diverse companion animal species in the domains of physical, social and psychological outcomes. Therefore, numerous animal-attachment scales have been developed to measure the extent of individual human's attachment to their companion animals. Validated attachment scales exist for humans with dogs and cats. However, to date there has been limited research into the attachment that forms between an owner or keeper and their horse, and few attempts to create an instrument that is capable of capturing its different domains. This study describes the development of the Human-Equine Attachment Scale (HEAS) and investigates its reliability and validity in the context of owner attachment to horses used for casual and competitive riding. The reliability and validity of the HEAS was assessed in a sample of horse owners residing in the United Kingdom (n=3611). A 25-item questionnaire, implementing 4-point Likert responses to items, was designed to measure features of owner attachment to their horses. The items were designed to capture aspects of human-animal bonding that have been established in extant human, and human-companion animal attachment scales (AAS, CFCAS, CPAS, LAPS, MDORS, PAL, PAQ.) Items were chosen from five attachment subdomains and were adapted for an equine context. Additional items specific to horse ownership were also constructed for inclusion. Principle Component Analysis and Cronbach Alpha analyses determined the fit of the HEAS scale. Following Principal Component Analysis, three items were removed due to unacceptable collinearity scores. This resulted in a six-factor solution (which explained 60% of the variance); and Cronbach's Alpha for the scale was acceptable ( $\alpha = 0.77$ ). The subscales indicated 1) companionship, 2) personal wellbeing, 3) dependence, 4) status 5) growth and 6) sacrifice were key factors within the scale. The study establishes HEAS as a coherent and psychometrically robust measure of human-equine attachment, with potential for utilisation in social science and health related research, and to support research to improve successful pairings between horses and humans.

**Lay Person's Message:** Human-animal attachment has been shown to have numerous positive physical, social and psychological benefits for owners. The quality of the human-horse relationship is often cited as the reason for positive horse-human partnerships and underpinning equine relinquishment, where these relationships break down. Despite the importance of horse-human

relationships, limited research has explored these. This study developed and validated a scale that is capable of capturing the attachment that owners form for their horses, which can be used to facilitate further research on the benefits of this attachment and improve successful pairings between horses and humans in the future.

**Keywords:** human-horse relationship, equine, attachment, scale, development

**A SHORT INTERVENTION ON THE CORRECT USE OF NEGATIVE REINFORCEMENT (R-) CAN INCREASE HANDLER KNOWLEDGE AND UNDERSTANDING IN COLLEGE STUDENTS**

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**Abstract:**

To increase equine welfare and reduce the risk of injury, correct use of negative reinforcement (R-) is critical. This study investigated the impact of an educational intervention on correct use of R- on 28 equine students at Berkshire College of Agriculture. Participant ability to use R- before (pre), one week (post) and four months (delayed post) after two one-hour training sessions was assessed through a questionnaire and a handling task.

Pre-questionnaire answers were compared to post- and delayed post-questionnaire results using Wilcoxon signed rank tests. Participant ability to correctly describe R- and give an example significantly increased between both pre- and post-questionnaires ( $r=0.802$ ,  $p<0.001$ ) and pre- and delayed post-questionnaires ( $r=0.780$ ,  $p<0.001$ ). In pre-questionnaires, half the descriptions were generic ( $n=14$ , 50%), a quarter were unable to answer ( $n=7$ , 25%), some described punishment ( $n=6$ , 21%) whilst only one person vaguely described negative reinforcement. After training, more participants were able to describe R- either correctly (Post:  $n=12$ , 43%; Delayed:  $n=11$ , 39%) or partially correctly (Post:  $n=4$ , 14%; Delayed:  $n=6$ , 21%). Partially correct answers referenced reinforcement and aversive stimuli but lacked explicit description of release. Punishment was still described by some (Post:  $n=6$ , 21%; Delayed:  $n=2$ , 7%). There was a significant increase in participants reporting of how often they use R- between pre- and post-questionnaires ( $r=0.763$ ,  $p<0.001$ ) and pre- and delayed post-questionnaires ( $r=0.756$ ,  $p<0.001$ ). Participants also selected the example of using R- in a scenario of two different handling situations more often in both post-questionnaire (Q5:  $r=0.436$ ,  $p<0.05$ ; Q6:  $r=0.577$ ,  $p<0.01$ ) and delayed post-questionnaire (Q5:  $r=0.436$ ,  $p<0.05$ ; Q6:  $r=0.399$ ,  $p<0.05$ ). In the handling task, the handlers were quicker at releasing the pressure in pre- vs delayed post-data analysis ( $z=2.361$ ,  $p=0.05$ ). There were no other significant changes in behaviour or performance measurements.

The educational intervention in this study was effective in increasing the participants' theoretical understanding of the correct use of R- and their timing of pressure-release. However, no changes in the horses' performance or behaviour may be a consequence of multiple handlers and limited time to specifically train this task. Further research should focus on designing strategies to promote the correct use of R- in the industry.

**Lay person message:** This study investigated the impact of short intervention focused on correct use of negative reinforcement (R-) on 28 equine college students. The intervention consisted of two training sessions, one theory and one practical, and was effective at improving the participants' theoretical understanding of R- and timing of pressure-release but not the horses' performance. Providing access to short training sessions could help increase the equestrian's understanding of R-.

**Key words:** equine; negative reinforcement; educational intervention; learning; knowledge



## FACTORS ASSOCIATED WITH FALLS OF RIDERS, OR RIDERS AND HORSES

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### Abstract:

Falls of riders, or riders and horses are undesirable as they may result in direct or indirect injury; direct as an immediate consequence of the fall or indirect, for example, due to loose horses falling on roads, running through fences or being hit by vehicles. Surprisingly there is little information about factors associated with falls across equestrian activities. We devised an online survey (Survey Monkey©) consisting of 20 questions asking respondents who had fallen off a horse/s in the previous 12 months details on fall frequency and fall circumstances were collected. The survey was disseminated primarily via Facebook and was open for 30 days in Dec and Jan 2020. A total of 1977 complete responses were received. The majority of the respondents were female (96.8%, n=1914). The main disciplines/activities that respondents were involved in were: Pleasure/hacking (55.8%); Dressage (51.8%); Showjumping (40.1%); Eventing (27.3%) (N.B. respondents were allowed to select multiple activities); 53% of respondents had fallen off once in the last 12 months, 24% twice and the remainder more than 3 times. The highest frequency of reported falls occurred between October and December. Only 11% of falls resulted in both the horse and the rider falling (making contact with the ground). Kruskal Wallis analysis identified fall frequency differed between disciplines ( $p=0.0004$ ); pleasure and dressage riders recorded significantly less falls than showjumping and event riders (post-hoc Mann Whitney-U:  $p<0.0004$ ), suggesting jumping may be associated with an increased fall risk, however jumping specifically was not reported as a specific risk factor for falls by respondents. Hacking (26%), schooling on the flat (26%) and showjumping schooling (19%) were the three most common activities where falls occurred. Horses changing direction rapidly, rearing or bucking were the most common reasons why riders felt they fell off, with most riders (73%) falling off the side of the horse. Our results suggest that falls occur across all equestrian activities but appear to happen more frequently: 1) when hacking and schooling, possibly when riders are more relaxed and less likely to be wearing protective equipment such as a body protector; 2) for riders engaged in showjumping and eventing; 3) were often associated with conflict behaviours and a potential breakdown in clear communication within the horse-rider dyad and/or poor rider stability. Future work should aim to understand underpinning factors which contribute to falls; the influence of horse management, training regimens and breed should also be considered in future research.

**Lay person's message:** Riding is acknowledged as a high-risk activity, yet little is known about risks associated with falling off; 1977 riders completed an online survey identifying factors linked to falls in

the last 12 months. Eventing and Showjumping riders were more likely to fall off than Dressage or Pleasure riders, with falls associated with rearing, bucking and napping, as well as hacking and schooling. The results suggest riders should consider their stability in the saddle and communication with their horse to reduce the risk of falling and should consider wearing a body protector for anecdotally considered lower risk activities such as hacking.

**Keywords:** equestrian sport; rider safety; horse; horse-rider relationship

## INDUSTRY PERCEPTIONS AND UNDERSTANDING ON AUSTRALIAN FEEDLOT WORKING HORSES

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### Abstract:

As Social Licence to Operate becomes more prominent, insight into industry perceptions of the use of horses is critically important. Horses in Australia frequently perform working roles, such as on cattle feedlots, where the cattle are kept intensively in large groups and health monitoring is done from horseback. The aim of this study was to first, assess equine and animal industry participants' understanding of the use of horses in Australian cattle feedlots, and second to determine how this is viewed in terms of equine welfare. An online survey, open to Australian residents over the age of 18 years, comprising 18 questions was distributed via email and social media between August 2021 and December 2021. Of the 492 respondents 95.9% (n=418) registered involvement in the equine industry, 46.5% (n=200) in animal production industry and 45.9% (n=197) were involved in both. Most respondents identified as female (93.18%) with a wide range of ages represented (18 to 65+ years).

