



**10th Alltech-Hartpury Student
Conference**

Conference Proceedings

30th June & 1st July 2021



**HARTPURY
UNIVERSITY**

Hello & welcome.....

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



Dr Helen Warren; European Technical Manager, Alltech

On behalf of Hartpury University, it is our pleasure to welcome you to the 10th Alltech-Hartpury Conference. This 10th anniversary conference was due to take place last year and it was with great disappointment that we had to postpone it due to the ongoing global pandemic. As such, we are so pleased to be able to host the Conference this year, albeit virtually! The team of staff in the Department of Equine Science here at Hartpury University are passionate about our subject and one of our wider aims is to maximise opportunities for dissemination of research to the wider equine forum. Our collaboration with Alltech® has provided a unique opportunity for like-minded academics, industry professionals and students to debate emerging ideas, which could have a positive impact on performance, health and welfare of the horse, and the development of the equine industry. We are pleased with the breadth of topics and the standard of the presentation topics in today's programme and are looking forwards to what is predicted to be an enjoyable and inspiring conference day; we hope you are too.



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

Acknowledgements

The Alltech-Hartpury Conference Committee gratefully acknowledges the support of all collaborative partners who have made this conference possible. We are very much indebted to the peer review team of Dr Helen Warren, Dr Georgina Crossman, Dr Jane Williams, Lorna Cameron, Lucy Dumbell, Dr Simon Daniels, Dr Sophie Lee, Emma Davies, Dr Rebecca Sumner, Dr Debbie Nash and Lauren Birkbeck who have given their time freely to offer support and guidance to those presenting today.

Thanks also to the staff members of Hartpury University who have helped setup in preparation for the conference. Gratitude is also extended to Professor Hilary Clayton, Dr Pat Harris, Tullis Matson, Janet Douglas, Emily Floyd, Emma Short and David Redvers for delivering the science and industry-based keynote presentations.

Prizes

Prizes will be awarded for the best theatre and poster presentations.

Prizes have kindly been sponsored by Alltech.

Alltech-Hartpury Conference Scientific Programme:

Wednesday 30th June

Morning Session:

9.00am Log-in to the conference opens

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

9.15am: Dr Pat Harris; WALTHAM™ Petcare Science Institute: The Changing Equine Silhouette. Obesity research over two decades: A personal perspective.

10.15am Undergraduate Student Oral Presentations

10.15am: Tabby Cook: Differences in equine masticatory biomechanics and consumption time across various feed types; University Centre Sparsholt

10.30am: Emily Craddock: Analysis of the Management Strategies and Prevalence of Exertional Myopathies and Neuromuscular Disorders in Equines; University Centre Reaseheath

10.45am Break

11.00am Undergraduate Student Oral Presentations

11.00am: Catherine Morrish: Why the Long Face? - Horses Show Distinct Facial Expressions During Agonistic and Affiliative Interactions; University Centre Sparsholt

11.15am: Rosie Tooby: Female Elite Level Event Riders' Perceptions of Mental Skills Use in Eventing; Hartpury University

11.30am: Tegan Jenkins: The use of manual therapies to prevent lameness in domestic horses (Equus caballus); University Centre Reaseheath

11.45am Undergraduate Student Poster Session

Lois Watson: Horse owners' perceptions of the aetiology and management of stereotypies; Moulton College

Olivia Cornick: The impact of lockdown one during Covid-19 on the exercise and management of horses; Hartpury University

Alltech-Hartpury Conference Scientific Programme:

Wednesday 30th June

Alana Armstrong-Smith: The impact of single lateral heel studs on the stride kinematics of polo horses at canter; University Centre Sparsholt

Lorna Laurence: Evaluation of the ability of horses to be trained using operant conditioning to discriminate a non-conspecific odour; Writtle University Centre

Megan Hunter: The opinions of equine rare breed breeders on the use of assisted reproductive technologies (ARTs) and breed societies' support; CAFRE

12.00pm Lunch break

Afternoon Session:

1.00pm Janet Douglas: World Horse Welfare - The importance of research and evidence in equine welfare

1.45pm Undergraduate Student Oral Presentations

1.45pm: Sofia Forino: An investigation into self-perception of body image in female equestrians in the United Kingdom; University Centre Sparsholt

2.00pm: Evelyne Duncan: It's a sham: An investigation into the level of aversion experienced among horses during clipping using physiological and behavioural measures; University Centre Reaseheath

2.15pm: Nicola O'Sullivan: Is there a relationship between body image and anxiety levels in female equestrian students at one Land based college? University Centre Sparsholt

2.30pm Undergraduate Student Poster and Lightning Introduction Session

Rowena Redgrove: A study measuring the effect of a flair nasal strip on recovery rate of horses after swimming; Hadlow College

Alexandra Cheshire: The Impact of Surgery and Steroid Injections on Impinging Dorsal Spinous Processes (IDSP) in Equines; Oxford Brooks University

Alltech-Hartpury Conference Scientific Programme:

Wednesday 30th June

Rebecca Copper: A preliminary study on the influence of sleep disruption on discriminative learning in stabled horses; Hartpury University

Charlotte Brunt: An Investigation into the Physiological Impacts of Traditional Management on the Domestic Horse, with Emphasis on Equine Gastric Ulcers; University Centre Reaseheath

2.40pm Break

2.55pm Undergraduate Student Oral Presentations

2.55pm: Rachel Collins: Comparisons of horse behaviour based on handler intent to exercise; Duchy College

3.10pm: Isobel Wells: Does the start of flat races influence racehorse race performance? Hartpury University

3.25pm: Rebecca Schofield: Saddle Up: An Investigation into the Occurrence of Saddle Slip in Mounted Games Ponies; Northumberland College

3.40pm Postgraduate Student Poster Presentations

Anne Haitjema: Application of IMUs in horseback riders to objectify peak acceleration and shock attenuation in the lower limbs and trunk; University of Twente

Marc Elmeua-Gonzalez: Shock Attenuation and Electromyographic Activity of Advanced and Novice Equestrian Riders' Trunk; University of Primorska

3.45pm David Redvers: Tweenhills Stud: The use of technology in buying and selling bloodstock

4.30pm Round up of the day

4.40pm Conference closes

Alltech-Hartpury Conference Scientific Programme:

Thursday 1st July

Morning Session:

9.15am Log-in to the conference opens

9.25am Dr Helen Warren and Kirsty Leśniak: Welcome to the conference

9.30am: Tullis Matson; Stallion AI Services: New Technologies in Equine Assisted Reproduction & Their Application to Other Species Preservation

10.15am Undergraduate Student Oral Presentations

10.30am: Millie Moore: Evaluating the success of interspinous ligament desmotomy (ISLD) on the subsequent performance of the horse; Hartpury University

10.45am: Leah Crook: The Impact of the Covid-19 Pandemic on Riding for the Disabled Association Stakeholders; Myerscough College

11.00am Break

11.15am Undergraduate Student Oral Presentations

11.15am: Stephanie Key: Investigation into the effect of Pelvic Alignment in Horse Rider Posture on Saddle and Walkway Pressure Distribution; Writtle University Centre

11.30am: Jasmine Chanter: Should the Equestrian Rider Consider Themselves an Athlete? Duchy College

11.45am Undergraduate Student Poster Session

Elisha Cohen-Neighbour: Owner's treatment choice analysis of horses with colic and how much preplanning has been done on surgery or euthanasia in the event of a severe colic episode; Moulton College

Georgina Boyton: Measure of anticipatory behaviour during the approach to regular feeding times; Glyndwr University

Rebecca Ellis: Banned Substances in Equestrian Sport, Cross Contamination and Knowledge of Prohibited Drugs in Amateur Riders; Hartpury University

Alltech-Hartpury Conference Scientific Programme:

Thursday 1st July

Charlotte Coloe: A groom's job is never done: perspectives of employment conditions and working rights in equestrian grooms; Nottingham Trent University

Sophie Armstrong: The Impact of Height and Breed on Equine Hoof Wall Thickness; Hartpury University

12.00pm Lunch break

Afternoon Session:

1.00pm Emily Floyd: Rosssdales Veterinary Centre - Where science integrates into equine veterinary practice

1.45pm Postgraduate Student Oral Presentations

1.45pm: Jasmine Hinton: Coaching in British showjumping; is LTAD plan being used efficiently; Myerscough College

2.00pm: Kirsty Ure: The Effectiveness of the off-horse Activate your Seat Training Programme in Horse Riders; Hartpury University

2.15pm: Sarah Reega: Anticipation of trotting: is there an effect on the horse and rider? University of Edinburgh

2.30pm: Steffi Dampney: A scientifically grounded case study to explore how a self-care intervention can help an elite rider manage their stress and recovery balance and enhance their well-being; Hartpury University

2.45pm Break

3.00pm: Emma Short: Baileys Horse Feed - Feed Formulation - From the science to the horse's mouth

3.30pm Undergraduate Student Poster and Lightning Introduction Session

Kate Adams: The progression of the stride length in the equine forelimb over time following a manual massage intervention; Bishop Burton College

Alltech-Hartpury Conference Scientific Programme:

Thursday 1st July

Orsolya Losonci: Investigating the possible presence of learned helplessness in horses (Equus caballus); Writtle University Centre

Megan Curtis: A comparison of activation in thoracic stabilising muscles of horse riders in a 2-point and 3-point seat at canter on a mechanical horse; Writtle University Centre

3.40pm Professor Hilary Clayton: Michigan State University - Biomechanics of the Diagonal Gaits from Extended Trot to Piaffe – the latest information on how horses achieve increasing degrees of collection from trot to passage and piaffe

4.40pm Round up of the day

4.50pm Conference closes

Alltech-Hartpury Conference

Keynote Speakers

Dr Pat Harris; MA PhD DipECVCN VetMB MRCVS



After qualifying from Cambridge University, Pat completed her Ph.D. at the Animal Health Trust into the Equine Rhabdomyolysis Syndrome. She joined the Waltham Centre for Pet Nutrition (now Waltham Petcare Science Institute) in 1995. As Director of Science for Mars Horsecare and head of the WALTHAM™ Equine Studies Group, she is responsible for their equine research conducted in collaboration with experts at institutes and universities globally. This provides the science behind the SPILLERS™, BUCKEYE™ Nutrition, and WINERGY™ brands. She is also a scientific advisor to MARS EQUESTRIAN™. Pat is a European Specialist in Veterinary Clinical and Comparative Nutrition, an RCVS recognized specialist in veterinary clinical nutrition (equine), and a British Equine Veterinary Association Past-President. She is also a member of several international society and charity boards and holds, or has held, a number of academic posts within various institutions around the world. Pat lectures internationally on nutrition as it affects the health, welfare, behaviour, and performance of the horse. She is the author or co-author of over 500 scientific papers, abstracts, and book chapters with recent emphasis on obesity, laminitis, and senior horse nutrition

Alltech-Hartpury Conference

Keynote Speakers

Janet Douglas; MA, VET MB, MSC, PHD, AFHEA, MRCVS



Janet is an equine vet who has worked at the Animal Health Trust, the University of Guelph in Ontario, and the University of Pennsylvania's New Bolton Center in positions that have involved clinical work, research and education. She has an MSc and a PhD and has extensive experience in the review and interpretation of medical research. She is also involved in education at all levels, from basic scientists through to medical specialists, veterinary surgeons, veterinary students, horse owners, and Pony Club members. Janet believes strongly in ensuring that all recommendations and educational content are evidence-based, and in making clinically relevant and welfare-based research information accessible to non-scientists. She is involved in teaching at the Universities of Nottingham, Liverpool, and Guelph and currently holds the position of Research and Education Officer at World Horse Welfare.

Alltech-Hartpury Conference

Keynote Speakers

David Redvers



David set up David Redvers Bloodstock agency in 1995, when he founded Tweenhills in Gloucestershire. Since then he has purchased Group One winners, Simple Verse, Just The Judge, Sunlight, Lightening Pearl, Lightning Spear, Rosdhu Queen, Peace And War, Havana Gold, Dunaden, Elm Park, Side Glance & Trade Storm. In 2016 he bought Roaring Lion who was crowned World Champion 3yo in 2018. David is the Racing and Bloodstock Manager for Sheikh Fahad Al Thani and his brothers' Qatar Racing operation and stands their stallions Roaring Lion, Zoustar, Charm Spirit, Havana Gold, Hot Streak and Lightning Spear, at Tweenhills.

David has a worldwide understanding and experience of the racing and bloodstock markets and manages the sponsorship portfolio for British Champions Series sponsor, QIPCO. David was presented with the Chris Deuters Award from the ROA in 2017 and was crowned Bloodstock Agent of the Year in 2018.

Alltech-Hartpury Conference

Keynote Speakers

Tullis Matson; FRAGS



Stallion AI Services, Cryogenetics Ltd, Gemini Genetics, Elite Kennel Fertility and Nature's SAFE

Tullis Matson has been a leading figure in the equine assisted reproduction industry for over 25 years. His work started in 1989 with the establishment of a small natural covering stud at the family farm. In 1990, he travelled to New Zealand to learn the practice of Artificial Insemination before returning home to form one of the first equine AI units in the UK; Stallion AI Services. Stallion AI Services was founded in 2000 and is one of the world's most successful stallion collection centers, offering semen collection services, fertility assessment and worldwide semen export. The company processes semen from over 200 stallions per year and has over 1,400 stallion's semen in cryopreserved storage.

Throughout his career, Tullis has carried out extensive research into semen collection, stallion fertility and equine semen cryopreservation with Stallion AI Services being home to a world leading equine semen freezing extender. Tullis and Stallion AI Services specialize in semen collection and processing from sub-fertile stallions and the latest technologies available in the industry including post castration epididymal semen extraction, semen sexing and whole genetic preservation. Tullis has been a long-standing ambassador for the plight of rare breed equines and has recently established a charity, Nature's SAFE, aimed at assisting in the conservation of the world's most rare and endangered species through regenerative cryopreservation.

Alltech-Hartpury Conference

Keynote Speakers

Emily Floyd; BVSc, DACVIM, MRCVS



After graduating from the University of Bristol veterinary school in 2003, Emily worked in the UK before moving to California where she completed a specialist residency in equine internal medicine. Emily moved back to Newmarket in 2009 to work at RosSDales Equine Hospital; her current role at RosSDales is a specialist vet in internal medicine. Within this role, Emily deals with horses with a variety of medical problems and has a special interest in neonatology.

Alltech-Hartpury Conference

Keynote Speakers

Emma Short; BSc (Hons)



Emma joined Baileys Horse Feeds as an Equine Nutritionist, after graduating from Writtle College with a BSc (Hons) in Equine Science in 2002. Her role is varied, covering the provision of feed advice for general horse owners, working on specialist feeding programmes for larger yards and professionals, and providing technical support for the Baileys sales and marketing teams.

