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Scientific Committee

**Chairs**
- Dr. Camie Heleski (Michigan State University)
- Dr. Katrina Merkies (University of Guelph)

**Members**
- Dr. Colleen Brady (Purdue University)
- Dr. Janne Winther Christensen (Aarhus University)
- Professor Hilary Clayton (Michigan State University, Emeritus)
- Dr. Elizabeth Greene (University of Vermont)
- Professor Katherine Houpt (Cornell University, Emeritus)
- Professor Jan Ladewig (University of Copenhagen)
- Professor Frank Ödberg (Ghent University)
- Marc Pierard (Ph.D. student, Katholieke Universiteit Leuven)
- Dr. Hayley Randle (Duchy College)
- Dr. Machteld van Dierendonck (Ghent University & University of Antwerpen)
- Dr. Kathalijne Visser (Horsonality)
- Dr. Uta König von Borstel (University of Göttingen)
- Professor Natalie Waran (University of Edinburgh)
- Dr. Karen Waite (Michigan State University)
- Dr. Carissa Wickens (University of Florida)
Welcome to Vancouver for the 11th ISES Conference

Welcome to Vancouver and the 11th Annual International Equitation Science Conference. We are hosted and mentored at the University of British Columbia by the Animal Welfare Program, one of the most respected animal welfare science centres globally. Demonstration Day is just minutes away at the historic Southlands Riding Club, the heart of a unique equestrian community within the City of Vancouver.

British Columbia has become a focal point in Canada for support of Equitation Science at the grass roots level. This year’s local organizing committee reflects those ‘grass roots’ and was skillfully directed by Dr. Camie Heleski, Junior Vice President and incoming Honorary President of ISES.

The theme “Breaking Barriers and Building Bridges” signifies the transitioning of Equitation Science from the enclaves to academia into practice plus the universality of the message of Equitation Science to all equestrian disciplines. An eclectic mix of scientific topics explores training techniques in various applications, new technology, horse behaviour and emotion, the influence of the rider and welfare for both sport horses and working equids. Demonstration Day brings the message home as we watch Equitation Science put to work handling horses in challenging conditions, starting young horses and in a range of ridden work including dressage, jumping, para equestrian and western trail. We will get a chance to see Andrew McLean’s revised scoring system go head to head with the traditional judging system in both Western and English dressage tests in the Judges’ Challenge. An encore presentation of Jan Ladewig’s 2013 Plenary ‘What about the other 23 Hours?’ is back by popular demand to round out the Demo Day program.

We hope you have some time to enjoy our spectacular City, explore the many treasures at the University of British Columbia, attend the Banquet at Point Grey Golf and Country Club and share science, the love for horses, good food and friendship.

Dr. Judith Gavin/Olson on behalf of the www.ises2015vancouver Local Organizing Committee

Other LOC members: Dr. Mary Jane Bowie
Dr. Susi Cienciala
Dr. Camie Heleski
Zoë Thorbergson

Additional help from: Dr. Colleen Brady (Posters), Dr. Katrina Merkies (Abstracts & Proceedings), Catherine Wentworth-Stanley (Social Media & Sponsor Contacts), Linda Greening (Assistance with English Editing of Some Abstracts)
President’s Welcome

Welcome to the 2015 International Society for Equitation Science conference. The theme “Ethical Equitation for All Equestrian Disciplines: Breaking Barriers and Building Bridges” is a pivotal one, forming a strong link to our previous conference themes and I am sure, to future ones. Equitation Science has always been about the conduct of rigorous objective research and the application of its findings to practice within industry and the horse-owning population. It is really pleasing to see continued growth of equitation science research covering an increasing number of equestrian disciplines and equid uses. The application of learning theory continues its development with a review of the first principles of training as applied to the education and training of equids. Each principle has a direct application to improve the education process for the equid (and human) whether in the ridden-, in-hand-, or to some extent, unhandled-, context. The impact of the application, or not, of each principle on equid welfare is being increasingly clarified, through the work of the scientists and practitioners on ISES Council and members at large. The academic programme includes a wide range of talks covering many different equestrian disciplines and aspects of equitation. The use of multidisciplinary approaches to evaluate existing practice and to propose new ones, continues to develop. The practical programme, containing a mixture of demonstrations from at least four disciplines and interactive opportunities, promises to be both exciting and inspiring. All in all, the programme promises the opportunity to continue advancing our scholarship through learning about other’s research. Armed with new information we can continue to evaluate and develop our own practice and potentially also that of others. I hope that you enjoy this conference and find a lot to take away from it to help with assuring and safeguarding the welfare of equids worldwide.

Many thanks to the Local Conference Organising Committee and our JVP, Dr. Camie Heleski for her untiring work.

Dr. Hayley Randle
## CONFERENCE SCHEDULE

### WELCOME DAY at UBC

**WEDNESDAY AUGUST 5, 2015**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Location</th>
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</thead>
<tbody>
<tr>
<td>3:00 pm</td>
<td>Check In available at Gage Residences</td>
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<tr>
<td>5:00 – 7:00</td>
<td>Registration Open in foyer of Gage Residences</td>
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<tr>
<td>5:00 – 9:00</td>
<td>Welcome Reception, Fort Camp Lounge, Gage Residences</td>
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<tr>
<td>2:00 – 9:00</td>
<td>Poster Board Set Up &amp; Speaker Ready Room available, H. R. MacMillan Building</td>
<td>Agora Lounge &amp; Room 170</td>
</tr>
</tbody>
</table>

### ACADEMIC DAYS at UBC

**THURSDAY AUGUST 6 & FRIDAY AUGUST 7, 2015**

#### THURSDAY AUGUST 6  H.R. MacMillan Building

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Location</th>
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</thead>
<tbody>
<tr>
<td>7:30 am</td>
<td>Poster Board Set Up &amp; Speaker Ready Room available</td>
<td>Agora Lounge &amp; Room 170</td>
</tr>
<tr>
<td>7:00 – 8:00</td>
<td>Guided walk/run through UBC</td>
<td>Gage Residence Foyer</td>
</tr>
<tr>
<td>7:00 – 8:30</td>
<td>Conference Registration</td>
<td>Entrance</td>
</tr>
<tr>
<td>8:30</td>
<td>Opening Remarks, Introduction of ISES Council</td>
<td>Room 166</td>
</tr>
<tr>
<td>9:00 – 9:45</td>
<td>Plenary – <strong>Andrew McLean</strong> - Co-Author Dr. Paul McGreevy , Revisiting the 8 ISES Training Principles, A Work in Progress</td>
<td>Room 166</td>
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</tbody>
</table>
| 10:00 – 10:30 | Oral 1 & 2  
10:00  
10:15  
Differences between amateurs and professionals in round pen training technique – Paul McGreevy et al. | Room 166                                      |
<p>| 10:30 – 11:15 | Poster board sessions (even #s Stand by posters)/Coffee Break List of abstracts located at end of Conference Schedule. – Colleen Brady | Agora Lounge                                 |
| 11:15 – 12:15 | Oral 3 – Oral 5                                                           | Room 166                                      |</p>
<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Location</th>
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<tbody>
<tr>
<td>11:15</td>
<td>More than just Horse Play – The challenges equine veterinarians face with non-compliant horses and approaches to managing these behaviours – Gemma Pearson et al.</td>
<td></td>
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<tr>
<td>11:30</td>
<td>The understanding of equine learning theory by equine veterinarians – Gemma Pearson et al.</td>
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<tr>
<td>11:45</td>
<td>Assessing the influence of nose twitching during a potentially aversive husbandry procedure (ear clipping) using behavioral and physiological measures – Ahmed Ali et al.</td>
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<tr>
<td>12:00 - 1:00</td>
<td>Lunch Break</td>
<td>Agora Lounge</td>
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</tbody>
</table>
| 1:00 - 2:00 | (Pre-Plenary: 10 min) - Title of talk: New Horizons in Wearable Equine Sensing  
Speaker: **Dominic Lombardo**, CEO and Founder of Equala  
Plenary 2 – **Hilary Clayton** – Biomechanics for equitation scientists | Room 166       |
| 2:00 - 3:15 | Oral 6 – Oral 9                                                             | Room 166       |
| 2:00    | An investigation of rein tensions exhibited during therapeutic riding lessons – Kirstie Parker & Hayley Randle |                |
| 2:15    | The effect of martingale attachments on rein tension in the ridden horse – Megan O’Neill & Hayley Randle |                |
| 2:30    | Current usage and perceptions of artificial aids by horse enthusiasts in Canada – Lindsay Nakonechny et al. |                |
| 2:45    | Subjective scoring of rideability by professional riders – is it linked to rein tension and occurrence of conflict behaviour? – Janne Winther Christensen et al. |                |
| 3:00 - 3:45 | Poster board sessions (odd #s Stand by posters)/Coffee Break  
List of abstracts located at end of Conference Schedule. | Agora Lounge   |
<p>| 3:45- 4:45 | Oral 10 – Oral 13                                                           | Room 166       |
| 3:45    | The first characterization of whip rule breaches in Australian horseracing using Stewards’ Reports: a retrospective study – Paul McGreevy et al. |                |
| 4:00    | Relation between temperament tests and preceding activity for Belgian police horses – Marc Pierard et al. |                |</p>
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>4:15</td>
<td>Resisting transitions or being forced into a frame? How the new paradigm of equitation science is understood, advocated and resisted – Kirrilly Thompson &amp; Laura Haigh</td>
</tr>
<tr>
<td>4:30</td>
<td>An Exploration of Factors affecting Viewpoints of ISES Conference – Betsy Greene et al.</td>
</tr>
<tr>
<td>4:45</td>
<td>Instructions for the Evening - LOC member</td>
</tr>
<tr>
<td>6:00 &amp;</td>
<td>Bus boarding at Gage Residences and departs at 6:15 &amp; 6:45 pm for Gage Residences</td>
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<tr>
<td>6:30 - 9:30</td>
<td>Banquet and cash bar at Point Grey Golf &amp; Country Club</td>
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<tr>
<td>9:35 -</td>
<td>Bus boarding at Point Grey Golf &amp; Country Club and departs 9:45 &amp; 10:10 pm for Gage Residences at UBC</td>
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</table>

**FRIDAY AUGUST 7** **H.R. MacMillan Building**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Room</th>
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<tbody>
<tr>
<td>7:30 am</td>
<td>Speaker Ready Room available</td>
<td>Room 170</td>
</tr>
<tr>
<td>7:00 - 8:00</td>
<td>Guided walk/run through UBC</td>
<td>Gage Residence Foyer</td>
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<tr>
<td>8:30</td>
<td>Opening Remarks/”Housekeeping”</td>
<td>Room 166</td>
</tr>
<tr>
<td>9:00 - 9:45</td>
<td>Plenary 3 – <strong>Marina (Nina) Von Keyserlingk</strong> – Scientific assessment of the emotional states of animals</td>
<td>Room 166</td>
</tr>
<tr>
<td>9:45 - 10:30</td>
<td>Oral 14 – Oral 16</td>
<td>Room 166</td>
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<tr>
<td>9:45</td>
<td>Is it possible to judge if a horse is a happy athlete? – Natalie Waran</td>
<td></td>
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<tr>
<td>10:00</td>
<td>When I look into your eyes...what eye wrinkles in horses tell us about their emotional state – Sara Hintze et al.</td>
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<tr>
<td>10:15</td>
<td>Physiological and Behavioral Responses of Horses to Wither Scratching and Patting the Neck When Under Saddle – Zoë Thorbergson et al.</td>
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<tr>
<td>10:30 - 11:15</td>
<td>Poster board sessions (odd #s Stand by posters)/Coffee Break</td>
<td>Agora Lounge</td>
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<tr>
<td>11:15 - 12:15</td>
<td>Oral 17 – Oral 20</td>
<td>Room 166</td>
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<tr>
<td>11:15</td>
<td>A preliminary study into whether duration of nocturnal sleep behaviours are associated with competition performance – Darcy Murphy et al.</td>
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<tr>
<td>11:30</td>
<td>Does prior target training generalize to and reduce equine stress during trailer loading and rider mounting? – Kelsey Wallach &amp; Robin Foster</td>
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<td>Time</td>
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<tr>
<td>11:45</td>
<td>An investigation of equine coat colour bias in assessment of potential</td>
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<td>performance horses - Anna Fisker Hansen, et al.</td>
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<tr>
<td>12:00</td>
<td>Preliminary investigation into relationships between equine skull</td>
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<td></td>
<td>morphology and brain organization – Katrina Merkies &amp; Paul McGreevy</td>
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<tr>
<td>12:15 -</td>
<td>Lunch Break</td>
<td>Agora Lounge</td>
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<td>1:15</td>
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<tr>
<td>1:15 - 2:00</td>
<td>Plenary 4 – <strong>Melissa Voigt</strong> – A model for understanding and influencing</td>
<td>Room 166</td>
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<td></td>
<td>human behaviours toward show horses</td>
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<tr>
<td>2:00 - 3:00</td>
<td>Oral 21 – Oral 23</td>
<td>Room 166</td>
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<tr>
<td>2:00</td>
<td>Views of riders from different disciplines on horse husbandry with</td>
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<td></td>
<td>regard to animal welfare labeling – Christina Ikinger, et al.</td>
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<tr>
<td>2:15</td>
<td>Differences and commonalities between different equestrian disciplines</td>
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<td></td>
<td>with particular regard to the overall debate on horse welfare –</td>
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<td></td>
<td>Katharina Wiegand, et al.</td>
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<td>2:30</td>
<td>Riders’ motivation, involvement and their behavioural intentions – Jie</td>
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<td>Wu</td>
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<tr>
<td>2:45 - 3:30</td>
<td>Poster board sessions (even #s Stand by posters)/Coffee Break</td>
<td>Agora Lounge</td>
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<td></td>
<td>List of abstract located at end of Conference Schedule.</td>
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<tr>
<td>3:30 - 4:30</td>
<td>Oral 24 – Oral 26</td>
<td>Room 166</td>
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<tr>
<td>3:30</td>
<td>An initial investigation into breast health issues in female horse</td>
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<td></td>
<td>riders – Jenny Burbage &amp; Lorna Cameron</td>
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<td>3:45</td>
<td>The influence of an 8-week rider core fitness program on the equine</td>
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<td>back at sitting trot – Alexandra Hampson &amp; Hayley Randle</td>
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<tr>
<td>4:00</td>
<td>A preliminary comparison of rider position between a horse simulator</td>
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<td></td>
<td>and a live horse – Lucy Dumbell et al.</td>
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<tr>
<td>4:15 - 4:45</td>
<td>Closing of the Scientific portion of the Conference</td>
<td>Room 166</td>
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<tr>
<td></td>
<td>Short Presentation – ISES 2016 – France Student Awards</td>
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<tr>
<td>5:00 – 6:30</td>
<td>ISES AGM</td>
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<tr>
<td>8:00 am</td>
<td>Registration open for Demonstration Day at Southlands Riding Club</td>
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<tr>
<td>7:40</td>
<td>First bus pick up at Gage Residences, UBC &amp; departs at 7:50 am to Southlands Riding Club</td>
<td>Entrance Gage Residence</td>
</tr>
<tr>
<td>8:20</td>
<td>Second bus pick at Gage Residences, UBC &amp; departs 8:30am to Southlands Riding Club</td>
<td>Entrance Gage Residence</td>
</tr>
<tr>
<td>9:00 - 9:15</td>
<td>Opening Remarks</td>
<td>Arena</td>
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<tr>
<td>9:15 - 10:00</td>
<td>Andrew McLean: The essentials of learning theory as applied to the training of horses</td>
<td>Arena</td>
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<tr>
<td>10:00 - 10:30</td>
<td>Coffee Break</td>
<td>Club House</td>
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<tr>
<td>10:30 - 12:30</td>
<td>Putting Equitation Science to work – Four Lessons, Four Disciplines, and One Common Goal:</td>
<td>Arena</td>
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<tr>
<td>12:30 - 1:30</td>
<td>LUNCH</td>
<td>Club House</td>
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</table>

*The Principles:*
- Train with full regard for the horse’s unique cognition and ethology
- Release pressure immediately when horse responds
- Use signals horse can differentiate
- Train and initiate responses one at a time (shaping)
- Train habitual responses using consistency and repetition
- Train only one response per signal
- Avoid fear during training
- Train persistence of responses
- Check for relaxation

*The Participants:*
- Horsemanship/Western: Hermen Geerstema coached by Marion Weisskopff
- Para Equestrian: Jennifer Mackenzie coached by Manuela McLean
- Jumping: Lynne Larsen coached by Angelo Telatin
- Dressage: Pamela Nezil coached by Janine Davies
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Location</th>
</tr>
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<tbody>
<tr>
<td>1:30 – 3:00</td>
<td>Sessions to run, in part, concurrently</td>
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<tr>
<td></td>
<td>1:30 pm start - <strong>Gemma Pearson</strong>: Safety First - Horse handling</td>
<td>Arena</td>
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<td></td>
<td>Techniques for Vets, Farriers, and those that hold the horses</td>
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<tr>
<td></td>
<td>2:00 pm start - <strong>Jan Ladewig</strong>: What About the other 23 Hours?</td>
<td>Club House</td>
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<tr>
<td></td>
<td>2:15 pm start - <strong>Jody Hartstone</strong>: Giving Horses A Scientific Start –</td>
<td>Arena</td>
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<tr>
<td></td>
<td>Applying Learning Theory to Foundation Training</td>
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<tr>
<td>3:00 – 3:30</td>
<td>Coffee break</td>
<td>Club House</td>
</tr>
<tr>
<td>3:00 – 3:30</td>
<td>Smart phone apps and Rein Tension Gauge Demo</td>
<td>Arena</td>
</tr>
<tr>
<td>3:30</td>
<td><strong>Andrew McLean</strong>: The Dressage Judges' Challenge - A New Judging Scale?</td>
<td>Arena</td>
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<tr>
<td></td>
<td>Western Rider: Adiva Murphy</td>
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<td></td>
<td>English Rider: Wendy Christoff</td>
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<td></td>
<td>An invitation to the audience to score dressage tests with the</td>
<td></td>
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<tr>
<td></td>
<td>traditional (FEI) or the “new” scale proposed by Andrew McLean and</td>
<td></td>
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<tr>
<td></td>
<td>others. Discussion to follow.</td>
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<tr>
<td>5:00 – 5:15</td>
<td>Closing Remarks</td>
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</tr>
<tr>
<td>5:15 &amp; 5:55</td>
<td>Bus boarding at Southlands Riding Club and bus departs at 5:25 &amp; 6:05 pm for Gage Residences UBC</td>
<td>Parking Lot</td>
</tr>
<tr>
<td>No.</td>
<td>Title</td>
<td>Authors</td>
</tr>
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<tr>
<td>1</td>
<td>Rider demographics, veterinary history and incidence of injury in horses at BE Novice and Intermediate levels</td>
<td>Alexandra Kingdon &amp; Heidi Janicke, University of Nottingham, UK</td>
</tr>
<tr>
<td>2</td>
<td>Evaluation of use of head control equipment in riding horses –</td>
<td>Katrina Merkies, University of Guelph, Canada &amp; Paul McGreevy, University of Sydney, Australia</td>
</tr>
<tr>
<td>3</td>
<td>Handedness of horse-riders affects rein tension –</td>
<td>Jenni Douglas, Hartpury College, UK</td>
</tr>
<tr>
<td>4</td>
<td>Moving on with the times: how can we promote positive experiences in working equids? –</td>
<td>Rebecca Sommerville, The Brooke, UK &amp; Sara Hintze, Univ of Bern, Switzerland</td>
</tr>
<tr>
<td>5</td>
<td>Functional Movement Screen Scores in Female Horse-riders –</td>
<td>Jenni Douglas et al., Hartpury College, UK</td>
</tr>
<tr>
<td>6</td>
<td>Equine stress-related behaviors in therapeutic riding classes –</td>
<td>Robin Foster, Univ of Puget Sound &amp; Kelsey Wallach, Univ of Washington, US</td>
</tr>
<tr>
<td>7</td>
<td>The influence of handler experience on the behaviour of horses in an educational environment: Heart Rate and Visual Analogue Scores –</td>
<td>Joanne Challacombe et al., Duchy College, UK</td>
</tr>
<tr>
<td>8</td>
<td>Equine assisted education for children as a social contribution by a Japanese university equestrian team –</td>
<td>Hajime Tanida, Aya Iwamoto, Hiroshima University, Japan</td>
</tr>
<tr>
<td>9</td>
<td>Horse riders’ perception of the use of bitless bridles –</td>
<td>Victoria Lewis &amp; Sabrina Ormston, Hartpury College, UK</td>
</tr>
<tr>
<td>11</td>
<td>Practise of Supplementary Fitness Training in Horse Riders –</td>
<td>Jenni Douglas &amp; Inga Rebbeing, Hartpury College, UK</td>
</tr>
<tr>
<td>12</td>
<td>Effect of “lowering of the neck” exercises on gait in Mangalarga Marchador horses – pilot study –</td>
<td>Kate Barcelos, Universidade Federal de Minas Gerais, Brazil &amp; Renate Weller, Royal Veterinary College-University of London</td>
</tr>
</tbody>
</table>
13 Videographic Feedback Affects Positional Kinematics of Riders in Sitting Trot – Jenni Douglas et al., Hartpury College, UK