Respondents involved only in the equine industry were aware that horses are used for work purposes on cattle feedlots ( $\chi^2=46.8$ , DF=1,  $P<0.001$ ), as were those involved in the animal production industry ( $\chi^2=6.1$ , DF=1,  $P<0.05$ ). Respondents involved in the equine and the animal production industries agreed that the use of horses to manage cattle on feedlots is likely more beneficial to cattle welfare ( $\chi^2=6.17$ , DF=2,  $P<0.05$  and  $\chi^2=26.2$ , DF=2,  $P<0.001$  respectively). Interestingly despite recognition that using horses on feedlots has the potential to improve cattle welfare, for example by avoiding the stress responses that may occur with the use of motorized vehicles, many animal industry respondents thought that horses should work on cattle feedlots ( $\chi^2=29.5$ , DF=2,  $P<0.001$ ). Interestingly, those involved in the animal production industry were less certain about horses being used in cattle feedlots than those involved in the equine industry. However as with any form of horse use this is subject to increasing public scrutiny. Whilst this survey highlighted positive perceptions of horse use from a cattle production perspective, more evidence is needed to understand how this type of work impacts a horse if questions regarding Social License to Operate for this form of work are to be comprehensively answered.

**Lay Person Message:** Current use of horses in Australian cattle feedlots, for monitoring and moving cattle, is viewed as positive by both equine industry and animal production industry participants. Interestingly those working in the equine industry consider the use of horses as more beneficial to the cattle than alternatives such as motorised vehicles, than those working in the animal production

industry who were more unsure. Given this view and the number of horses already working in Australian feedlots research is needed to fully understand the impacts of this type of activity on the health and welfare of the working horse.

**Keywords:** Welfare; Social Licence to Operate; Working horse; cattle; feedlot; perception

## AN INITIAL TRAINING METHOD OF SPORT HORSES INCLUDING POSITIVE REINFORCEMENTS

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### Abstract:

Initial training is often a stress-inducing period for horses and can raise safety issues for the trainer. However, it lays the foundations for the horse's future sporting life. There is a growing body of research on horse training methods and how to optimise them. The use of positive reinforcement, such as food rewards, has been reported to increase horse motivation and learning efficiency and may allow the animals to better manage training-induced stress. In the current study conducted at the French Stud "Haras de Hus", we evaluated the effects of using positive reinforcements during the initial training of young horses on learning, animal welfare and trainer safety. Behavioural and physiological measurements were investigated. Two groups of 15 three year-old sport horses, that had never been ridden, were studied for 4 weeks/horse. All horses followed the same initial training method, which consisted in introducing a set of exercises on the ground and then with a rider. The order of the exercises was the same for all animals. Of the two groups of horses, one received food rewards during several predefined exercises ("R+" group) and the other did not ("control" group). In the "R+" horses, food rewards were delivered in continuous reinforcement at the beginning, then in partial reinforcement by respecting temporal contiguity and contingency. All three trainers were experienced and had been trained in the same training method for several years. The effects of using food rewards were analysed using Wilcoxon Rank Sum Test during specific ground exercises: walking backwards, moving the hindquarters and the "flag exercise", which consists in waving a cloth flag around the horse with the aim of reducing flight responses. Several significant effects of using food rewards were observed. Regarding learning, the "R+" horses responded faster to the trainer's cues in several exercises (e.g., walking backwards; Wilcoxon Rank Sum Test:  $P=0.02$ ) and were more attentive towards the trainer ( $P=0.04$ ). Regarding animal welfare, fear reactions were lower in the "R+" group during the exercise of moving the hindquarters ( $P=0.03$ ) and the "flag exercise" ( $P<0.01$ ). Also, salivary cortisol levels taken after 7 days of training in the stable before the training session were lower in the "R+" group ( $P=0.02$ ). Finally, regarding trainer safety, the number of undesirable behaviours such as digging in the trainer's pockets was higher in the "R+" group during the "flag exercise" ( $P=0.04$ ), but not during the other exercises. These results highlight the beneficial consequences of the use of food rewards on the attentional and affective state of young horses during initial training.

### Lay person's message:

In line with previous research, this study shows that including food rewards during initial training of sport horses increases training efficiency and reduces stress levels in animals, although it could be useful to implement some techniques to limit unwanted behaviour, such as pocket digging.

**Keywords:** Positive reinforcement ; initial training ; animal welfare ; training efficiency ; trainer safety

**Bayesian multilevel region-specific investigation of risk factors for elimination from FEI endurance rides due to irregular gait and metabolic problems**

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**Abstract:**

Endurance is a popular equestrian sport with the second largest number of events among all Fédération Équestre Internationale (FEI) disciplines. At the international level, horse and rider combinations race over distances of 80 to 160 km, which puts a significant load on equine and human athletes' musculoskeletal systems and metabolism and gives rise to the risk of injuries and other issues. The sport is practised and regulated globally and organised within eight FEI Regional Groups (RGs). Despite common regulation, the sport's specifics vary among RGs, with RG7 - North Africa/Middle East hosting significantly faster and larger competitions, with a younger, predominantly male rider population and lower proportion of completed rides. To date, risk factors for the two most prevalent adverse outcomes, elimination due to irregular gait (FTQ-GA) or metabolic problems (FTQ-ME), have been investigated using global models or models for one or more countries across RGs. Such models, however, allow limited examination of RG-specific factors. This study focused on RG7 and aimed to identify regional risk factors for FTQ-GA and FTQ-ME, which may be specific or more important to rides in this area, and which have thus not been detected or investigated in detail in global or national models. This retrospective cohort study used data from the FEI's Global Endurance Database. The study included 30,138 starts made by 11,119 horses ridden by 4,649 riders in 568 one-day international competitions held in 10 RG7 countries. This represents 94% of all starts made in RG7 from July 2012 to December 2019. Bayesian Generalised Additive Multilevel Models were fit to investigate associations between the outcomes and 61 potential risk factors identified based on earlier studies and a priori hypotheses. Modelling accounted for clustering at horse, rider, trainer, competition, and venue level, nonlinear shapes of associations, and biologically plausible interactions. The study identified multiple risk factors including horse and rider sex, age, eliminations history, competition frequency and progression. Fast riding speed was associated with a sharp increase in the likelihood of FTQ-GA (ELPD diff. 269.2, SE diff. 21.5). Increasing rider and horse experience were associated with a decreased likelihood of FTQ-GA (38.6, 9.4 and 33.3, 8.7, respectively). Female riders were less likely to end with FTQ-GA (OR 0.84, 95% CI 0.73–0.98) and FTQ-ME (0.63, 0.49–0.80) than male riders, and junior rides

were more likely to result in FTQ-ME than non-junior ones (2.16, 1.52–3.10). Identified modifiable factors, including high riding speed and frequency, can be mitigated by appropriate rules, and considered by athletes when planning competition schedules or during the ride itself.

**Lay Person's Message:** Endurance is a physically demanding equestrian sport held over very long distances of up to 160 km. Around 30% of horse starts in endurance rides do not successfully complete and are eliminated at one of several veterinary examinations that must be passed during the ride. The two most common reasons for a “failure to qualify” (FTQ) in a vet exam are lameness and metabolic problems. Previous studies have looked at global datasets and noticed regional variations. This study focussed on one particular region of the world with a higher-than-average proportion of FTQs and identified multiple risk factors for eliminations.

**Keywords:** Endurance; Elimination; Performance; Statistical Analysis; Modelling

# INVESTIGATING METHODS TO RELIABLY ASSESS EQUINE PERSONALITY: A MIXED METHODS STUDY

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## Abstract:

It has been suggested that equine personality should be defined as those characteristics of individuals that describe and account for temporally stable patterns of affect, cognition and behaviour. Over the past twenty years there has been a surge in interest in equine personality, with the aim of furthering our understanding of, and relationships with, horses under our management. This research aimed to develop a sensitive and specific equine personality assessment via a mixed methods explorative study. Firstly, a previously validated Hominoid personality questionnaire was adapted for equine use and applied in the field by two qualified equine professionals to assess personality in 35 horses. The 54 traits were also presented to 91 experts worldwide, via a Delphi consultation (round one), for them to rate their level of agreement as to whether each trait was clear in definition, present in equids and could be reliably identified. The field study results were tested for inter-rater agreement and further analysed via Principal Component Analysis (PCA) to identify overarching personality groupings within which specific personality traits were identified. Following this, the personality groupings were presented to the experts again (round 2) to rate their level of agreement. Results were analysed to finalise groupings to be taken forward for further field trial validation. Inter-rater agreement on equine personality traits scores was high (Cronbach's Alpha  $\alpha = 0.89$ ). PCA identified that the 54 personality traits could be grouped into 10 principal components (accounting for 86.7% of the variation). The data were checked for cross-loading with no significant cross loaders identified. Following this, eight clusters were selected for further analysis. Thirteen overarching personality groups were identified with six achieving expert consensus (70% agreement) with no specified alterations, a further seven groupings had alterations suggested. Following further refinement, a final 12 overarching personality groups (such as Exuberant, Nervous and Affiliative) were identified inclusive of 42 personality traits. This research is ongoing with the identified personality groupings currently being validated in further field-based trials. It is hoped that this study will enable horse owners and professionals to undertake reliable assessment of equine personality which can then be utilised to enhance welfare through consideration of individual horse personality traits in the management, training and selection of horses. Indeed, this may facilitate further reflection on the effect of individual equine personality on affective state, further promoting positive emotional wellbeing of domesticated horses.