Emma enjoys applied and clinical nutrition having seen plenty of changes and progression over the years within the industry. She is keen to apply new research to the benefit of the welfare and performance of the horse, through Baileys' product development, as well as educational talks to horse owners, equestrian associations, veterinary practices and retailers.

Alltech-Hartpury Conference

Keynote Speakers

Professor Hilary Clayton; BVMS, PHD, DIPL. ACVSMR, FRCVS



Professor Hilary M. Clayton is a veterinarian, researcher and horsewoman. For over 40 years she has performed innovative research in the areas of locomotor biomechanics, lameness, rehabilitation, conditioning programs for equine athletes, and the interaction between rider, tack and horse. She has published 7 books and over 200 scientific articles on these topics. Dr Clayton served as the Mary Anne McPhail Dressage Chair in Equine Sports Medicine at Michigan State University's College of Veterinary Medicine from 1997 until she retired from academia in 2014. She continues to perform collaborative research with colleagues in universities around the world. Dr Clayton is a charter diplomate and past president of the American College of Veterinary Sports Medicine and Rehabilitation. She is an Honorary Fellow of the International Society for Equitation Science and has been inducted into the International Equine Veterinarians Hall of Fame, the United States Dressage Federation Hall of Fame, the Midwest Dressage Association Hall of Fame and the Saskatoon Sports Hall of Fame. She is a lifelong rider and has competed in many equestrian sports, most recently focusing on dressage in which she trains through the Grand Prix level and has earned US Dressage Federation bronze, silver and gold medals.

Undergraduate Oral Presentations

Differences in equine masticatory biomechanics and consumption time across various feed types.

Cook, T., Knight, C. & Stones, N.*

University Centre Sparsholt, U.K.

Keywords: mastication, muscle force, equine gastric ulcer syndrome.

Introduction: A key part of equine digestive health is mastication. Increased mastication promotes saliva production, neutralising the epithelial lining in the gastrointestinal tract and preventing ulceration. Equine gastric ulcer syndrome (EGUS) and stereotypical behaviours in domesticated horses are prevalent, often caused by feeding concentrates to fuel energy requirements (Bochnia et al., 2019; Veruvet et al., 2012), taking less masticatory effort to break down (Paivo Neto et al., 2018). However, there is limited research on the activation of the masticatory muscles or effect of feed type on mastication. This study investigated masticatory muscle activation in concentrate feeds compared to grass.

Materials & Methods: Following institutional ethical approval, a sample of horses ($n=6$) from Sparsholt College Equine Centre were allocated and small patches on the cheek clipped on six masticatory muscles. Electromyography sensors (Biometrics, UK) were attached to these areas on the left side of the face during consumption of various feed sources; grass, chaff (50g) and a pelleted concentrate (50g). Feed presentation order was rotated each feeding round/day. The chaff and concentrate were fed from the horses' usual buckets inside their stables. The horses were hand grazed for the mean time of chaff consumption during the habituation period, in an area they were familiar with. For analysis, horses were allocated to an older and a younger group with three in each group (younger group aged 6-8, older group aged 15-18 years).

Results: There were no significant differences between feed type and overall muscle amplitude (OMAM), individual muscle amplitudes or consumption time (CT) ($P>0.05$). Grass did have the highest overall masticatory force, followed by concentrate, and lastly chaff. The concentrate had a longer CT than chaff. A Kruskal-Wallis test found there was no significant effect of order on OMAM ($H(2) = 0.09, P=0.957$) or CT ($H(2) = 0.86, P=0.651$). The Spearman's rank correlation found no significant positive correlation between CT and OMAM ($P=0.605$). A Kruskal-Wallis test found significant differences in amplitude across the six different muscles ($H(2) = 33.84, P<0.001$). There was no significant difference ($W=12.0; P=0.663$) between muscle amplitudes of the upper muscle group (median = 46) and the lower muscle group (median = 44.91). There were significant differences in OMAM between the six horses ($H(5) = 23.11, P<0.001$) and significant differences in CT between individuals ($H(5) = 14.65,$

Undergraduate Oral Presentations

P=0.012). Kruskal-Wallis tests found there was a significant difference in OMAM between age groups ($H(1) = 7.25, P=0.007$) but no significant difference in CT ($H(1) = 0.16, P=0.688$).

Discussions & Conclusions: Grass had the highest OMAM, suggesting grass promotes mastication. Therefore, increased masticatory effort should be encouraged in stabled feeding practices to satisfy natural behaviour and digestion. The concentrate having a higher OMAM and CT compared to chaff contradicts previous research, however the lack of significance suggests further research is needed. Interestingly, the significant differences found in muscle amplitude mean between the masticatory muscles, the individual horses, and the two age groups of horses, supports previous findings regarding age, jaw size/length and dental health impact on mastication.

Acknowledgements: Many thanks expressed to Sparsholt Equine Centre, specifically to Rachelle Purnell (yard manager), for the facilitation and sample of horses to carry out this research.

References

Bochnia, M., Goetz, F., Wensch-Dorendorf, M., Koelln, M., & Zeyner, A. (2019). Chewing patterns in horses during the intake of variable quantities of two pelleted compound feeds differing in their physical characteristics only. *Research in veterinary science*, 125, 189-194.

Paiva Neto, A. O., Leite, C. T., Duarte, C. A., Dias, D. P. M., Döwich, G., Queiroz Neto, A., & Lacerda Neto, J. C. (2018). Biomechanical analysis of the masticatory movement before and after adjusting dental occlusion in equine. *Arquivo Brasileiro de Medicina Veterinária e Zootecnia*, 70(1), 6-12.

Vervuert, I., Brüssow, N., Bochnia, M., Cuddeford, D., & Coenen, M. (2013). Electromyographic evaluation of masseter muscle activity in horses fed (i) different types of roughage and (ii) maize after different hay allocations. *Journal of animal physiology and animal nutrition*, 97(3), 515-521.

Undergraduate Oral Presentations

Analysis of the Management Strategies and Prevalence of Exertional Myopathies and Neuromuscular Disorders in Equines

E. Craddock, S. Loveday-Lovell*

University Centre Reaseheath

Keywords: exertional myopathy, treatment, genetics

Introduction: When considering common myopathies such as polysaccharide storage myopathy (PSSM), their effects can be felt in many sectors within the equine community, and their incurability presents challenges when approaching treatment. This study assessed what owners are doing to manage the disease and the commonality of genetic mutations within the disease.

Materials & Methods: A questionnaire (built via Google Forms), which consisted of 6 control questions; 6 questions regarding a horse's myopathy; and 5 questions on topics such as breeding regulations, which were a combination of single or multiple choice, and comment box, was distributed in private myopathy-centric Facebook groups. The data was analysed via SPSS.

Chi-Squared tests were performed alongside a Phi and Cramer's V association test for correlations between answers provided. The Cramer's V value indicated that there was a strong association between some answers (such as whether the horse was diagnosed with a myopathy, and how the respondent answers the opinion-based questions), with the Phi value supporting this.

Results: Of 350 responses collected, 253 stated that they used a specialised diet, with both unique feeds (62) and supplements (122) being identified. Supplements were either a source of protein, vitamins and minerals, fat, or some form of clinical medication. Other additives, such as toxic substances and cannabidiol, were also documented. Most feeds were low in non-structural carbohydrates and high in fibre.

Many (329) believed that there was not enough research on myopathies. 299 were unhappy with the diagnostic tools available, and 217 the effectiveness of the treatment strategies. When asked what should be done to control the spread of myopathies, many chose to educate breeders (291), conduct more research into the cause of myopathies (232), and into treatments (264). 184 respondents wanted to implement legislation to control breeding, with a small portion (42) saying they wanted to allow selective breeding. Of 36 additional comments, many asked for transparency within breed registries about disease status.

Undergraduate Oral Presentations

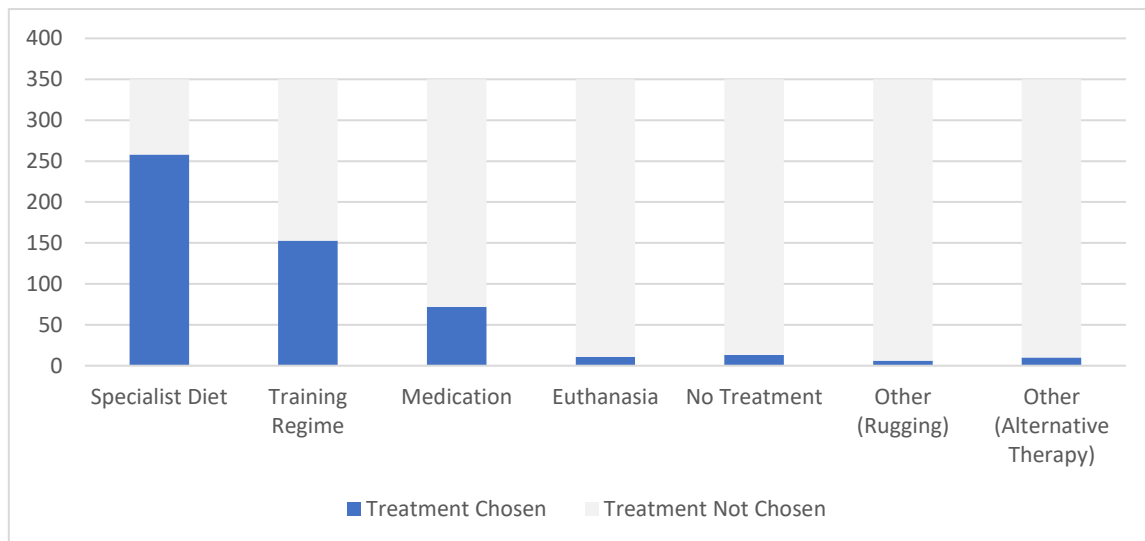


Figure 1: Differences in treatment pathways chosen by owners.

Discussion & Conclusions: Alongside unexpected data regarding the gene mutations horses presented, the majority of respondents said that they used a specialized diet, with less than half utilising training regimes, despite research showing it to be equally beneficial. Treatments involving medication, such as acetazolamide, indicate potential for new management pathways to be explored.

Many respondents stated that they did not believe there was enough research available into treatments. Education, which was important to respondents, is a powerful tool – it is applicable to many environments and can be easy to provide. The provision of legislation to prevent breeders from continuing to breed carriers was also suggested, alongside some recommending educating buyers, informing them of the financial and emotional burden of specialist care, and the risk of a limited career. Educating professionals (e.g. veterinarians, farriers) could have a positive impact – respondents wrote that some professionals they contacted did not have experience with, or know how to treat, myopathies.

To improve, access to a larger population and more varied equine communities would be ideal. The inclusion of a breed question would also be useful for determining myopathy prevalence within breeds.

Undergraduate Oral Presentations

Why the Long Face? - Horses Show Distinct Facial Expressions During Agonistic and Affiliative Interactions

Morrish, C.^{1}, Cameron, L.J.¹, Stones, N.C.¹, Knight, C.¹ and Lewis, K.²*

¹ **University Centre Sparsholt, Hampshire, UK**

² **University of Portsmouth, Department of Psychology**

Keywords: Equine, Behaviour, Conspecifics

Introduction: Horses are social animals that form strong long-lasting bonds within their social groups. Research shows that horses can perform a variety of facial expressions such as nostril dilation and ear movements (forward, back, pinned); the development of the Equine Facial Action Coding System (EquiFACS) by Wathan et al. (2015) presents the opportunity to analyse how a horse's expression varies in different environments and situations. Horses can recognise and react accordingly to different emotions expressed through facial expression in photographs of unknown conspecifics, as evidenced by Wathan et al. (2016). The present study aimed to expand on these findings using genuine interactions between conspecifics during routine turnout, focusing on facial expressions observed during agonistic and affiliative interactions.

Materials & Methods: Data collection commenced on 2nd September 2020 and finished on 19th December 2020 at Sparsholt Equine Centre. Following institutional ethical approval, data were collected using 37 opportunistically selected riding school horses (5-23 years; 24 geldings, 13 mares) of various breeds. Field groupings were same-gender and the number of horses in the field at a time varied week-by-week – one gender was randomly selected for observation each day. Due to the randomised selection of the focal horses during data collection, the number of interactions recorded varies. Data collection periods consisted of multiple 30-minute focal watches of randomly selected horses using a preconstructed ethogram. Duration of data collection varied daily, depending on external factors, such as the weather and availability of observers. A camera (Panasonic HC-VXF1) was focused on the subject's face and an observer would begin recording when horse-horse interactions occurred and finished recording when the subject's face returned to a neutral position for a minimum of five seconds, or when the subject exhibited a new behaviour according to the ethogram. A GoPro Hero 5 was used to film the focal horse and its immediate surroundings during each focal watch to aid analysis. The EquiFACS manual was used to code facial movements, 300 overall, of which 178 were agonistic and 122 were affiliative. A chi-squared goodness-of-fit test was used to determine significant relationships between the facial movements observed between agonistic and affiliative interactions. Any behaviours common to both agonistic and affiliative interactions (e.g. bite, push, withdrawal) were noted.

Wednesday 30th June

Undergraduate Oral Presentations

Results: The facial movements that were found to be most significantly linked with affiliative interactions were blink (N=64, DF=1, $X^2=10.9280$, $P=0.001$) and ears forward (N=39, DF=1, $X^2=23.4851$, $P<0.001$). For agonistic interactions, the most significant facial movements were nostril lift (N=18, DF=1, $X^2=10.5812$, $P=0.001$), ear flattener (N=125, DF=1, $X^2=50.6800$, $P<0.001$), ear rotator (N=152, DF=1, $X^2=18.4111$, $P<0.001$), and nostril dilator (N=50, DF=1, $X^2=11.3004$, $P=0.001$).

Discussion & Conclusions: Blinking was found to be strongly associated with positive interactions, supporting previous research that suggests horses' blink rates decrease while experiencing pain and emotional stress (Merkies et al., 2019). Nostril lift was seen almost exclusively during agonistic interactions. Nostril dilator was also observed most often in agonistic interactions, supporting previous research suggesting that nostril dilation is linked to negative emotion in horses. The results of this study support anecdotal interpretations of ear movements in horses.

References:

Wathan, J., Burrows, A., Waller, B., & McComb, K. (2015). EquiFACS: The Equine Facial Action Coding System. PLOS ONE, 10(8), e0131738. <https://doi.org/10.1371/journal.pone.0131738>

Wathan, J., Proops, L., Grounds, K., & McComb, K. (2016). Horses discriminate between facial expressions of conspecifics. Scientific Reports, 6(1). <https://doi.org/10.1038/srep38322>

Merkies, K., Ready, C., Farkas, L., & Hodder, A. (2019). Eye blink rates and eyelid twitches as a non-invasive measure of stress in the domestic horse. Animals, 9(8), 562.