14 Comparison of the impact of various influencing factors on the attitudes towards horse welfare across different riding disciplines – Christina Ikinger, Univ of Göttingen, Germany

15 French horse industry: vocational courses development and learners typology – Sylvie Doaré, IFCE/équi-ressources, France

16 Approaches to better integrate adult newcomers to equestrian sports – Sarah Kuhl & Achim Spiller, Univ of Göttingen, Germany (withdrawn)

17 Effect of saddle pad thickness on the ridden horse’s back – Jessica Giblett et al., Duchy College, UK

18 Automated stress monitoring and suitability assessment in candidate police horses – Deborah Piette et al., KU Leuven, Belgium

19 Preliminary study to investigate the effectiveness of the BEF’s long term athlete development plan/Do the guidelines proposed in the long term athlete development provide a realistic and applicable framework? – Victoria Lewis et al., Hartpury College, UK (withdrawn)

20 A preliminary study to investigate the equine nutrition knowledge and feeding practices of a population of DIY livery horse owners in the UK – Victoria Lewis et al., Hartpury College, UK

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22 Can we detect rider-related differences in roll and pitch motion of the equine back in professional riders riding the same horses? – Agneta Engenvall et al., Swed Univ Agr Sci, Sweden

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Plenary 1

Revisiting the ISES Training Principles

Andrew McLean* (Australian Equine Behaviour Centre) & Paul McGreevy (University of Sydney, Australia)
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The following 10 training principles are presented as ‘First Principles’ for all horse training interactions. As first Principles, these stand as non-negotiable obligations for trainers to maintain optimal welfare in trained horses as well as optimal training efficiency. These Principles are presented as further refinements of the original 8 Principles on the ISES website and in peer-reviewed literature (McGreevy and McLean, 2006).

1. Train according to the horse’s ethology and cognition
Does your training demonstrate recognition of Ethology and Cognition? Over- or underestimating horses’ intelligence has negative welfare implications. Isolation, restricted locomotion and restricted foraging have welfare implications.

2. Use learning theory appropriately
Does your training demonstrate the appropriate use of Habituation, Sensitisation, Operant conditioning, Shaping and Classical conditioning?
The optimal use of the most appropriate learning process in training not only enhances efficiency, but also reduces the problem behaviours related to confusion or inability to respond. The incorrect use of aversive stimuli has the potential for serious welfare implications that range from escape, aggression and apathy to learned helplessness.

3. Train easy-to-discriminate signals
Does your training demonstrate that operant and classically conditioned signals are unique and easily discriminated? Blurred and ambivalent signals can lead to confusion, distress and responses that compromise performance and rider safety.

4. Shape responses and movements
Does your training demonstrate that, for any behaviour modification, training begins by reinforcing basic attempts at the target behaviour and then gradually improving approximations of that behaviour? Poor shaping can lead to confusion and responses that compromise performance and rider safety.

5. Elicit responses one-at-a-time
Does your training demonstrate that individual cues/signals are separated in time from each other? When contradictory cues are applied simultaneously, such as those for acceleration and deceleration, the desensitisation effects are magnified and confusion and stress are likely to set in. Clashing cues weaken stimulus control and can lead to confusion and responses that compromise performance and rider safety.

6. Train only one response per signal
Does your training demonstrate that each signal elicits a single response? Ambiguous rein and leg signals lead to confusion and responses that compromise performance and rider safety.
7. Form consistent habits
Does your training demonstrate consistency, so that in training new responses, training is set up in the same context each time, and the same signals are used on the same part of the horse’s body or in the same location relative to the horse’s body? Inconsistent training can lead to dull responses that compromise performance.

8. Train persistence of responses (self-carriage)
Does your training demonstrate the duration of locomotory responses so that the horse learns to ‘keep going’ in rhythm, straightness and outline to avoid any need for constant signalling and the risk of the horse habituating to signals? The consequences of a lack of self-carriage range from dull responses to hyper-reactive responses that compromise performance, welfare and rider safety.

9. Avoid and dissociate flight responses (because they resist extinction and trigger fear problems)
Does your training demonstrate the avoidance of flight responses? Flight responses have unique characteristics, such as resistance to extinction, and may reappear spontaneously. They manifest as acute or chronic stress. Acute stress shows up as problem behaviours (escape, aggression, apathy). Chronic stress has very serious welfare implications, including pathologies and learned helplessness, and can be fatal.

10. Demonstrate minimum levels of arousal sufficient for training (to ensure absence of conflict)
Does your training demonstrate appropriate relaxation? Trainers should be able to show that the horse is as relaxed as possible. Certain levels of arousal, muscle tone and attentiveness are required for successful learning, but when these levels are exceeded, learning and welfare suffer. Too much arousal may lead to compromised welfare, which may show up as acute/chronic stress (escape, aggression, apathy).
Plenary 2

Biomechanics for equitation scientists

Innovative technology relevant to equitation science

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The locomotor capabilities of different species have evolved in accordance with environmental and social pressures. Horses and humans are obviously very different structurally and functionally and, by domesticating horses and training them to be ridden, we have taken advantage of their superb athletic abilities, originally for utilitarian purposes and more recently for participation in sport and recreation.

Biomechanical analysis applies engineering principles to study the structure and function of biological systems, such as horses and humans. Equitation science pursues knowledge of the interactions between humans and horses. Training the horse usually involves the application of a stimulus with the goal of eliciting a specific response. Both the stimulus and the response can often be measured using biomechanical techniques. This talk will address the principles and practice of biomechanical analysis as it applies to the discipline of equitation science.

The ability to communicate the findings of biomechanical research unambiguously is dependent on using standardized language. This talk will also review anatomical and biomechanical terminology that is used to describe three-dimensional orientations and movements of the body segments with a focus on differences between equine (quadrupedal) and human (bipedal) anatomy.
Plenary 3

Scientific assessment of emotional states of animals

Marina A.G. von Keyserlingk* & Daniel M. Weary
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The three constituents of animal welfare that are now widely accepted are: 1) animals should exhibit good physical health and biological functioning, 2) animals should have the ability to live reasonably natural lives consistent with their evolutionary history, and 3) animals should experience minimal negative psychological states and the presence of at least some positive psychological states. Animal caregivers are naturally concerned about the first category; addressing issues such as disease and injury. In terms of natural behavior a key concern is whether the animal is able to live a reasonably natural life, for example, routine access to pasture. In recent years there has been a growing concern regarding the scientific assessment of affective states in animals. Although once thought to be beyond the scope of science, understanding mental states in animals is now an active area of research, and developing validated measures of these states remains one of the most interesting problems in animal welfare. In this lecture, examples of the work we have undertaken on understanding the emotional states of animals will be discussed, drawing largely on our work done on pain and hunger in dairy cattle.
Plenary 4

A model for understanding and influencing human behaviours toward show horses

Melissa Voigt* (Purdue University), Kristina Hiney (Oklahoma State University, United States); Mark Russell (Purdue University); Jennifer Richardson (Purdue University, United States); Abigail Borron (University of Georgia, United States); Colleen Brady (Purdue University, United States)
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The findings from three research studies on the state of welfare of stock-type show horses were used in combination with the Social Cognitive Theory to inform the development of a model for understanding what influences individual’s behavior toward show horses and how that understanding can be used to develop efforts to influence those behaviors. The central findings from the three studies on the state of stock-type show horse welfare in the U.S. included: 1) an incomplete understanding of welfare within the stock-type horse show industry; 2) concern for novices, amateurs, and young trainers and their level of experience and knowledge necessary to make sound decisions related to the treatment of horses in their care; 3) unrealistic expectations and prioritization of winning by professional trainers; and 4) common occurrence of excessive jerking on the reins, excessive spurring, induced excessive unnatural movement, excessively repetitious aid or practice, and excessive continued pressure on the bit. To effectively take action against and reduce incidents of inhumane treatment to horses requires an understanding of the reasons for inhumane treatment. A theoretical perspective that frames the concepts of educational intervention and behavior change, as well as provides an explanation and understanding of human behavior is the Social Cognitive Theory. The Social Cognitive Theory depicts continuous interactions among cognitive, behavioral, and environmental factors. Within the context of behaviors toward show horses, primary environmental factors include rules and regulations and social norms. Primary behavioral factors include reinforcement from success and reinforcement-punishment pendulum. Primary cognitive factors include understanding of welfare, attitude toward horses, and individual differences. Based on the three research studies, eight ways to reduce compromises to show horse welfare were determined and included influencing behavior through promoting social norms, education, awareness, moral reasoning, investigative behavior, empathy, de-sanitized language, and conversation. In addition to promoting strategies for reducing the frequency of compromises to show horse welfare, the model provides direction for stakeholders to work toward reducing incidents of compromise to show horse welfare. This model serves two primary functions: 1) to be used as a practical guide for the design and development of efforts to effectively reduce compromises to show horse welfare and 2) to be used as a foundation for future research related to the care and treatment of horses.

LP: This presentation will discuss a model for understanding what influences people’s behavior toward show horses. This model can be used to inform the development of efforts from industry stakeholders to reduce the occurrence of compromises to show horse welfare.
Oral Presentation Abstract 1

Hyperflexing horses' necks – meta-analysis and cost-benefit evaluation

Uta König v. Borstel* (University of Göttingen, Germany), Kathrin Kienapfel (University of Bochum, Germany); Andrew McLean (Australian Equine Behaviour Centre, Australia); Christina Wilkins (PO Box 99, Rosewood, Queensland 4340, Australia); David Evans; Paul McGreevy, Paul (University of Sydney, Australia)

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A review of the scientific literature identified 55 articles dealing with the effects of equine head and neck postures (HNP) on welfare (n=42) and/or gymnastic outcomes (n=35) such as kinematics, muscle activity, respiratory related issues or overall workload. In the dataset for the meta-analysis we coded overall results of the individual studies as follows: positive (1), contradictory or insignificant (0) or negative (-1) influences on a) welfare and b) gymnastics. Information on the reported features of hyperflexion (e.g., degree and duration), the horses (e.g., level of dressage training), and quality and design of the study (e.g., whether or not the study’s conclusions were supported by data) was also integrated into the dataset. The significant majority of studies (88%; Z=4.94; P<0.0001) indicated that a hyperflexed HNP negatively impacts welfare. Only one study suggested positive effects on welfare. Reasons for compromised welfare included impeded ventilation, pathological changes in the structures of the neck, impaired forward vision, and stress and pain due to these factors as well as the rider intervention necessary to achieve the posture. An across-study analysis using a mixed model revealed that the probability of a study reporting negative welfare effects was unrelated to any of the investigated factors such as horses’ familiarity with the posture, level of dressage training, duration of the HNP or size and quality of the study (all P>0.1). While gymnastic benefits were described in 26% of the studies, a similar proportion of studies (23%, P>0.1) detected undesirable gymnastic consequences of a hyperflexed HNP. The remaining studies (46%) described insignificant or contradictory effects on gymnastics. Desired gymnastic effects included higher dressage scores, a larger range of motion in the back or legs or an increased overall workload, while undesired gymnastic effects included lower dressage scores, increased activation of lower neck muscles and reduced oxygen supply due to obstruction of upper airways. Studies conducted on highest level dressage horses and on horses familiar with a hyperflexed HNP were more likely to describe gymnastic benefits than studies conducted on non-dressage horses or those unfamiliar with the posture (both P<0.05). These findings question whether any desirable effects of this training method are based solely on biomechanical relationships. Instead, the effects may be the result of horses learning to respond to the cues associated with hyperflexed HNPs with desired changes in posture or movements.

LP: Based on a comprehensive review of the scientific literature, the presumed gymnastic benefits of training horses in a hyperflexed head and neck posture are by far outweighed by both undesired gymnastic effects and reduced equine welfare. A statistical analysis across the studies revealed that negative effects on welfare prevail regardless of the circumstances under which hyperflexion is practiced.
Oral Presentation Abstract 2

Differences between amateurs and professionals in round pen training technique

Erin Kydd (University of Sydney, Australia); Barbara Padalino (University of Sydney, Australia); Cathrynne Henshall (Hillydale Stud, Bungonia, N, Australia); Paul McGreevy* (University of Sydney, Sydney, Australia)
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Natural Horsemanship (NH) is popular among many amateur and professional trainers and its deployment of round pen training (RPT) has been the subject of recent scientific enquiry. RPT sessions are usually split into a series of bouts; each including two phases: chasing/flight and chasing offset/flight offset. However, NH training styles are heterogeneous. This study investigated online videos of RPT to explore the characteristics of RPT sessions and test for differences in techniques and outcomes between amateurs and professionals (as defined by accompanying online materials that promoted clinics, merchandise or a service to the public). From more than 300 candidate videos, we selected sample files for amateur (n=24) and professional (n=21) trainers. Inclusion criteria were: training at liberty in a RP; more than one bout and good quality video. Sessions or portions of sessions were excluded if the trainer attached equipment such as a lunge line directly to the horse or the horse was saddled, mounted or ridden. The number of bouts and duration of each chasing and non-chasing phase were recorded, and the duration of each RPT session was calculated. Poisson regression analysis showed that professionals spent more time looking at their horses, when transitioning between gaits, than amateurs did (p<0.05). The probability of horses following the trainer was not significantly associated with amount of chasing, regardless of category. Given that, according to some practitioners, the following response is a goal of RPT, this result may prompt caution in those inclined to give chase. The horses handled by professionals showed fewer conflict behaviours (eg kicking, biting, stomping, head tossing, defecating, bucking and attempting to escape), notably at the canter and gallop (p<0.05). In contrast, those handled by professionals exhibited fewer so-called submissive behaviours (eg head lowering, licking and chewing) than those handled by amateurs (p<0.05). In essence, these data show that conflict behaviors are more likely in horses showing so-called submission. One possible explanation is that horses in conflict were being chased unnecessarily and were having pressure applied persistently. These findings mirror those in ridden horses and highlight the importance of excellent timing when using negative reinforcement.

LP: RPT sessions usually involve a series of bouts. Each bout includes two phases: chasing and chasing offset. To safeguard horse welfare, chasing must be minimized and triggered only with subtle cues. This study shows that professional RP trainers use generally less chasing. All horse trainers need to appreciate that RPT obeys the laws of learning theory. Acceptable use of aversive pressure is characterized by its timely cessation; the process known as negative reinforcement.
Oral Presentation Abstract 3

More than just Horse Play – The challenges equine veterinarians face with non-compliant horses and approaches to managing these behaviours.

Gemma Pearson* (Royal (Dick) School of Veterinary Studies, Scotland); Richard Reardon; John Keen; Natalie Waran (University of Edinburgh, UK)
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Research into occupational injuries sustained by equine veterinarians has shown that working in this profession is more dangerous than any other civilian occupation within the U.K. The behaviour of the horse is frequently cited as a cause of many accidents. Knowledge of the behaviours commonly demonstrated by horses undergoing veterinary examination and treatment, and the approaches equine veterinarians commonly utilise in these scenarios may help us to further understand why the prevalence of injury is so high amongst equine veterinarians and suggest methods for mitigating these problems.

A web-based survey was sent via a link in a British Equine Veterinary Association eNewsletter and a further email sent out to referring practices to the R(D)SVS.

Of 220 completed responses, 80.9% of practitioners had sustained at least one injury as a result of one of their patients in the last 5 years. 57.7% of respondents reported they put themselves in a potentially dangerous situation either every day or a few times each week.

When asked about horses they perceived as difficult, 54.5% said they encounter these patients either every day or a few times each week. Unwanted behaviours exhibited either every day or a few times each week included horses refusing to stand still for examination and being ‘bargy’ or ‘pushy’. Unwanted behaviours occurring a few times each month or more frequently included refusing to enter examination room, stocks or trailers, bolting or pulling away when led, being needle, clipper or head shy, and kicking with a hind foot.

Practitioners were then asked about the value they place on methods of restraint or control on non-compliant patients. Chemical sedation, nose twitch, neck twitch, and an anti rearing bit were most commonly valued forms of restraint. Control techniques based on equine learning theory were generally considered unhelpful or the respondent commented they did not understand or had not heard of the technique. However positive reinforcement was rated as very useful, fairly useful or useful by 61.4% of respondents.

This survey confirms previous findings that equine veterinarians frequently encounter potentially dangerous situations, and have a high risk of sustaining injuries from patients’ horses. They frequently encounter horses that demonstrate unwanted and potentially dangerous behaviours and manage these scenarios using traditional techniques rather than those based on knowledge of equine learning theory (the processes by which horses learn).

LP: Equine veterinarians frequently encounter horses that exhibit unwanted behaviours and which may injure the veterinarian. Equine veterinarians frequently manage these situations based on traditional methods and further training, incorporating equine learning theory (the processes by which horses learn) may reduce the risk of injury.
Oral Presentation Abstract 4

The understanding of equine learning theory by equine veterinarians

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Equine veterinarians are at high risk of occupational injury and many of these injuries are a result of dangerous horse behaviour. Previous studies have shown that professional equine coaches in Australia and Canada have a poor understanding of equine learning theory (the processes by which horses learn) but this has not been repeated in equine veterinarians. A web-based survey was accessed via a link in a British Equine Veterinary Association eNewsletter and a further email sent out to referring practices to the R(D)SVS. Of 220 respondents 45.5% reported that had never received any teaching on the subject of equine learning theory. Generally respondents felt they had a moderate knowledge of, and moderate ability to apply their knowledge of how horses learn. When asked if they understood the terms used in operant conditioning the majority said they understood positive reinforcement (81.2%) and negative reinforcement (78.8%). However fewer respondents said they understood the terms positive punishment (38.7%) and negative punishment (44.4%). Respondents said they understood habituation (74.8%) and classical conditioning (56.9%) most of the time. To test this knowledge respondents were given scenarios and asked if they correctly described the term ascribed to them. When an example of negative reinforcement was given as positive reinforcement only 16% of respondent recognized it as incorrect, 71.4% thought it was correct and the remaining 12.6% said they did not know. When a scenario of negative reinforcement was given as positive punishment, 28.1% of respondents recognized it as incorrect with 55.7% attributed it as correct. 22.7% of respondents correctly noted that the scenario of negative punishment was not positive punishment, whilst 36.9% thought it was correct. 44.6% of respondents recognized that the scenario describing negative punishment was incorrect. Respondents were more likely to recognise that the scenarios describing habituation (89.1%) and classical conditioning (70.4%) were correctly described. This survey demonstrates that, similar to previous studies amongst equine professionals, equine veterinarians have a poor understanding of equine learning theory. A poor understanding of learning theory may correlate with a high injury prevalence within the profession, however further work in this area needs to be done to confirm this.