## Lay person's message:

Equine personality is an important facet of our interactions with horses. It impacts upon both management and training. Understanding the personalities of horses is a vital component in enhancing our interactions with them and promoting positive emotional welfare. This study has used both field-based research and expert consensus to identify 12 personality groups that can be easily assessed by both owners and professionals. Further field trials to validate the initial results may help to provide those who engage with horses with a reliable method to understand the individual personality of horses and augment their interactions and management, thereby optimising welfare.

## Keywords:

Equine; Personality; Delphi; Welfare, Affective state



## DOES SEX OF THE JOCKEY INFLUENCE RACEHORSE PHYSIOLOGY AND PERFORMANCE.

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### **Abstract:**

The racing industry is supported by a predominance of female stablehands and work riders, but few become professional jockeys. Notable, recent race success for female jockeys may encourage more females into the sport at the highest level. No study has assessed whether the sex of the rider may subtly influence racehorse physiology to affect performance. We hypothesise no difference on many aspects of racehorse physiology and performance, when measured objectively. Using a validated recording system (the 'Equimetre'<sup>™</sup>), we report on racehorse cardiovascular (heart rate, heart rate recovery) and biomechanical parameters (stride length and frequency) at various exercise intensities (slow canter to hard gallop), according to sex of the jockey. 530 Thoroughbreds, varying in age (2-7 years old) and sex (including geldings), from one racing yard in Australia, completed a total of 3,568 training sessions, monitored by a single trainer, on varying track surfaces (sand, turf or fibre). 103 different work riders (male, n=66; female, n=37), including current or past registered professionals (n=43 in total) were used. Race results in the UK and Australia (52,284 races in total) were also available as a measure of race performance. Data were analysed using analysis of variation (ANOVA) or mixed-effect models, as appropriate. Sex of rider did not influence racehorse speed ( $P = 0.06$ ) nor stride length ( $P = 0.42$ ) at any training intensity. Peak heart rate (HR) increased with training intensity ( $P < .001$ ), with no difference between rider sex (e.g. peak HR at gallop, female rider:  $216 \pm 15$  vs. male rider,  $218 \pm 20$  beats/min;  $P = 0.73$ ). HR recovery (at 15mins post exercise) was affected by rider sex, but only when training intensity on each surface was reversed (e.g. HR after galloping on sand, male < female; HR after cantering on turf, male > female). Male jockeys had a small, but significantly higher win-rate in races vs female jockeys (11 vs 9%; OR, 1.14 [1.05-1.25],  $P < .001$ ). This study, using objectively obtained data, demonstrates for the first time no overt effect of the rider's sex on racehorse physiology in training and performance in racing. Such data could increase female participation in racing and improve their access to quality mounts in racing events. New perspectives arise to shift traditional male-dominated perception, attitude and shape betting behaviour of the greater public.

### **Lay person's message:**

This decade has seen an increase in participation of female jockeys at an elite level in the racing industry. Previous research had suggested an underestimation of the ability of female jockeys to win races, as recorded in betting behaviour. This study outlined that rider sex showed no influence on

racehorse physiology and performance in both training and racing. The study offers a new perspective on the possible balance of elite male and female jockeys on the start line of races. Further efforts to favor a more inclusive racing environment would contribute towards equal opportunities and the promotion of fair competition.

**Keywords:** rider, sex, horse, performance, physiology

## REIN TENSION AND AVERSION BEHAVIOURS IN HORSES WHEN LED WITH A HALTER OR A BITTED BRIDLE: IS THERE A DIFFERENCE?

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### **Abstract:**

Equitation generally necessitates the application of equipment with unknown impacts on the horse. For example, the impact of bits being placed in the horse's mouth due to the pressure on the oral structures remains under debate. Studies comparing bitted with bitless bridles and examining the effects of bit mouthpieces have yielded varying results due to factors such as an individual horse's training, exposure to bit types, equestrian discipline and rider/handler attributes, abilities and expectations. The aim of this study was to investigate the differences between bit and halter pressure on horse behaviour and physiological responses during light exercise. Five leisure horses (four geldings, one mare; aged 5-25 years), handled by their owner were involved in this study using a crossover design with two test conditions (wearing their usual halter; wearing their usual snaffle bridle) and a 30-minute wash-out period. A FLIR ONE Gen 3 thermography camera was used to capture 3 consecutive images of each horse's left eye before being fitted with a polar H10 heart rate monitor paired with the Polar Beat app, side reins (with elastic insert) attached a roller and either their usual halter or bridle. IPOS rein tension sensors were fitted between the side reins and either the halter side rings or the bit. Horses were video recorded using a Google Pixel 5 on a tripod positioned 7.5m from the horse. The horse was then led (using the same lead rope for both conditions) in a straight line for 13m three times. Left eye temperature was taken again immediately after the final replicate. Eye temperature (°C), heart rate (BPM), rein tension (N), and behaviour data (frequencies) were collated in MS Excel and analysed using JASP. Means of the difference between eye temperature before and after each replicate and the mean heart rate during each trial were derived. No significant differences in mean rein tension or mean eye temperature between test conditions were found ( $t_4=0.34$ ;  $p>0.05$  and  $t_4=0.87$ ;  $p>0.05$  respectively). Mean heart rate was significantly greater when horses were wearing their bridle ( $18.2\pm 4.69$ bpm) than when they were led wearing their halter ( $15.14\pm 3.09$ bpm;  $t_{14}=3.04$ ;  $P<0.01$ ). Tail swishing occurred significantly more frequently when led with a halter ( $6.04\pm 3.77$ ) than with a bridle ( $3.34\pm 4.05$ ;  $t_4=4.95$ ;  $p<0.01$ ). The finding that horses may be more stressed when led with a light contact with bitted bridles than with a halter may have some significance for improving partnerships and equine performance.

**Lay person message:** There is often a lack of consideration of the impact of equipment on horses. Bits are often used which when rein tension is applied to them, puts pressure on parts of the horse's

mouth. Whilst no changes were seen in rein tension or eye temperature when horses were led in their normal bitted bridle compared to their normal halter, higher heart rates were evident when horses were led in their bridle and more tail swishing when they were led in their halter. These findings are important when seeking to improve horse-human partnerships and performance.

**Keywords:** stress, bit, bitless, halter, eye temperature, heart rate, rein tension, behaviour

## BREEDING FOR DURABILITY – EQUINE MONITORING AT PASTURE USING HALTER ATTACHED HOOFSTEP® AI SENSORS

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### Abstract:

To breed healthy and sustainable horses for competition purposes, many advocate keeping young horses together on large pastures with exposure to a varied terrain and footing to ensure optimal physiological and behavioral development. Using smart sensors may aid in both daily monitoring and improving our understanding of what influences individual horse behavior during the other 23 hours. Ten female Swedish Warmblood yearlings were released together with a “nanny” mare at Brösarp natural reserve, in southern Sweden (20 ha of hilly and partly forested terrain, up to 60 meters above sea level). At the nearby Bollerup stud, 8 female yearlings were released onto 9 ha of cultivated pasture which was 15 m above sea level. To register individual activity patterns, time budgets and distance travelled, all yearlings were equipped with HoofStep® AI sensor halters. The Brösarp horses spent more time in activity and moved longer distances per day (total mean 11.6 km/day compared to 9.3 km/day). Both pastures had natural water but less accessible at Brösarp where horses drank together three times daily whereas water consumption at Bollerup were less synchronized and more frequent. In Brösarp, the horses were most active during the afternoon and evening (12-24h) and least between 0-6 h. This time of day was also the highest duration of lying down rest. Mean time/day in lateral recumbency was 42 min at Brösarp and more than double at Bollerup (1 h 43 min). At Bollerup horses was most active between 06-18 and least active between 18-06. Brösarp yearlings spent less mean total time inactive compared to Bollerup yearlings (6 h 40 min/day and 7 h 29 min/day respectively). Monthly daily eating duration varied but maintained similar in both groups (10-11 hours/day/month ranging from 8.1 -11.4 hours/day). The nativegrassland pastures and higher daily energy output in Brösarp, resulted in less weight gain than at Bollerup but all horses maintained a BCS of 4, based on a Henneke 0-9 scale. No difference in change of carpus circumference or wither height development were found. Daily activity pattern in Brösarp indicate improved conditioning compared to Bollerup, a foundation for future soundness and durability.

**Lay Person’s Message:** To promote healthy development and improve soundness of future top level competition horses, 10 Swedish Warmblood (SWB) yearlings of both dressage and show jumping pedigree were released onto 20ha of natural hilly pastures and compared to 8 yearlings released onto 9ha of cultivated pastures in southern Sweden. Daily activity pattern was registered using HoofStep

sensor technology. The “Brösarp-project” was initiated by Professor DVM Ingvar Fredricson, managed by the non-profit organization Hästen i Skåne and financed by EU-Leader Dnr 2020-989.