Wednesday 30th June

Undergraduate Oral Presentations

Female Elite Level Event Riders' Perceptions of Mental Skills Use in Eventing

Tooby, R, Davies, E*

Hartpury University, Hartpury, Gloucestershire, GL19 3BE

Key words: Athlete, Sport Psychology, Equestrian

Introduction: Eventing is a high-risk sport, in which riders face additional pressures such as relying on competitive success to maintain their business, meaning eventing places a significant psychological demand on riders (Lamperd *et al.*, 2016). Mental skills use has been shown to improve performance by helping athletes to cope with and overcome psychological demands in other sports although little is known about how female elite level event riders use mental skills (Macnamara, Button and Collins, 2010). In 2011, 84% of British Eventing members were female (Dashper, 2013) and with the number of riders starting in international events constantly increasing (47% increase between 2008-2019); a significant number of female event riders may benefit from mental skills use. This suggests that research needs to determine if mental skills use could improve the performance of female event riders. This research aimed to explore female elite level event riders' perceptions of mental skills use in eventing.

Methods: This was a qualitative study which used semi-structured interviews focusing on open-ended questions to collect data. The mean interview time was 30 minutes. The interviews were transcribed verbatim and Braun and Clarke's six-step thematic analysis method was used to analyse the data collected, which allowed second order themes to be identified developed into higher order themes. A deductive analysis approach was used due to the extent of research on mental skill use in sport. The five participants were all female elite level event riders who had completed at least one CCI5*-L level event in the last 15 years.

Results: Two higher-order themes were found: mental skills use and elite athlete characteristics, followed by seven second-order themes: imagery, self-talk, controlled breathing, goal setting, mental skill development, mental control and emotional regulation of members of a female elite level event riders support team. The results suggest that all female elite level event riders use mental skills although each rider did not use each mental skill.

Discussion & Conclusions: The results of this study suggest that female elite level event riders perceive mental skills use as highly beneficial to performance in eventing, the study also found that female elite level event riders share certain characteristics. One characteristic found was that female elite level event riders develop mental skill use through a natural learning experience, which previous research suggests is a common characteristic of elite athletes in other sports, suggesting this could be used for talent identification in young female event

Undergraduate Oral Presentations

riders. The results also suggest that making mental skills training more accessible to female event riders at all levels and members of a rider's support team, would be beneficial. Although riders were not asked about their support teams, they discussed their importance, suggesting although this was an unexpected finding, the mental skills of a rider's support team can be very influential on their rider's performance. Future research could examine the mental experience of members of a rider's support team during competition, to assist with the creation of tailored mental skills training programs for members of a rider's support team. Future research could also explore how accessibility of mental skills training for female event riders of all levels could be increased, potentially using online resources, due to the benefits mental skills have on the performance of female elite level event riders.

References:

Dashper, K. L. (2013) 'Beyond the Binary: Gender Integration in British Equestrian Sport'.

Lamperd, W. *et al.* (2016) 'What makes and elite equestrian rider?', *Comparative Exercise Physiology*, 12(3), pp. 105–118. doi: 10.3920/CEP160011.

Macnamara, Á., Button, A. and Collins, D. (2010) *The Role of Psychological Characteristics in Facilitating the Pathway to Elite Performance Part 1: Identifying Mental Skills and Behaviors*, *The Sport Psychologist*.

Undergraduate Oral Presentations

The use of manual therapies to prevent lameness in domestic horses (*Equus caballus*).

*Jenkins, T. & Hancox, K.**

Reaseheath College, England.

Keywords: Physiotherapy, massage, equine, injury.

Introduction: Lameness is a major factor in the cause of horse wastage both from recreational and competitive use. Lameness can be caused regardless of age, breed, sex or discipline; yet often horses with purpose have increased susceptibility (McGreevy et al., 2011). Complementary and alternative veterinary medicines (CAVM) have become increasingly popular amongst the equine community with the aim to reduce injury and lameness risk, or to return horses back to health as effectively and efficiently as possible. Despite this there are few studies evaluating the effectiveness of preventative physiotherapy or massage therapy on lameness rate within equines. Identifying a relationship between frequency of sessions and impact on lameness rate can be used overall to reduce equine wastage and improve welfare. Objectives for the study will include identifying any correlation between individual equine lameness rate and the frequency of equine physiotherapist or massage therapist sessions as well as whether one therapy method is favoured over the other.

Materials & Methods: An online survey was produced with Google forms and published using social media, including Facebook, Instagram and Horse & Hound forum. The frequency of lameness was identified through the questionnaire as well as the frequency of massage therapy or physiotherapy treatments on domestic horses in a range of disciplines at varying levels. A total of 103 responses were received and were interpreted using a Chi-square test of association through SPSS.

Results: Alternative therapies were used by the majority of respondents with 92.2% having used either physiotherapy, massage therapy or both. Physiotherapy was the most common treatment method, followed by a use of both physiotherapy and massage therapy. The results of the Chi Squared Test of Association show that there is no significant association between the frequency of treatment sessions and the rate of lameness ($\chi^2 (20, N = 103) = 24.794, p = .209$). The greatest frequency of treatment sessions was one session every 3 – 6 months (31.1%). Of these horses treated every 3 – 6 months, 37% exhibited lameness once in the past year and 45.5% exhibited lameness within the past 1 – 3 years. The majority of respondents (66%) reported a period of lameness at some point despite varying frequency of sessions.

Discussion & Conclusion: The results highlight areas requiring further investigation but are not conclusive in identifying a clear relationship between equine lameness and frequency of treatment sessions. The rate of lameness within the equine population is significant

Undergraduate Oral Presentations

supporting why there may be a high rate of interest in the use of alternative therapies in order to prevent and treat lameness (Povey-White, 2017; Slater, 2018). However, lameness identification is also subjective which therefore raises questions about reliability of responses when using questionnaire-based studies. Environmental factors and conditions may also influence lameness regardless of physiotherapy or massage therapy sessions.

References:

McGreevy, P., McLean, A., Buckley, P., McConaghy, F. & McLean, C. (2011). How riding may affect welfare: What the equine veterinarian needs to know. *Equine Veterinary Education*, 23(10), 531-539. <https://doi.org/10.1111/j.2042-3292.2010.00217.x>

Povey-White, S. (2017). Is routine physiotherapy really necessary? *Equine Health*, 36, 30-32. DOI: 10.12968/eqhe.2017.36.30

Slater, J. (2018). *National Equine Health Survey*. Oxfordshire, United Kingdom: BlueCross. Retrieved from <https://www.bluecross.org.uk/sites/default/files/downloads/NEHS-results-2018.pdf>

Undergraduate Oral Presentations

An investigation into self-perception of body image in female equestrians in the United Kingdom.

Forino, S; Cameron, L, J., Stones, N; Freeman, M

University Centre Sparsholt

Keywords: Horse riding; Self-Confidence; Physique

Introduction: Body image perception has become widely considered in modern sports and the impact has been found to affect performance, sport participation levels, athlete self-confidence and to impact subjective judging. Female body image (BI) has been investigated in a range of sports yet, in the female dominated sport of equestrianism, where several disciplines are subjectively judged, there is a paucity of BI research. This study aimed to identify self-perceptions of BI in female equestrians, identify rider perceptions of judge and coach BI bias, highlight relationships between female equestrian body image and self-consciousness and explore any effect of breast size.

Material & Methods: A 4-part, 27 question online survey (Google Forms™) was distributed for two months via various equestrian social media platforms and was completed by female equestrians (n=493), based in the United Kingdom, currently participating in horse riding activities. Participants supplied demographic information, self-perceived BI and ideal female equestrian BI (rated on a validated scale from the smallest BI A to the largest J) (Harris et al., 2008), breast size, and self-consciousness details while horse riding. Chi-squared (X^2) and Wilcoxon (W) analyses were utilised to test associations between participant responses.

Results: The second smallest body image on the scale (B) was perceived to be ideal for the female equestrian ($X^2 = 352.751$, $P < 0.001$). There was no significant effect of rider age, own BI, or level of riding commitment on this perception. There was a significant perception that judges favoured riders with a smaller frame ($X^2 = 54.2111$, $P < 0.001$); and a significant association was found between riders who perceived their BI to be larger than ideal feeling self-conscious when riding ($X^2 = 87.514$, $P < 0.001$). Additionally, significantly more people perceived the ideal BI to be smaller than their own BI (Median = -1.5, $W = 7777.00$, $P < 0.001$). There was an association between those categorised as dissatisfied with their BI and feeling self-conscious when riding ($X^2 = 83.649$, $P < 0.001$).

Discussion & Conclusion: Perception of the ideal female equestrian frame is smaller than many riders' own BI perception, and females perceiving themselves as a larger frame negatively impacts rider self-confidence, potentially impacting performance, and participation, therefore, warranting further research. Female riders with a larger frame may

Wednesday 30th June

Undergraduate Oral Presentations

be perceived negatively by judges, or at least feel they are, and further study is indicated to investigate the extent these influences have on the subjective judging of equestrian sport.

References:

Harris, C., Bradlyn, A., Coffman, J., Gunel, E., & Cottrell, L. (2008). BMI-based body size guides for women and men: development and validation of a novel pictorial method to assess weight-related concepts. *International Journal of Obesity*, 32(2), 336-342. <https://doi.org/10.1038/sj.ijo.0803704>

Undergraduate Oral Presentations

It's a sham: An investigation into the level of aversion experienced among horses during clipping using physiological and behavioural measures.

*Duncan, E. & Wild, H.**

University Centre Reaseheath /University of Chester

Keywords: Aversive, behavioural, clipping, physiological.

Introduction: Equine husbandry management techniques include practices which are not likely to inflict pain but may cause aversiveness, activation of the hypothalamic pituitary adrenal axis and acute stress. Clipping is a regular management technique whereby the coat is removed to increase heat loss and decrease thermal load during exercise, as a result changes in physiology and behaviour may occur. Therefore, the aim of this study was to investigate whether the application of sham in comparison to real clipping impacts the physiological and behavioural responses of horses using an infra-red thermography camera, heart rate monitor, behavioural compliance score system and the horse grimace scale.

Materials & Methods: Seven horses (10 to 18 years old, comprising of 3 mares and 4 geldings) were selected based on being kept on working livery at Reaseheath College. A pilot study was completed to confirm the ideal placement of the heart rate monitor and infra-red thermography camera. All horses were tied up in an American barn and given five minutes to acclimatise to the infra-red thermography camera, mobile phone stand and heart rate monitor. Five minutes prior to sham clipping commencing an eye temperature reading and side profile was taken. Sham clipping then began on the near side of the neck continuing for ten minutes, when this ended eye temperature was recorded again, and a second side profile taken. The blades were inserted onto the clippers, and the same procedure repeated. Five minutes after the procedure ceased a third eye temperature and side profile was taken. Heart rate was recorded continuously every one minute throughout the study. Behavioural observations and side profiles for the horse grimace scale were recorded using an iPhone XR and analysed later. Horses were scored between zero to three for behavioural compliance, and each side profile was given a score between zero to two for six facial action units adding to a total out of twelve for each three profiles per horse. Results were analysed in IBM SPSS 27, the Kolmogorov Smirnov test for normality indicated all results were parametric.

Results: The null hypothesis was accepted as all statistical tests were over the critical p-value (>0.05). Heart rate (paired t test = .107, p=.918, df=6) and behavioural compliance score (paired t-test = 1.222, p=.103, df=6) varied between individual horses (Figure 1). Heart rates recorded for horse numbers five and seven indicate a proactive response to clipping while horse numbers one and six were reactive. Eye temperature (F=2.442, p=.115, df=2) increased

Undergraduate Oral Presentations

incrementally throughout study, and horse grimace scale ($F=.666$, $p=.526$, $df =2$) showed increases in fearfulness and anxiety.

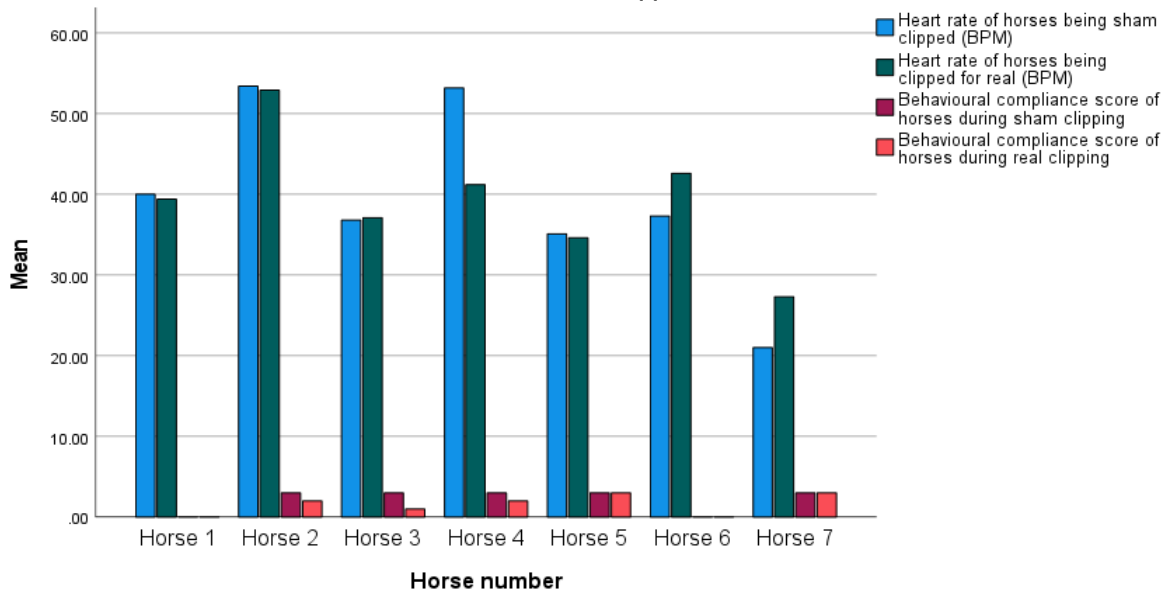


Figure 1. A clustered bar chart to show the heart rate (bpm) and behavioural compliance score of horses being sham and real clipped.