LP: Equine veterinarians have a poor knowledge of equine learning theory, which may compromise their ability to work safely and effectively with their patients. Further training in this area may reduce the current high prevalence of injuries within the profession.
Oral Presentation Abstract 5

Assessing the influence of nose twitching during a potentially aversive husbandry procedure (ear clipping) using behavioral and physiological measures.

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When engaging in procedures that horses may find aversive, restraint methods are often employed to help ensure the safety of both horse and handler. Nose twitching is a common restraint method, but its use is sometimes considered controversial. Based on previous work there is evidence supporting the concept of the twitch acting more nearly like acupuncture than like divertive pain. Our aim was to compare behaviors, heart rate (HR), HRV, and ease and time of completing procedure when naïve horses were ear clipped with or without a twitch. Clipping out the inside of a horse’s ear is considered a routine, competition-preparation procedure for many horses, particularly in the US. Many horses, however, find the procedure to be aversive and make attempts to avoid the procedure. 8 Arabian horses (4 mares and 4 geldings; mean age 2.8 yrs±1.0) that were naïve to both ear clipping and twitching were tested during the fall 2014. Baseline HR and HRV data were collected. Horses were randomly assigned to either being clipped with a twitch (ECT1) or clipped without a twitch (EC). Later, the alternate treatment was applied. To help identify whether horses found the twitch aversive, each horse was twitched a second time and clipped (ECT2). Time elapsed to perform ear clipping (sec), behaviors, summed ear clipping reactivity score (ECRS), HR (bpm), time domain indices of HRV (SDRR and RMSSD) and power spectral analysis indices HF, LF, and LF/HF ratios in normalized units (n.u) were recorded. Analysis of variance "ANOVA" was used to compare among different groups using SPSS17.1. Mean HR varied from a mean of 42.7±1.6 bpm (baseline) to 107.7±6.2 (EC), 71.2±3.5 (ECT1) and 59.4±1.3 (ECT2) (baseline differed from EC and both differed from ECT1, P<0.05); mean LF/HF ratio (sympatho-vagal balance, where a lower number indicates less distress) varied from a mean of 1.5±0.9 for baseline to 7.2±0.2 (EC), 3.0±0.3 (ECT1), 2.1±0.1 (ECT2) (baseline differed from EC and both differed from ECT1, P<0.05). Time to complete task and the ECRS varied from 120.5±13.1 sec, 12.1±2.5 for EC to 69.0±7.4, 3.6±1.3 for ECT1 and 48.4±6.8, 1.1±0.7 ECT2 (EC differed from ECT1 and ECT2, P<0.05). EC resulted in the strongest HR and HRV indicators of stress, the most behavioral indicators of aversion, and took the longest time to complete the procedure. Furthermore, the horses’ second exposure to the twitch did not show evidence of increased aversion to the twitch (the expected response if the twitch was primarily inducing divertive pain).

LP: When engaging in procedures that horses find aversive, restraint methods are often used to help ensure horse and handler safety. Based on the evidence in this study, we believe that nose twitches, when properly applied, should be considered a viable, humane restraint for short usage situations. (This should not be seen as an endorsement to use a twitch in place of careful training).
An investigation of rein tensions exhibited during therapeutic riding lessons

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There have only been studies published of rein tension with able bodied riders. Within therapeutic riding existing research focusses on the benefits of the therapy to the rider; with very little emphasis on the effects on the horse. Objective assessment of the impacts of being ridden by non-able bodied riders would be beneficial in terms of horse welfare. The aim of this study was to examine the effect of a range of influences on the rein tension exhibited during therapy riding sessions. Variables included rider disability, location of reins and individual hand tension. The objective of this study was to record the rein tension therapy horses are subject to during therapeutic riding sessions. Fifteen riders-and-horses were selected opportunistically from a registered therapy riding centre and considered representative of a typical riding group engaging in Therapeutic riding. Centaur Rein Tension™ gauges were attached to the reins and relayed rein tension data wirelessly to a laptop whilst riders were led at walk accompanied by up to four helpers for 30 minutes. Rein tension was analysed using analysis of variance with the horse as a covariate. Rein tension was influenced by a number rider and riding equipment related variables. Significantly greater rein tension were seen in the right rein (1.48 ± 3.15 N) than in the left rein (1.15 ± 1.70 N; F1,36788=78.23, P< 0.05). The attachment position of reins had a significant effect on rein tension (F2,33676=2031.24; P<0.05) with greater tensions seen when the reins are fitted to the bit (5.71 ± 8.39 N) than to the D ring on a head collar worn underneath the bridle (0.60 ± 1.70 N). The nature of rider disability had a significant impact on rein tension (F5,33674=1502.72; P<0.05) with substantially higher rein tension exhibited with tunnel vision (5.71 ± 8.39 N). Rein tension can be a welfare concern for the horse due to discomfort and pain that may result, and consequently the occurrence of clinical and behavioural problems. This study provides some objective data on the rein tension experienced by a group of horses used in therapy riding. The results highlight the need for further scientific study to allow a proper consideration of the welfare of the therapeutic riding horse.

LP: Very little research has been conducted on the therapeutic riding horse. Measurements of rein tension during therapy riding sessions demonstrate that a number of variables, including the attachment position of the reins on the head gear used and the nature of the rider disability influence the rein tension experienced by the horse. Further research would be beneficial to ensure the welfare of the therapy horse is safeguarded.
Oral Presentation Abstract 7

The effect of martingale attachments on rein tension in the ridden horse

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Additional equipment is often used within equestrian disciplines in order to influence the behaviours exhibited by horses and/or to enhance the safety of the rider. The martingale is commonly used to control the horse’s head carriage but very little attention has been paid to its effects on the reins and the resulting pressures on the horse’s mouth. It has been suggested horses experience discomfort due to increased rein tension applied by when ridden by novice riders who are overly reliant upon the reins for stabilization. Martingales have been used to reduce the rein tension and consequently the discomfort experienced by the horse. This study investigated the effect of the use of martingale attachments on rein tension in the ridden horse. Six horses were selected at random from a sample frame of 40 riding horses and allocated to one of six riders all deemed novice by a qualified instructor participated in the study. Each horse and rider followed a predetermined route based on a 20m circle incorporating walk, trot and halt in both directions, 2 replicates of each. Phase 1 for all riders involved riding the predetermined route, with which all subjects were accustomed prior to the study, in the horse’s normal correctly fitted tack without a martingale attachment. In phase 2 three of the horse-rider combinations followed the same route with an irish martingale attached, whilst the remaining three horse-rider combinations wore a running martingale. In phase 3 the first group of horse-rider combinations were tested wearing the running martingale, whilst the second group were tested wearing the irish martingale. All horses were ridden in standard rubber reins (18 mm wide x 7mm thick) fitted with rein stops. Rein tension was recorded at a rate of 100 measures/second using the Centaur Rein Tension GaugeTM sent via wifi to a laptop computer. Rein tension data were normally distributed (Anderson-Darling, P>0.05). The use of a martingale had a significant impact upon rein tension (F2,132 = 5.13, P<0.01). Rein tension with no martingale (2.85±0.98 N) was significantly greater than with a running martingale (2.45±0.68 N) and an Irish martingale (2.36±0.80 N). This confirms that the addition of a martingale significantly reduces the rein tension applied and may have a positive impact on the welfare of the ridden horse.

LP: Equipment such as the martingale is frequently used in equestrian disciplines with little regard to the possible effect on the horse’s mouth. This study shows that the use of either a running or irish martingales reduces the tension applied on the horse’s mouth via the reins and may therefore be used to protect the welfare of the ridden horse.
Oral Presentation Abstract 8

Current usage and perceptions of artificial aids by horse enthusiasts in Canada

Lindsay Nakonechny (Department of Animal and Poultry Science, University of Guelph, Canada); Cordelie Dubois; Katrina Merkies (Department of Animal and Poultry Science, University of Guelph) lnakonec@uoguelph.ca

Empirical data examining current usage of artificial aids within the Canadian horse industry are unavailable. Comparing perceptions to actual aid usage may provide insight about the transparency of riding and training methods. An online survey was circulated to horse enthusiasts in Canada through national and provincial horse organizations, online forums and posters. Respondents who reported working directly with horses (RH, n=565) were asked about when they utilize devices that modify a horse’s head or neck position, whips and spurs. Respondents who reported not working directly with horses (R, n=89) were asked about when they believe riders or trainers utilize such aids. Descriptive statistics (percentages) were conducted on all questions, and the statistical program R was used to perform a t-test between RH and R responses. Actual usage (RH) differed from perceived usage (R) of devices that modify head or neck position: when lunging a horse (32.8% vs. 51.2% respectively; p=0.0148), when a horse exhibits undesirable behaviour (15.6% vs. 42.7% respectively; p<0.0001) or when a horse does not respond to cues (9.9% vs. 28.1% respectively; p=0.0014). RH predominantly reported never using these devices during riding or training (43%), whereas only 8.5% of R believe these devices are never used (p<0.0001). RH and R responses were similar for whip use: when a horse does not respond to cues (58.3% vs. 63.2% respectively; p=0.6646), as a cue for a horse to move forward or laterally (36% vs. 44.8% respectively; p=0.2096) or when a horse exhibits undesirable behaviour (17.9% vs. 24.1% respectively; p=0.2674). For spur use, RH and R responses were similar for when a horse does not respond to cues (45.7% vs. 51.2% respectively; p=0.5732) and when a horse exhibits undesirable behaviour (4.5% vs. 11.6% respectively; p=0.0562). RH use of spurs as a cue for a horse to move forward or laterally was lower than perceived use (28% vs. 48.8% respectively; p=0.0012). Reported non-use of spurs during riding or training by RH was higher than perceived (37.5% vs. 15.1% respectively; p<0.0001). Perceptions of whip use followed actual usage, whereas perceived spur use was higher than reported. The largest discrepancy between RH and R responses was observed for devices that modify head or neck position. Overall perceived use was much higher than actual usage, and R believe such devices are largely utilized as corrective or disciplinary measures for undesirable behaviour. Differences between perceptions and actual use may be related to varying respondent opinion about aid purpose.

LP: Perceptions were similar to actual whip use, whereas discrepancies were observed for usage of spurs and devices that modify head and neck position. Misperceptions about artificial aids may lead to misuse by new riders, such as using lunging devices for disciplinary purposes. Communication about artificial aids may prevent inappropriate use and reduced horse welfare during riding and training.
Oral Presentation Abstract 9

Subjective scoring of rideability by professional riders – is it linked to rein tension and occurrence of conflict behaviour?

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Many breeding organisations include subjective scoring of rideability into their evaluation of sports horses. This study aimed to investigate (i) whether professional riders agree in their scoring of rideability, and (ii) whether rein tension (RT), horse conflict behaviour, heart rate (HR, HRV) and salivary cortisol reflect the scores given by riders.

Ten professional, female riders each rode 10 dressage horses (level M German scale; n=100 combinations) through a standardised dressage program (10 min warm-up followed by a 5-min test) and subsequently scored the horses for rideability on a 1-10 scale (from 0=poor to 10=excellent). The experiment was conducted over five days, i.e. each horse was ridden by two riders on each test day. Prior to testing, the riders were fitted with sensors to measure stability of their position on the horse, and the horse was fitted with RT and HR equipment and saddle pressure pads. The dressage test was recorded on video for registration of behaviour. Salivary cortisol was measured at -30, 0 and 5 min after each riding test.

Data were analysed in an ANOVA model considering repeated measures. There was a significant effect of rider on rein tension force (F_9,63=16.1; P<0.001; mean per rider: 2.3-3.2 kg), thus some riders applied significantly more rein tension than others when riding the same 10 horses through the same standardised dressage program. Similarly, there was a significant effect of rider on the frequency of conflict behaviour (F_9,77=2.8; P=0.007; mean per rider: 3.2-14.4). The horses expressed the highest level of conflict behaviour when ridden by the riders with the highest rein tension. There was considerable variation between riders in their scoring of rideability to the individual horses (e.g. the horse with the highest variation received scores 1-8). Rideability scores did not depend on the level of rein tension (P>0.05) but there was a significant effect of conflict behaviour (F_1,84=5.9; P=0.017), i.e. the higher the frequency of conflict behaviour during the test the lower the rideability score. Data on salivary cortisol, heart rate, saddle pressure and rider position remain to be analysed.

LP: This study found considerable variation in subjective rideability scores given to ten sports horses by ten professional riders. Rideability scores depended on the horse’ conflict behaviour, suggesting that horses that were difficult to ride showed more conflict behaviour, or that conflict behaviour was perceived negatively by the riders.
Oral Presentation Abstract 10

The first characterization of whip rule breaches in Australian horseracing using Stewards' Reports: a retrospective study

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Self-regulation of the Australian racing industry means that Stewards enforce the Rules of Racing, including whip rules. Our study used Stewards’ Reports from 1 August 2013 to identify the first 100 reported whip rule breaches and regulatory responses to these in New South Wales and the Australian Capital Territory. The breaches occurred over a 100-day period covering 1,587 races on Metropolitan (M), Provincial (P) and Country (C) tracks (n=23 breaches from 226 races, n=20 from 299, n=57 from 1062, respectively). The reported breaches were: exceeding permitted number of forehand strikes (total n=45 [M=6,P=10,C=29], %M, P, C breaches 26.1; 50; 50.9, respectively); using an action that raises the jockey’s arm above shoulder height (n=28 [M=14,P=4,C=10], % M, P, C breaches 60.9; 20; 17.5, respectively); whipping when out of contention (n=12 [M=0,P=2,C=10], %M, P, C breaches 0; 10; 17.5, respectively); whipping in consecutive strides (n=8 [M=1,P=4,C=3], % M, P, C breaches 4.3; 20; 5.3, respectively); and others (n=7 [M=2,P=0,C=5], % M,P,C breaches 8.7; 0; 8.8, respectively). The % patterns of the breach types differed significantly (X²=25.97, df=8, P=0.001). While there was no difference in C versus P patterns (P=0.154) combining these saw a highly significant difference between M and other tracks (X² =19.29, df=4, P < 0.001). Average M prize money per horse that was the subject of a reported whip breach was 3.2 times the C average (P=0.002). Average P prize money was only 1.4 times the C average, and this difference was not significant. Average M race prize money where a breach was reported was 4.8 times the C average (P<0.001), while the P average was 2.0 times the C average (P<0.001). Despite these findings, there was no significant difference in mean fines on C and M tracks (P=0.174), and the difference between P and C tracks was very marginally not significant (P=0.053). Stewards reported 1.89 times more breaches at M races (10.2%) than at C races (5.4%, X²=6.53, df=1, P=0.011). This may imply stricter enforcement of whip rules at M races, including better surveillance, or that there are actually more breaches at M than C races. It also might reflect higher race prize money at M races. The study provides the first characterization of whip rule breaches and their regulatory outcomes in horseracing using Stewards’ Reports, and improves understanding of whip use and compliance in a major racing jurisdiction.

LP: This study characterized the number and type of whip rule breaches reported by Stewards over a 100-day period in Australia, and the regulatory outcomes of these. It highlights differences in reported breaches that depend on whether the races were at Metropolitan (M), Provincial (P) or Country (C) tracks. The results show that even though the rules are the same, almost twice as many breaches are reported at M tracks, and the patterns of breaches vary. These findings have implications for horse welfare and racing integrity.
Behavioral tests can be influenced by many confounding variables. To study the robustness of ongoing research on Belgian police horses, this experiment evaluated the impact of preceding activity on behavioral responses in temperament tests. Three different starting situations were applied in a crossover trial: straight from their box, after 30min tied outside and after 30min alone in a sand paddock. The sample consisted of 3 groups of 10 horses with a different treatment order per group. The temperament tests included an arena test followed by a sudden object test. For each test rate, mean bout length and percentage of total time were measured for locomotory responses (stand, walk, trot, canter) and rolling, plus the rate for buck/jump and whinnying. For the sudden object test categories for distance to the object were measured. Additionally Likert scores from 1 to 5 were given for leading the horse into the arena and leading it out at the end, 1 being the easiest to lead. Results were analyzed with mixed models to evaluate order and treatment effects. Treatment only resulted in significant effects in the arena test, on all variables for stand, canter, roll (all p<0.05) and on buck rate (p=0.0003). The order of the tests had a significant effect on the stand rate in the arena test (p=0.003) and the sudden object test (p=0.002), on the rate (p=0.03) and mean bout length (p=0.02) for walk in the sudden object test and on the scores for release at the beginning of the tests (p=0.0002) and approach to catch them at the end (p=0.0006). These results suggest a very limited influence of repeated testing on the behavioral responses measured and for the treatments only an effect for the arena test, with 10 out of 18 variables showing a significant difference. The absence of any treatment effect in the sudden object test could be due to the 10min arena test preceding. After the complete test program, 5 duos out of the sample were tested to study the effect of company on test results. They were tested together, coming straight out of their boxes. These results were compared to their individual scores for the same treatment. Comparisons showed only 5 significant Spearman correlations and only 2 out of 54 variables were significantly different in a Wilcoxon signed rank test. Overall these results indicate a strong robustness of the behavioral tests for repeated testing, a strong effect of prior activity on the arena test and no clear difference between individual and pair testing. 

LP: Behavioral observations during temperament tests of police horses show limited sensitivity to repeated testing. Activity just prior to testing had an influence on activity in an arena test but not on the following sudden object test or on the scores for entering or leaving the test arena. Testing in pairs had no clear influence on test results. This shows standardization of preceding activities of horses is important for reliability of behavioral tests.
Oral Presentation Abstract 12

Resisting transitions or being forced into a frame? How the new paradigm of equitation science is understood, advocated and resisted

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Recently, equitation science (ES) has questioned the air of reverence frequently attributed to ‘naturally’ successful riders born with excellent ‘feel’. However, it is precisely the sublime, ineffable and inexplicable achievement of human-horse harmony that attracts many horse people to equestrianism in the first place. For such riders, the scientific paradigm of ES is irreconcilable with more artistic or intuitive approaches to equine engagements. Improving scientific literacy is not necessarily the answer. In fact, it may strengthen opposition to ES. Rather, there is a need to improve the resonance of ES with equestrians regardless of their support or skepticism of scientific paradigms. To determine the discourses and belief systems of Australian equestrians, we conducted a discourse analysis of a public online forum where users debated ES. This enabled the identification of equestrian discourses that varied in their alignment with scientific discourses in general and ES in particular. While some forumites saw ES as beneficial for both improving riding as well as horse welfare, there was a large amount of confusion, skepticism and misunderstanding of what ES encompasses, how it differs from already established training methods, how it betters ‘feel’ and learning by experience, and what it has achieved. In particular, we identified a view of the horse/human dyad as a ‘relationship’ and not a learned – or ‘learnable’ behavior. We argue that this lay perception of ES as incompatible with subjective experiences of human-horse relationships needs to be addressed to increase the number of horses and humans benefitting from ES research and practice.