**Keywords:** AI, wearable devices, daily monitoring, time budget, sustainability, welfare

## INVESTIGATION INTO EQUINE NOCTURNAL BEHAVIOUR BETWEEN THE FIELD AND STABLE

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### Abstract:

Our understanding of nocturnal behaviours in domesticated horses is limited. This study aimed to increase our knowledge of equine nocturnal time-budgets and how these vary between stables and pasture, and according to age. Eight horses, in groups of youngsters (YH n=4, mean age=2.75yrs±0.14 s.d.) and adults (OH n=4 mean age=17.25yrs±0.95 s.d.) were observed in a cross-over design for 7 nights (18:00-06:00) in Winter. Step count, foraging behaviour and recumbency were observed in both environments. Ice Robotics Qubes™ (IRQ), attached to left forelimb, recorded steps per hour and recumbency in both environments. When stabled in individual boxes (16x16ft) on straw (15-20cm deep), covering 50% of the stable (no mats) foraging behaviour was recorded via infrared light source CCTV. At pasture, microphones attached to head collars provided audio recordings of foraging. Hay and hard feed provision was calculated against their workload, weight and health at the stipulation of the yard manager. The same amount of hay was provided spread out in the paddock as in the stables. For data analysis, Wilcoxon sign tests, Paired t-tests and Independent t-tests<sub>(i)</sub> were used (degree of freedom d.f.=7 between treatment or age groups and d.f.=6 between age groups within treatment; Mean±S.E. unless stated otherwise). Significantly more (n=8, T-test, t=-12.51, df=7, P<0.001) steps were taken at pasture (2217±149) than when stabled (488.1±42.56). Total recumbency duration when stabled (2.6±0.7hrs) was significantly higher (n=8, T-test, t=3.0, df=7, P<0.05) than at pasture (0.7±0.1hrs) and horses spent significantly (n=8, T-test, t=-6.8, df=7, P<0.001) more time (7.2±0.17hrs) (60%) foraging at pasture, compared to when stabled (4.1±4.3hrs) (32%). Additionally, recumbency frequency was significantly higher when stabled (n=8, T-test, t=2.7, df=7; stable=5.87±1.35; pasture=2.29±0.31; P<0.05). When stabled YH performed significantly more recumbency bouts compared to OH, (YH=9.3±0.4; OH=2.5±0.87; T<sub>(i)</sub>, t=7.2, df=6, P<0.001) and overall significantly more total recumbency, (YH=4.2±0.2hrs; OH=0.9±0.4hrs; T<sub>(i)</sub>, t=8.1, df=6, P<0.001). OH performed significantly more 'other' behaviour in the stable, primarily identified as standing (OH=7.2±0.86hrs; YH=3.34±0.2hrs; T<sub>(i)</sub>, t=-4.4, df=6, P<0.01). No significant differences were found at pasture between horses. The results indicate that horses behaved similarly at pasture, moved significantly less in the stable than at pasture and age groups reacted differently to being stabled. More foraging behaviour was observed at pasture, which was replaced with lying or 'other' behaviour when stabled. This pilot study suggests that older horses may struggle to lie down and stand up again when stabled, instead remaining stood for the majority of the night. This raises welfare concerns for horses

in stabled environments with regards to musculoskeletal health, foraging behaviour fulfilment and particularly of older horses achieving adequate recumbency per night.

**Lay person's message:** Understanding equine nocturnal time-budgets is important to ensure welfare is maintained throughout a 24hr period. Keeping horses stabled at night meant they moved less (80% fewer steps) and performed less foraging behaviour, compared to when at pasture. Older horses remained standing when stabled for significantly longer periods of time compared to younger horses, despite being housed in larger than standard 12x12 stables. This raises concerns regarding horses' ability to fulfill their behavioural needs to forage and move when stabled and in particular, older horses ability to rest lying down when stabled.

**Key Words:** Time-budgets, welfare, foraging, locomotion, lying, housing



## DO PLAY, SOCIAL COMPANIONSHIP AND AGE PROTECT FOALS FROM WEANING STRESS?

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**Abstract:** Juvenile play behaviour can increase health and fitness during adulthood and facilitate positive social bonding, important for horses as social species. The presence of a companion during stressful events can attenuate a subject's behavioural and physiological stress response and/or aid homeostatic recovery, i.e. provide social buffering. Weaning is one of the most stressful events for foals with the potential to compromise short- and long-term welfare; further, because it occurs at different ages depending on industry sector and practice. This study aimed to test the predictions that foals engaging in more social play pre-weaning, have more social companions and are older at weaning, will exhibit fewer stress responses. Forty-five foals were recruited across four UK studs (contacted by phone; A: n=12, Thoroughbred, TB, B: n=8, TB, C: n=5, Warmblood, WB, D: n=20, TB) in two foaling seasons (2020 and 2021). Pre-weaning social play behaviours (e.g. play fighting between two or more foals) were live recorded for 4h by *ad libitum* focal and continuous recording for twenty 10min intervals per day over three days when foals were 3-5 months of age and kept at pasture with their dams. Foals' responses (locomotion frequency (%) and number of vocalisations) to weaning (at 4-6 months of age) were live-recorded for four hours following dam-offspring separation (progressive pasture weaning (n=3), abrupt pasture weaning (n=1); controlled for statistically i.e. stud entered as fixed factor in model). Locomotor behaviour (frequency in %) of foals was assessed by instantaneous sampling every 10min, foal vocalisations were assessed by *ad libitum* focal and continuous recording during each 10min interval. Number of social companions was recorded pre- and at weaning fields. Foals engaged  $0.82\text{h}^{-1} \pm 0.11$  (*Mean*±*SEM*) in social play behaviour during pre-weaning observations. During weaning, foals who spent more time locomoting also vocalised more ( $r_{43}=0.864, p<0.001$ ), although foal behavioural stress responses were not predicted by foal age at weaning (locomotion frequency:  $F_{1,39}=0.020, p=0.888$ ; vocalisation frequency:  $F_{1,39}=0.122, p=0.740$ ). Pre-weaning social play behaviour did not affect foals' responses at weaning either (locomotion frequency:  $F_{1,32}=1.212, p=0.279$ ; vocalisation frequency:  $F_{1,32}=2.682, p=0.111$ ). In contrast, foals with more field companions at weaning spent less time locomoting ( $F_{1,32}=5.444, p=0.026$ ) and vocalising ( $F_{1,32}=4.771, p=0.036$ ) compared to foals with fewer field companions. It is possible that a greater number of companions is associated with more effective social buffering during artificial weaning, while age and opportunities to engage in play behaviour pre-weaning do not appear protective of weaning stress. To improve foal welfare during artificial weaning, stud managers should consider social companionship during dam-foal separations, e.g. keeping foals in bigger groups at weaning.

**Lay person message:** Playing and bonding with peers can benefit health and fitness during adulthood. During stressful events, the presence of a social companion can alleviate the stress experienced and/or help to recover from it more quickly. This phenomenon is called social buffering. We predicted that pre-weaning playing with peers, social buffering and age at weaning, a stressful event for foals, acts protective of behavioural stress experienced during weaning. Foals who had more field companions during weaning showed less restless walking and whinnying. However, age at weaning and pre-weaning playing with peers did not appear to lower stress-related behaviours.

**Keywords:** foal; welfare; weaning; social behaviour; stress

## THE EFFECT OF HORSESHOES AND SURFACES ON HORSE AND JOCKEY CENTRE OF MASS DISPLACEMENTS AT GALLOP

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### Abstract:

This study sought to quantify centre of mass (COM) displacements in thirteen horse-jockey dyads galloping on turf and artificial tracks at the British Racing School in aluminium, barefoot, GluShu (aluminium-rubber composite) and steel shoeing conditions. Tri-axial acceleration data were collected close to the COM for the horse (girth) and jockey (kidney-belt), using iPhones (Apple Inc.) equipped with an iOS app (SensorLog, sample rate=50 Hz). Shoe-surface combinations were tested in a randomized order and horse-jockey pairings remained constant. Acceleration data were filtered using bandpass Butterworth filters with cut-off frequencies of 15 Hz and 1 Hz, then integrated for displacement using Matlab. Peak displacement was assessed in both directions (positive 'maxima', negative 'minima') along the cranio-caudal (CC, positive=forwards), medio-lateral (ML, positive=right) and dorso-ventral (DV, positive=up) axes for all strides with frequency  $\geq 2$  Hz (mean=2.06 Hz). Linear mixed-models determined whether surfaces, shoes or shoe-surface interactions (fixed factors) significantly affected the displacement patterns observed, with day, run and horse-jockey pairs included as random factors; significance was set at  $p < 0.05$ . Data indicated that surface-type significantly affected peak COM displacements in all directions for the horse ( $p < 0.001$ ) and for all directions ( $p \leq 0.008$ ) but forwards in the jockey. The largest differences were observed in the DV-axis, with an additional 5.7 mm and 2.5 mm of downwards displacement for the horse and jockey, respectively, on the artificial surface. Shoeing condition significantly affected all displacement parameters except ML-axis minima for the horse ( $p \leq 0.007$ ), and all displacement parameters for the jockey ( $p < 0.001$ ). Absolute differences were again largest vertically, with similarities amongst displacements from barefoot and aluminium trials compared to GluShu and steel. Shoe-surface interactions affected all but CC-axis minima for the jockey ( $p \leq 0.002$ ), but only ML-axis minima and maxima and DV-axis maxima for the horse ( $p \leq 0.008$ ). The results demonstrate that hoof-surface interface interventions can significantly affect horse and jockey upper-body displacements, which may have performance and safety implications. Greater sink of hooves on impact, combined with increased push-off during the propulsive phase, could explain the higher vertical displacements on the artificial track. Variations in distal limb mass associated with shoe-type may drive compensatory COM displacements to minimize the energetic cost of movement. The artificial surface and steel shoes provoked the least CC-axis movement of the jockey, so may promote greatest stability. However, differences between horse and jockey displacements found DV-axis and CC-axis offsets with compensatory increases and decreases, suggesting the dyad might collectively operate within displacement limits to maintain stability.