Discussion & Conclusions: Eye temperature increased linearly throughout the study indicating activation of sympathetic section of the autonomic nervous system during acute stress. Whereas heart rate varied on an individual basis, analysis of behavioural compliance score and heart rate indicated horse five and seven were proactive individuals, compared to horse one and six who were reactive individuals thus displaying different coping mechanisms. Evaluation of the horse grimace scale showed increases in fearfulness or anxiety indicating the scale can be used during aversive procedures and not necessarily for measuring pain. This is the first apparent study to investigate the physiological and behavioural reactions of horses being sham clipped compared to real, and to measure the horse grimace scale against fearfulness and anxiety. Although by conducting sham clipping first the horses may have undergone a degree of desensitisation. This study supports previous research for the use of infra-red cameras and heart rate monitors to measure the internal stress response during aversive procedures. Behavioural compliance scoring and horse grimace scales are incredibly useful in supporting physiological measurements but can be subjective so must be interpreted thoroughly for accurate results.

Wednesday 30th June

Undergraduate Oral Presentations

Is there a relationship between body image and anxiety levels in female equestrian students at one Land based college?

*O'Sullivan, N.E., * Stones, N.C., and Cameron, L.J.*

***University Centre Sparsholt, Hampshire, UK**

Keywords: Equine, Mental Health, Perceived Body Image, Sports

Introduction: Both body image and anxiety have been extensively researched independently, in non-equestrian sports, (Michou and Costarelli, 2011). Body image and anxiety have not yet been researched within the same study in equestrian sports. However, anecdotally there are increasing rates of body image issues and anxiety across the general population so this may be mirrored in equestrians. Body image and anxiety link together whereby individuals can feel anxious about the way they look after seeing edited images in magazines or social media. Alternatively, body image can impact anxiety levels through the diagnosis of eating disorders when an individual feels the need to look and feel a specific way about their bodies. The objective of this study was to establish whether there was a relationship between body image and anxiety levels in female equestrian students at University Centre Sparsholt.

Materials & Methods: Due to the sensitive nature of the topic, a three-part 24 question online survey (Google Forms™) was completed by female equestrian Higher Education students studying at one UK land-based college (n=25) through convenience sampling. Body Image scale (Harris et al., 2008) was used so participants could rate their perceived and ideal body image. Likert-scales were used to measure participants anxiety levels in different situations. Data were transferred to Excel and Minitab and were analysed using Chi-Squared Goodness of Fit.

Results: Body Image and Anxiety issues were reported among 68% of participants (n=17); whilst Body Image issues were reported by 88% of participants (n=22) and Anxiety issues were reported by 72% of participants (n=18). Additionally, Not Happy with Own Perceived Body Image was reported by 72% of participants (n=18). Although, 68% (n=17) of participants reported anxiety scores when riding as part of university course as 6 or above on a scale of 1-10. Of that 68%, 20% (n=5) reported anxiety scores when riding as part of university at a 6 on a scale of 1-10, but 16% (n=4) reported anxiety scores as 10 on a scale of 1-10 when riding as part of university. The results indicate significant increase of percentage for participants who have issues with body image and/or anxiety compared to participants who do not have issues with body image and/or anxiety.

Discussion & Conclusion: The results suggest concerns for female equestrian students regarding issues surrounding body image and anxiety. These findings will inform future

Wednesday 30th June

Undergraduate Oral Presentations

discussion with students regarding body image issues and suggest that further investigation is warranted. Investigating the higher education sector would be beneficial to establish whether other students experience similar issues with body image and/or anxiety levels. The implication for the equine sector is the ratio of female to males who are in the industry. As the equestrian sector is predominantly female based, it would be interesting to compare male body image and anxiety issues to establish whether gender impacts body image and/or anxiety levels.

Acknowledgements: The author wishes to thank their university supervisors and specialist support staff for their continuous support and advice throughout the entire research process. As well as the authors family for their continuous love and support.

References

Harris, C. V., Bradlyn, A. S., Coffman, J., Gunel, E., & Cottrell, L. (2008). BMI-based body size guides for women and men: Development and validation of a novel pictorial method to assess weight-related concepts. *International Journal of Obesity*, 32(2), 336–342. <https://doi.org/10.1038/sj.ijo.0803704>

Michou, M. and Costarelli, V. (2011) 'Disordered Eating Attitudes in Relation to Anxiety Levels, Self-esteem and Body Image in Female Basketball Players', *Journal of Exercise Science & Fitness*, 9(2), pp. 109-115.

Wednesday 30th June

Undergraduate Oral Presentations

Comparisons of horse behaviour based on handler intent to exercise

Collins, R.B*, Challacombe, J.L, Pinno, L.C and May, S.J

Duchy College, Stoke Climsland, Cornwall. PL17 8PB

Keywords: Horse, Intent, Behaviour, Handler

Introduction: There is an existing body of research which explores the responses of the domestic horse (*Equus Caballus*) to human-given cues, however consideration for intent affecting behavioural responses of the horse within human-horse interaction, could benefit from further investigation. This study aimed to determine if a difference in behaviours was exhibited by horses with handlers having intent or no intent to exercise with a null hypothesis of no significant difference in types or frequency of behaviours with handler intent to exercise.

Materials & Methods: Specific behaviours of 16 horses, age range five to 20 years, were each observed by one observer with four experienced handlers in a 6-week cross-over design with intent or no intent to exercise on the horse walker. Horses were observed, twice a day maximum, over four conditions of approach to stable, entering stable, headcollar with tying up and leaving stable. An ethogram, constructed for recording frequency of behaviours observed contained behaviours selected from published literature (Draaisma, 2017), chosen for suitability from a distance with ability to discriminate clearly from other behaviours. Data were tested for statistical significance using Minitab®(version19.2) for handler, condition and intent to exercise using a Chi-squared test.

Results: Data were successfully collected from 16 horses. Behaviour frequency of step forward and ears forward combined were statistically significant with both handler (Chi-squared₂=42.399;P<0.001) and condition, with highest frequencies observed with approach to stable (Chi-squared₂=23.490;P=0.005) and no statistical significance with intent to exercise. The frequency of ears forward was found to be statistically significant with handler (Chi-squared₂=33.647; P<0.001). Although median frequency of lick/chew was one for intent and no intent(Fig1) there was statistical significance with condition, with highest frequencies observed for headcollar with tying up and lowest with approach to stable (Chi-squared₂=29.992;P<0.001).

Undergraduate Oral Presentations

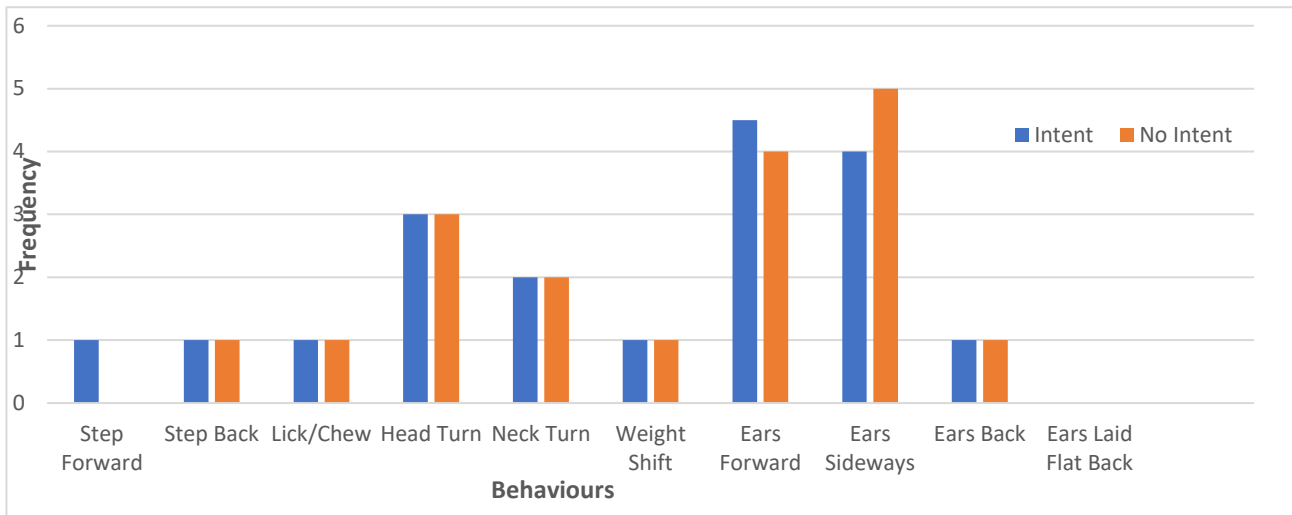


Figure 1: Median frequency for behaviours for the situation of intent and no intent over all four conditions with 16 horses and four handlers.

Discussion and Conclusion: The development of an ethogram enabled specific behaviours to be recorded however, whilst one observer conducted the study for consistency, behaviours observed could be potentially subjective with additional thought processes that evolve through data collection. D’Ingeo *et al.*, (2019) suggests that ears held forward, found to be statistically different with handler one, could indicate a positive emotional state as horses may react to a positive human voice associated with previously positive experiences, the slight difference in median frequency between intent and no intent may offer a neutral state in regard to social referencing between horse and handler (Schrimpf *et al.*, 2020). The statistical significance of frequency of behaviours step forward and ears forward within the condition of approach to stable with handler one may suggest the horse was seeking proximity of the handler. There were no statistically significant differences in the types and frequencies of behaviours exhibited in relation to intent, however there were statistical significances with handler and condition. This highlights the importance of awareness of horse response to initial human presence, and effect of individuals on horse-human interactions, therefore recognising need for further research within the horse-human dyad advancing understanding to enhance horse welfare.

References:

- Draaisma, R., 2017. *Language Signs and Calming Signals of Horses: Recognition and Application*. CRC Press.
- D’Ingeo, S., Quaranta, A., Siniscalchi, M., Stomp, M., Coste, C., Bagnard, C., Hausberger, M. and Cousillas, H., 2019. Horses associate individual human voices with the valence of past interactions: a behavioural and electrophysiological study. *Scientific reports*, 9(1), pp.1-10.
- Schrimpf, A., Single, M.S. and Nawroth, C., 2020. Social Referencing in the Domestic Horse. *Animals*, 10(1), p.164.

Wednesday 30th June

Undergraduate Oral Presentations

Does the start of flat races influence racehorse race performance?

Wells, I. and Williams, J.*

Hartpury University, Hartpury, Gloucestershire, GL19 3BE

Key words: horse racing, performance, starting stalls, multivariate analysis

Introduction: Previous literature and anecdotal evidence suggest that the start of flat races can both positively and negatively affect race performance of racehorses (Hutson and Haskell, 1997; Mukai *et al.*, 2007). However, limited research exists on the explicit effect that waiting at the start and inside starting stalls has on racehorse finishing position. This project aimed to investigate how time spent inside starting stalls, horse behaviour in race preliminaries, the amount horses sweat, jockey behaviour, and loading aids affected racehorse performance.

Method: A cross-sectional design was used to evaluate performance of 546 horses (92% of starters) across eight race days at Chelmsford City racecourse in November and December 2020, using televised racing coverage; 45 additional horses were removed from analysis due to the inability to observe their behaviour. Time horses spent inside starting stalls, loading aids and jockey behaviours were noted, and notational analysis was used to measure how much horses sweat and their behaviour before, during and after loading. Pre-race racehorse behaviour was categorised using an ethogram adapted from conflict behaviour research. Mann Whitney U (MWU) and Kruskal-Wallis analyses with post-hoc MWU tests, conducted in SPSS, identified if differences in behavioural, sweating, jockey behaviour and loading aid variables affected racehorse finishing position. General linear models explored how these variables interacted and binary logistic regression models (win vs. did not win; placed vs. did not place) tested if these variables affected performance.

Results: Horses that spent less than 50 seconds inside starting stalls were more likely to win ($p < 0.05$) and place ($p < 0.01$). Those showing moderate adverse behaviour before loading ($p < 0.01$) and no adverse behaviour inside stalls ($p < 0.05$) were more likely to place, although behaviour during loading had no significant effect on performance. Horses foaming ($p < 0.01$) and those requiring specialist loaders were more likely to win ($p < 0.05$), although other loading aids had no significant effect on performance. The only jockey action that significantly affected performance was pushing bodyweight forwards in the saddle during loading, which increased the chance of placing first to fourth ($p < 0.05$). Binary logistic regression found a horse's chance of winning was reduced by 15% for every increase in drawn order ($p < 0.01$; CI:0.77-0.96) and by 59% when the horse spent over 50 seconds inside stalls ($p < 0.05$; CI:0.19-0.92). A horse's chance of placing decreased by 13% for every increased year of age ($p < 0.05$; CI:0.78-0.97) and by 17% for each additional horse in the field ($p < 0.001$; CI:0.00-0.83).

Wednesday 30th June

Undergraduate Oral Presentations

Showing any adverse behaviour inside stalls reduced a horse's chance of placing by 52% ($p < 0.05$; CI: 0.00-0.48).

Discussion & Conclusions: The results suggest that the start of flat races can affect racehorse performance as suggested anecdotally, however longitudinal research utilising on-site collection is warranted to facilitate more accurate measurement of observed variables. These results highlight the importance of implementing warm-up protocols and gate training to reduce occurrence of adverse behaviours inside stalls to maximise racehorse performance. This study could also support adjustments to the rules of racing regarding the start, such as introducing a maximum number of loading attempts before a horse is withdrawn, to improve racing integrity.

References:

Hutson, G.D. and Haskell, M.J. (1997) 'Pre-race behaviour of horses as a predictor of race finishing order', *Applied Animal Behaviour Science*, 53(4), pp.231-248. doi: 10.1016/S0168-1591(96)01162-8

Mukai, K. *et al.* (2007) Heart rates and blood lactate response in Thoroughbred horses during a race, *Journal of Equine Science*, 18(4), pp.153-160. doi: 10.1294/jes.18.153

Undergraduate Oral Presentations

Saddle-up: An investigation into the occurrence of saddle slip in mounted games ponies

Schofield. R^a and Ainley. N^b

^a Northumberland College, Kirkley Hall, Ponteland, Northumberland, NE20 0AQ;

^b University of Cumbria, The Barn, Rydal Road, Ambleside, Cumbria, LA22 9BB

Keywords: Mounted Games, Saddle Slip, Biomechanics

Introduction: As noted in previous studies, saddle slip has a paucity of quantitative research (Clayton *et al*, 2015; MacKechnie-Guire *et al*, 2018;2020). Mounted Games (MG) involves tight turns and rapid acceleration and deceleration. It can be assumed that there are incidences of saddle slip in MG competition from visual images, and asymmetrical movements throughout the competitions, however no existing research currently corroborates this. The purpose of this study was to quantify the existence of saddle slip in MG ponies during common movements.