LP: Equitation Science appeals to those who have a scientific outlook, but it may not be consistent with the views of all equestrians. To ensure that ES is not ‘preaching to the converted,’ it needs to resonate with equestrians across a range of scientific support or skepticism.
An exploration of factors affecting viewpoints of ISES Conference attendees

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This study was conducted at the 9th (Delaware, USA, 2013) and 10th (Vejle, Denmark, 2014) International Society for Equitation Science Conferences to determine factors affecting attendee viewpoints related to horse care and welfare. A total of 166 participants completed and submitted the surveys; 63 from 2013 and 103 from 2014. Participants originated from 22 countries, with the USA (32.5%) having the most participants. Forty-three percent of participants were members of ISES. For analysis, the countries were grouped as North America (NA) (40.6%), Europe and Australia (EA) (56.6%) and Other (2.4%). Chi-Square analysis revealed that year of conference and place of origin were statistically confounded (P<.0001), therefore, data were not analyzed by year of conference. Data were analyzed using ANOVA to determine if a relationship existed between place of origin and attitudes and beliefs regarding horse use and welfare. Three items were different (P<.05) based on continent of origin: horses are companion animals; I support the concept of animal rights; and the level of government involvement in horse care and welfare. Participants from EA more strongly agreed that horses are companion animals, and more strongly support the concept of animal rights. NA participants were in favor of less government involvement in animal welfare than EA participants. Gender did not affect viewpoints, however, age was a factor (P<.05) regarding: horses as livestock; attitude toward animal use and care; level of government involvement in horse care and welfare; and the top issue facing the horse industry. There was no consistent relationship between age and viewpoints. The final demographic factor analyzed was ISES membership. Members and nonmembers had a different viewpoint related to ‘support of the concept of animal rights’ (P<.05) with members more strongly supporting the concept of animal rights than non-members. ‘Level of government involvement in horse care and welfare’ (P=.053), and ‘top issue facing the horse industry’ (P=.061) approached significance, with non-members trending toward less government involvement in horse care and welfare. Non-members saw the unwanted horse as the top issue facing the horse industry, while ISES members reported ‘owners who don’t understand horses’ as the top issue. In conclusion, place of origin, age, and ISES membership status impacted attendee viewpoints in factors related to horse care and well-being such as attitudes toward use and care, level of government involvement needed in horse care and welfare, and the top issue facing the horse industry.

LP: Surveys were conducted at the last two ISES Conferences to determine demographic factors influencing attendee viewpoints on matters related to horse care and welfare. The results obtained will help us better understand factors that impact people’s outlooks on horse care and well-being, and assist us in effectively targeting educational needs for a diverse audience.
Is it possible to judge if a horse is a happy athlete?

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Ever since the phrase, ‘the happy athlete’ was introduced into the FEI rules for dressage (Article 401.1) there have been discussions about what this actually means and if it is possible to recognize and reward happiness in horses. In fact, a number of authors have rather controversially posed the difficult question of whether a horse needs to be happy to perform a high scoring dressage test. For those interested in the study of equine behaviour, the use of a subjective measures for assessing horse behaviour and performance, is interesting in that this approach suggests that horse trainers, riders and judges feel that there are horse emotions that can be accurately assessed through observation of the horse at work and during competition. Yet how confident can we be with this notion and is there evidence that happiness and indeed any other positive emotions are expressed in a recognizable and universally agreed way that can be measurable in our horses?

Research into positive emotions in humans tells us that there are many different views on the causes of happiness but most people agree that being happy relates to having pleasurable activities, good social relationships, feeling engaged in life and feeling as if life has meaning or purpose. Happiness is perceived as a positive state of mental wellbeing and is correlated with having a good life.

Most horse owners would agree that when their horse’s is playing, or relaxing whilst sunning themselves in the company of their group-mates, it certainly appears as if their horses are happy or content. But how do we know this is the case? Research into positive emotions in domestic animals can give us some clues, suggesting that a positive emotional state in animals, can be judged by measuring certain behavioural indicators, such as levels of play, performance of affiliative behaviors and for some species, use of specific vocalizations and even changes in facial expression.

Although there has been much more research into the recognition of negative emotions such as pain, fear and stress in horses, recently there have been a number of studies attempting to look at what horse’s choose and how they may express the pleasure. In this paper I will examine the results of recent work in this area, and the challenges such research poses both in relation to the science, but also to the use of horses for recreation and sport. ‘Putting the welfare of the horse as a ‘happy athlete’ at the heart of everything we do’, is one of the main values quoted as part of various country’s strategic dressage plans. However how successfully this can be achieved given that there is little to no use of objective evidence regarding measures of positive emotions in horses in dressage judging and training, is currently debatable.
Oral Presentation Abstract 15

When I look into your eyes... What eye wrinkles in horses tell us about their emotional state

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Wrinkles above the eye ball are common in horses but may differ in number and shape between and within individuals. They are caused by contraction of the inner eye brow raiser and some people working with horses call them “worry wrinkles”, considering them to reflect emotional states. However, as yet no study has formally investigated the relationship between eye wrinkles and emotional state in horses.

The aim of the present study was to induce different emotional states and to assess whether positive emotions would reduce the expression of eye wrinkles while negative emotions would increase it. Sixteen horses were confronted in a balanced order with two presumably positive situations (anticipation of a food reward (FA) and petting (P)) and two negative situations each (food competition (FC) and waving a plastic bag (PB)). Each situation lasted for 60s (TRT) and was preceded by a 60s control phase (CON). Throughout CON and TRT pictures of the eyes were taken. For each horse four pictures per situation (FA, P, FC, PB) and phase (CON,TRT) were randomly selected (n = 512) and scored in random order and blind to treatment for six outcome variables: overall impression, number, angle and markedness of eye wrinkles, presence of eye white, and eye lid shape.

Data were analysed separately for the right and left eye using mixed effects models and ordered logistic regression with “situation”, “phase” and their two-way interaction as fixed effects. Expression of eye wrinkles did not vary consistently across “situation” and “phase”. Independent of phase, eye white appeared less frequently during P than during FA (z=-3.15, p=0.009), FC (z=-2.94, p=0.02), and PB (z=4.17, p<0.001) in the left eye and during PB (z=4.10, p=0.001) in the right eye.

Similarly, wrinkles were less marked during P compared to the other situations in the left eye (FA: z=3.15, p=0.009; FC: z=-2.94, p=0.017; PB: z=4.17, p<0.001) and compared to PB in the right eye (z=4.10, p=0.001), while no differences between situations occurred in wrinkle number, overall impression and eye lid shape for both eyes. Consistent with our hypothesis, P induced relaxation of the underlying muscle in the right eye resulting in a wider angle compared to its control (interaction situation*phase: F3,10=3.71, p=0.055; z=-3.57, p=0.009), while FC induced muscle contraction, resulting in a sharper angle in the left eye (interaction situation*phase: F3,11=6.57, p=0.011; z=3.73, p=0.005).

We conclude that emotional states may affect characteristics of eye wrinkle expression which might therefore be a promising indicator of horse welfare but further research is needed to validate the relevant outcome variables.

LP: People working with horses often use eye wrinkles as indicator of negative emotions. Even though the results of our study are not consistent, some characteristics of eye wrinkle expression were affected by situations of different emotional states and might therefore be promising indicators of horse welfare.
Oral Presentation Abstract 16

Physiological and behavioral responses of horses to wither scratching and patting the neck when under saddle

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Evidence suggests riding could be considered an arousing event for horses, and so may have implications for their welfare. Historically, horse trainers indicate relaxation of the horse during riding is imperative to facilitate learning and ease of training as it allows the horse to be in a state more conducive to respond to rider aids. Patting the neck as a form of reward or a means to soothe the horse has been recommended in certain riding manuals. No comparable horse-horse behaviors to human-horse patting have been identified, thus patting may not be relevant ethologically. Mutual grooming has been identified as a behavior of biological importance and is performed by equines towards conspecifics in a social bonding context and as a comfort behavior. Research suggests that scratching the wither area of a horse seems to imitate mutual grooming, thus may be a more useful tool for relaxation compared to the common practice of neck patting. The aim of the present study was to determine whether horses respond differently to wither scratching (WS), neck patting (NP) and no interaction (control, C) when under saddle. In the current study, 18 horses were exposed to three randomized treatments: C, NP and WS. Each horse was ridden through a short obstacle course (20 X 40 m), one of the three treatments were applied for one minute. The course was then ridden twice more in order to test the remaining two treatments. Data were analyzed using a generalized linear mixed model in AsREML. Heart rate (HR), heart rate variability (HRV), and behavioral postures, of ear, leg, tail, head, and mouth movements were measured in the horses. Wither scratching produced a significantly longer duration of the relaxed-type behaviors head below the withers (F= 24.62, P < 0.001) and neutral ears position (F= 9.35, P < 0.009), than the other two treatments. Compared to WS, C and NP treatments caused more agitated-type behaviors including ears back (F= 11.91, P = 0.003), reefing on the reins (defined as a distinct pull against the reins) (F= 28.16, P < 0.001), and tail swishing (F= 18.32, P < 0.001). No significant treatment differences were found for HR and HRV parameters measured. Behavioral results in the current study suggest that wither scratching for a one minute period may help to increase relaxation when the horse is standing under saddle. Unexpectedly, horses displayed a similar number of agitated behaviors during both NP and C treatments. These findings may have implications for the management and comfort of horses while under saddle. Two behaviors, left ear lateralization and right ear lateralization, were identified as being potentially useful indicators of the affective states of horses. While these behaviors show promise, further investigation is needed.

Oral Presentation Abstract 17

A preliminary investigation of competition performance linked to duration and frequency of nocturnal sleep behaviours

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Research in human sleep patterns demonstrates links between sleep, cognition, memory and performance; three categories also important to horse training and performance. Knowing if sleep patterns in horses affects performance may instigate interest in considering sleep as an important management factor. Seven horses of mixed breed, age, sex and height were recorded 8PM – 6AM for two consecutive nights. Using continuous focal sampling horses sternal, lateral and standing sleep frequency and duration were recorded. On the third consecutive day horses completed a 7 fence show jumping (SJ) course of 0.76m twice and performance was measured by calculation of a competition score based on the show jumping course completion time and faults acquired. Management and performance variables were controlled by using horses housed at a single SJ facility. Ethical and safety concerns were addressed through a qualified course designer and all participants having previously competed at 0.76m. Pearson’s correlation coefficient was used to test for correlation between duration and frequency of nocturnal sleep behaviours and competition score. Competition scores were derived using a standard SJ competition calculation and ranged from 2.67 (1st place) to 9.37 (last place). Sternal sleep duration ranged from 0 minutes (competition score 2.76) to 67.33 minutes (competition score 7.15); with average sleep sternal duration of 30.70 minutes. A significant negative correlation (R=-0.807, P=0.028) was found between sternal recumbent sleep duration and competition score. Frequency of standing sleep ranged from 16 occurrences (competition score 7.05) to 33 occurrences (competition score 2.76); with an average of sleep standing occurrences of 20.79. A significant negative correlation (R=-0.907, P=0.005) between frequency of standing sleep and competition score was found. No significant correlation was found between competition score, standing sleep duration (R=-0.688, P=0.087), lateral sleep duration (R=0.439, P=0.324), sternal sleep frequency (R=-0.0475, P=0.282), or lateral sleep frequency (R=0.526, P=0.225). Results indicate an association between some sleep behaviours and performance in SJ and indicate the preliminary study was successful in identifying a line of study for the future.

LP: The preliminary research indicates horses’ sleep patterns may have an effect on their performance in line with sleep research in humans. More research is needed to confirm the results of this study.
Oral Presentation Abstract 18

Does prior target training generalize to and reduce equine stress during trailer loading and rider mounting?

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Stress and avoidance behaviors displayed by horses during rider mounting and trailer loading pose serious concerns for safety and equine welfare. This study examined if target training using positive reinforcement in a familiar and low-stress context would generalize to the familiar and high-stress contexts of trailer loading and rider mounting. We also examined if the associated positive valence of target training would reduce the frequency of stress and avoidance behaviors displayed in these contexts. Twelve horses were trained to a criterion performance on a chained clicker trained target following sequence. We compared rates of stress and avoidance behaviors during trailer loading and mounting in a pretest before target training and in two posttests after target training. The first posttest used the chained target-following sequence and the second posttest broke down the targeting into smaller, more frequently reinforced elements. Preliminary analyses from 5 horses using a repeated measures ANOVA show significantly fewer stress and avoidance behaviors in posttest-2 than in both the pretest and posttest-1 (p < .02 for all comparisons). There were no differences in stress and avoidance behaviors between pretest and posttest-1 during trailer loading (Pretest M=6.66/min, Posttest-1: M=8.30/min) and at the mounting block (Pretest M=8.00/min, Posttest-1 M=7.42/min). These results suggest that clicker trained chained sequence did not generalize to a familiar, stressful situation and did not carry enough positive valence to reduce the frequency of stress behaviors during mounting and trailer loading. In the high stress contexts none of the horses were able to complete the previously learned chained sequence. In posttest 2 when the target-following was broken down into simpler elements, stress and avoidance behaviors were significantly lower during both trailer loading (Posttest-2 M=3.19/min) and rider mounting (Posttest-2: M=2.80/min). Horses also made significantly fewer target-following errors (ChainedMB: M=6.181 errors/min, SimpleMB: M=2.210 errors/min; ChainedTL: M=5.9967 errors/min, SimpleTL: M=2.262 errors/min). Thus prior training in a low stress context facilitated target training and reduced problem behaviors in the higher stress situations. Variations in learning rate among horses may reflect qualities of temperament that aid in learning. This research gives valuable insight into the effective application of clicker training in equine care and management.

LP: Horses were clicker trained to follow a target in a low stress and familiar context. The target-following behavioral sequences did not transfer to the stressful contexts of trailer loading and riding mounting however, when broken down into simpler steps, the initial training in the low stress context facilitated target training and reduced stress and avoidance behaviors in the higher stress situations.
An investigation of equine coat colour bias in assessment of potential performance horses

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Bias, a result of the human brain’s limitations in memory recall and decision-making, has been extensively studied e.g. in sport with judging bias according to athletes’ uniform colour. Feedback from participants of the British Equestrian Federation’s (BEF) young horse evaluations, The British Breeding Futurity, has suggested evaluator bias according to horse colour. The Futurity annually evaluates foals-3yo for their potential as future performance horses on a discipline basis (Dressage, Show Jumping, Eventing or Endurance). The premium scores awarded at the Futurity can influence the worth of a horse, thus any bias in scoring could have economic implications. This is noteworthy, as unwanted horses have majorly increased in Britain, affecting equine welfare. The aims of this study were to (1) investigate whether equine coat colour bias exists within the BEF evaluations, by analysing 7 years (2008-2014) of Futurity data (n=4001 horses), and (2) investigate current preferences in horse coat colours amongst British equestrians, by online surveying. Registered horse colours were grouped according to phenotypic similarities: Bay (B) (n=2218): light bay, bay, dark bay; Chestnut (C) (n=773): chestnut, dark chestnut; Black (Bl) (n=345); Spotted (S) (n=298): spotted, appaloosa, roan, grey; Block Coloured (BC) (n=241): piebald, skewbald and Dilutions (D) (n=126): dun, buckskin, palomino. The survey was designed, piloted and distributed through social media (June-September 2014) (n=65). One-way ANOVA and Tukey HSD post hoc analysis (IMB SPSS statistics 21) of the BEF data showed BC to have the significantly lowest mean premium score compared to all ‘solid’ (i.e. B, C, Bl, D) coat colour groups (P<0.001). Spotted horses had the second lowest mean premium score, significantly lower than B, C and Bl horses (P<0.001). Block Coloured horses also had the lowest mean premium score according to the discipline Show Jumping (n=754) and Eventing (n=1574). In Dressage evaluations (n=1608), S horses had the lowest mean score followed by BC horses. These results mirror those of the questionnaire with BC and S chosen as the least favourite horse colours by a significant number (p<0.001) of respondents. This suggests a negative bias of ‘Block Coloured’ and ‘Spotted’ horses influencing subjective evaluations of potential sports horses. Thus, a new subject in equitation science, comparable to colour bias in sport, is theorised, potentially identifying horse colour bias as a discipline to be assessed in regards to welfare issues of breeding low value equines. Future analysis will include the development of a ‘genetic data normalisation’ method based on the world breeding federation for sports horses’ top 100 sires list.

LP: Negative bias of horse colour is suggested to influence the evaluation of potential performance horses, possibly due to a current fashion in horse coat colours. Knowledge of horse colour bias can contribute to welfare assessments regarding overbreeding.
Oral Presentation Abstract 20

Preliminary investigation into relationships between equine skull morphology and brain organization

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Skull shape in dogs has been linked to brain morphology and specific behaviours, with long-skulled dogs generally displaying chase-proneness and cautiousness compared to dogs with short skulls, who tend to be bolder. Horses also display a variety of skull types, and this research explored possible relationships between brain structure and skull morphology. Fourteen skulls, primarily of Standardbred type, were obtained post-mortem. Skulls were sectioned sagittally along the midline, and photographs of the brain and skull were taken to permit measurement of various structures using Image J software. Measurements included: skull index (SI)=zygomatic width*100/skull length; cranial index (CI)=cranial width*100/cranial length; nasal index (NI)=zygomatic width*100/nasal length; olfactory lobe (OL) area (ex situ); OL pitch [angle between hard palate and the OL axis]; brain pitch [angle between longitudinal axis of the cerebral hemispheres and the hard palate]; and whorl location [described by angle of deviation of the OL from a perpendicular line dropped from the centre of the forehead whorl]. Pearson correlations were used to determine relationships between skull morphology and brain structure. Perhaps due to the small sample size and homogeneity in breed type, no correlations were significant. However, some useful observations emerged that may direct further research. NI had a mean of 76.1±14.4 with a variance of 206, while CI and SI had much smaller variances (38 and 10, respectively). Both brain pitch and olfactory pitch also exhibited a wide range (2.3° to 16.6° and 51.4° to 75.9°, respectively). Interestingly, the location of the whorl predictably described the location of the olfactory lobes within 1.5 cm. Even with this small sample size, distinct differences are evident among individuals in brain organization and skull structure, which may be linked with differences in behaviour, as already documented in dogs. The implication is that horses which exhibit different skull shapes, also possess different brain organization.