### Lay person's message:

The athletic performance and safety of racehorses and their jockeys are influenced by hoof-surface interactions. This intervention study assessed the effect of eight horseshoe-surface combinations on horse and jockey centre of mass displacements during galloping. Aluminium, barefoot, GluShu and steel shoeing conditions were trialled on turf and artificial surfaces. Vertical centre of mass displacements increased on the artificial surface relative to turf, and in barefoot and aluminium

conditions relative to steel and GluShu; findings which may indicate more efficient propulsion. Reduced forwards-backwards movements, possibly linked to improved stability, were associated with the artificial surface and steel shoes.

**Keywords:** Racehorse-jockey dyad; centre of mass; tri-axial displacement; gallop; shoeing condition; surface

**JOCKEY PERCEPTIONS OF HORSESHOE AND SURFACE CONDITIONS: A COMPARISON TO OBJECTIVE BIOMECHANICAL DATA**

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**Abstract:**

Riding racehorses is a high-risk profession and optimizing safety alongside performance is paramount. Horseshoes play a critical role in providing traction with the ground surface and are therefore a major determinant of safety. However, the subjective perceptions of expert riders influence attitudes towards using different shoes and must be taken into consideration before any changes may be implemented. This study used a questionnaire-based method to evaluate jockey opinion of four shoeing conditions (aluminium, steel, GluShu, and barefoot) trialled at gallop over turf and artificial surfaces. Nine Lickert style questions explored impact, cushioning, responsiveness, grip, uniformity, smoothness of ride, safety, adaptation period, and overall rating for each shoe-surface combination. A total of 94 questionnaires, based on 15 horse-rider pairs, were assessed using descriptive statistics and linear mixed models performed in SPSS: models included shoeing condition, surface and shoe-surface interaction as fixed factors and day and horse-rider pair as random factors; significance was set at  $p < 0.05$ . Data indicated that shoeing condition significantly affected all question responses ( $p \leq 0.013$ ), with the exception of impact ( $p = 0.067$ ). Surface-type significantly affected perception of grip ( $p = 0.001$ ) and safety ( $p = 0.004$ ). The perception of increased grip on the artificial surface may help to explain significantly faster (by 10% on average across limbs;  $p \leq 0.04$ ) hoof breakover on this surface compared to turf; quantified using high-speed video footage (Sony DSC-RX100M5) of 384 breakover events. In addition, tri-axial hoof accelerations, quantified from 41,183 strides using hoof-mounted accelerometers (SlamstickX, range  $\pm 500$  g, sample rate = 5000 Hz), were significantly higher at impact on turf (1.2–2.4 times;  $p \leq 0.015$ ), which may have influenced opinions on safety. Overall, jockeys showed a preference for familiar aluminium and steel shoes across both surfaces. These rated “excellent” and were considered to be “very supportive” in approximately 80% of trials, with a 100%

“active” response, good grip, and a quick adaptation period. In contrast, barefoot and GluShu conditions were generally considered “moderately supportive,” with barefoot appearing favourable on the artificial surface. On turf, barefoot was deemed the least smooth and the only condition that jockeys sometimes marked “unsafe” (17% of responses). Hoof accelerometry data indicated horses had a greater tendency to swap leads in this condition, possibly explaining this response. However, in general, patterns in hoof kinematic data reflected a stronger influence of surface than shoe-type, indicating that jockey preferences were not always clearly aligned with objective data. Future work aims to investigate the implications of jockey opinion on risk-taking behaviour.

**Lay person’s message:** This study compared jockey perceptions of aluminium, barefoot, GluShu and steel shoeing conditions, trialled at gallop on turf and artificial surfaces, to objective biomechanical data. Jockey opinions on hoof-ground interactions appeared dominated by shoeing condition, whereas data for hoof accelerations and breakover times showed a stronger dependency on surface. In general, jockeys favoured aluminium and steel shoes with which they are most familiar.

**Keywords:** Jockey; questionnaire; racehorse; surface; shoeing condition; hoof kinematics

## A PRELIMINARY INVESTIGATION INTO RIDER PERCEPTIONS OF THEIR WELLBEING

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### **Abstract:**

Riding is a unique, physical activity, requiring non-verbal communication and symbiosis of two sentient bodies. Growing empirical evidence demonstrates how the physical, psychological, and emotional condition of the human influences the complex interplay within the partnership. Self-awareness of rider impact and their responsibility to mitigate against stress and strain on the ridden horse is becoming increasingly important. This qualitative pilot study aimed to determine methods with which to explore riders' perceptions and recognition of components of wellbeing as relevant to ride experience and the horse, to gain an understanding of human wellbeing within an equestrian context. Three female riders aged 29-59 years, who self-described as professional (dressage), leisure and learning, took part individually in semi-structured one to one interviews online that were recorded and later transcribed for inductive thematic analysis. Open-ended questions around rider motivation/wellbeing perception/ influence on the horse/ support systems were combined with further probing, to explore how rider wellbeing was appreciated and considered relevant to the horse. Four key themes were determined; rider physicality, emotional state, injury and risk awareness, and socio-environmental influence. Rider physicality was discussed in terms of asymmetry and core stability. The professional rider also considered weight, stamina, tension, and pain impacting the horse. Two riders reported using riding to manage their mental health, while all believed their emotional state had a significant effect on their ride experience, mentioning the horses' intuitive nature. All had fallen off in the last year; two had subsequently ridden with broken ribs, however, neither considered the impact on the experience of the horse. Coaches were discussed at length as essential support by all three riders and regarded as integral to managing rider psychology and 'baggage.' Social media pressure and resource constraints were raised as stressors. The novel findings justify a study on a larger scale, although refinements to some questions would help to provide further insights into wellbeing within an equestrian context.

### **Lay Person's Message:**

The benefits of the horse on human health and wellbeing have been appreciated and celebrated for centuries. This preliminary study explored riders' perceptions and recognition of their own fitness and wellbeing as relevant to the horse; not only for enhancing ridden performance, but for improving the health, safety and longevity of the horse and rider partnership. Riders' motivations, experience and environment were found to be important to self-awareness of how their own physical, psychological, and emotional state and condition impacts and effects their horse.

**Keywords:** ethical equitation; rider wellbeing; one welfare; horse-rider relationship; qualitative; pilot

## HORSE INDUSTRY STAKEHOLDERS' ATTITUDES TOWARDS BIT-RELATED ORAL LESIONS IN HARNESS RACING HORSES – PILOT STUDY

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**Abstract:** According to local harness racing guidelines the race veterinarian or their assistants shall examine a horse if mouth bleeding is observed. They may remove a horse with mouth lesion from the race or require a health certificate before the next race. The aim was to investigate differences in horse industry stakeholders' (N = 93) attitudes towards bit-related lesions in harness racing horses. Twelve photographs of authentic moderate or severe oral wounds (as per a peer-reviewed oral lesion grading system) in bars of the mandible, inner or outer lip commissures, or buccal area with an imaginary scenario were presented to 14 veterinarians and 14 race veterinary assistants (VETS), 32 trotting horse trainers (TRAINERS) and 33 other stakeholders such as grooms and owners (OTHERS) before an educational event in 2018. Participants expressed anonymously whether they would allow the horse to race or not (scenarios S1–7 before a race) or whether they would stipulate a health certificate or not (scenarios S8–12 after a race). The association between stakeholder groups and their responses was examined with the Pearson Chi-square test. Statistical differences between groups emerged in 6 out of 12 scenarios. In each, OTHERS withdrew the horse from the race or stipulated a health certificate more frequently than other groups. Proportion of respondents in favour or removal (S1, S2, S4, S6, S7) or a health certificate (S9); S1 (severe) VETS 43%, TRAINERS 22%, OTHERS 52%, (N = 93,  $\chi^2$  6.31, df 2, p = 0.04), S2 (severe) VETS 14%, TRAINERS 13%, OTHERS 36% (N = 93,  $\chi^2$  6.72, df 2, p = 0.04), S4 (moderate) VETS 11%, TRAINERS 13%, OTHERS 33% (N = 93,  $\chi^2$  6.43, df 2, p = 0.04), S6 (severe) VETS 14%, TRAINERS 53%, OTHERS 64% (N = 93,  $\chi^2$  16.15, df 2, p < 0.001), S7 (severe) VETS 25%, TRAINERS 45%, OTHERS 63% (N = 91,  $\chi^2$  8.48, df 2, p = 0.01), S9 (moderate) VETS 4%, TRAINERS 6%, OTHERS 38% (N = 92,  $\chi^2$  16.23, df 2, p < 0.001). We found differences in attitudes towards bit-related lesions both between and within stakeholder groups. Veterinarians, assistants, and trainers were less willing than other stakeholders to withdraw the horse from the race or to stipulate a health certificate. Differences in ethical attitudes might cause conflicts, and not removing horses with severe oral lesions from the race might compromise horse welfare and society's trust in the discipline's surveillance system.