Materials & Methods: Ponies used in MG competition were tested during control, vault, and scoop movements. Data was collected using motion capture and analysed through Quintic Biomechanics, using automatic marker tracking to investigate the degree of slip left/right. A sample of three MG ponies ranging in breed, gender and age were used, and 2 riders rode in their own fitted saddles. Five half sphere skin markers were placed on each pony using double sided tape. Marker locations were at the midpoint of the cantle, and approximately the L6, S2, S4, and C2 vertebrae.

After a self-directed 10-minute warm up, three repeats of each movement were collected visually, the control, the vault, and the scoop. Outcome parameters for each movement were (1) saddle slip, and (2) degree of saddle slip left or right. The significance level was set as $p < 0.05$ for outcome parameters. Data met parametric assumptions; a One-Way ANOVA test was performed followed by post hoc analysis.

Results: During vault movements, the mean degree of saddle slip was 16.08°. A significant difference between vault and control was seen ($p = 0.03$). Degrees of slip to the right ranged between 7.67° and 35.41°. The increase in the degree of slip does not appear to be consistent between horses (A= -15.87%, B= 200%, C= 316.33%). During scoop movements, the mean degree of saddle slip to the right was 21.18°. A significant difference between scoop and control movements was seen ($p < 0.05$). Degrees of slip to the right ranged between 13.61° and 28.12°. The increase in the degree of slip appears to be mostly consistent between horses (A= 147.92%, B= 384.90%, C= 151.65%), with Horse B appearing as an outlier. Statistically significant differences between control and movement values were determined by Tukey and one-way ANOVA tests ($F_{2,24} = 11.44, p < 0.05$).

Undergraduate Oral Presentations

Discussion & Conclusion: The study quantified that saddle slip is significant ($p < 0.05$) in both vault and scoop movements. The degree of slip is not consistent between ponies in the vault movement, it varied significantly between all three combinations, however the increase in the degree of slip was more consistent between the sample during the scoop movement. Visual evidence was found that suggests the highest degree of saddle slip occurs during the stance phase of the inside leg on the side of lean. The study provided a comprehensive, successful pilot methodology, providing significant parametric data with areas of consistency that can be utilised in research going forward. Due to COVID-19 restrictions, there was a small sample size which may have affected reporting of results. Natural progressions exist for the study to consider further aspects of saddle slip, including larger sample sizes, biomechanics and use of further kinematic and kinetic data collection.

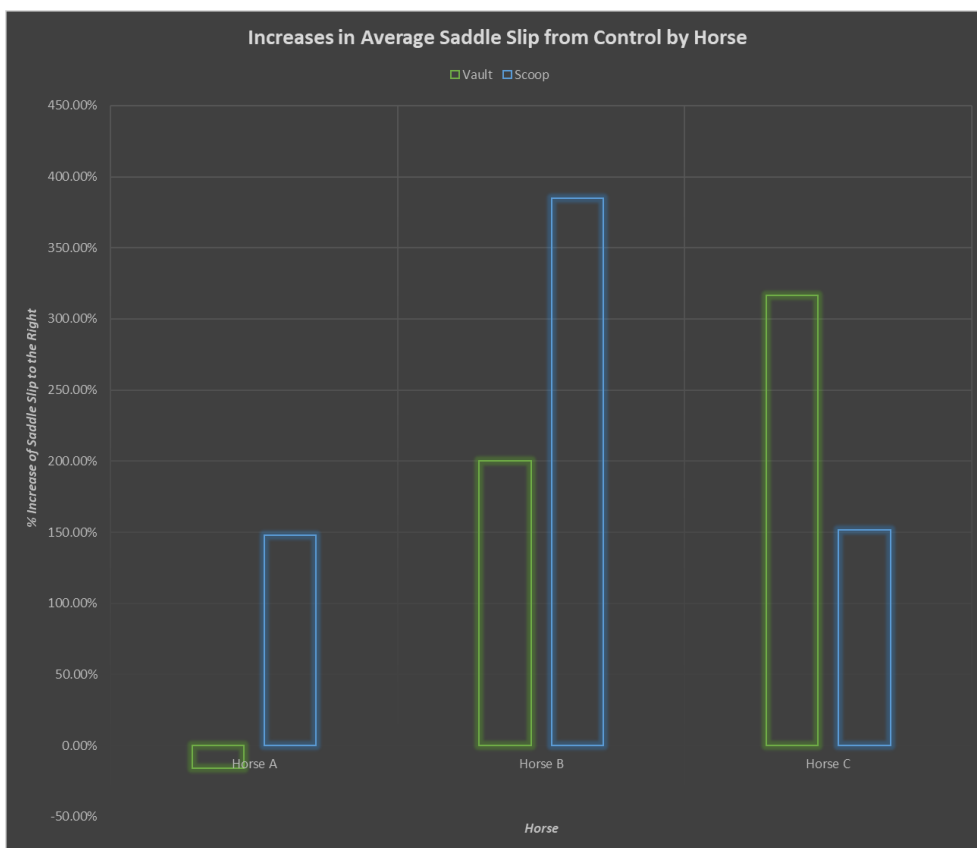


Figure 1: Graph showing mean values of saddle slip % increase by pony

Wednesday 30th June
Undergraduate Oral Presentations

REFERENCES:

Clayton, H., Dyson, S., Harris, P. and Bondi, A., (2015). Horses, saddles and riders: Applying the science. *Equine Veterinary Education*, 27(9), pp.447-452.

MacKechnie-Guire, R., MacKechnie-Guire, E., Fisher, M., Mathie, H., Bush, R., Pfau,

T. and Weller, R., (2018). Relationship between Saddle and Rider Kinematics, Horse Locomotion, and Thoracolumbar Pressures in Sound Horses. *Journal of Equine Veterinary Science*, 69, pp.43-52.

MacKechnie-Guire, R., (2020). *Evidence Based Saddle Fitting – Online Course*.

Undergraduate Poster Presentations

Horse owners' perceptions of the aetiology and management of stereotypies

Watson, L. and Sparrow, S.*

Moulton College

Keywords: equine behaviour; stereotypic behaviour; welfare

Introduction: Stereotypic behaviour in horses has obtained substantial attention in research although horse owners' views on these behaviours have received little investigation. Stereotypic behaviour may impact the health of the horse and horse owners' views may result in inappropriate management thus impacting welfare. In previous research, McGreevy et al. (1995) found that 72% of participants believed that stereotypic behaviour was copied; advances by Albright et al. (2009) identified a decrease in the prevalence of this opinion with 48.8% of participants holding this belief. Albright et al. (2009) results indicated that they also believed environmental factors were a predominant cause (54.5%). In similar research, Litva et al. (2010) found that boredom, stress and habit were viewed as causes of crib-biting. Understanding horse owners' views will help identify areas in which education is required to promote best welfare practices for horses. In view of the change in opinions over the years, this study aimed to investigate horse owners' current knowledge and perceptions of equine stereotypies and if these views have changed.

Materials & Methods: Horse owners' perceptions were gathered through the use of an online questionnaire that was shared on Facebook groups, such as 'Northants Riders Club' and 'Northamptonshire and Surrounding Areas Horse Owners & Riders', with the aim of attracting mostly leisure horse owners. The results were analysed primarily using descriptive statistics in addition to Chi-squared tests in the statistical software R.

Results: A total of 130 responses were analysed and 65% of participants understood the definition of stereotypies. Stress (74%), boredom (61%) and confinement (58%) were seen as the most common causes of stereotypic behaviour. A quarter of respondents believed that copying other horses could cause stereotypies; those that did not care for horses with stereotypies were more likely to believe this ($\chi^2=15.343$, $df=1$, $p<0.001$). Management methods used by horse owners to prevent stereotypies included covering surfaces in an unpleasant taste (83%), cribbing collars (50%) and weaving grills (50%). In a separate question where all respondents were asked about methods they would consider using, increased turnout was the most popular with 87% and 90% for oral and locomotor stereotypies respectively. Results from this question also found physical prevention methods were less likely to be considered with 19% suggesting a cribbing collar.

Undergraduate Poster Presentations

Discussions & Conclusions: Stereotypic behaviour may be an area where horse owners would benefit from more education. Although 35% of participants did not understand the definition of stereotypic behaviour, participants did identify boredom, stress and confinement in the stable as factors influencing the aetiology of stereotypies, which is concurrent with the research of Albright et al. (2009) and Litva et al. (2010). The opinion that stereotypies are copied was less common than previous research and was more likely to be held by those that did not care for stereotypic horses. Physical prevention methods were prevalent with participants that had previously attempted to manage stereotypic behaviour although some research has indicated this may increase stress levels. However, when all respondents were asked what methods they would consider, increased turnout and enrichment were common choices. Further research to obtain more information about what influences horse owners' views and decisions around managing stereotypies, particularly physical prevention methods, would be beneficial. This study has highlighted a need for educating horse owners about stereotypies to help improve the welfare of horses.

References:

Albright, J. D., Mohammed, H. O., Heleski, C. R., Wickens, C. L. and Houpt, K. A. (2009) Crib-biting in US horses: Breed predispositions and owner perceptions of aetiology. *Equine Veterinary Journal*. 41(5), pp.455-458.

Litva, A., Robinson, C. S. and Archer, D. C. (2010) Exploring lay perceptions of the causes of crib-biting/windsucking behaviour in horses. *Equine Veterinary Journal*. 42(4), pp.288-293.

McGreevy, P. D., French, N. P. and Nicol, C. J. (1995) The prevalence of abnormal behaviours in dressage, eventing and endurance horses in relation to stabling. *The Veterinary Record*. 137(2), pp.36-37.

Undergraduate Poster Presentations

The impact of lockdown one during Covid-19 on the exercise and management of horses in Great Britain

Cornick, O. F. and Lesniak, K.*

Hartpury University, Hartpury, Gloucestershire, GL19 3BE, UK

Key words: Covid-19, Lockdown, Equine, Injury

Introduction: The global outbreak of Covid-19 resulted in the first full national lockdown, for all within the UK from March 2020 until its initial easing in May 2020 (IGF, 2021). Consequently, the management and exercise of horses changed due to significant changes in owner lifestyle, including having to work from home, unable to access yards or trainers, and cancelled competitions. Additionally, horse riders were advised by governing bodies such as the British Horse Society to stop hacking to reduce strain on the NHS. This study aimed to assess the implications of lockdown one on the exercise and management routines of equines and to identify changes that may contribute to increased likelihood of injury.

Material & Methods: An online questionnaire was conducted via Microsoft Forms using a mixed method of closed and open questions. The questionnaire, launched on January 12th and closed on February 8th 2021, was circulated via social media, received 187 completed surveys for analysis. Median respondent age was 46-50 ± 5. The East of England had the majority of respondents, followed by the Southwest and South East. Differences in frequency data were analysed using Friedman's test with post hoc analysis using SPSS. Thematic analysis was used for the one qualitative open question. Similar emergent themes were identified and grouped together in relevant categories.

Results: Whilst there was no significant difference for duration spent exercising horses pre- and during lockdown for lunging hours ($P = 0.17$) or pole work hours ($P = 0.06$), statistically significant differences were found for a reduction in hacking ($P = 0.00$), and schooling hours ($P = 0.00$). Physiotherapists were most likely to cancel, while dentists and saddlers were more likely to delay appointments ($P = 0.00$). Statistically significant changes were not observed for veterinarian or farrier appointments. Key themes that emerged from thematic analysis included: childcare affecting exercise management, confusion over interpretation of advice given by governing bodies, concerns over in-hand work during lockdown, and lack of Covid-19 safety measures at yards.

Discussion & Conclusions:

Lockdown one therefore caused significant changes to exercise, with hours spent schooling and hacking significantly reduced. Impacting factors included cancelled competitions, lack of arena access and reduced motivation to train. Owners reported fearing injury and possible hospital admission which would increase exposure to Covid-19. Childcare significantly

Undergraduate Poster Presentations

impacted the time available for owners to spend exercising their horse. Alterations in practitioner visits were likely due to the frequency of those specific interventions. Biannual saddle checks and annual dental checks were more likely to be postponed than the farrier, where elongating the advised 6- to 8-week interval can have a greater impact (Lesniak *et al.*, 2017). These combined changes may contribute to increased injury risk on return to normal workload post lockdown. Reduced exposure to varied terrain during lockdown has potentially reversed previous physiological adaptations of the musculoskeletal system. Implementation of progressive overload and careful reintroduction to reduce injury risk is needed, especially considering the additional impact of further lockdown periods. Further research to investigate exercise and management changes for the following lockdowns would be valuable to identify potential risks to the horse.

References

Institute for Government (2021) Timeline of UK coronavirus lockdowns, March 2020 to March 2021. <https://www.instituteforgovernment.org.uk/sites/default/files/timeline-lockdown-web.pdf>

Lesniak, K., Williams, J, Kuznik, K. and Douglas, P. (2017) 'Does a 4-6 Week Shoeing Interval Promote Optimal Foot Balance in the Working Equine?', *Animals*, 7, p. 29. doi: 10.3390/ani7040029.

Undergraduate Poster Presentations

The impact of single lateral heel studs on the stride kinematics of polo horses at canter

Armstrong-Smith, A. *, Cameron, L.J. and Stones, N.C.

University Centre Sparsholt, Hampshire, U.K.

Keywords: Biomechanics, Equestrian Performance, Stride Length, Equine

Introduction: Horses have evolved with natural athleticism that has been utilised by humans for sporting activities (Hinchcliff & Geor, 2008). This has resulted in research within the equine industry focusing on performance, specifically exploring the effect of additional equipment to aid good performance (Barrey, 2013). Many aids have been developed to achieve improved performance, such as increasing stride length and traction. It is suggested that increasing stride length is considered to improve equine performance, resulting in possible factors affecting stride parameters to be studied (Zeng *et al.*, 2019). Metal shoe studs are often used for horses competing in sports that require additional traction, but the impact of the studs on how the horse moves has not been widely researched. The aim of this study was to investigate the influence of wearing single heel studs on the hind digits, in comparison to not wearing studs, on stride length.

Materials & Methods: Six polo horses were observed under two conditions: with studs and without studs. Each horse was marked with fluorescent markers to provide measurements of stride parameters and ridden in a straight line (10m) at canter on a grass surface; running for three trials for both conditions to provide an average. Horses were recorded from the right side and a single stride was selected from each pass for analysis of: stride length, knee angle range, hock angle range and front and hind limb acceleration and deceleration using Quintic V29 Software. A mean for each measure for each horse in both conditions was calculated and data were then analysed using a repeated measures ANOVA.

Results: No significant differences were found for in stride length, knee angle range, hock angle range, and forelimb and hindlimb acceleration and deceleration between the two conditions, with studs and without studs. Table 1 shows a slight increase in stride length, knee angle range and hock angle range when studs were used, but forelimb and hindlimb acceleration and deceleration slightly decreased.