LP: Further understanding of horse behaviour is crucial to improving safety for humans working around horses, advancing horse welfare, and reducing behavioural wastage due to miscommunication between horses and humans. This pilot study examined the brains of a small number of horses. We know that breeds differ widely in skull shape but this study reveals differences in the organization of their brain. It has previously been documented that different breeds demonstrate specific behaviours, which may be related to brain organization. If this proves true, then behaviours can be predicted based on skull shape, not only breed.
views of riders from different disciplines on horse husbandry with regard to animal welfare labeling

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in germany, the horse market is currently characterized by a growing concern about the animal-friendliness of common horse husbandry practices as well as by a growing heterogeneity due to emerging new disciplines and the increasing number of leisure riders who often lack familiarity with and basic knowledge about the horse. this group can encounter large difficulties in assessing the quality of horse husbandry systems – particularly with regard to its animal-friendliness. against this specific background, an animal welfare label for horse husbandry seems to represent a possible way to improve the level of horse welfare in the long term. yet, the question arises if one universal label could be implemented regarding the large variety of equestrian disciplines and their respective view on horse husbandry. hence, the aim of this study is to explore if riders from various disciplines differ in terms of their demands on horse husbandry and their interest in an animal welfare label for horse husbandry as well as in terms of criteria that could be relevant for the implementation of such a label. an online study with a total sample of 2,048 equestrians was conducted. four disciplines were selected for further investigation: two typical classic riding disciplines (dressage (n=659); show jumping (n=190)) and two recent, more leisure-oriented disciplines (western riding (n=264); riding of gaited horses (n=153)). the analysis of the data was carried out using the software spss 21. the results show that the riders of the four disciplines differ regarding preferred husbandry systems and their demands on various aspects related to horse husbandry. however, the majority within each discipline (between 85% and 93%) regards an animal welfare label for horse husbandry as useful. in this case, only the show-jumpers differ significantly, expressing the highest rejection across all disciplines (cross tabulation, std. residuum: 2.5, p<0.05). in comparison, show-jumpers regard an adequate feeding regime (anova, f=5.652, p=0.001) and regular access to pasture (anova, f=24.533, p<0.001) as less important whereas riders of gaited horses and western riders more clearly reject individual housing (anova, f=39.963, p<0.001). however, besides these differences, the ranking of the criteria by their perceived importance yields similar results across all disciplines. one can conclude that both differences and similarities exist between the riders of different disciplines. yet, the differences appear to be rather small and do not seem to be incompatible at all.

lp: despite some differences among the considered disciplines, similarities prevail. the majority of the participants supports the idea of an animal welfare label for horse husbandry and would take similar criteria into account. hence, both a standard animal welfare label for horse husbandry as well riding stables responding to customers practicing different riding disciplines seem to be entirely feasible.
Oral Presentation Abstract 22

Differences and commonalities between different equestrian disciplines with particular regard to the overall debate on horse welfare

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German equestrianism is getting more heterogeneous in terms of disciplines, horse breeds and husbandry systems appearing on the market. At the same time, the discussion on animal welfare and other ethical aspects of horse riding has emerged not only among riders but also in society. The horse sector needs to be incorporated into this discussion. Thus, this study investigates motives, interests, opinions and attitudes - especially on aspects of horse welfare - among riders of different disciplines for laying a cornerstone for a joint discussion. Data from an online-survey with 3,011 participants were analyzed with the software SPSS 21. From the overall nine disciplines included in the survey, three groups were selected as examples for comparison in the present study: show-jumping (n=324), western riding (n=309) and gaited horse riding (n=87). These were compared by ANOVA including post-hoc tests. Results show that show-jumpers are most tournament-orientated and attach more importance to motives such as sport and competition (p < 0.001). Western riders value the aspect partnership with the horse (p<0.001) the most, and, finally, gaited horse riders are motivated especially by nature experience (p<0.001). All participants principally deny the statement “All riders are the same”, yet the western riders more strongly reject it than compared to the show jumpers (p=0.001). The western and gaited horse riders primarily agree with the statement that riders in the classic (olympic) disciplines tend to feel as if they were somewhat better than other disciplines (p<0.001). In contrast, the show-jumpers stronger agree that riders in alternative disciplines lack a solid education in riding (p<0.001). This statement is negated most by the western riders. A factor describing the attitude towards animal welfare could be built by factor analysis (KMO: 0.894, Bartlett-test of sphericity p<0.001; Cronbachs alpha: 0.825) including eight statements. Comparison shows that the show-jumpers do not assess this topic with as great of an importance as the other groups (p<0.001). Despite the differences, all riders agree that tournament- and leisure-riders do fit together (p>0.05). Most connective aspects are enjoyment of riding and love for the horse. Overall, differences and commonalities of riders from different disciplines can be discussed. Possible prejudices among disciplines should be considered in terms of breaking barriers and building bridges not only within equestrianism but towards society as a whole.

LP: Besides differences between motives and attitudes of riders participating in various equestrian disciplines, there are connecting motives such as enjoyment and the high standing of the hobby. These aspects can be considered as common denominator of all horse-persons and give a great foundation to present a united front in times of rising criticism with regard to animal husbandry in general and horse riding in particular on the part of society.
Oral Presentation Abstract 23

Riders’ motivation, involvement and their behavioural intentions

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Applying the theory of planned behaviour this paper evaluates riders’ experience during their involvement in riding, their motivations and behavioural intentions. Riders are characterised by a leisure riding to a particular site with preferred environment and attributes to achieve the desired horse-based recreation experience. The conceptual model of this research focuses on riders’ behavioural intentions as a dependent variable which includes four antecedent variables: motivation, involvement, subjective norms, and perceived behavioural control. Riders’ behavioural intentions refer to their continued participation in leisure riding activities and spread positive word-of-mouth about their experiences. The premise of this research is that riders’ behavioural intentions are shaped by their: i) motivation to participate in riding activities; ii) involvement in equine related activities; iii) family and friends who approve of the riding behaviour; and iv) their resources (e.g. time or money) and abilities that help them in undertaking riding. A total of 186 completed questionnaires were collected by an online survey from November, 2012 to February, 2013. Data were analysed by partial least squares structural equation modelling. Data reveals that four predictor constructs (motivation, involvement, subjective norms, and perceived behavioural control) played an essential role in explaining the formation of riders’ behavioural intentions (R²=0.419). Further, involvement had the greatest direct impact on behavioural intentions among antecedent variables (β=0.432, P<0.1%). This finding implied the prominent role of riders’ involvement in comprehending the formation of their behavioural intentions while perceived behavioural control had the smallest influence on their behavioural intentions (β=0.093, P<1%).

LP: Riders’ motivations, involvement, subjective norms (e.g. family member’s attitude towards riding) and perceived behaviour control (e.g. time and budget) play a significant role in affecting their behavioural intentions. An understanding of motivations and involvement of users in rider pursuits could help to build loyalty and repeat business in a destination.

*(Author was not present to give this talk.)*
Oral Presentation Abstract 24

An initial investigation into breast health issues in female horse riders

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For female horse riders, breast health issues such as breast pain and poor bra fit may be important concerns which have yet to be considered. Exercise-related breast pain is known to increase with vigorous activity and poor breast support. As research suggests riders who are stiff, unbalanced and in pain may have a negative impact on the training and welfare of the horse it is important to establish the prevalence, severity and impact of breast health issues in female horse riders. A 6-part, 32 question online survey assessing; bras and bra fit, physical activity, breast pain, comments and improvements, breast history and demographics was completed by 1324 female horse riders. Data were analysed descriptively to summarise participant’s demographic profile and prevalence of breast health issues. Chi-squared tests were used to assess the association of self-reported cup size with breast pain and the frequency of bra fit issues. Almost half of riders surveyed (47%) competed in affiliated, regional, national or international level events and 51% of riders were classified as being large-breasted (≥D cup size). Breast pain was reportedly experienced by 40% of all participants and this was significantly related to cup size ($\chi^2 = 33.651$, df = 1, $p < 0.01$), increasing linearly. For those who experienced breast pain, sitting trot was rated the most painful activity (58%), followed by vigorous-intensity riding (canter, gallop and jump; 39%), with 21% of riders reporting that breast pain affected their performance. Only 27% of riders exclusively wore a sports bra when participating in horse riding. At least one bra fitting issue was reported by 59% of participants when horse riding; upper body muscle pain and poor posture was experienced significantly more by riders with larger breasts (31%, 26%) compared to those with smaller breasts (12%, 9%) ($\chi^2 = 96.189$, df = 4, $p < 0.01$; $\chi^2 = 87.278$, df = 4, $p <0.01$). The breast was reportedly a barrier to participation in horse riding for 25% of the respondents and accounted for 17% of the total barriers reported ($n = 3858$). For larger-breasted participants the fourth highest barrier to participation in horse riding was related to their breast size (25%). Breast pain and upper body muscle pain as a result of bra issues are prevalent in female horse riders, and especially those with larger breasts. It is unknown what effect this pain and discomfort may have on horse-rider interaction, but warrants further investigation. These results demonstrate that educational initiatives are needed to ensure female horse riders are informed about appropriate bra fit and breast support during horse riding to help reduce barriers to participation and the potential negative effect on riding performance.

LP: Breast pain and bra fitting issues are prevalent in female horse riders, and especially those with larger breasts, demonstrating a need for educational initiatives in this area to reduce barriers to participation. Further research is also warranted to understand whether breast health issues can negatively affect the horse-rider dyad.
Oral Presentation Abstract 25

The influence of an 8-week rider core fitness program on the equine back at sitting trot

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The physical influence of the rider is increasingly being recognized as an important contributor to equine back pain and lameness, and asymmetrical loading, in particular, can be damaging to the horse. The aim of this study was to investigate the effects of an 8-week unmounted rider core fitness program on rider symmetry. Ten healthy dressage horse and rider pairs (horse age 12.30 ±4.64 years, rider age 41.5 ±14.83 years) performed two ridden tests at sitting trot, before and after participating in an 8-week program. The regime was a sport-specific, 22-minute core fitness program, performed three times weekly. Horses and riders each wore four reflective markers. A Pliance™ electronic saddle mat (60Hz sampling rate) and Casio™ high speed camera (240 frames per second) with Quintic™ biomechanical software were used to record all trials. Statistical analysis was conducted using Minitab 16™ paired t-tests. All riders (n=10) showed a significant improvement in their symmetry after the program, with a decrease in left-right mean pressure differential of 0.368 ± 0.361kPa. Maximum total force ($F = ma$) increased by 2.36 ±3.36N/kg when normalized to rider body mass. Mean stride length (m) increased by 8.4%.

LP: Participating in a rider core fitness program can have a significant effect on rider symmetry, and consequently, provide an important method for improving equine welfare.
Oral Presentation Abstract 26

A preliminary comparison of rider position between a horse simulator and a live horse

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As rider research increases balancing internal and external validity becomes a more common problem. One way of increasing internal validity is to utilise a horse simulator as these can perform repeatably, however no studies on their impact on external validity were found. Additionally if a novice rider could learn to achieve a balanced position on a simulator the welfare of riding school horses would be improved. The aim of this study was to assess whether riding position on a horse simulator during trot was representative of that on a live horse. Six adult participants all riding to at least British Horse Society stage two level volunteered. A Racewood horse simulator was used in a set protocol, which was then repeated with a single live horse (7 yo, part Arab 160 cm fit, sound riding horse). Participants rode in walk, sitting trot (ST), rising trot (RT) and canter for 2 minutes and were then allowed to adjust their stirrups, before starting the test protocol (TP) at their usual, flat schooling length. The TP involved riding for 120 s at walk, ST, RT and a slow canter. Video data capture (Sony HDR-CX190E (60 fps) on a fixed tripod) occurred and frames (post 20 s at both ST and RT) identified using Dartfish Connect 6.0. The first five frames at the same point of stride as the live horse for ST, sit phase RT and rise phase RT were identified. TRUNK (from femoral greater trochanter (FGT) to distal pinna and a down vertical), HIP (from acromion to FGT to mid-point between anterior patella and posterior knee), KNEE (from FGT to knee (as above) to the most distal point of the heel) and ANKLE angles (from knee (as above) to boot over calcaneal tuberosity to most distal point of toe) were measured. Maximum and minimum angles were discarded and the mean of the remaining 3 angles taken. The differences between simulator and live horse angles at both stride phases were then statistically tested (Wilcoxon’s test) using SPSS v21.0 and a significance level of P=0.05. There were no statistically significant differences during ST (P>0.05). At RT the only statistically significant differences were seen in TRUNK (smaller on the live horse) during the sit phase (Z=−1.992, p<0.05) and ANKLE (greater on the live horse) in both sit and rise phases (Z=−2.201, p<0.05). The results of this preliminary study do indicate that riding position on a horse simulator is similar to that on a real horse in ST, however there were some differences found in RT. This study will be extended to support future research designs and to advise on the possibility of using horse simulators as part of evidence-based coaching programmes.

LP: Horse simulators offer a repeatable riding experience, however if they are to be used for coaching or research it is important that horse riders respond to them similarly to live horses. This initial study into rider position would suggest that they may be a reliable model when assessing rider position in trot, however further research is required.
Poster Presentation Abstract 1

Rider demographics, veterinary history and incidence of injury in horses at BE Novice and Intermediate levels

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British eventing is a popular sport involving amateur and professional riders competing at all levels. Equine injuries are common and research has identified risk factors at international events where horses are held on site for three days. Little information is available on national one day events, as horses leave the competition on the day complicating data collection. Data from this study was used to assess national level demographics and identify how these potentially affect risk of injury. Data was acquired anonymously using SurveyMonkey (SurveyMonkey Inc., www.surveymonkey.com) after permission was granted by British Eventing. Riders were recruited at competitions and using social media (©Twitter, ©Facebook) over 8 weeks resulting in 349 responses. All answered questions were used in the statistical analysis. The data was coded and imported into SPSS (Version 21), Chi-Square and Kruskal-Wallis tests performed. There was a significantly higher ratio of male: female riders amongst professionals compared to amateurs (F336= 19.732; p=0.00) and a significantly larger proportion of amateur riders competing at Novice level; with a higher proportion of professional riders at Intermediate level (F306= 33.470; p= 0.00). There was no significant difference found in XC performance between amateur and professional riders across both levels or number of post competition injuries (within 24h of competition). There was also no significant link between competitor status and incidence of lameness at the competition (F276= 1.038; p=0.388) or within 24 hours of competition (F272= 0.666; p=0.616). Number of horses receiving veterinary treatment fielded by amateur or professional riders was also not statistically different at the event (F271= 0.101; p=0.730) or within 24 hours of competition (F266= 0.481; p=0.487). Data regarding types of injury and veterinary history (n=214) identified cuts, scrapes, azoturia and broken bones occurring in 22.2% of horses at the competition, with an additional 12.4% observed within 24h. According to their veterinary history 22.1% of competitors reported their horses having suffered muscle stiffness and 14.9% a musculoskeletal injury in the past three years. Lameness of some degree according to the AAEP scale was reported in 9.4% of horses whilst at the event and in 12.8% of horses in the following 24 hours. This data shows a higher injury rate of Novice and Intermediate event horses than previously reported. Further data from this study will be used to identify the influence of rider status on training and cool down regimes and the influence of training and cool down on injury occurrence.

LP: Eventing is one of the most popular horse sports in the UK. Very little is known about the effect of rider status, training methods and cool down routines on risk of injury in this discipline. Data from this survey will enable us to understand risk of injury and adapt training and cool down to minimise injury in the event horse.
Poster Presentation Abstract 2

Evaluation of use of head control equipment in riding horses

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Various pieces of equipment are used in equitation with the intent of gaining more control over a horse’s head position (e.g., martingales and draw reins). The use of such equipment is potentially aversive to the horse and may compromise welfare. Empirical evidence is lacking on the prevalence of head control equipment (HCE). This study examined the presence of HCE in relation to breed (Thoroughbred [TB], Warmblood [WB], pony, stock, draft, Arabian, other), discipline (pleasure, performance or working), level (basic, intermediate or advanced), type of noseband, combined use with whip and spurs, value of horse and age of rider (adult vs child) as described in horse sales advertisements. One randomly selected issue of an Australian horse sales magazine from each of three years (2005, 2010, 2012) was chosen, yielding data from a total of 1,666 advertisements of riding horses. Non-parametric analysis of variance was conducted using a Kruskal-Wallis test for Chi-squared relationships. Wilcoxon rank scores were used for multiple comparisons using the DCSF method. The prevalence of HCE increased with the sale price of the horse (p<0.0001). Pleasure horses of any level or breed were least likely to wear HCE (p<0.0001), and intermediate and advanced horses in the working disciplines were most likely (p<0.004). Horses wearing HCE were associated with riders wearing spurs (p<0.03) but not carrying whips (p>0.65), and with dropped, Kineton or figure-of-8 nosebands (p<0.0001). These results indicate that HCE is more often pictured on sales horses working at higher levels and in combination with other equipment, such as spurs and restrictive nosebands. These horses are presumably ridden by more experienced riders, but the difference in use of HCE between children and adult riders was not significant (p=0.07). While reasons for wearing HCE are unknown in this sample, the most common reason is to restrict undesirable behaviours. More research on the reasons for using such equipment and the net behavioural outcomes would guide appropriate use.

LP: The use of equipment, such as martingales or draw reins, to control the position of a horse’s head may cause concern if used inappropriately (i.e. to mask training deficits). Such equipment appears more prevalent in sales advertisements for more expensive, higher-level horses such as Warmbloods and Thoroughbreds, and occurs in conjunction with the use of spurs and more restrictive nosebands. Photographs in sales advertisements are presumably taken to show the best aspects of the horse, and the viewing audience may regard such equipment as normal or necessary. There is a need for better understanding of the reasons for equipment use.
Handedness of horse-riders affects rein tension

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The study of rein tension has produced fairly inconsistent results; ranging from 0-60N throughout various equine gaits and equitation movements. Human handedness is a widely documented topic, however research investigating the effect handedness may have on rein tension is lacking. The aim of the current study was to investigate whether handedness affects rein tensions exhibited throughout gaits and riders position on a mechanical horse. The study sample consisted of n=23 female right hand dominant riders (age 34.5±14.6 years, height 166±8.7 cm, mass 63.4±9.3 kg). Riders were required to complete a 5 minute standardised test on a mechanical horse (Racewood, UK), 1 minute in each gait; walk, sitting trot, rising trot, seated canter and 2-point canter. Data was collected via SignalScribe rein tensiometers (SignalScribe, Australia) post calibration and analysed for the final 30s of each gait. A paired T-test was used test for differences between the dominant and non dominant hand. ANOVA tests were used to assess differences between the gaits and riders position. The right rein reports greater mean (Walk=19.4±8.9N; Sitting Trot=19.9±5.4N; Rising trot=17.7±8.6N; Canter=11.0±5.2N; 2-Point Canter=8.8±5.3N) and peak tensions (Walk=29±9.4N; Sitting Trot=34.1±16.1N; Rising trot=37.2±17.3N; Canter=29.9±12.3N; 2-Point Canter=31.8±18.3N) compared to mean (Walk=10.7±17.6N; Sitting Trot=11.9±6.3N; Rising trot=9.9±5N; Canter=11±5.2N; 2-Point Canter=8.8±5.3N) and peak tensions in the left rein (Walk=16.2±5.3N; Sitting Trot=21.1±9.4N; Rising trot=21.5±16.7N; Canter=19±8.6N; 2-Point Canter=17.4±11.1N) (p<0.05). There was no statistical difference (p>0.05) between right mean rein tensions throughout the gaits, there were statistical differences (p<0.05) in left mean rein tension. The non-dominant hand reports a lower mean and peak rein tension compared to the dominant hand. No differences in mean tension between the gaits in the right rein may be explained by participants being right handed. It has been reported that athletes display more dexterity with their dominant hand and is demonstrated in this equestrian population. Higher peak tension in the right rein is may attributed to the increase in strength often reported in the dominant arm. This research indicates handedness affects rein tension, if this also occurs on-live horses, potential welfare concerns arise. Forearm dexterity and symmetry can be balanced with specific training and is therefore an area for future research considerations.

LP: This research documents that average rein tensions in the dominant hand are 34-45% greater than in the non-dominant hand. Riders strive for equal rein tensions in certain movements and this data has identified significant asymmetries. Future research may wish to consider forearm strength and its relationship with rein tensions and the effect of specific training regimes to reduce rein tension asymmetry.
Poster Presentation Abstract 4

Moving on with the times: how can we promote positive experiences in working equids?

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Animal welfare science has mainly focused on how to reduce negative experiences like pain and suffering, thereby neglecting emphasis on the importance of the positives. In the last few years a surge of interest in how to assess and promote positive experiences has developed. Advancing the focus on positive welfare will require furthering assessment of positive states, which is difficult because positive experiences are innately subjective and less conspicuous through behaviour. We outline research to date and underway including identification of facial expressions, body language and behaviours indicative of positive experiences in horses and donkeys. Promising emerging methods include Qualitative Behaviour Assessment, based on the assumption that we can infer from body language and dynamic interaction with the environment how an animal feels. We discuss how positive welfare in equids can be implemented in practice using the context of The Brooke. The Brooke is an international animal welfare organisation which aims to make sustainable improvements to the welfare of working horses, donkeys and mules across Africa, Asia and Latin America. To date, welfare assessment protocols have focused on indicators of poor welfare, which indicate that lameness, wounds and malnourishment are widespread. We propose that it is simultaneously possible to promote positive experiences, in and amongst our efforts to reduce suffering, thereby improving overall quality of life. The development of approaches that are applicable to systematically assess positive states in field conditions will enable the Brooke to fully assess and promote the welfare of working equids. The Brooke’s interventions involve community engagement, improvement of health service provision and advocacy to policy makers. We suggest ways in which positive welfare could be promoted within these approaches. Discussion groups with animal owners could be utilised to raise awareness of behaviours assumed to be positive, such as free movement, rolling and social interaction, during non-working hours. Existing monitoring tools could be modified to record whether animals are given opportunities to experience positive emotions, such as through rest periods and grazing. We conclude by describing important future research including the validation of different methods to assess facial expressions and body language as indicators of positive emotional states. We also identify steps to improve the promotion of positive welfare within the Brooke. Working equids may be far from good welfare, but their lives can be improved by more of the positives.