**Lay Person's Message:** Veterinarians are required to make evaluations on horse welfare in a variety of circumstances. Imaginary harness racing scenarios with authentic photographs of lesions from horses' mouths were presented to three stakeholder groups (veterinarians and race veterinary assistants, trotting horse trainers, and others). Respondents evaluated whether a horse with the presented lesion in the described situation was fit to compete. Veterinarians, assistants, and trainers were less willing to withdraw the horse from the race or to stipulate a health certificate than other stakeholders such as grooms.

**Keywords:** oral lesions, bit, equine welfare, veterinary guidance, harness racing

## PRACTITIONER SAFETY AND THE APPLICATION OF LEARNING THEORY IN EQUINE PHYSIOTHERAPY:

### A PRELIMINARY STUDY

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#### **Abstract:**

Similarly to the equine veterinary profession, there may be a high risk of occupational injury for the equine physiotherapy profession and preventive strategies, such as the application of learning theory (LT), may mitigate workplace injury frequency. The purpose of this study was to identify the frequency of occupational injury among equine physiotherapists and investigate the relationship between injury rate and knowledge of LT. An online survey was distributed, receiving 64 valid responses: of these, 77% (n=51) were qualified veterinary physiotherapists working with equines and their data were taken forward for analysis. The mean injury frequency was  $0.59 \pm 1$  per year, with 70% (n=36) reporting at least one injury during their career. There was a moderate negative correlation ( $r = -0.34$ , 95%CI[-0.56,-0.07],  $p < 0.05$ ) between career length (in years) and injury frequency. The most common site of injury for practitioners was the lower limb (43%, n=22) and the most common type of injury was bruising (63%, n=32). 35% (n=18) of respondents who claimed the work activity they were performing significantly contributed to their most severe injury, were carrying out equine hindlimb treatment at the time of injury. Knowledge of LT was poor: only 41% (n=21) of respondents scored 3/9 or higher in the section on practical application of LT and 47% (n=24) achieved a grade of 6/10 or higher in the section on theoretical knowledge, with one respondent achieving 0/10. There was a moderate positive correlation ( $r = 0.37$ , 95%CI[0.10,0.58],  $p < 0.01$ ) between veterinary physiotherapists' theoretical knowledge scores and their self-evaluation of LT terminology scores. There was no significant correlation between practical and theoretical LT scores and injury frequency. However, there was a weak negative correlation ( $r = -0.31$ , 95%CI[-0.54,-0.04],  $p < 0.05$ ) between self-evaluation of LT terminology scores and injury frequency. Due to the small number of responses, results from the present study are not representative of the target population. However, results nonetheless highlight a trend of high injury rates and low levels of understanding of equine learning. This is comparable to other equine-related professions, indicating the urgent need of research into better prevention and safety-enhancing strategies, which could reduce the rates of occupational injury and safeguard the welfare of both practitioners and equines.

#### **Lay person's message:**

Similarly to the equine veterinary profession, equine physiotherapy may be a high-risk career and the application of learning theory may help to reduce injury frequency, as practitioners who understand

and are able to prevent flight responses will work with more relaxed and manageable horses. This survey found that equine physiotherapists sustained on average one injury every two years and that few applied learning theory consistently to their work. More should be done to address workplace safety, through better education and the development of strategies that aim to prevent flight responses and other potentially dangerous behaviours.

**Keywords:** Equine physiotherapy, learning theory, occupational injury, practitioner education, workplace safety

## A PRELIMINARY STUDY INTO EQUINE SLEEP QUALITY USING BEHAVIOURAL MEASUREMENTS

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### Abstract:

In human research, diminished sleep quality has been found to; have deleterious effects on glucose regulation, interfere with the secretion of anabolic hormones, and change food regulation in terms of preferences and timing of consumption. Sleep disruption has also been found to influence cognitive functioning and mood in the same way as total sleep deprivation. Previous studies of equine sleep have established environmental influences on the occurrence of sleep, measuring total sleep time (sleep quantity). This study aimed to test the use of novel measurements of sleep quality in response to bedding depth as a factor that has been found to influence the equine sleep profile previously. Using a cross-over design, seven riding school horses were observed using CCTV equipment and focal continuous sampling (19:00-07:00) on control (1.6m x 3.6m coverage, 5cm depth) and treatment bedding (2.6m x 3.6m, 15cm depth) for five nights on each with a two day wash out period between. Arousals lasting <3 minutes (>3 minutes = activation of the sympathetic nervous system/wakefulness) from sleep states derived from a pre-determined ethogram were measured in terms of overall frequency ( $\text{min}^{-1}$ ) and proportion (%) of the sleep state. Paired tests of difference were used according to distribution of data to establish whether measurements differed between bedding conditions ( $P < 0.05$ ). Frequency of arousals during rapid eye movement sleep (REM) in sternal recumbency were significantly higher on control bedding ( $0.44 \pm 0.23 \text{ min}^{-1}$ ) compared to treatment bedding ( $0.34 \pm 0.27 \text{ min}^{-1}$ ). Similar results were found for non-REM sleep in sternal recumbency. Although frequency of arousals during REM sleep in lateral recumbency were not significantly different, the proportion of arousals were higher on treatment bedding ( $14.01 \pm 19.87 \%$ ) compared to control bedding ( $7.90 \pm 13.43 \%$ ). Results suggest that the occurrence of arousals could be a useful measure of sleep quality and that sleep quality appears to be influenced by bedding depth. Further investigation of equine sleep quality is necessary to understand what constitutes poor quality sleep and its consequences in terms of wellbeing and performance.

### Lay person's message

The use of a novel behavioural measurement proved useful in the quantification of equine sleep quality, and highlighted how bedding depth can influence this aspect of sleep. However more research is required to increase our understanding of what constitutes good and bad sleep quality for the horse and the influence on everyday wellbeing and performance.

**Keywords:** horse; sleep; arousal; bedding; wellbeing; sleep disturbance

# A PILOT STUDY INVESTIGATING A NOVEL GRID TO MEASURE EQUINE RECUMBENT LATERALISATION AND LOCATION WITHIN THE STABLE

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## **Abstract:**

The demands of rising from recumbency and associated asymmetric movement pattern mean that equine preference of recumbent lateralisation may strain specific structures or incur uneven muscle development. Thus, lateralisation of sleep has the potential to impact equine welfare. The pilot study trialled a novel grid of pre-determined stable locations for suitability in determining recumbent sleep location and lateralisation. The grid was revised due to initial incompatibility with the angle of retrospective camera footage and the final grid was comprised of equal, rectangular quadrants with an additional central, square location. Where the subject was positioned across multiple locations, the location of the trunk distal to the axial plane determined the location recorded; however, the centre location was recorded only when the subject was observed to be equidistant across two quadrants and within the centre zone. Location and lateralisation were recorded for each sleep bout. Four riding school horses of variable demographics were observed during nocturnal periods using CCTV and continuous focal sampling. The grid proved successful in determining equine recumbent location by observation. Equines showed individual recumbent location and lateralisation preferences. The centre and back-right locations accounted for 82% of recumbent bouts and both locations indicated a right-side lateralisation preference. Interesting anecdotal observations included that equines appeared to orientate their standing and recumbent rest according to aspects within their environment such as the position of the stable door. Accordingly, it may be possible to optimise the environment within the stable to minimise the physiological effects of recumbent lateralisation preference and improve equine welfare. The pilot indicates further research may benefit equine welfare; however, methodological modifications including consideration of the bias introduced by camera position, the limited sample population, and modifying the grid for different stable designs are recommended.

## **Lay person's message**

Having a preferred lying side may impact equine health and wellbeing. This pilot tested a new method for measuring sleep location within the stable and lying side. Horses appeared to have preferred sleep sites and lying sides which may be related to stable design and vigilance. A larger scale study is recommended to gather statistically significant results and potentially identify areas where horse wellbeing could be improved.

**Keywords:** Sleep; lateralisation; location; recumbency; environment

## RETHINKING HORSE FALLS: WORKING TOWARDS EVENTING SPORT SAFETY.

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### **Abstract:**

Horse falls continue to be the leading cause of serious injury and fatality to horses and riders competing in eventing cross-country, with 13 rider deaths in the five year period between 2018-2022. Recently (2021-2022), media reports have suggested that the inclusion of equestrian eventing at the Olympics is under threat due to format, inclusivity and costs. In addition to these operational challenges, the social license to operate for equestrian sports has been under scrutiny. It is imperative that eventing governing bodies put safety at the forefront of the sport, not only to reduce risk to and improve welfare of participants, but to protect social license and therefore the future of the sport.

In recent years (2021-22) eventing safety research has demonstrated a more data-informed approach to risk-management, with studies utilising large datasets to identify risk factors for incidents such as horse falls. One key limitation of data-driven approaches to risk management is that the research is dependent on the quality and veracity of the dataset.