Table 1 Mean data for stride parameters comparing horses with studs and without studs.

	Stride Length (m)	Knee Angle Range (degrees)	Hock Angle Range (degrees)	Forelimb Acceleration (m/s ²)	Forelimb Deceleration (m/s ²)	Hindlimb Acceleration (m/s ²)	Hindlimb Deceleration (m/s ²)
Studs	3.26	74.79	37.36	7.67	-9.44	6.02	-7.23
No Studs	3.21	73.30	36.90	8.79	-9.00	8.21	-8.37

Undergraduate Poster Presentations

Discussion & Conclusions: The results suggest that studs do not have a significant influence on stride length in a straight line in canter on a grass surface. On this basis, it may be suggested that horses can continue to wear studs as required. Further research is required into the impact of stud use in horses being worked on a circle and those completing tight turns, as is required during polo. Also, future research may want to focus on determining muscular movement and kinetics in relation to stud use in horses, with the recommendation of focusing on those within disciplines other than polo.

Acknowledgments: Special thanks to the staff at Druids Lodge Polo Club for providing access to their facilities, horses and grooms required for data collection.

References:

Barrey, E., 2013. Biomechanics of locomotion in the athletic horse. *Equine Sports Medicine and Surgery-Basic and Clinical Sciences of the Equine Athlete*, pp.189-211.

Hinchcliff, K. and Geor, R., 2008. The horse as an athlete: a physiological overview. *Equine exercise physiology: the science of exercise in the athletic horse*, 454, p.454.

Zeng, Y., Meng, J., Wang, J., Kong, Q., Li, L., Ge, S., Ren, X., Yao, X. and Liu, W., 2019. Correlation Analysis Between Stride Characteristics and Racing Ability of 2-year-old Yili Horses in Track Conditions. *Journal of equine veterinary science*, 75, pp.19-24.

Undergraduate Poster Presentations

Evaluation of the ability of horses to be trained using operant conditioning to discriminate a non-conspecific odour.

Laurence, L.* & Verwijs, R.

Writtle University College

Key Words: Horse, Olfaction, Senses, Positive reinforcement

Introduction: A review by Rørvang *et al.* (2020) concluded that although olfaction is an important means of equine conspecific communication, knowledge of equine olfaction is currently lacking. Studies have shown that dogs (*Canis familiaris*) and giant African pouched rats (*Cricetomys gambianus*) can be trained to discriminate a range of non-conspecific odours (NCO's) (Polling *et al.*, 2010; Willis *et al.*, 2011). However, the training protocols are often not disclosed, and the results inconsistently reported in such studies. This study aimed to evaluate whether horses can be trained using positive reinforcement (PR), to discriminate a NCO. The objectives were to measure the frequency of indications of the NCO and the duration to make an indication.

Materials & Methods: Horses ($n = 4$) were trained following the same PR training protocol to indicate the NCO. An indication consisted of the horse using its nose to touch the bucket containing the NCO before touching a target affixed ~one metre above the bucket. The horses underwent three training sessions of ~10 to 20 minutes each per day over five consecutive days. Although no horse reached the 75% success rate in four consecutive trials inclusion criteria, the experiment phase was conducted to enable preliminary data to be obtained. During the experiment phase each horse was presented with a two-choice selection with one bucket that contained the NCO and the other which was empty (control) or which contained a sample of their own urine (OU), own faeces (OF), unfamiliar conspecific's urine (UCU) or unfamiliar conspecific's faeces (UCF), three consecutive times. The experimenter was blind to the randomised spatial position of the NCO. The frequency of correct, incorrect or no indications were recorded. Post trials, the duration to make indications were measured from the video recording. The data were analysed using IBM SPSS Statistics (version 27).

Results: The horses indicated correctly in 61.7% ($n=37$), incorrectly in 31.7% ($n=19$), and no indication in 6.7% ($n=4$) of trials ($n=60$). The NCO was correctly indicated in 80% of trials when presented next to the horse's OU (figure 1). A Pearson Chi-Square test found no statistically significant association between indication and substance types $\chi^2(8, N=60) = 11.554, p = .172$. Duration to make indications were not normally distributed as assessed by a Shapiro-Wilk test ($p < 0.05$). A Kruskal-Wallis H test found a statistically significant difference between duration to make indications and indication types, ($\chi^2(2) = 11.764, p = 0.003$) and post hoc analysis of pairwise comparison with a Bonferroni correction revealed statistically significant differences between with correct indications (median= 4 seconds) and no indications (median=120

Undergraduate Poster Presentations

seconds) ($p=.002$) and incorrect indications (median=6 seconds) and no indications (median=120 seconds) ($p=0.012$).

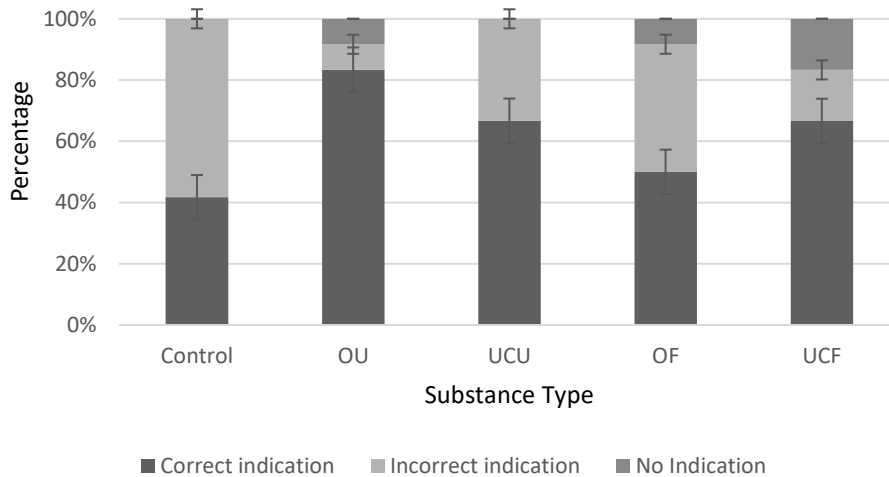


Figure 1: Percentage of mean frequency of indication types by substance types (Source: Author).

Discussions & Conclusions: The NCO was correctly indicated more often than by chance suggesting the horses learned through the PR training method to discriminate a NCO. Designing a robust study investigating equine olfaction in an applied setting is challenging. However, the training protocol can be a benchmark for future studies investigating equine olfaction.

References:

Poling, A., Weetjens, B.J., Cox, C., Mgone, G., Jubitana, M., Kazwala, R., Mfinanga, G.S. and Huis, D. (2010). Using giant African pouched rats to detect tuberculosis in human sputum samples: 2009 findings. *The American journal of tropical medicine and hygiene*. **83** (6), pp.1308-1310.

Rørvang, M. V., Nielsen, B. L. and McLean, A. N. (2020). Sensory Abilities of Horses and Their Importance for Equitation Science. *Frontiers in Veterinary Science*. **7** (633), pp.1-17.

Willis, C. M., Britton, L. E., Harris, R., Wallace, J. and Guest, C. M. (2011). Volatile organic compounds as biomarkers of bladder cancer: Sensitivity and specificity using trained sniffer dogs. *Cancer Biomarkers*. **8** (3), pp.145–153.

Undergraduate Poster Presentations

The opinions of equine rare breed breeders on the use of assisted reproductive technologies (ARTs) and breed societies' support.

*Hunter, M. V., *Smith, L. *Elliott, J.*

College of Agriculture, Food and Rural Enterprise (CAFRE).

Keywords: Assisted Reproductive Technologies, Conservation.

Introduction: With worldwide populations of species declining, it has become more important than ever to encourage the conservation of native breeds (Worldwide Fund for Nature, 2021). There has been a recent upsurge in the need to conserve native breeds in the UK and Ireland to prevent extinction (Morris, 2021). The use of new technology in the form of ARTs can help increase annual foal production. The support of breed societies in the acceptance of the use of ARTs is essential to encourage breeding by allowing a wider choice of methods to breeders. The objectives of this study were to: identify the past, current, and future use of ART by rare breed breeders; to determine the opinions of rare breed breeders on the advantages and disadvantages of ART; and to investigate the influencing factors on the opinions of ART.

Materials & Methods: A survey of 43 questions was constructed to question rare breed breeders which achieved 113 responses with a response rate of 95.5%. The majority of the results were obtained through descriptive analysis using Microsoft Excel. The exception was a Chi-Squared Test of Association using Minitab for statistical analysis of age as an influencing factor.

Results: Breeders had used natural covering the most in the past (51.3%) and were planning to use natural covering most in the coming season (42.2%). Breeders were most likely to consider using sexed semen in the future (53.8%). Cloning was the method that breeders would not consider using (83.0%). The most commonly selected advantage of ARTs across questions was the ability to ship, freeze and store semen using semen collection (32.8%), and epididymal semen harvesting (36.5%). A theme across the disadvantages of ART was cost which was selected most for AI (34.2%), ET (36.2%), OPU (29.6%), epididymal semen harvesting (31.9%), and ICSI (40.0%). Respondents' age (n=110) was compared against 15 categories under four questions including involvement in the industry, type of horse owned, foals produced in the previous year, and the amount of money they are willing to spend on ART. Each test had a P value > 0.05 so these results are statistically not significant but remain important to the study.

Discussion & Conclusions: Hobby breeding was the most common involvement respondents had with rare breeds (59.5%). This suggests that there would be limited funding available to the breeders as breeding is not their profession, hence the suggested need for financial assistance from breed societies (21.1%). Therefore, this information will benefit breed

Wednesday 30th June

Undergraduate Poster Presentations

societies. It allows societies to see areas for improvement and the methods their members would be willing to use so they can educate society members on the available techniques. By providing information and funding breeders could be encouraged to use ARTs which will lead to increases in populations. Using ART to create new breeding animals will add options for breeding matches in the future which will benefit the genetic diversity of the breed by increasing the likelihood of more horses being able to breed and by increasing the geographical spread of bloodlines.

References

Morris, T. (2021) *Original Populations in Native Livestock*. Warwickshire: Rare Breeds Survival Trust. [Online]. Available at: <https://www.rbst.org.uk/Blog/original-populations-in-native-livestock1>

Worldwide Fund for Nature (2021) *Living Planet Report 2020*. Switzerland: World Wide Fund for Nature. [Online]. Available at: [Living Planet Report 2020 | Official Site | WWF \(panda.org\)](https://www.panda.org/our-work/living-planet-report-2020/)

Undergraduate Poster Presentations

The Effect of a Flair[®] Nasal Strip on Recovery Rate of Horses After Swimming

**Redgrove, R.¹ & Paddison, J.²*

¹Hadlow College; ²Hartpury University, Hartpury, Gloucestershire, GL19 3BE

Key words: Nasal Strips, Swimming, Recovery Rate

Introduction: Nasal Strips have often been used in elite equestrian sport to aid with the ease and recovery from intense exercise, due to the belief that the pulling taught of nasal soft tissue, optimises oxygen uptake, enabling the horse to process oxygen more efficiently during exercise and therefore recover quicker. Although extensive research has been carried out on nasal strips as an aid to reduce Exercise Induced Pulmonary Haemorrhage (EIPH), their efficacy for use during and recovery from swimming has yet to be determined. Swimming is an exercise that is highly utilised in the racing industry, and is becoming increasingly popular as a fittening tool for elite sport horses (Steel *et al.*, 2019). This study aimed to test the efficacy of Flair[®] Nasal Strips on the recovery rate of horses completing swimming exercise. The objective was to measure recovery rate as an indicator of fitness through heart rate and respiratory rate.

Material & Methods: A sample of mixed breeds (n=7) of horses were recruited from the Greenwich Equestrian Centre. Mean age \pm SD= 13 \pm 2.9 years; mean height \pm SD= 16hh \pm 0.55. Heart rate and respiratory rate were taken once in the stable to establish a baseline value, once during each lap of the pool (three). Recovery rates were taken from two minutes post exercise, and were taken every two minutes until variables reached \pm 5 of the baseline value. Heart rate was taken by a Polar H10 heart rate belt, whereas respiratory rate was taken by observation of breaths at the flank. A crossover study design was used with treatment and control to increase reliability of results. Data was exported to Microsoft Excel. A Shapiro-wilk test was used to determine data as normal. Multiple regression analysis used to identify a relationship between a difference recovery rate. A Fisher r-to-z transformation was performed to test the difference between the two Pearson correlation coefficients for each dependent variable.

Results: There was a strong negative correlation between HR recovery rate and time for horses wearing Flair[®] nasal strips ($r(5)=-0.97, p<0.05$) and those without Flair[®] ($r(5)=-0.98, p<0.05$). There was no significant difference between r values for HR of horses in each condition ($z=0.29, P>0.05$).

Similarly strong negative correlation was observed in respiratory rate recovery with Flair[®] ($r(5)=-0.89, p<0.05$) and without Flair[®] ($r(5)=-0.87, p<0.05$). There was no significant difference between r values for respiratory rate of horses in each condition ($z=-0.13, P<0.05$).

Undergraduate Poster Presentations

Discussion & Conclusions: In conclusion, this study indicated a lack of significant difference in recovery rate parameters between horses swimming wearing nasal strips and those without. This supports the original aims of the study, testing the efficacy of Flair® nasal strips during recovery. Equine respiratory patterns are altered during swimming and a study by Jones *et al.* (2019) found that horses incur periods of apnoea during swimming exercise, thus limiting the impact of Flair® strips during swimming itself. Research suggests the use of nasal strips may have a positive effect on reducing recovery time by reducing the incidence of Exercise Induced Pulmonary Haemorrhage (EIPH), known to increase recovery time (Kindig *et al.*, 2001). However, due to no horses in the present study suffering with EIPH, the results of the Flair® strips in aiding recovery is not supported by previous research at this stage and therefore may be ambiguous. However, potential methodological limitations in the present study, such as measurements being taken at two minute intervals during recovery may have impacted the results of Flair® strips during recovery from this exercise. Research showed a positive result when measuring recovery continuously until 5 minutes post exercise (Bitschnau *et al.*, 2010), therefore this may be suggested for practical implementation in future work. This research, therefore, has yet to be fully established and forms a basis for further study. The efficiency of nasal strips in exercising horses is important to determine, due to their potential to improve recovery, potentially providing an impact on welfare in this way.

References:

Bitschnau, C., Wiestner, T., Trachsel, D., Auer, J. and Weishaupt, M., 2010. Performance parameters and post exercise heart rate recovery in Warmblood sports horses of different performance levels. *Equine Veterinary Journal*, 42, pp.17-22.