LP: Working equids in poor communities around the world suffer from serious welfare problems and reducing suffering therefore remains crucial. We suggest that even under these tough conditions promoting and evaluating positive experience is possible and important to improve the overall quality of life of these animals.
Poster Presentation Abstract 5

Functional movement screen scores in female horse-riders

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Videographic performance analysis has been found to be effective in the training of other sports, yet limited research has evidenced the most effective feedback techniques for equestrian athletes. The aim of this study was to investigate whether videographic feedback affects positional kinematics of the rider in sitting trot. A sample of riders (n=14, mean age 9.4±1.8 years), were randomly assigned to either the control (verbal feedback only) or intervention (verbal and videographic feedback) group. Each rider rode their own horse in their usual tack and were given individual feedback by a UKCC L2 coach. Participants performed a 15 minute warm up, they were instructed to perform sitting trot once around the perimeter of a 25 x 35m arena on both reins, recorded in the sagittal plane by a 60 Hz Sony SR37 camcorder (used for kinematic analysis) and an iPad (used for visual feedback), 12m from the track 1.5m from the ground. The participants were given their feedback (verbal for control or verbal and video for intervention) and 10 minutes to practise. Riders repeated sitting trot on both reins. The relative angles of the shoulder, hip and knee were measured and analysed on Dartfish 7 software. Tests for difference were analysed using a paired T-Test on SPSS v21. The intervention group reported significant differences (p<0.05) between angles pre-and post-video feedback in hip and knee angles (mean±SD angle; hip left pre=135.1±8.7°, post=145.4±8.6°, hip right pre=135.4±10.7°, post=145.2±7.8°; knee left pre=127.6±7.3°, post=134.3±9.0°, knee right pre=122.4±6°, post=129.6±6.3°). No differences were reported for the shoulder (p>0.05). The control group reported no differences pre-and-post feedback (p>0.05). The control group reported significant asymmetry between left and right angles of the shoulder both pre (left 24.9±4.3°, right 21.1±3.2°, p=0.015) and post (left 26.9±3.1°, right 20.9±3.6°, p=0.009) feedback. The intervention group reported differences between left and right angles of the knee both pre (left 127.6±7.3°, right 122.4±6.0°, p=0.003) and post (left 134.3±9.0°, right 129.6±6.3°, p=0.035) feedback. Verbal feedback combined with videographic analysis reported increased angles of the hip and knee, which has been established as an elite positional trait by prior literature. As a sport where an athlete is often required to self-coach, videoing performance is a technique riders and coaches should consider implementing into their regime more regularly.

LP: The riders were given video feedback on an iPad which indicates that although for scientific analysis a specific camera is required, for visual feedback smartphones and tablets are effective for improving position than when compared to verbal feedback alone. Coaches may wish to consider the use of video feedback within their sessions, or promote riders to send video feedback to their coach when self-coaching.
Equine stress-related behaviors in therapeutic riding classes

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This study was part of a larger project to increase retention of EAAT horses. Occupational demands can create stress and discomfort that impair a horse’s performance, diminish the benefits of therapy, and create safety risks to vulnerable riders. From January through July 2014 we looked at equine stress and avoidance behaviors during adaptive riding classes at a PATH Premier Accredited center in Redmond, WA. In 2013, 50% of the horses at this center were released from work due to behavior issues. We recorded all incidents of stress-related behaviors in 21 horses while riders mounted and in 10-min focal animal observations during classes, for a total of 120 h. Preliminary findings are reported here. First, stress-related behaviors rarely interrupted the riding activity. Low intensity behaviors were common, whereas extreme behaviors such as “buck” and “spook” never occurred. Lick-chew, tail swish, and ears back/pinned accounted for 46.5% of the stress-related behaviors. Riding exercises were impacted most by a horse’s sluggish, rushed, or improper responses to changes in speed and direction (hereafter referred to as “avoidant-resistant” behaviors), which comprised 25.5% of the recorded behaviors. Some responses that occurred regularly during mounting, including “walk off”, “barge”, “head toss” and “bite”, posed safety risks to riders and delayed classes. Second, individual horses differed in the rate (M ± SD = .61 ± .30 beh/min, Range=.25-1.39 beh/min) and type of stress-related behaviors they displayed. Length of time in the program, but not age or sex, was important. Horses that had been in the program longer tended to have lower rates of stress-related behaviors overall (r=-.375, p=.114). In addition, horses that displayed predominantly avoidant-resistant responses had been in the program significantly longer (M=5.75 years) than other horses (M=2.07 years, p=.017). Finally, the effects of rider characteristics and riding activities on equine stress-related behaviors are also discussed.

LP: Horses in therapeutic riding classes showed very few stress-related behaviors that interfered with the quality of the rider experience. When they did, the behaviors were typically sluggish or rushed responses to riders’ or leaders’ cues to speed up, slow down, and turn. Horses differed in the frequency and nature of stress-related behaviors; horses that had been in the program longer displayed fewer problem behaviors, overall, but tended to display more avoidant-resistant behaviors. These findings have implications for the management and training of horses in EAAT programs.
Poster Presentation Abstract 7

The influence of handler experience on the behaviour of horses in an educational environment: Heart Rate and Visual Analogue Scores

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Horses kept in educational systems are often assumed to be well adapted to the environment and therefore able to cope with the demands made of them. This study investigated the responses of horses kept in a college environment to standard handling procedures in preparation for work when performed by novice or experienced handlers. Fifteen horses kept at Duchy College Equestrian Centre were selected using stratified random sampling to ensure appropriate representation of sex and age (6 mares, 9 geldings; 6-21 years). All horses had been at the centre for at least 6 months prior to the study, and remained in their home stable for the duration of the study. Handlers were categorised as experienced (paid professionals with a UK level 3 qualification minimum) or novice (individuals who had not yet acquired a level 1 qualification). The effect of three elements of a standard handling procedure (being approached, head collared and tacked up) were investigated using horse heart rate and a Visual Analogue Score (VAS; score 1=mild behaviour/of no concern to score 5= behaviour of potential danger to handler). Each horse was exposed to each handler only once and a cross over-design was used to avoid handler experience order effects. Individual horses were accustomed to wearing Polar Equine Sports Tester C600 heart rate monitors and baseline heart rates were acquired prior to the commencement of the study. Handler experience had no significant effect on horse HR (bpm; F1,265=1.22; P>0.05) or VAS behaviour score (F1,84= 0.79; P>0.05). Phase of the preparation process had a significant effect on horse HR (bpm; F2,265=9.89;P<0.001). A significantly greater heart rate (deviation from baseline) was seen when putting the head collar on (7.50±5.18 bpm) than when approaching (4.91±5.34 bpm) and tacking up (5.90±4.60 bpm). VAS score also varied according to phase (F2,84= 4.00; P<0.05) with significantly higher scores seen during approach (2.4±0.75) and head collar fitting (2.2±0.49) than during tacking up (1.85±0.23). Although HR (bpm) and VAS were positively related (higher HRs associated with more severe behaviours; rho=0.354, p<0.001) this relationship only existed during the approach (rho=0.39; P<0.05) and tacking up phases (rho=0.461; p<0.001). This study suggests that although HR and VAS scores may not measure the same thing, collectively they are a useful tool for assessing the welfare of the horse kept in a college environment.

LP: This study of horses kept in an educational environment demonstrates that the use of HR alone is insufficient, however a combination of horse heart rate and behaviour can be used to assess horse welfare. Horses become most anxious when the head collar is put on showing increased heart rates and more behaviours of concern. It is important to take into account different measures when assessing a horse’s welfare.
**Poster Presentation Abstract 8**

**Equine assisted education for children as a social contribution by a Japanese university equestrian team**

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Many Japanese kindergartens keep small animals for educational purposes, but the animal welfare there falls short of the Japanese Animal Welfare Standards and Guidelines because teachers are not experts in animal management and handling. It has become an alternative for kindergartens not to keep animals by themselves, and to ask volunteers who are animal specialists to bring their own animals to kindergartens. In accordance with the social contribution goals set by the Japan University Equestrian Federation (JUEF), the Hiroshima University Equestrian Team (HUET) conducted an experimental equine assisted education (EAE) program for children. The objectives of the study were to evaluate the program and to find out if other Japanese university equestrian teams can use the program. HUET conducted EAE program for 5-year olds (n=163) at 3 kindergartens in Hiroshima prefecture. Another kindergarten consisting of 43 children who did not attend the program served as control. The program consisted of 3 steps (Step 1: visit children without a pony, Step 2: visit children with a pony, Step 3: invite children to the HUET stable to ride on a horse (one ride/child). All steps were conducted within 2 months. After each step, children were asked to draw a picture of the event. Right before and after horseback riding at Step 3, children participated in a Go/No Go trial using a laptop computer to investigate changes in children’s ability for concentration and self-control. The Go/No Go trial is a pass/fail test principle using two boundary conditions. The test is passed only when a participant hits the key when a picture of a white horse appears on the display monitor and also when the participant does not hit the key when a picture of a black horse appears. After all three steps, questionnaires were sent to guardians and teachers. The preciseness of horse drawing by children significantly improved from Step 1 to Step 3 (P<0.05: Chi-square test); for instance, the proportion of children who drew not only horses but also harnesses such as noseband and saddle has increased. The results of the Go/No Go trial suggested that children’s concentration ability but not their ability for self-control improved significantly after horse riding at Step 3 (P<0.05: Wilcoxon signed rank test). Guardians and teachers comments in questionnaires suggested desirable changes seen in children through the progress of the program.

LP: The results suggested that the EAE program conducted by the Hiroshima University Equestrian Team could be effective for reinforcing children’s education at kindergartens.
Horse riders' perception of the use of bitless bridles

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Pieces of equipment that restrain the natural movement of the horse are often suggested to compromise welfare. These include methods of controlling the horse whilst ridden by means of bitted and bitless bridles. Many assume that bitless bridles are a kind alternative to the conventional bitted bridle. However, studies have suggested this is not the case, as the action of these bridles puts considerable pressure, particularly on the horse’s nose.

This study aimed to assess horse riders’ knowledge of bit and bitless bridles. It investigates the reasons why they choose bitted or bitless bridles, giving an insight of their perceptions of different bits and bitless bridles. An internet survey using closed-ended questions was publicized through Facebook on equestrian specific pages receiving a total of 218 responses. Chi squared tests indicated an association between the type of bit used and the reason given for their use (p=0.001). Those riders using the bitless bridle did so because they either assumed they were kinder and more comfortable for the horse or because they believed their horse appeared happier in it. An association was found between the type of bit or bitless bridle used and the perceived severity (p=0.022). Respondents using bitless bridles including the Hackamore tended to assume the cross-under bitless bridle to be less severe than the snaffle bit bridle. Whereas those using bitted bridles perceived the snaffle bit to be less severe than the Hackamore. The horse riders that used bitless bridles perceived them to be kinder to the horse than bitted bridles (p=0.001) and that bitted bridles were an invasive method of controlling the horse (p=0.001).

Although no relation was found between knowledge of bitless bridles and the type used, there was a lack of knowledge found regarding the biomechanical effect of bitless bridles. Therefore this lack of knowledge may affect how the rider uses the equipment, which may have implications on horse welfare.

This study highlights the need for increased education on the effect, selection and use of bitted and bitless bridles to safeguard the welfare of the ridden horse.

LP: There is limited knowledge regarding the biomechanical effect of bitless bridles and that riders use them because they perceive that they are kinder to the horse. This lack of knowledge may have implications on horse welfare, therefore horse rider education is needed in this area.
Poster Presentation Abstract 10

Subjective judging systems: A review of the dressage scoring system used at London 2012

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Traditionally, dressage at the Olympics was judged by 5 judges positioned at E, H, C, M and B. Each Judge scored the individual movements of the test out of 10, zero if the movement was not executed and ten given if the movement was excellent. The collective marks are split into four sections comprising of paces (freedom and regularity), impulsion (desire to move forward, elastic of the steps, suppleness of the back and engagement of the hind quarters), submission (attention and confidence, harmony, lightness and ease of movement, acceptance of the bridle and lightness of the forehand) and riders position incorporating correctness and effect of the aids. Subjective judging has drawbacks including position of the judge, nationalism, home advantages, expectation bias and order effects. In an attempt to make the judging more objective the F.E.I. added two extra judges (positioned at K and F) and a separate supervisory panel to overturn judging decisions at the London 2012 Olympic Games. Data from the London Games was reviewed retrospectively with the aim to look at whether the new system of judging made an effect on the medal and individual ranking positions. Data was analysed using descriptive statistics and SPSS. A Kolmogorov- Smirnov Normally test was used to see if the data was normally distrupued. Then an paired t-test was used to compare the means for the two groups as the raw data was continuous and dependent variable. Through analysis it was found that the new system has made no significant difference to the average marks given to individual competitors nor the team medals (GP p value 0.774 and GPS p value 0.860 respectively). Position changes within individual ranking was not seen, meaning the same competitors progressed to the individual freestyle final. Further research include analysis of the individual freestyle final, which is judged differently to the Grand Prix and Grand Prix Special. Position of the judge effecting marks, nationalism and discarding the high and low marks.

Using other subjective sports to assess the different ways of judging may enable the FEI and dressage governing bodies to establish more ways to make the sport more objective. Areas for further research for potential use in dressage include video analysis, discarding high and low marks and specific judging for different areas of the test.

Overall the judging field of dressage needs more research within the field to enable governing bodies to implement the most effective method of judging, allowing more objective judging decisions to be made.

LP: The new dressage judging system introduced for the London 2012 Olympic Games which included two extra judges and a separate supervisory panel did not affect the overall results of the team or individual competition if it had been judged using the old system.
Practise of supplementary fitness training in horse riders

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Supplementary fitness training is recommended for riders to enhance performance, reduce injury & asymmetric loading of both the rider & their horse. The inclusion of sports specific strength and conditioning programmes are common in mainstream sports, however the practise of ancillary training is not known within equestrianism, and therefore the aim of this study was to investigate the practice of supplementary fitness training amongst horse-riders. A questionnaire was developed based on the design of Ebben & Blackard, (2001) and distributed online (Toluna Quicksurveys) which received n=102 responses (n=3 males, n=99 females). The survey examined demographics, supplementary training practise, and attitudes towards supplementary training. Descriptive statistics were used to interpret responses to questions. Mean age of participants was 28.8±9.9 years representing six different countries (UK, Sweden, Norway, Canada, South Africa, USA). Forty three percent (n=44) of riders participated in Dressage, 21% (n=22) Show Jumping and 17% (n=18) Eventing, the remaining 19% participated in racing, hacking and leisure riding. Sixty seven (n=68) riders competed regularly. Seventy five percent (n=78) of the participants practice supplementary fitness training in addition to their riding, which included a wide range of strength exercises, most commonly noted were the squat (16%) and non-specific exercises with free weights (16%), followed by planks (11%), body weight exercises (9%), push-ups (8%) and sit-ups (8%) (mean duration = 2.8±2.7 hours per week), the most frequently listed conditioning activity was running (48%), followed by cycling (10%) and walking (9%) (mean duration=2.5±1.6 hours per week). None of these riders followed a periodised programme designed by a sports specific strength and conditioning coach, despite 75% (n=78) reporting they would like a rider specific programme designed by a specialist. The amount of fitness training practiced by riders exceeds the standard recommendations for physical activity. However, the fitness training is not specific to their discipline and may not benefit them as much as it potentially could. Further development of specific fitness programmes for riders is needed to ensure that riders that are committing time to training are enhancing sport specific characteristics and reducing asymmetry and injury that is reported within this population of athletes.

LP: Evidence is building to suggest that riders should follow sports specific strength and conditioning programmes to reduce asymmetry, improve fitness and therefore enhance performance and welfare of both the horse and rider. This research demonstrates a large proportion of riders are including supplementary training into their regime. The problem is that this training is non-specific and un-structured which highlights the need of educating riders and trainers to ensure optimal results are achieved with the effort this research demonstrates riders are putting in.
Effect of “lowering of the neck” exercises on gait in Mangalarga Marchador horses – pilot study

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The Mangalarga Marchador (MM) breed is known for two types of smooth gaits: Marcha Picada (MP) and Marcha Batida (MB). Some dressage exercises are used specifically for training Marcha gaits, including ‘lowering of the neck’ (LN), which has also been used as a basic exercise in other equine sports disciplines but its effect has not been investigated for use with MM. The aim of this study was to evaluate the effect of LN on MP and MB gaits in MM. We hypothesized that LN training would significantly improve lateral flexibility of the body and lengthen the stride (over-reaching) without interfering with the pattern of the Marcha gaits.

Eighteen horses that were accustomed to training for the Marcha gait competition but had not undergone LN before were split into two groups: a study group that underwent LN exercises and a control group that did not undergo LN exercise. Each group included horses that either showed MB (four stallions, three mares in the study group and three mares in the control group) or MP (two stallions, two mares, one gelding in the study group, and three mares in the control group). All horses were examined by an experienced clinician and presented without any clinical signs of musculoskeletal problems. All horses were trained three times a week by two experienced riders, one for MB and one for MP horses. LN exercises were carried out twice a week for a maximum of 15 minutes on both reins on a 20m circle in Marcha gait for a 105-day period. The control group underwent the same training without LN.

Changes in gait quality were assessed visually by independent observers at three time points. The first one was performed at the beginning of the study. The second one was performed after 15 days and the third one after 105 days. The assessments were performed by two expert riders on the first time point and by the same expert riders, plus one judge on the following time points. Changes in gait were only recorded if all assessors agreed.

All the MB horses completed the first 15 days of the study period, while 40% of the MP horses in the study group stopped the LN exercises since the horses started to show excessive pace movement, which is undesirable in this breed. All remaining horses in the study group showed an increase in flexibility on the circle and stride length in the Marcha gait at the second and third assessment point. These changes were not observed in the control group.

Conclusion: LN exercise can improve lateral flexibility of the body and stride length in MM horses. However, it may affect the Marcha gait in MP horses negatively since it appears to encourage pacing in these horses, which is undesirable.

LP: LN can be useful in Mangalarga Marchador horse training, however care should be taken in using this exercise in MP horses.
Poster Presentation Abstract 13

Videographic feedback affects positional kinematics of riders in sitting trot

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Videographic performance analysis has been found to be effective in the training of other sports, yet limited research has evidenced the most effective feedback techniques for equestrian athletes. The aim of this study was to investigate whether videographic feedback affects positional kinematics of the rider in sitting trot. A sample of riders (n=14, mean age 9.4±1.8 years), were randomly assigned to either the control (verbal feedback only) or intervention (verbal and videographic feedback) group. Each rider rode their own horse in their usual tack and were given individual feedback by a UKCC L2 coach. Participants performed a 15 minute warm up, they were instructed to perform sitting trot once around the perimeter of a 25 x 35m arena on both reins, recorded in the sagittal plane by a 60 Hz Sony SR37 camcorder (used for kinematic analysis) and an iPad (used for visual feedback), 12m from the track 1.5m from the ground. The participants were given their feedback (verbal for control or verbal and video for intervention) and 10 minutes to practise. Riders repeated sitting trot on both reins. The relative angles of the shoulder, hip and knee were measured and analysed on Dartfish 7 software. Tests for difference were analysed using a paired T-Test on SPSS v21. The intervention group reported significant differences (p<0.05) between angles pre-and post-video feedback in hip and knee angles (mean±SD angle; hip left pre=135.1±8.7°, post=145.4±8.6°, hip right pre=135.4±10.7°, post=145.2±7.8°; knee left pre=127.6±7.3°, post=134.3±9.0°, knee right pre=122.4±6°, post=129.60±6.3°). No differences were reported for the shoulder (p>0.05). The control group reported no differences pre-and-post feedback (p>0.05). The control group reported significant asymmetry between left and right angles of the shoulder both pre (left 24.9±4.3°, right 21.1±3.2°, p=0.015) and post (left 26.9±3.1°, right 20.9±3.6°, p=0.009) feedback. The intervention group reported differences between left and right angles of the knee both pre (left 127.6±7.3°, right 122.43±6.0°, p=0.003) and post (left 134.3±9.0°, right 129.6±6.3°, p=0.035) feedback. Verbal feedback combined with videographic analysis reported increased angles of the hip and knee, which has been established as an elite positional trait by prior literature. As a sport where an athlete is often required to self-coach, videoing performance is a technique riders and coaches should consider implementing into their regime more regularly.