Currently, horse falls are categorised by eventing governing bodies as either rotational or non-rotational. To date, rotational falls have been the main outcome of interest for eventing risk management strategy, due to the high prevalence of athlete injury and fatality from these falls. It is clear however when observing horse falls, that the non-rotational fall category includes distinct sub-categories. As a result of past and ongoing eventing safety research conducted by our team, we propose theoretical work which outlines new, additional categories of horse falls to be included at the point of data capture, which will contribute to improved analysis moving forwards. In addition, we suggest that 'near misses' should be recorded. We propose clear definitions of fall types and near misses which could be easily implemented by eventing governing bodies. Inclusion of these newly defined incidents would enable a more complete analysis, leading to additional recommendations for specific interventions that would aim to reduce the risk of horse falls.

**Lay person's message:** The most common cause of serious injury/fatality during eventing is a horse fall, where the horse falls to the ground, sometimes landing on top of the rider. Recent research has analysed large datasets to identify factors that increase the risk of a horse fall. Currently, horse falls are categorised into two types. We propose a further two categories and recording of 'near misses', to improve future data analysis. This may enable researchers to identify new risk factors for horse falls, which could then be used to inform policy and procedure which aims to reduce the risk of horse falls.

**Keywords:** Equestrian sport, eventing, horse falls, safety, analysis

## EQUINE BODY CONDITION: HORSE OWNERS' PERCEPTIONS

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**Abstract:** Equine obesity is a growing cause for concern in the equestrian sector. Indeed, in some equine populations, obesity is reported to be so common that it has become a cultural norm. Overweight horses and ponies have an increased risk of impaired athletic performance, thermal stress, disease related to increased loading of the joints, laminitis and colic. In humans, the World Health Organisation recognise 'globesity', the increasing number of overweight and obese humans, as a major physical and psychological challenge to good health. This raises the question, with increasing equine and human obesity levels, are horse owners equipped to identify healthy body condition in the horse. A simple online survey, distributed via Facebook™, presented participants with two images: A) visibly underweight Thoroughbred-type horse; B) visibly overweight cross-breed horse. Respondents were asked to 1) select which horse they considered unhealthy based on their body condition: A, B, both, neither, or not sure, and 2) would they be more concerned about one of these animals than the other: A, B, both, neither, or not sure. Demographic information on which equestrian disciplines respondents participated in, role in the equestrian industry, and country of residence were collected. Frequency analysis and Kruskal-Wallis analyses with post-hoc Mann Whitney-U tests identified if differences occurred in respondent ratings by discipline, role and location. Most respondents thought both horses were unhealthy (66%; n=2335), 30% (n=1056) considered horse B most unhealthy, 1% (n=37) horse A and 3% (n=93) felt neither were of concern, 10 respondents were not sure. Similarly, more respondents (67%, n=67%) were concerned for horse B, than horse A (4%, n=139), both horses (28%, n=997), or neither (0.2%, n=11); 8 respondents were not sure. No differences in unhealthy rating were reported by discipline, but differed by country ( $p=0.0004$ ), with more British (GB) respondents (12-14%;  $p<0.0004$ ) finding horse B unhealthy compared to those in Europe, North America and Australasia. GB respondents also rated horse B of increased concern (10-15%;  $p<0.010$ ) compared to other countries. Concerns for horses' health differed by discipline ( $p<0.030$ ), with respondents participating in showing (6-12%;  $p=0.020$ ) and racing (6-12%,  $p=0.020$ ) less concerned for horse B than those in other disciplines. Respondents working in industry and resident in GB, reported increased concerns for horse B (13%) than European respondents ( $p=0.003$ ). The results identify differences in horse owner perceptions of equine body condition; understanding what underpins these differences is essential to inform future education strategies to improve equine welfare.

**Lay person's message:** Equine obesity is increasing globally, with overweight horses and ponies becoming accepted as normal, representing a substantial equine welfare concern; 3531 horse owners



rated two images: underweight horse (A) and overweight (B) horse, to identify which were unhealthy and they were concerned for. Two-thirds of respondents rated horse B as unhealthy and of more concern; owners participating in showing and racing were less concerned for horse B than those active in other disciplines. Being able to recognise healthy body condition is essential to inform management strategies and ensure horse owners are meeting their duty of care to safeguard equine welfare.

**Keywords:** equine welfare; equine health; obesity; equine performance; horse owner responsibility

**ARE WE ALL ON THE SAME PAGE? A SYSTEMATIC REVIEW OF HORSE TRAINING METHODS WITHIN THE PUBLISHED SCIENTIFIC LITERATURE**

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**Abstract:**

It is vital that the impact of different horse training methods (TMs) are studied, to ensure the methods employed are effective and to assess their welfare implications. Whilst a range of different TMs are referred to within the scientific literature, no research has explored whether the way these are applied, and the terminology used, is consistent across existing studies. This is problematic as methodological differences may alter study outcomes, limit potential for inter-study comparison, and impede effective scientific communication. A systematic search of the published literature from three online databases (SCOPUS; Web of Science; PubMed) in December 2021 was used to identify studies that apply horse TMs within their methodology. A description of the training protocols was extracted from each paper verbatim and used to categorise the training approach(es) employed, identify their defining characteristics and highlight inconsistencies within TM description. The learning theory underlying each TM was also reviewed for consistency and validity by two experienced assessors (inter-rater agreement:  $\kappa=0.952$ ;  $P<0.001$ ). A total of 75 studies were reviewed, within which 10 distinct TM categories were identified. Five of these aligned directly with the principles of learning theory, however, several key differences in how these are being applied were identified, which may have potential to alter how horses respond to training. The five remaining categories were less clearly defined, with some authors referring to learning theory incorrectly, or failing to acknowledge it altogether. Limited information provided within some methodologies meant that study replication would not be possible. These findings highlight a need for more consistent and detailed reporting of horse TMs within the scientific literature. This would facilitate clear communication between researchers and further enable comparisons to be drawn across multiple studies, ultimately improving our understanding of modern horse training practices and their impact on both performance and equine welfare.

**Lay person's message:**

It is important to explore the impact that different horse training methods (TMs) have on both training success and horse wellbeing. For these to be reliably studied, training terms must be used consistently to enable researchers to understand how methods are applied. A review of the scientific literature identified 10 TM categories. The way that methods were applied, and the terms used to describe them,

varied between researchers, which may impede their translation into practice. Consequently, a push for greater standardisation of TM application and terminology within the literature is warranted.

**Key words:** Horse training; equitation science; learning theory; method reporting; terminology use

## EQUESTRIAN COACH AND JUDGE PERCEPTIONS OF THE IDEAL BODY SHAPE OF FEMALE HORSE RIDERS.

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### **Abstract:**

Body image (BI) in females has been found to differ amongst sport types, the ideal equestrian BI has recently been identified as a smaller physique and riders feel BI ideals influence judges scoring within dressage competitions. Previous research has also indicated that certain anthropometric values of female riders will influence rider ability. This research aimed to identify perceptions of equestrian coaches and dressage judges on rider body shape (BS) and detect if a bias is present; identify perceptions of appropriate horse rider matching and identify the perceived impact of BS on rider ability. An online survey presented on 'GoogleForms™' was posted on specific coaching, dressage and judging Facebook groups and distributed for a four-week period (n=265, coaches=174 judges=91), images for the survey were taken of twelve riders of different body shapes (Ectomorph, Mesomorph and Endomorph) riding three horses of different breeds and similar sizes. Pearson's Chi-squared ( $\chi^2$ ) Test of Association was utilised for data analysis. The results found that Ectomorph was significantly the most popular choice for the ideal somatotype on all three horses ( $\chi^2=44.084$ , DF=4,  $P<0.001$ ). No significant difference between coach and judge perception of BS was found, both identifying the ideal physique as a smaller image from the validated BI scale image ( $\chi^2= 3.580$ , DF=3,  $P=0.311$ ). Both coaches and judges perceive that BS impacts rider ability ( $\chi^2= 13.960$ , DF=2,  $P=0.001$ ), and no association between judge bias and ideal BS was found ( $\chi^2=3.46192$ , DF=12,  $P=0.991$ ), indicating that although judges state that body size or shape does not impact scores given, the ideal BS was still perceived as a smaller frame. A significant perception for horse rider matching identified the cob as the most appropriate for the Endomorph physique, compared to the warmblood and thoroughbred horse ( $\chi^2= 691.932$ , DF=4,  $P<0.001$ ). This result is consistent with previous research findings and potentially explains why the overall perception of the ideal female rider is of a smaller physique, indicating the need for future research investigating the effects of BS on rider posture and skill. Future research into physique related bias from judges is required to further identify the impact of BS on equestrian sport. The importance of appropriate horse-rider matching became apparent, potentially reducing any occurring bias in equestrian sport, and resulting in a more ascetically pleasing image.

### **Lay person's message:**

The ideal equestrian body image (BI) has been identified as a smaller physique and riders feel that BI ideals influence judges scoring within dressage competitions. An online survey found that perceptions

of coaches and judges of the ideal equestrian image to also be of a smaller physique and perceive that body shape (BS) impacts rider ability. Perceptions of appropriate horse rider matching identified the cob as most appropriate for the Endomorph physique. Future research is required to identify physique related bias from judges and to identify the impact of BS on rider ability.