Kindig, C., McDonough, P., Fenton, G., Poole, D. and Erickson, H., 2001. Efficacy of nasal strip and furosemide in mitigating EIPH in Thoroughbred horses. *Journal of Applied Physiology*, 91(3), pp.1396-1400.

Steel, C., Bond, B. and Morrice-West, A., 2019. Survey of trainers on the use of swimming exercise for Standardbred racehorses in Australia. *Australian Veterinary Journal*, 97(3), pp.61-67.

Jones, S., Franklin, S., Martin, C. and Steel, C., 2019. Complete upper airway collapse and apnoea during tethered swimming in horses. *Equine Veterinary Journal*, 52(3), pp.352-358.

Undergraduate Poster Presentations

The Impact of Surgery and Steroid Injections on Impinging Dorsal Spinous Processes (IDSP) in Equines

Cheshire, A. & Meredith, J.*

Abingdon and Witney College in Partnership with Oxford Brookes University

Introduction: The purpose of this study was to investigate the impact of surgical techniques and corticosteroid administration on impinging dorsal spinous processes (IDSP), particularly the longevity of comfort, and the experience for owners. This is an important area of research due to the regular occurrences of kissing spine throughout the international equine population. It was hypothesized that surgery would be the preferred intervention technique for the treatment of IDSP.

Material & Methods: An online voluntary questionnaire was distributed on Facebook equine groups during March 2021. Key areas included owner experience of the rehabilitation process, the intensity of exercise the horses returned to, and the efficacy of each type of intervention. All athletic abilities, ages, breeds and sex of horses were able to participate. The survey had eighteen questions, and collected inferential, retrospective data. The data were analysed using the Chi square test of association and frequency analysis.

Results: A total of 46 respondents completed the survey. No significant association was found between treatment type and workload ($P=0.34$); 70.5% ($n=31$) of respondents stated that an increased or same workload was achieved after completing rehabilitation. No relationship was found between treatment type and relapse in musculoskeletal pain and tension ($P=0.49$), however, 71.1% ($n=32$) reported that their horses suffered intermittent or regular musculoskeletal and tension. No association was found between treatment type and likelihood of recommending to others ($P=0.31$), however, regardless of treatment, the majority of respondents were very likely to recommend (71.1%; $n=33$) or possibly recommend (28.3%; $n=13$) having treatment for IDSP. No respondents stated that they would not recommend having a form of treatment. Occurrence in sex was a key finding in this study, with 73.9% ($n=34$) of cases being found in male horses. Further studies could be completed to identify if sex is a predisposition for IDSP, or if it is related to the increased number of geldings owned generally.

Rehabilitation was found to be moderately challenging or difficult (76.1%; $n=35$), with 63% ($n=29$) of owners needing assistance. Investigation is warranted to determine the considerations needed when prescribing rehabilitation plans to reflect owner confidence, ability, and commitment. It was largely considered that physical therapy had a positive response in the management of IDSP, with 91.3% ($n=42$) having treatments twice annually or more often. When considering clinical signs of IDSP, bucking was the most commonly noted

Wednesday 30th June

Undergraduate Poster Presentations

symptom. Multiple symptoms were presented as well as the presence of pre-existing conditions, therefore specific traits were unable to be determined.

Discussion & Conclusions: The results show that surgery was not identified as the preferred method of treatment for IDSP in this group. Physiotherapeutic modalities have been gaining traction over the past ten years, and their prevalence as part of IDSP management shows their importance to owners to promote equine welfare and comfort. Further knowledge is required on the factors that influence the diagnosis, treatment, and rehabilitation as well as the contributions to predispositions and long-term management of IDSP. Overall, this study raises some important considerations that could form material for future clinical investigations to fully understand how owners cope with IDSP rehabilitation and the impact on affected horses.

Undergraduate Poster Presentations

A preliminary study on the influence of sleep disruption on discriminative learning in stabled horses

Copper, R. & Greening, L.*

Hartpury University, Hartpury, Gloucestershire, GL19 3BE

Key Words: equine; cognition; visual discrimination; sleep

Introduction: Previous research into equine sleeping behaviours and its effects on performance have indicated that sleep may have an impact on cognitive abilities (Colley *et al.*, 2015; Greening *et al.*, 2021). The authors suggested that an alternative cognitive paradigm may yield different results. This preliminary study aimed to investigate whether short-term disruption of equine sleep influenced performance in a visual discrimination memory task.

Materials and Methods: Ten horses were randomly assigned to two groups (n=5) within a five-day crossover repeated measures design experiment. The groups were subjected to both controlled (light off overnight) and treatment (lights on overnight) conditions for three nights. Horses were trained to discriminate between symbols and then memory of the task was tested the following day in both control and treatment conditions. Group A were exposed to controlled conditions prior to treatment conditions, while Group B were trained and tested in treatment conditions followed by controlled conditions (Table 1). This allowed for observation of whether sleep disruption affects learning when conditions are returned to normal.

Table 2. Lighting Conditions and Learning Schedule

Day	Lights	Task Schedule
30/11	Control	–
01/12	Control	Train (Group A)
02/12	Control	Test (Group A)
03/12	Treatment	–
04/12	Treatment	Train (Group A & B)
05/12	Treatment	Test (Group A & B)
06/12	Control	–
07/12	Control	Train (Group B)
08/12	Control	Test (Group B)

Differences between the total number of trials and latency to reach learning criterion in training under each condition along with the total number of correct trials and the latency to complete ten trials during testing under each condition were analysed via SPSS Statistical software using a paired samples t-test. Differences between the measures for first verses

Undergraduate Poster Presentations

second repeats of training and testing were analysed using paired samples t-tests with significance set at $p \leq 0.05$.

Results: All horses met the learning criterion for both visual discrimination tasks under control and treatment conditions. Although trends were apparent, no significant difference were found for all variables when comparing learning under control and treatment conditions. When furthering analysis to first performance of a discrimination task versus the second performance regardless of condition, a significant difference ($t(9) = 2.25, p \leq 0.05$) was apparent in number of correct trials out of ten between the first attempt (5.7 ± 2.16) and second attempt (7 ± 1.41), indicative of learning.

Discussion & Conclusion: Although trends in results suggest some interference, the influence of leaving the lights on overnight to induce sleep disruption did not affect cognitive function during a discriminative learning task in agreement with previous research (Colley *et al.*, 2015; Greening *et al.*, 2021). Future research should utilise automated training systems to provide standardisation and remove trainer errors as well as the use of a larger sample size. Individual variation affected averages indicative of cognitive differences at this level suggesting that adequate sleep is a consideration for equine performance and welfare.

References

Colley, S., Murphy, D. and Greening, L., 2015. A preliminary study into whether duration of nocturnal sleep behaviours are associated with competition performance. In 11th International Society of Equitation Science conference 2015: Ethical Equitation for All Equestrian Disciplines – Breaking Barriers and Building Bridges. Vancouver, Canada.

Greening, L., Downing, J., Amiouny, D., Lekang, L. and McBride, S., 2021. The effect of altering routine husbandry factors on sleep duration and memory consolidation in the horse. *Applied Animal Behaviour Science*, 236, p. 105229. doi: 10.1016/j.applanim.2021.105229.

Undergraduate Poster Presentations

An Investigation into the Physiological Impacts of Traditional Management on the Domestic Horse, with Emphasis on Equine Gastric Ulcers.

*Brunt, C. Loveday-Lovell, S.**

University Centre Reaseheath, University of Chester

Keywords: *Equine Gastric Ulcer Syndrome, Equine Management, Domesticated Horses.*

Introduction: The way in which domesticated horses have been managed has remained largely unchanged since horses first became used for both work and pleasure, despite evidence to suggest that traditional management techniques such as stabling and meal feeding may be detrimental to the horse. The hypothesis of this study was that there would be a significant association between traditional management techniques and the prevalence of Equine Gastric Ulcers.

Materials & Methods: Using an online questionnaire distributed on relevant Facebook forums such as Horses with Ulcers UK, horse owners were asked about the way in which they manage their horses and if their horses had Equine Gastric Ulcer Syndrome. Owners were asked about the grade of ulcer that had been diagnosed and what management changes had taken place following diagnosis. This section of the questionnaire was only applicable to owners whose horses had been diagnosed with Equine Gastric Ulcer Syndrome, other owners could select the "Not Applicable" option. Owners could detail what horses were fed in an open text box, along with the questionnaire covering several areas such as workload, amount of forage fed and how much time they spent stabled. The data was analysed using SPSS V27 with a chi-squared test for association. The open text questions were used to discuss management changes made. In total, it received 406 responses.

Results: The results showed associations between some management techniques, such as feeding concentrate meals that are high in starch and horses having Equine Gastric Ulcers, however no association was found between areas previously considered to be potential risk factors, such as single haynet usage as a method of feeding forage ($\chi^2 = 5.201$ df = 3, p value = .158). As well as this, the study revealed that there is an association between meal feeding concentrates and horses not having Equine Gastric Ulcers ($\chi^2 = 15.130$ df = 3, p value = .002) which contradicts prior research. The study showed that there is a delay in time taken to diagnose a higher grade (3-4) of ulcer, whereas low grades are diagnosed quickly. The main finding of the study was that owners do not make changes to their horses management until severe ulcers are diagnosed ($\chi^2 = 222.226$, df = 8, p value = .000).

Discussion & Conclusions: In conclusion the results of the study proved the hypothesis to be correct, with some management techniques being linked to Equine Gastric Ulcers however

Wednesday 30th June

Undergraduate Poster Presentations

not in the areas first thought. The link between time taken to get a diagnosis and the grade of ulcer diagnosed could highlight a potential problem with the diagnosis of Equine Gastric Ulcer Syndrome. The lack of management changes until severe ulceration was diagnosed could be a reason as to why higher grades of Equine Gastric Ulcers were often found and this could be a potential area of interest for future research. The horses in this study were pleasure & low-level competition horses (non-elite) so it is possible that results found could change if a different population was looked at, for example elite racehorses.

Postgraduate Poster Presentations

Application of IMUs in horseback riders to objectify peak acceleration and shock attenuation in the lower limbs and trunk

Haitjema A^{1,2*}, Marotta L^{1,2}, Reenalda J^{1,2}

¹Roessingh Research and Development, Enschede, The Netherlands

²University of Twente, Enschede, the Netherlands

Key words: inertial measurement unit, peak acceleration, shock attenuation, horse riding

Introduction: Chronic lower back pain is a common complaint in horseback riders (Kraft et al, 2009). Despite the efforts of several research groups, a biomechanical explanation for the high prevalence of chronic lower back pain in horseback riders remains absent (Kraft et al, 2009; Kraft et al, 2007). Research performed in other sports disciplines suggests that peak acceleration and shock attenuation might play a role in chronic lower back pain (Hamill, Moses and Seay, 2009). The primary objective of this work was to investigate how inertial measurement units (IMUs) can be used to measure biomechanical parameters, like peak acceleration and shock attenuation, that might be related to chronic lower back pain in horseback riders.

Materials & Methods: As part of a larger study, one female active horseback rider was recruited (age 24 years, medium level) to perform a riding protocol. The subject performed three laps of walk, three laps of sitting trot and three laps of canter with and without stirrups on her own horse. The subject was instrumented with 8 IMUs (feet, lower legs, upper legs, pelvis and sternum) sampling at 240 Hz. Data were analyzed using Xsens MVN Analyze (version 2019.2) and MATLAB (version 2020a). Shock attenuation was defined as:

$$\text{Shock attenuation} = \left(1 - \frac{\text{peak acceleration segment 2}}{\text{peak acceleration segment 1}}\right) \cdot 100$$

Results: Results from a single case study indicate that peak accelerations and shock attenuation can be measured in horseback riders using IMUs. Over the entire gait cycle, the absolute mean acceleration values in the lower extremities in the walk were low, with a relatively large standard deviation. Two peaks of equal height were visible for the pelvis and sternum and shock attenuation was calculated (see table 1). Figure 1 shows the accelerations in the sagittal sensor plane of the different segments in trot. A clear movement pattern appeared visible, and two peaks of equal height were present per gait cycle. Table 1 shows the corresponding shock attenuation values. In canter, one peak was visible in all segments and shock attenuation was calculated (see table 1).

Postgraduate Poster Presentations

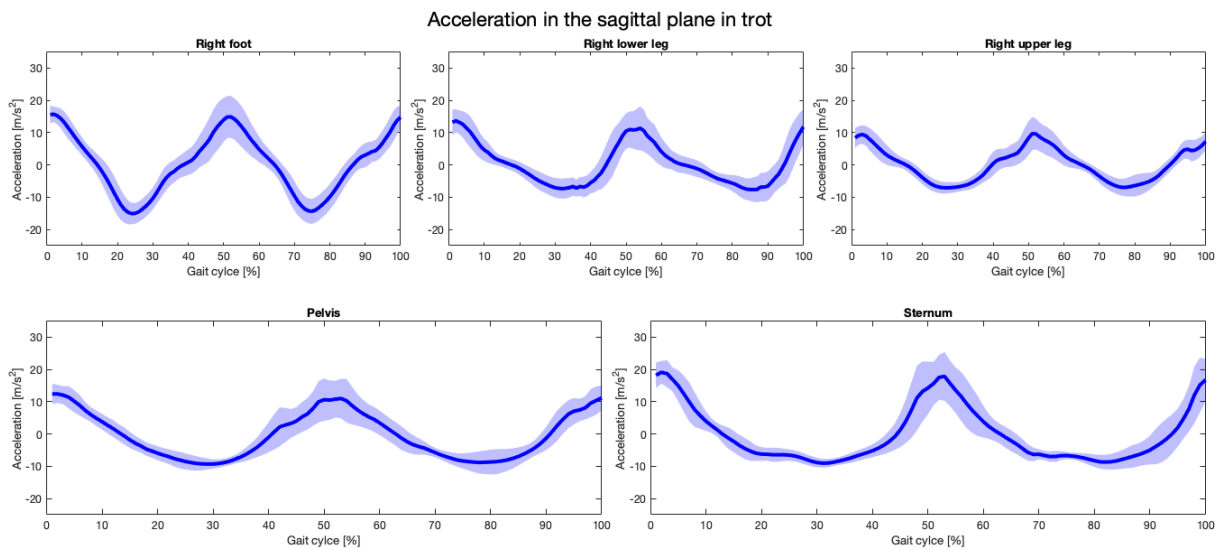


Figure 1: Accelerations in the sagittal sensor plane in sitting trot for the different segments. The mean acceleration of 20 gait cycles is represented by the dark blue line. The light blue shaded area represents the standard deviation.