LP: The riders were given video feedback on an iPad which indicates that although for scientific analysis a specific camera is required, for visual feedback smartphones and tablets are effective for improving position than when compared to verbal feedback alone. Coaches may wish to consider the use of video feedback within their sessions, or promote riders to send video feedback to their coach when self-coaching.
Poster Presentation Abstract 14

A comparison of the impact of various influencing factors on the attitudes towards horse welfare across different riding disciplines

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German equestrianism has become very heterogeneous especially regarding the practice of different disciplines. Simultaneously, there is a growing concern about horse welfare and potential indicators that could be used for its measurement. Thereby, equestrians show very different understandings of, and attitudes towards, horse welfare. So far only little is known about these attitudes towards horse welfare (AHW) and its respective influencing factors. The aim of the study was to investigate if the AHW differs between different riding disciplines and if different factors influencing the AHW exist. An online survey with a total sample of 1,117 equestrians was conducted. Three disciplines were selected for further investigation: leisure riding (n=105), dressage (n=515) and eventing (n=176). The analysis of the data was carried out with the software SPSS 21. Regarding the AHW, no difference was found across disciplines (ANOVA, F=0.504, p=0.604). Yet, the analysis of different factors related to equestrianism (e.g. perceived importance of different welfare indicators, motives, etc.) and their influence on the respective AHW, which was calculated via multiple regression analysis, revealed both similarities and differences. Regarding leisure riders, their own knowledge (p<0.05), the perceived importance of further education (p<0.05) as well as the perceived importance of performance and health indicators (p<0.05) and behavioral disorders (p<0.05) as welfare indicators showed a positive influence on the AHW. A stronger competition motivation (p<0.05), in contrast, exerted a negative influence. In the case of dressage, a longer experience (p<0.05) and a higher perceived importance of further education (p<0.001) as well as a stronger motivation through the love for the horse (p<0.01) were found to exert a positive influence on the AHW. This was also the case for the perceived importance of social contact (p<0.001) and behavioral disorders (p=0.001) as welfare indicators. In contrast within the eventing subsample, both a longer experience (p<0.01) as well as the perceived importance of health and performance indicators (p<0.01) exerted a negative influence, whereas a stronger competition motivation (p<0.05) resulted in a more positive AHW. Although all of the considered disciplines did show a similar and quite positive AHW, the factors influencing these attitudes seem to be quite diverse. This emphasizes the high complexity of the topic, but the information is also important to understand in order to join together in a common discourse in the future.

LP: The importance of horse welfare does not differ substantially among different disciplines, yet it is influenced by varying factors and welfare indicators. This underlines both the heterogeneity of opinions on horse welfare and the complexity of different attitudes towards it. For equestrian practice this knowledge can be helpful when discussing the sensitive topic of horse welfare.
The French horse industry is very attractive for young people and adults. Most of the time, to be able to get a job in this industry is an expansion of their passion. But this idealized image must be balanced against realities of the courses and the job market.

7 years ago, the French horse industry worked to create a unique job center, “équi-ressources” to help to connect employers and employees in the French equine industry: “équi-ressources”. The partnership established between public and private members of the equine sector has the ambition to federate all the sectors of the French horse industry around the problem of the gap between training and employment. “Equi-ressources” has set up a four-year monitoring center. It is an instrument for analysis and prospective study dedicated to the equine sector. The collection of sparse data helps to understand the dynamics of the equine vocational courses.

Between 2005 and 2010, the number of learners on equine courses grew by 83%. Since 2011, this number has decreased (- 6.3% between 2011 and 2013) due to the reform of agricultural diplomas. In 2012-2013, 8656 learners were registered in the different levels of courses. 74% of them were women. This percentage is much higher than the 54.15% of women among the present employees of the French horse industry. This statement proves that the feminization of the sector will continue over the coming years. The number of students in higher level diplomas and qualifications is increasing. In 2011, for example, 2900 students were in vocational high schools to prepare an equine diploma corresponding to the European baccalaureate (high school certificate) against 3600 in 2012. But the enrollment wastage rates are important during the first year of courses; many young people give up (between 2.23% and 18.75% depending on the course) and usually, this situation of failure corresponds to an academic problem or wrong career path choice.

Apprenticeship training is an alternative way for a person to gain skills. In 2012-2013, 2998 apprentices had an employment contract with an equine enterprise and at the same time were following their agricultural course. The women represent 65% of these apprentices against 16.2% all sectors combined.

In the future, to enhanced the chance of success for the learner’s individual program, more solid work on the motives concerning the choice of an equine vocational course will be required.

LP: Equine vocational courses are very attractive. In France, the number of learners stays at a high level. Most of these adult or young people are women. However, the level of the enrollment wastage rates shows the weakness of the motives when they discover the reality of professions in the French horse industry.
Poster Presentation Abstract 16

Approaches to better integrate adult newcomers to equestrian sports

(Withdrawn at author’s request)
**Poster Presentation Abstract 17**

**Effect of saddle pad thickness on the ridden horse’s back**

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The fitting of a saddle has a substantial influence on a horse’s welfare, if a saddle is causing pain or discomfort then welfare is compromised. Although saddle pads are often added to improve saddle fit, in addition to protecting the saddle from dirt from the horse, there is little research into their impact on the pressures on the horse’s back. Some owners reportedly use a combination of up to four saddle pads in preference to having saddles refitted. This study investigated the effect of saddle pads of different thicknesses on the likely pressure exerted on the horse’s back as indicated by the depth of indentations on a specifically designed measuring pad. Eight horses (3 mares & 5 geldings; 11.5±4.69 years) were randomly selected from a population of riding horses and were ridden by riders all deemed experienced by a qualified instructor. Each horse and rider followed a predetermined route incorporating walk, trot and canter, circles and straight lines in both directions, typically lasting 6 minutes. Horses were tested under four conditions: no pad, Shires® cotton saddle pad (4mm), cotton PolyPad™ (6mm) and Mattes® cotton and sheepskin pad (8mm) in a randomised order. Likely saddle pressure was assessed using a Port Lewis Impression Pad™ (PLIP) placed on the horses back beneath the saddle pad and the saddle. On completion of the ridden exercise the PLIP was removed, placed on a flat surface and the depths of indentations at 6 predetermined locations (front, middle and back on the left and right sides) were measured immediately using a depth gauge. Depth data (mm) were normally distributed (Anderson-Darling, P>0.05). Saddle pad thickness effected the indentation depth recorded on the PLIP and therefore the likely pressure on the horse’s back (F3,185=8.74; P< 0.0001). There were significantly shallower indentations with a sheepskin pad (9.86±3.33) than with a PolyPad™ (12.8±3.48), a thin pad (12.3±3.36) and without a pad (12.2±3.33). Significantly greater indentations were evident on the left side (in total; 12.6±3.84) than on the right side (11.0±3.06; F1,185=12.82; P< 0.001). With all pads there were shallower indentations in the middle section of the PLIP (10.0±2.86) than at the front (12.8±3.26) or the back (12.5±3.84; F2,185=16.1; P< 0.0001). The use of saddle pads of different thicknesses influences the likely pressure on the horse’s back.

LP: Saddle pads are frequently used in equestrian disciplines for various reasons. Thicker pads appear to reduce the pressure on the horses back under the saddle.
Automated stress monitoring and suitability assessment in candidate police horses

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The mounted police in Brussels, Belgium, are interested in finding an objective tool that can help them decide if a candidate horse is suitable for the mounted police. In the search for such a tool, 4 protocols were designed to evaluate the reaction of police horses to mounted police tasks. These included ridden and non-ridden situations: a ‘going to work’ test, an obstacle test, a flexibility test and a ‘coming from work’ test. For the experiments 9 horses (3 mares and 6 geldings, aged 4-15 years) were divided into 4 categories by mounted police riders, based on their experience and suitability: good beginner, bad beginner, good experienced and bad experienced. The horses were ridden by 9 riders (4 female and 5 male, aged 24-50 years) of the mounted police. All measurements were performed twice with all but one horse, making sure that no horse was ridden twice by the same rider to take into account the effect of the rider. During the measurements the heart rate and activity of the horses and riders were measured. Based on their measured activity, a modelled heart rate which captures the heart rate component that is related to activity was computed using a linear ARX model of order [2, 2, 1]. By taking the difference between this modelled heart rate and the measured heart rate which contains a mental component and an activity component, a measure for mental state was obtained in an automated way for horses and riders in the form a relative stress graph. Based on this relative stress graph, the number of times each horse exceeded the 10% relative stress level and the length of time it stayed in that stress were stored for each horse. A Tukey-Kramer test (α=0,05) showed that good beginner horses spend significantly less time in the 10% relative stress zone compared to bad beginner horses in the ‘coming from work’ test (p-value=0,0277). The correlation between the relative stress graph of the rider and the horse during the obstacle test was calculated as a measure for the interaction between horse and rider. This correlation was compared between the 4 horse categories using the Tukey-Kramer test (α=0,05). A significant difference was observed between good beginner horses that showed a higher correlation in relative stress with their rider, and bad beginner horses that showed a lower correlation (p-value=0,0040). Summarised, this study demonstrates the usability of automated mental state detection in horses and their riders for suitability assessment of candidate police horses and sets a basis for further research into this field.

LP: Using the measured activity of horses and their riders, their heart rate’s activity component is calculated. Comparing this to the measured heart rate which contains an activity and a mental component, the mental component of the horse’s and rider’s heart rate is extracted. Based on the horse’s and the rider’s mental state, it is possible to assess the suitability of the horse as a mounted police horse.
Poster Presentation Abstract 19

Preliminary study to investigate the effectiveness of the BEF's Long Term Athlete Development Plan on the development of the elite event rider/Do the guidelines proposed in the long term athlete development provide a realistic and applicable framework?

(Withdrawn at author’s request)
Poster Presentation Abstract 20

A preliminary study to investigate the equine nutrition knowledge and feeding practices of a population of DIY livery horse owners in the UK

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Appropriate nutrition is vital for equine health, however research suggests that many horse owners practice incorrect feeding regimes. It has been suggested that this is due to a lack of equine nutrition knowledge. The aim of this study was to examine the equine nutrition knowledge and feeding practices of a population of horse owners in the UK who are the sole carers for their horses (DIY livery), through the use of a survey. The objectives were to find out the extent of the horse owner’s equestrian experience, their use of the rules of feeding as outlined by the British Horse Society (BHS), whether they are members of any equestrian organisations, their knowledge of some key aspects of basic equine nutrition which includes the nutritional value of feeds, and if there are any relationships between nutrition knowledge and the other three variables. 306 completed surveys were gathered in total. Quantitative data was tested for normal distribution using the Kolmogorov-Smirnov normality test function in SPSS. Tests for correlations between variables were then carried out using the Pearson’s r correlation function in SPSS. Qualitative data were compared using descriptive statistics. Mean score from the quiz was 13 (52%) out of a possible 25 (n=306, ± 2.57, range, 6-20). No correlation was found between nutrition knowledge score and experience (r=0.038, n=306, p=0.506). Owners providing horses with free access to hay had a higher average knowledge score (53.2%, n=306) than those who restricted hay intake (50.6%, n=306). No correlation was found between the number of times horses are fed per day and nutrition knowledge quiz scores (r= 0.027, n=306, p=0.643). Average knowledge score was higher for owners who were members of an equestrian organisation (52%, n=306), than for owners who were not members (49%, n=306). However, despite a low theoretical understanding, owners do adhere to some practical rules of feeding, such as providing free access to forage. Level of equestrian experience does not appear to increase equine nutrition knowledge therefore equestrian organisations must aim to target all levels of horse owners to improve the quality and accessibility of nutrition education available.

Membership of organisations such as the BHS and the Pony Club appears to correlate with increased nutrition knowledge, therefore the effectiveness of equestrian organisations as a source for equine education is supported. Further research is required to determine the quality and accessibility of the education.

LP: This survey suggests that many horse owners have a poor understanding of equine nutrition and highlights a requirement for more equine nutrition education to be provided in order to improve equine welfare.
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Automatic activity classification of horses using wireless body mounted motion sensors

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This paper presents the design, implementation and validation of an automatic system that autonomously detects and classifies horses’ behaviour using a lightweight wearable motion sensor. Awareness of the time-budget of stabled horses could greatly improve the knowledge on horse behaviour and horse welfare. Assessing horse time-budget with traditional live or video observation is very scarce and time consuming. With the availability and rapid advancement of low-cost wearable motion sensors and high performance wearable computers, automatic motion analysis and accurate classification are gaining popularity in animal behaviour research and might become a useful tool for horse keepers. The aim of this project is two-fold: to measure and classify horse behaviours exhibited inside the stable and to automatically detect activities that require immediate intervention by the caretakers, such as repetitive nervousness, stuck in box after rolling, colic and foaling. In the first phase of this feasibility study, 5 sport horses (Anglo-Arabian and Selle Français ; 4 to 8 years old) located at Haras du Pin (France) were fitted on the top of the head with a lightweight 3D accelerometer to remotely sample activity data and simultaneously filmed to record precisely the time of every behaviour. Their activity was measured without any human intervention in their usual stall. Behaviours were classified into two types: Low-activity (eating and standing still) and High-activity (rolling). Specific features (mean acceleration and entropy) were extracted from four acceleration data (X, Y, Z and Vector Sum (VS)) and were categorised according to the behaviour observed from the video in order to train an artificial intelligent system. We have successfully categorised eating (Mean of VS = 0.30 ± 0.173 and Entropy of VS = -2.35 ± 0.275), standing still (Mean of VS = 0.93 ± 0.100 and Entropy of VS = -1.27 ± 0.530) and rolling (Mean of VS = 1.59 ± 0.440 and Entropy of VS = -3.12 ± 0.099). At the early stages of validation, using simultaneously both Mean and Entropy, the motion sensor is able to distinguish between the activities with approximately 90% accuracy, when compared to the human-referenced behaviour observed from the video. The results are consistent among horses. The second phase is to categorise and build models for lying down, foaling, colic and repetitive nervousness behaviours exhibited in stalls.

LP: Body mounted motion sensors potentially can be used to automatically identify horse behaviours without the intervention of humans. The benefits are improved research on time budgeting and early detection of health threatening activities.
Can we detect rider-related differences in roll and pitch motion of the equine back in professional riders riding the same horses?

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It has been shown that riders affect the health of their horses. It is also known that some riders are more successful in competition than others. However, only some pieces contributing to the rider effect in sport horses have been well demonstrated. To further elucidate the rider effect we investigated whether there we could detect a direct rider effect on the locomotory pattern of horses during riding.

Ten professional, female riders each rode 10 dressage horses (level M German scale; n=100 combinations) through a standardised dressage program (10 min warm-up followed by a 5-min test). The experiment was conducted over five days, i.e. each horse was ridden by two riders on each test day. The dressage test was recorded on video.

An inertial measurement unit sensor (sampling frequency 256 Hz) was fastened caudal to the saddlepad. For each rider and horse the longest and most complete sequence each of trot, walk, right and left canter were identified. Euler angles were derived from the gyroscopic signals. Roll, the angular motion around the cranio-caudal horizontal axis and pitch, angular motion around left-right horizontal axis were studied. After high-pass filtering, eight ranges of motion (ROM)-measures were constructed for roll and pitch percentile differences [between 98-2, 95-5, 90-10 and 75-10 percentiles], analysed using mixed model analysis with one observation per dyad (including fixed effects of gait, horse and rider with roll analysed in logarithm format). Skewness of roll and pitch were likewise analysed. There was a significant effect of horse (P<0.05) in nine of the 10 models (except the skewness pitch model). The gait effect was significant in all 10 models, and pairwise differences were often found between walk and trot. Rider was significant in five models (98-2 and 95-5 percentiles of roll and pitch and skewness of roll). From pairwise between-rider comparisons it was not evident that differences were due to rider weight.

LP: This study found that the angular locomotion of the equine back pattern varied both with rider and horse. That horses have different locomotion patterns was expected but the considerable variation between riders is worth further studies on more horses and riders, as well as the effect of sensors placed also on other body parts of the horse. It is possible that we touched one key to the ‘rider effect’ on performance with possible influence also on health.
The effect of stirrup length on the light seat position of horse riders

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The light seat position is used by leisure and competitive horse riders, particularly during the canter. Despite this little is known about the position. Evidence-based coaching of the rider in light seat could increase rider safety and horse welfare. The aim of this study was to look at the effect of stirrup length on the light seat position during the canter. Ten participants all riding at British Horse Society stage three level and over 18 years of age volunteered. A Racewood horse simulator with a Devoucoux 17” show jumping saddle was used in a set protocol. Participants mounted and rode in walk, trot (sitting and rising) and working canter and were then allowed to adjust their stirrups, to ensure that they started the test protocol (TP) at their usual, non-jumping length. The TP then began and consisted of the horse being taken through the paces to working canter. The participant rode in light seat for 30 s (TPLong). The horse was halted and both stirrups were shortened by 4 cm and the TP repeated (TPMid). This was repeated a further time (TPShort). Video data capture (Sony HDR-CX190E (60 fps) on a fixed tripod) occurred and ten frames (post 15 s at working canter) identified using Dartfish Connect 6.0. The first five frames at both the highest (Fhighest) and lowest (Flowest) phases of the stride were identified. HIP angle (from acromion to femoral greater trochanter (FGT) to mid-point on a line between the anterior patella and posterior knee) and KNEE angle (from FGT to knee (as above) to the most distal point of the heel) were then calculated for each frame and TP. The maximum and minimum angles were discarded and the mean of the remaining 3 angles taken. The differences between frames and stirrup lengths were then statistically tested (Wilcoxon’s and Friedman’s tests respectively) using SPSS v 21.0 and a significance level of P=0.05. Both HIP and KNEE displayed statistically highly significant differences between Fhighest and Flowest (P<0.01) with Fhighest having greater angles for both. HIP did not show a statistically significant difference between stirrup lengths for either frame (P>0.05) but KNEE showed a statistically significant difference for both Fhighest (P<0.001) and Flowest (P<0.01). For both frames the TPLong KNEE was statistically different to the other two lengths (P<0.01). Stride phase did affect the riders’ position in light seat, but surprisingly only KNEE angle was affected by stirrup length. There was great inter-rider variability in the HIP angle, and therefore the upper body position, which in this small sample is likely to have resulted in the non-significant findings.