**Key words:** Dressage; Bias; Physique; Body-image; Matching

**BEER AND URINE? QUALITATIVE ANALYSIS OF THE TREATMENT OF COMMON HEALTH PROBLEMS SEEN WITHIN  
WORKING EQUID POPULATIONS IN COLOMBIA**

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**Abstract:**

There are an estimated 1.5 million working equids in Colombia providing vital support to families, the majority of whom live below the international poverty line. The welfare of these animals is frequently compromised with problems such as colic and lameness being commonly seen; however, many owners lack the financial or physical capacity to utilise veterinary services to treat conditions such as these. This study aimed to explore problems experienced and treatments used by equid owners in Colombia. This study was approved by The School of Veterinary Medicine's Committee for Animal Research and Ethics and all participants gave informed consent. Twenty-four focus groups with between two and ten participants were carried out across eight regions. Three groups were represented per community: equid owners, women and community leaders with meetings following a loosely structured narrative script, with sound recordings subsequently transcribed into English. Inductive thematic analysis was performed using NVivo with double coding of six focus groups. Two overarching themes were identified that contributed to poor equid welfare; 'common health conditions' and 'treatment plans'. Colic, lameness and skin problems were frequently reported within equid populations in Colombia. Treatments employed varied, with owners reporting using either veterinary or empirical methods. Examples of treatment for lameness included application of bleach, battery acid, gasoline and ivermectin, whilst beer and urine were frequently used as treatments for colic. Whilst leaders and women were aware of the treatments used for working equids; owners discussed these methods in more detail. Some leaders commented that limited use of conventional medicines was a result of financial restrictions. Understanding the conditions seen within these vulnerable communities and the treatment methods used will provide key background information on the current situation. This will allow for the development of targeted interventions aimed at improving working equid welfare.

**Lay person's message:**

Working equids provide vital support to their owners and the wider communities in which they live and work. Whilst the importance of these animals is clear, their welfare is often compromised. There are high rates of lameness, skin sores and other health condition seen within working equid populations. Owners use a range of treatment methods for these conditions; many of which are home remedies. This study investigated the conditions commonly seen in these equids and what treatment methods are currently being used by owners. This will provide important background information on the current situation of these vulnerable communities.

**Keywords:** working equids, equid welfare, treatment method

## REIN TENSION AND AVERSION BEHAVIOURS IN HORSES WHEN LED WITH A HALTER OR A BITTED BRIDLE: IS THERE A DIFFERENCE?

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Equitation generally necessitates the application of equipment with unknown impacts on the horse. For example, the impact of bits being placed in the horse's mouth due to the pressure on the oral structures remains under debate. Studies comparing bitted with bitless bridles and examining the effects of bit mouthpieces have yielded varying results due to factors such as an individual horse's training, exposure to bit types, equestrian discipline and rider/handler attributes, abilities and expectations. The aim of this study was to investigate the differences between bit and halter pressure on horse behaviour and physiological responses during light exercise. Five leisure horses (four geldings, one mare; aged 5-25 years), handled by their owner were involved in this study using a crossover design with two test conditions (wearing their usual halter; wearing their usual snaffle bridle) and a 30-minute wash-out period. A FLIR ONE Gen 3 thermography camera was used to capture 3 consecutive images of each horse's left eye before being fitted with a polar H10 heart rate monitor paired with the Polar Beat app, side reins (with elastic insert) attached a roller and either their usual halter or bridle. IPOS rein tension sensors were fitted between the side reins and either the halter side rings or the bit. Horses were video recorded using a Google Pixel 5 on a tripod positioned 7.5m from the horse. The horse was then led (using the same lead rope for both conditions) in a straight line for 13m three times. Left eye temperature was taken again immediately after the final replicate. Eye temperature (°C), heart rate (BPM), rein tension (N), and behaviour data (frequencies) were collated in MS Excel and analysed using JASP. Means of the difference between eye temperature before and after each replicate and the mean heart rate during each trial were derived. No significant differences in mean rein tension or mean eye temperature between test conditions were found ( $t_1=0.34$ ;  $p>0.05$  and  $t_4=0.87$ ;  $p>0.05$  respectively). Mean heart rate was significantly greater when horses were wearing their bridle ( $18.2\pm 4.69$ bpm) than when they were led wearing their halter ( $15.14\pm 3.09$ bpm;  $t_{14}=3.04$ ;  $P<0.01$ ). Tail swishing occurred significantly more frequently when led with a halter ( $6.04\pm 3.77$ ) than with a bridle ( $3.34\pm 4.05$ ;  $t_4=4.95$ ;  $p<0.01$ ). The finding that horses may be more stressed when led with a light contact with bitted bridles than with a halter may have some significance for improving partnerships and equine performance.

**Lay person message:** There is often a lack of consideration of the impact of equipment on horses. Bits are often used which when rein tension is applied to them, puts pressure on parts of the horses mouth. Whilst no changes were seen in rein tension or eye temperature when horses were led in their normal bitted bridle compared to their normal halter, higher heart rates were evident when horses were led in their bridle and more tail swishing when they were led in their halter. These findings are important when seeking to improve horse-human partnerships and performance.

**Keywords:** stress, bit, bitless, halter, eye temperature, heart rate, rein tension, behaviour

## A PICTURE IS NOT GOOD ENOUGH – CALMING EFFECTS ON HORSES INSIDE TRAILERS

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### **Abstract:**

Loading and transportation of horses may be risky for both horses and humans. Trailer loading often violates at least two of the basic needs of horses; often they are alone and they are confined not being able to move freely. Often they also are deprived from roughage. All these factors may induce stress, which can be measured by behavioural and physiological indicators. The social isolation stress has previously been found to be alleviated by a mirror. However a mirror may be impractical or risky to use in a horse trailer. The aim of this study was to investigate if a photography of a horse's head clearly visible in the trailer could have a calming effect on horses when loaded alone. We used 24 horses, loaded twice each onto their normal horse trailer, with a short break in between. Treatment, systematically varied was either a horse portrait of an unknown horse or loaded without the horse portrait. Behaviour was registered continuously and heart rate when the horse was standing inside the trailer.

All horses were very calm during loadings. There were no statistically significant difference in heart rate or behaviour between the loadings with or without the horse photography. However the heart rate was significantly lower ( $p < 0.001$ ) at the second loading compared to the first loading. In conclusion a photo does not seem to have the same calming effect as a mirror in the trailer. However there was a habituation effect with repeated loadings with a short break in-between. Habituation training, maybe combined with a safe type of mirror, may potentially make trailer loading safer for both horses and handlers.

### **Lay person's message:**

Trailer loading may be a very stressful and dangerous part of horse management, for both horses and humans. It has previously been found that a mirror in the trailer may calm horses. Mirrors may be difficult to use in trailers in a safe way and hence we wanted to test if a photo of a horse face could have an equally calming effect. We found no effect of the photo. However, repeated loadings reduced heart rate of the horses when inside the trailers. Hence systematic training of loadings and a safe type of mirror may reduce horses' stress and increase safety.

**Keywords:** trailer loading, horse portrait, heart rate, behaviour, habituation



## **Beer and urine? Quantitative analysis of the treatment of common health problems seen within working equid populations in Colombia**

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### **Abstract:**

There are an estimated 1.5 million working equids in Colombia providing vital support to families, the majority of whom live below the international poverty line. The welfare of these animals is frequently compromised with problems such as colic and lameness being commonly seen; however, many owners lack the financial or physical capacity to utilise veterinary services to treat conditions such as these. This study aimed to explore problems experienced and treatments used by equid owners in Colombia. This study was approved by The School of Veterinary Medicine's Committee for Animal Research and Ethics and all participants gave informed consent. Twenty-four focus groups with between two and ten participants were carried out across eight regions. Three groups were represented per community: equid owners, women and community leaders with meetings following a loosely structured narrative script, with sound recordings subsequently transcribed into English. Inductive thematic analysis was performed using NVivo with double coding of six focus groups. Two overarching themes were identified that contributed to poor equid welfare; 'common health conditions' and 'treatment plans'. Colic, lameness and skin problems were frequently reported within equid populations in Colombia. Treatments employed varied, with owners reporting using either veterinary or empirical methods. Examples of treatment for lameness included application of bleach, battery acid, gasoline and ivermectin, whilst beer and urine were frequently used as treatments for colic. Whilst leaders and women were aware of the treatments used for working equids; owners discussed these methods in more detail. Some leaders commented that limited use of conventional medicines was a result of financial restrictions. Understanding the conditions seen within these vulnerable communities and the treatment methods used will provide key background information on the current situation. This will allow for the development of targeted interventions aimed at improving working equid welfare.

### **Lay person's message:**

Working equids provide vital support to their owners and the wider communities in which they live and work. Whilst the importance of these animals is clear, their welfare is often compromised. There are high rates of lameness, skin sores and other health condition seen within working equid populations. Owners use a range of treatment methods for these conditions; many of which are home remedies. This study investigated the conditions commonly seen in these equids and what treatment methods are currently being used by owners. This will provide important background information on the current situation of these vulnerable communities.

**Keywords:** working equids, equid welfare, treatment method

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# THANK YOU

Thank you for attending this year's conference.  
We look forward to seeing you all again in 2023.