LP: The hip and knee angles of experienced riders in light seat at working canter change with different phases of the stride. Knee angle decreased as stirrup length decreased, however the upper body position and therefore hip angle is highly variable between riders in light seat.
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The status of equine welfare within the website of British lead bodies for FEI disciplines

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The International Equestrian Federation (FEI) is clear that it ‘condemns all training methods and practices that are contrary to horse welfare’ and has an FEI Equine Welfare Code of Conduct. The FEI oversees all international events in dressage and para-equestrian dressage, jumping, eventing, driving and para-equestrian driving, endurance, vaulting and reining. Despite having over 90,000 registered horses and riders only the minority of horse carers will ever compete under FEI rules. The challenge for the FEI is how to extend their oversight beyond their own competitions. 132 National Federations (NFs) are FEI affiliated and work with the FEI to ‘develop and promote the sport’ to ‘foster fair and inclusive competition’. The British Equestrian Federation (BEF) is an NF and umbrella organisation for 19 member bodies that include the 7 FEI sporting discipline lead bodies. Arguably it is these individual sport’s lead bodies that are positioned to influence many more carers of horses about ethical training methods to promote effectiveness and increased welfare for horse and human alike. The aim of this study was to review the promotion of equine welfare on the websites of the British NF-affiliated lead bodies of the FEI disciplines. The websites were systematically reviewed, with the presence of relevant information recorded. Only Endurance GB (EGB) mentioned welfare on their landing page, with a mission statement stating they will ‘uphold … the highest standards of horse welfare’. British Carriagedriving (BC), British Dressage (BD), British Equestrian Vaulting (BEV), British Eventing (BE) and EGB assess for lameness prior to start of competition (and EGB after for several welfare parameters). BD, BE, BEV, BS and EGB state never to use the bit as reprimand (BS also says other saddlery). BD, BE, BS and EGB have rules regarding overuse of whip and spurs, BC whip only. BC, BD, BE and BEV have rules guarding against overuse at competition. It was unclear what rules BR followed. BD, BE, BS and EGB’s have codes stating horse welfare is paramount, and BC and BR adopt the FEI code. BC, BD, BE and BS talk about horse falls. EGB says horses must remain at venue overnight after long ride. BD define grinding teeth and tail swishing as negative signs of horse stress, and believe poor welfare usually due to lack of knowledge and understanding. Overall equine welfare was present on all sites but on the landing page of only one (EGB) and seldom mentioned on BR’s site. At competition equine welfare is clearly protected, but lead bodies differ in the extent to which they cover both physical and psychological well-being. The only equestrian sporting body to be a key signatory of the National Equine Welfare Protocol is the British Horseracing Authority, not a FEI discipline.

LP: Whilst the British lead bodies for FEI disciplines do mention equine welfare on their websites the profile of this topic could be improved. EGB gives it the highest priority and BR the lowest.
An investigation into the management options available to secure a future for the pony on Dartmoor: a behavioural and opinion based evaluation

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The management of the pony (Equus Caballus) herds on Dartmoor commons has become a contentious issue between all stakeholders. There are three types of pony being bred on common land and only one of these is the recognised Dartmoor breed. However all originate from the same stock thought to have been introduced by Phoenician traders around 2000 years BCE. Recent changes to export laws and consequently market demand have meant the unhandled pony from Dartmoor now has little or no market. With no enforcement in place to control breeding up to 1500 ponies are being destroyed annually which is considered by many pony keepers, charities and members of the public to be an unacceptable form of management causing much negative media attention. A semi structured questionnaire was designed and 51 pony keepers approached to gain a clear picture of the issues being faced. This study found that in 2014 a significant majority (92%; Chi-squared1 = 36.3, P< 0.0001) of pony keepers are in agreement that the management should change as opposed to staying as it is and a similar majority (69%; Chi-squared2 =29.6, P<0.0001) wish to see Stallion Removal implemented as the method of breeding control. The behavioural impact on pony herds of three different breeding control strategies including stallion removal, stallion vasectomy and mare immuno-contraception were assessed and compared using comprehensive stallion and mare ethograms. All behavioural measures were non-parametric for both mare and stallion behaviours (all AD P<0.05). The results show that the removal of the stallion has no negative impact on behaviour. The proportions of time spent engaging in identified behaviours by mares under the three management plans differed. In the Stallion Removed herd the individuals within become less closely grouped (all W values, P<0.05). However, contrary to expectation (expressed by pony keepers against Stallion Removal) lairages (the areas the herds graze in) were not broken by mares when the stallion was removed. Overall the most effective form of breeding control on Dartmoor to reduce the unwanted foal crop and achieve a high level of welfare which is supported by the majority of pony keepers is the complete removal of entire males from the open commons. In addition to removal of stallions, sterilisation of stallions was also found to be an effective option with herding behaviour kept high in this management option, which is highly supported by pony keepers. The findings of this report can be utilised to inform the future management of ponies on the moor. With the UK currently in a National Equine Crisis and charities full of unwanted ponies a change to the existing management and implementation of a new breeding control plan is crucial on Dartmoor.

LP: Knowledge of breeding management tools in semi-feral pony herds on open common could reduce numbers of unwanted offspring, limit the need for annual culling and consequently improve welfare.
When selecting horses to ensure optimal performance and safety, temperament is a key consideration. Subjective assessment of personality provides a simpler method of collecting behavioral information compared to objective assessment, however subjective assessment must be accurate in predicting behavior to be effective. The objective of this preliminary investigation was to determine if a subjective temperament test could predict behavior exhibited during a startle reactivity test. Testing took place during a spring undergraduate course in Horse Psychology and Training at the University of Florida. We subjectively assessed temperament using a questionnaire focused on six characteristics: friendliness to people, reaction to novel stimuli, nervousness, fight or flight when cornered, response to touch and response to pressure. Seventeen stock-type horses were assessed both by the instructor of the course and their assigned student using the questionnaire. We conducted a single reactivity test on these 17 young horses (Quarter Horse and Appaloosa, mean age = 745.6 days, range = 700-787 days) in a paneled round pen. Visual observations of maximum flight distance and latency to return to feeding near the novel stimulus (a rapidly opening umbrella) were recorded. Principal Component Analysis (PCA) condensed the six subjective assessment scores into a single variable for comparison to physiological measures, including age in days and post-startle change in heart rate to assess reactivity and temperament. For the instructor scores, this variable reduction method revealed one primary axis of variation in temperament assessment, capturing 78.3% of variation (PC1) and strongly loading on the “reaction to novel stimuli” responses ($r = 0.45$). For the student scores, PCA also revealed one primary axis of variation in temperament assessment, capturing 48.65% of variation (Student-PC1) strongly correlated with “reaction to novel stimuli” ($r = 0.51$) and “fight or flight when cornered” ($r = 0.54$) responses. An ANOVA test revealed that Student-PC1 could predict latency to return to feeding after startle ($p < 0.0189$). There was no significant correlation between either Instructor-PC1 and Student-PC1 and any physiological measures. Subjective assessment, in the form of a handler questionnaire, may be a practical and reliable tool for predicting horses’ responses to sudden novel stimuli. Ongoing work will repeat these measures with the siblings of these horses in later foal crops. Further research will be beneficial to develop tools to predict suitable behavior for a horse’s intended task, and therefore improve handler safety.

LP: Temperament is an important consideration in horse selection, training, and performance. Additional research on the use of subjective assessments to characterize temperament and predict behavioral responses is warranted.
Can incorporation of equine learning theory into the undergraduate curriculum alter veterinary students’ perception of equine practice?

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Equine veterinarians are at high risk of occupational injury. Previous studies have demonstrated an association between injury and equine behaviour and that younger vets are more likely to sustain an injury than more seasoned practitioners. This has been cited as a factor that may put veterinary undergraduates off entering equine practice. It has been suggested therefore that further training of veterinarians in equine behaviour may be beneficial. Fourth year veterinary students were asked to complete an online questionnaire, assessing five veterinary scenarios involving horses exhibiting unwanted behaviour. For each scenario the student was asked how much they thought different emotions from the horse (including fear and dominance) may motivate their behaviour, and, how likely they thought various techniques of modifying the behaviour were likely to be successful. Finally they were asked how confident they would be as the vet in that situation, how high they perceived the risk of personal injury to be and how likely they thought they would be to succeed. The students were then given a 45 minute lecture on equine learning theory and its practical application to the veterinary environment. One week later the students received an email requesting they complete the same scenario-based questionnaire. Subsequently the same group of students were exposed to techniques based on learning theory to modify the behaviour of in-patients during their rotation through the equine hospital. At the end of this rotation they received an email requesting they complete the same scenario based questionnaire for a third time. Of 157 students in the year, 141 completed the first survey, 98 the second and 63 the third. Forty seven students (33.3%) completed all 3 surveys. Their opinions altered over time, ultimately they were less likely to consider the unwanted behaviour was motivated by the horse being naughty or dominant and more likely to consider it due to previous handling and training. They perceived they would be more confident (mean scores 4.5 pre survey, 6.4 post survey and 6.62 delayed post survey) and more likely to be successful (mean scores 5.2 pre survey, 6.77 post survey and 6.97 delayed post survey). A wilcoxin signed-rank test was used to assess differences in individual responses and was significant (p= 0.05) for both confidence and success. Of 37 students who left comments at the end of the final survey 5 said they felt that it gave them more confidence to work with horses and made the equine hospital a safer place to work, and 9 commented they had been able to successfully utilise the techniques themselves. Nineteen requested that learning theory was prioritised within the equine course and that they would like more lectures to be given.

LP: Integration of learning theory into the veterinary undergraduate curriculum was well received by the students. It allowed them to deal with horses demonstrating unwanted behaviours in a more safe and effective manner.
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Present situation of Japanese university equestrian teams

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In Japan, there were 81 university equestrian teams with 1225 members and 670 horses in 2013. According to the Japan University Equestrian Federation (JUEF), the primary goals of university equestrian teams are to refine students’ riding skills in order to attain higher competitiveness and to make a social contribution through various horse related events. The objective of this study was to collect data on the current situation of Japanese university equestrian teams to investigate if the teams’ activities met the JUEF goals. The mail questionnaire survey was sent to 80 university equestrian teams in Japan and was composed of two parts. The first part was for a team captain to answer general information such as number of members and number of horses, achievements towards social contribution and so on. The second part was for each member to answer questions on personal information including school year, sex, motivation to join a team, riding history, previous participation in competitions, highest level of competitions, and problems within a team. Team members were asked to participate in a Yatabe-Guilford personality inventory, which consists of 12 personality criteria with 10 questions each (total 120 questions). The 2013 JUEF yearbook was used as supplementary information source. The response rate of the mail questionnaire was 27.5% (22 teams with 197 members). The number of female members was significantly more than the number of male members (P<0.05: Chi-square test). The average number of team members was 15.9/team varying from 6 to 27 in 2014. The number was significantly decreased over 20 years (P<0.05: Wilcoxon signed rank test). There were only 9 teams that had members who started riding before joining a university equestrian team, and only 9 teams contributed to the society through horse events in their own university festivals. Responses also suggested that only a few active teams have attained the goals set by JUEF. The rest of the teams, which did not have professional coaches, had no clear objectives. There is a big gap between JUEF’s standards set for ideal teams and the actual standards seen in surveyed university equestrian teams. According to the Yatabe-Guilford personality inventory, the personality of the team members can be classified into 5 categories. However, there was no clear tendency seen in the personality traits among respondents.

LP: The average number of team members of Japanese university equestrian teams has significantly decreased over the past 20 years. There is a big gap between JUEF’s standards for ideal teams and the actual standards occurring within the respondent teams.
Demonstration Day Materials

THE PRINCIPLES OF LEARNING THEORY IN EQUITATION

Does your training stand the test of science?

Originally defined in the peer-reviewed scientific literature (McGreevy and McLean, 2007 – The roles of learning theory and ethology in equitation. Journal of Veterinary Behavior: Clinical Applications and Research, Volume 2, 108-118) the 8 Principles of Horse Training have been revised in 2015 and are presented for the first time during this ISES Conference, Vancouver 2015.

The application of these Principles is not restricted to any single method of horse-training, and we do not expect that just one system will emerge. There are many possible systems of optimal horse-training that adhere to all of these principles.

The following is a brief overview of the Principles and it has been simplified for ease of use. You can find a more complete description of each principle on the ISES website: www.equitationscience.com

THE FIRST TEN PRINCIPLES OF HORSE TRAINING:

These principles are essential for optimal welfare in trained horses, as well as training efficiency. They apply to all horses, no matter what age, breed, training level and equestrian discipline.

Ask yourself whether your training demonstrates each principle.

1 Train according to your horse's ethology and cognition

Horses have evolved to live and process information about the world in a certain way. They need the company of other horses, movement and virtually continuous eating. Although excellent at memorising, research indicates that they may not recall events like humans do, therefore, in training, we need to cautious in blaming them for past behaviours.

2 Use learning theory appropriately

Learning theory describes the processes by which horses learn. Learning theory offers a toolkit for trainers. Use it strategically for optimal welfare and effective training.

Your learning theory toolkit includes:

* **Habituation**

  *When he stops responding to events and stimuli as he becomes accustomed to them.* Habituation techniques include progressive desensitisation, overshadowing, stimulus blending, counter conditioning and approach conditioning.

* **Operant conditioning**
The use of rewards and consequences. Although there are four operant conditioning subsets, in horse training the focus should be on positive and negative reinforcement because, when used correctly (and in conjunction with the other 9 principles), they are both, ethical and effective.

With negative reinforcement the use of pressure should be subtle, as incorrect use can have serious welfare implications.

Correct use involves three phases:

1. begin with a light pressure cue
2. followed by either maintenance or increase of the pressure
3. and then the release of the pressure.

Good trainers aim to reduce cues to light forms of pressure so that any stronger pressure or prolonged pressure (phase 2), is no longer required.

**Classical conditioning**

Using cues to trigger and elicit behaviours. When training cues your timing needs to be precise to coincide with the start of the desired behaviour.

In horse training, classically conditioned cues typically include your seat, voice, and posture.

3 Train easy-to-discriminate cues

Make sure each cue is unique and easy to discriminate. In particular, make sure cues for acceleration (like going faster, up a gait(s) and longer strides) are all as different as possible from each other and also ensure that the same applies to cues for deceleration (like slower, down a gait(s) and shorter steps).

This applies to all rein and leg pressures, as well as voice, seat and posture cues.

4 Shape responses and movements

During training, first reinforce a basic attempt at the target behaviour. Then aim to improve the behaviour in a step-by-step way so that the horse chances upon the right answer as easily as possible.

5 Elicit responses one-at-a-time

Put simply, only ask for one thing at a time. If you use simultaneous or clashing cues (particularly for contradictory responses such as acceleration and deceleration), they inhibit each other and gradually the horse will desensitise to your cues.

Cues should target his limbs to move, so should be timed to elicit the correct limb movement.

Cues or signals can be closer as responses are consolidated.
6 Train only one response per cue

Each cue must elicit a single response. Make sure rein cues, which relate to deceleration and turning, are not used for other responses such as putting horses ‘on the bit’ or excessively bending the neck with the reins. Similarly, leg cues should be preserved for the role in acceleration.

*It is common for trainers to use their leg or rein cues for a multitude of responses and expect the horse to differentiate. He simply can’t.*

7 Form consistent habits

When training new responses, check you always:

• maintain the same context (the environment you are training in and any other variables)
• use the same cues in the same location on the horse’s body or relative to his body
• shape transitions so they are the same structure and duration each and every time (for example, 3 steps of the forelegs/2-3 seconds).

*Once each response is consolidated, the context (locations) can be gradually altered.*

8 Train persistence of responses (self-carriage)

The horse should be trained to keep going (maintaining rhythm, straightness and outline) without the need for constant cueing. Constant cueing (‘nagging’ or ‘motivating’) can lead him to habituate (stop responding) to your cues.

9 Avoid and dissociate flight responses (because they resist extinction and trigger fear problems)

Flight response behaviours (often seen as ‘problem behaviours’) should be avoided at all costs and downward transitions are best used to dissociate them. They resist extinction, may reappear spontaneously and are often accompanied by many physical and behaviour problems. Acute stress shows up as problem behaviours (such as escape, aggression, apathy). Chronic stress has very serious pathological and welfare implications, including learned helplessness, and can be fatal.

10 Demonstrate minimum levels of arousal sufficient for training (to ensure absence of conflict)

The horse should be as calm as possible during training. Certain levels of arousal, muscle tone and attentiveness are required for successful learning, but when these levels are exceeded, learning and welfare suffer.

*This is a brief overview of the principles and it has been simplified for ease of use. You can find a more complete description of each principle on the ISES website: www.equitationscience.com*
Demonstration Day Materials

Equitation Science - Applied Training - Horses Over Fences

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Training jumping horses involves two main aspects: teaching them the flatwork skills to go from jump A to jump B, and teaching them the athletic movement to clear the jump: takeoff, air time, landing.

The flatwork skills are similar to the ones required in dressage. However while in dressage we train horses to disregard environmental stimuli and perform behaviors shaped through negative reinforcement by the rider’s aids, when teaching a jumper we need to consider the learning challenges the interaction with an external stimuli adds to the training equation. One challenge is teaching horses to overcome the fear of new jumps. It is common practice among trainers to perceive the horse’s alert and slow down reaction to a new fence, as a disobedience to the aids. As a result, riders intensify the pressure of their aids, which become stressors that often push horses to exhibit flight or fight reactions. In this situation allowing the horse time to use the investigate behaviors towards new fences will help them acquire the necessary skill to generalize new jumps. As soon as the horse has acquired this ability it will quickly regain forward motion and listen to the rider’s aids.

Another challenge that riders face is the release of pressure on the rein during takeoff to allow horses to perform the jump properly. The same release is also the signal in a negative reinforcement based training that the behavior produced during the approach was the correct one. Consequently when horses display unwanted behaviors in front of the fence such as head tossing, riders rewards it by releasing the pressure as they cannot maintain it waiting for the proper behavior to happen, otherwise the jump will be compromised and the horse will stop jumping.

Therefore, it is important when teaching horses to jump, to use exercises that also produce the proper behavioral approach sequence in front of the fences. In this way, as the rider releases the pressure of the bit to allow the jump it will automatically reinforce the proper approach.

In conclusion, the knowledge of learning theory gives trainers the ability to select and properly use the correct exercises developed within the equine industry.
The other 23 hours of the day

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Most horses are handled or ridden for only a few hours every day. The rest of the time they are by themselves. Obviously, if we expect our horses to perform optimally, whether during riding competitions, during leisure riding, or in other ways, and if we expect them to be safe to handle and to ride, we must consider the quality of these other 23 hours.

Horses have evolved to live in social groups on open plains watching for predators. A large part of the 24 h period they spend moving around slowly while they graze. Their anatomy, physiology, and their psychology are shaped to these conditions, and thousands of years of domestication have hardly changed these characteristics.

The conditions for many riding horses are very different from what horses evolved to live under. They are housed in individual confinement in closed buildings. They receive two to three meals a day and exercise for about one hour. Although more horses are let out on pasture nowadays, often they are kept alone on a flat, un-stimulating square with nothing to do.

For other social domestic animals such as pigs and cattle, individual confinement has to a large extent been replaced by loose housing. A similar change still awaits most horses. But many horse owners are afraid of keeping their horse together with other horses, because they fear that they will fight and injure each other. From observations on feral and wild horses we know that, although aggression naturally occurs, horses rarely hurt each other. One possible reason is that they are better socialized because they grow up together with conspecifics of both sexes and of many different ages.

If we want to improve the quality of the other 23 hours we need to mimic natural conditions as much as possible. To do so, we need more research on areas such as the socialization process of horses, how the optimal group composition should be, the effect of keeping horses in large groups, and how we best enrich the horse environment.

The more the environment of riding horses is shaped like natural conditions, the more harmonious they will be, and the better and safer a performance we can expect of them.

(This talk is based upon an earlier talk presented at the 2013 ISES Conference in Delaware, US.)
Understanding horses to improve training and performance

12th International Society for Equitation Science Conference
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The International Society for Equitation Science is a not-for-profit organisation that aims to promote and encourage the application of objective research and advanced practice, which will ultimately improve the welfare of horses in their associations with humans.

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