Table 1: Shock attenuation values for walk, sitting trot and canter, represented as mean ± standard deviation

* No shock attenuation value was determined because the peak was not clearly visible at these segments

	Walk (%)	Trot (%)	Canter (%)
Right lower leg/Right foot	-*	8.7 ± 16.6	-80.3 ± 46.1
Pelvis/Right upper leg	-*	-30.4 ± 18.8	-19.2 ± 28.6
Sternum/Pelvis	-18.3 ± 24.3	-47.3 ± 18.0	0.9 ± 30.0

Discussion & Conclusion: The results of this case study indicate that peak accelerations and shock attenuation can be measured in horseback riders with an 8 IMU set-up. The negative shock attenuation values from the pelvis to the upper leg could be explained by the higher impact of the saddle on the pelvis compared to the upper leg. The negative shock attenuation

Wednesday 30th June

Postgraduate Poster Presentations

values for the back (from pelvis to sternum) in sitting trot indicate that the acceleration is increased, rather than attenuated. If this trend is confirmed at a group-level, then this could be of significant interest with regards to the development of chronic lower back pain in horseback riders. Future research could include video analysis to relate the acceleration patterns in the rider to the movements of the horse.

References:

Kraft C.N., Pennekamp P.H., Becker U., Young M., Diedrich O., Lüring C., von Falkenhausen M. 'Magnetic Resonance Imaging Findings of the Lumbar Spine in Elite Horseback Riders', *The American Journal of Sports Medicine*, 37(11), pp. 2205-2213, 2009.

Kraft C.N., Urban N., Ilg A., Wallny T., Scharfstädt A., Jäger M., Pennekamp P.H. 'Influence of the Riding Discipline and Riding Intensity on the Incidence of Back Pain in Competitive Horseback Riders', *Sportverletz Sportschaden*, 21(1), pp. 29-33, 2007.

Hamill J., Moses M., Seay J. 'Lower Extremity Joint Stiffness in Runners with Low Back Pain' *Research in Sports Medicine*, 17(4), pp. 260-273, 2009.

Postgraduate Poster Presentations

Shock Attenuation and Electromyographic Activity of Advanced and Novice Equestrian Riders' Trunk

Elmeua González, M.¹ & Šarabon, N.^{1,2,3}

¹Faculty of Health Sciences, University of Primorska, Polje 42, 6310 Izola, Slovenia

²Laboratory for Motor Control and Motor Behaviour, S2P, Science to Practice, Ltd., 1000 Ljubljana, Slovenia

³Human Health Department, InnoRenew CoE, Livade 6, 6310 Izola, Slovenia

Keywords: electromyography; core muscles; shock attenuation; horse riding

Introduction: Low back pain (LBP) is a prevailing affliction among recreational and professional horse riders. It can reduce performance and distract from the development of the athlete. A lower incidence of LBP has been observed in the professional riding population despite higher training volumes. This study aimed to describe neuromuscular mechanisms through which advanced, and novice riders attenuate the shockwave generated between the horse and rider. Such impacts are generated at the contact surface of the saddle and are responsible for disturbing rider balance and increase rider spinal stress, potentially leading to back pain.

Materials & Methods: Six novice riders (age 24 ± 7 years), nine advanced riders (age 31 ± 5 years) and four horses (age 15 ± 3 years) took part in this study. Surface electromyographic (sEMG) activity of the riders' trunk was recorded along with inertial data from inertial measuring units (IMU) placed the horses' leg, saddle and vertebrae of the riders at walk, trot and canter. sEMG amplitude was calculated with a RMS linear envelope (0.02-sec window; 0.01-sec window overlap) and normalized to the peak sEMG recordings. Shock attenuation was extracted from IMU data by means of a transfer function.

Results: Analyses of variances revealed a superior shock attenuating ability of the advanced group ($F(1,38) = 5.023, p = 0.03$) as well as a higher overall muscle tone ($F(1,488) = 9.80, p = 0.02$). Cross correlation analyses between shock attenuation and electromyographic activity showed that groups differ mostly in timing rather than the intensity of muscle activation.

Discussion & Conclusions: This finding is of great interest for equestrian athletes and coaches, as it points to a greater importance of training muscular anticipation within the trunk stabilizers rather than overall muscle activation.

Undergraduate Oral Presentations

Evaluating the success of interspinous ligament desmotomy (ISLD) on the subsequent performance of the horse.

Moore, M and Nankervis, K.

Hartpury University, Hartpury, Gloucestershire, England

Keywords: Impinging spinous processes; Interspinous ligament desmotomy; Performance; Lameness

Introduction: Impinging spinous processes, commonly known as ‘kissing spines’, are a common cause of back pain and poor performance in the ridden horse. Interspinous ligament desmotomy (ISLD) is a common surgical treatment option for this condition. Derham et al (2019) found that 85.5% of horses treated surgically using ISLD had long term improvement in performance without further treatment, however, Prisk and Garcia-Lopez (2019) reported only 52.9% either returned to equivalent performance, or showed improved performance, following ISLD. The aim of this study was to investigate the effect of ISLD on horse performance in the long term as determined via anonymous survey of owners of horses treated using ISLD.

Materials & Methods: An eleven question, three section survey was designed using Microsoft Forms to address the study aim. The survey was piloted on 10 horse owners prior to the final edit and launch. Section 1 verified that horses were treated using ISLD, the extent of, and time elapsed since surgery, section 2 considered the horses previous and current activities and level of performance and section 3 concentrated on the functional outcome for the horse and satisfaction of the owner with the surgical outcome. The survey was distributed via suitable social media (Facebook pages) and was ‘live’ for 14 days. The survey was aimed at owners whose horses had undergone ISLD surgery. All responses were completely anonymous. The study was approved by the Hartpury University Research Ethics Committee ETHICS2020-140-LR. The data were analysed using descriptive statistics. Associations between owner satisfaction and the follow up time, and between the number of sites operated on were tested using chi squared tests in MS Excel.

Results: Fifty-seven responses were received. The time elapsed since surgery ranged between ‘less than a year’ and ‘six years’. The most frequent number of sites treated surgically was 4-6 (53.0% of respondents). 31.6% respondents reported their horses returning to the same level of performance they were at before surgery. 47.4% of respondents said their horses had coexisting lameness at time of surgery and 15.8% had reported lameness following surgery. 45.6% of horses received further treatment for back pain following surgery. The survey found that 79% of owners were satisfied with the outcome of surgery. There was no significant association ($p= 0.0807$) found between owner

Undergraduate Oral Presentations

satisfaction and the follow up time. Similarly, there was no significant association ($p= 0.6776$) between owner satisfaction and the number of sites operated on.

Discussion & Conclusion: The return to previous level of performance was lower than reported in previous studies, with a large number of horses requiring treatment for back pain post-surgery. Despite the lower success rates found in our study, the majority of owners were satisfied with the outcome of the surgery. The reason for the difference in our results with previous findings may relate to study design. Long term follow-ups in previous studies have not exceeded a median of 365 days compared with up to six years in our study. Further long-term follow-up of cases treated using ISLD is needed to fully understand the effect on functional outcome.

References:

Derham, A.M., O’Leary, J.M., Connolly, S.E., Schumacher, J. and Kelly, G., 2019. Performance comparison of 159 Thoroughbred racehorses and matched cohorts before and after desmotomy of the interspinous ligament. *The Veterinary Journal*, 249, pp.16-23.

Prisk, A.J. and García-López, J.M., 2019. Long-term prognosis for return to athletic function after interspinous ligament desmotomy for treatment of impinging and overriding dorsal spinous processes in horses: 71 cases (2012–2017). *Veterinary Surgery*, 48(7), pp.1278-1286.

Undergraduate Oral Presentations

The Impact of the Covid-19 Pandemic on Riding for the Disabled Association Stakeholders

Crook, L.J.¹ & Brigden, C. V.¹

¹ University Centre Myerscough, St Michael's Road, Bilsborrow, Preston, PR3 2ER

Keywords: RDA, Health, Well-being, Vulnerable.

Introduction: The Covid-19 pandemic resulted in closure of many areas of society. Governing bodies provided guidance to the equine industry, which placed several restrictions on activities (Hockenhill *et al.*, 2021). This caused barriers to participation to equine assisted therapy and learning (EAT/L) for disabled people. The Riding for the Disabled Association (RDA) is a UK registered charity that provides therapy, skills development, and exercise to 25,000 disabled people through equestrian activities (RDA, 2021). EAT/L adds enrichment to disabled people's lives and can improve their physical and/or mental well-being (Burgon, 2014). The removal of this activity due to lockdown may impact the mental and physical well-being of this vulnerable group.

Methodology: The study aimed to analyse the impact of Riding for the Disabled Association (RDA) cessation during lockdown on the mental, social, and physical well-being of stakeholders. The study analysed responses (n=3294) to an online questionnaire developed by RDA during the first Covid-19 pandemic lockdown in March-June 2020. Qualitative and quantitative data were collected in May 2020 relating to the impacts felt by stakeholders, who were participants (riders/drivers), volunteers, parents, carers, teachers, and others. Kruskal Wallis test, Mann Whitney tests, and Chi-Square Tests for Association were used for quantitative data analysis using Minitab-19. Thematic analysis was used to analyse the qualitative data, using WordStat-8 to create the initial data codes.

Results: The results identified significant differences in the impacts of RDA cessation, with missing the RDA and missing the horse as the most highly rated impacts by all stakeholders (P<0.05).

Thematic analysis produced six first order themes and three second order themes, displayed in a thematic map (figure 1). Only volunteers mentioned data relating to positive mental state. All groups mentioned data relating to feelings of involvement with RDA activity during lockdown and virtual communication.

Undergraduate Oral Presentations

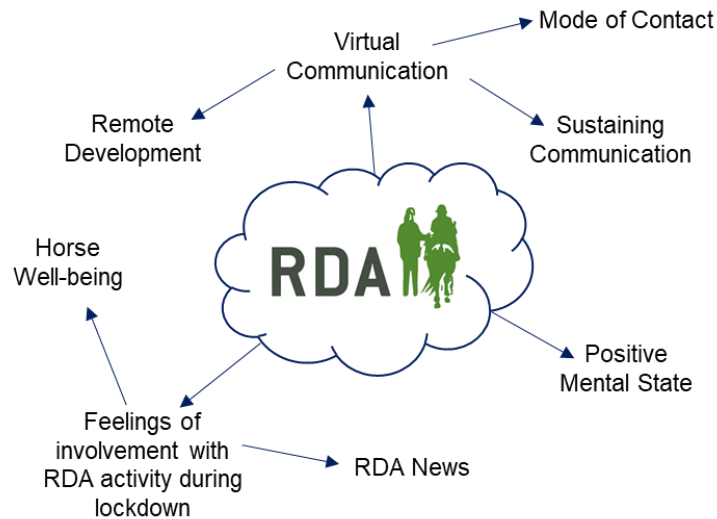


Figure 1 Thematic map of ways that Stakeholders felt RDA helped them during lockdown.

Discussions & Conclusion: RDA actions positively impacted stakeholders. Maintaining communication benefitted their social well-being when they were vulnerable to isolation and loneliness. Volunteers felt the most benefit from RDA during lockdown compared to other stakeholders, as some cared for the horses, giving them a purpose. Lack of routine negatively impacted the mental health of participants. Mental and physical health of stakeholders was impacted as without RDA activities they noticed an emotional and functional decline. Health concerns of return to RDA activity were raised by volunteers regarding the health of other stakeholders, due to the responsibility of their role. Covid-19 prevention measures should continue to ensure the well-being of all stakeholders. The measurable impact RDA has on volunteers should be emphasised as the RDA provides a strong sense of community to its volunteers. Sustaining communication with stakeholders, such as through social media, should continue following the reopening of RDA groups to ensure that those who may continue to isolate can feel involved with RDA. Future research could consider the impact of subsequent lockdowns in comparison to the impacts of the lockdown March-June 2020.

Acknowledgements: The authors gratefully acknowledge RDA-UK for permission to use the questionnaire data and ongoing support for this study.

References

- Burgon, H.L., (2014). *Equine-assisted therapy and learning with at-risk young people*. London: Palgrave Macmillan.
- Hockenfull, J., Bell, C., White, J. and Rogers, S., (2021). Response of UK Horse, Pony and Donkey Owners to the Early Stages of the COVID-19 Pandemic. *Animals*, 11(5), p.1215.
- RDA. (2021). *About Us*. Available: <https://www.rda.org.uk/about-us/>. Last accessed 3rd May 2021.

Undergraduate Oral Presentations

Investigation into the effect of Pelvic Alignment in Horse Rider Posture on Saddle and Walkway Pressure Distribution

Writtle University College

Key, S. and Ferro De Godoy, R

Key Words: Asymmetry, Myofascial Release, Weight

Introduction: Whilst there is some literature pertaining to the link between the prevalence of rider asymmetry and the impact on the horse's way of going there is an apparent lack of research investigating the impact of pelvic asymmetry on weight distribution in the saddle. Historically, research studies have shown that the majority of humans (Symes and Ellis, 2009) and horses (McGreevy and Rogers, 2005) display mild bilateral asymmetry. Consequently, this study aims to assess the impact of pelvic asymmetry on weight distribution in the saddle and standing weight distribution on the walkway and to further investigate the impact of Myofascial Release (MFR) treatment on correcting pelvic asymmetry.

Materials & Methods: Ten female, collegiate participants had an initial pelvic assessment using a goniometer, to identify asymmetry. The Racewood mechanical horse (dressage model) and Tekscan saddle mat were used to collect data on seated weight distribution. Participants mounted and cantered on the mechanical horse for 2 minutes before their pressure was recorded in halt. A Tekscan walkway was used to measure standing pressure distribution. All ten participants then underwent myofascial release (MFR) treatment by a qualified MFR practitioner, immediately after the first data collection. They then had another pelvic assessment using the goniometer. Participants were given a daily exercise by the MFR technician to complete and a replication of the first set of data was collected one week later.

Results: The majority of the data collected met the assumptions for parametric testing ($p \geq 0.05$) however, three sets of data were non-parametric ($p < 0.05$). A Friedman test identified statistically significant differences (see Figure 1) in pelvic angle between initial assessment and immediately after intervention ($p = 0.03$) and between initial assessment and one-week post intervention ($p = 0.005$). No statistically significant differences were noted between data collected immediately after intervention and one-week post intervention ($p = 1.00$) for pelvic angle. There was a significant improvement in pelvic alignment post intervention. There was a clear improvement in weight distribution in the saddle when comparing pressure on the left and right before intervention and one-week post intervention (see Figure 2), implying that correction of the pelvic angle improved weight distribution in the saddle. In contrast, results from the Tekscan walkway showed that there was very little change to standing weight distribution between pre and post intervention.

Undergraduate Oral Presentations

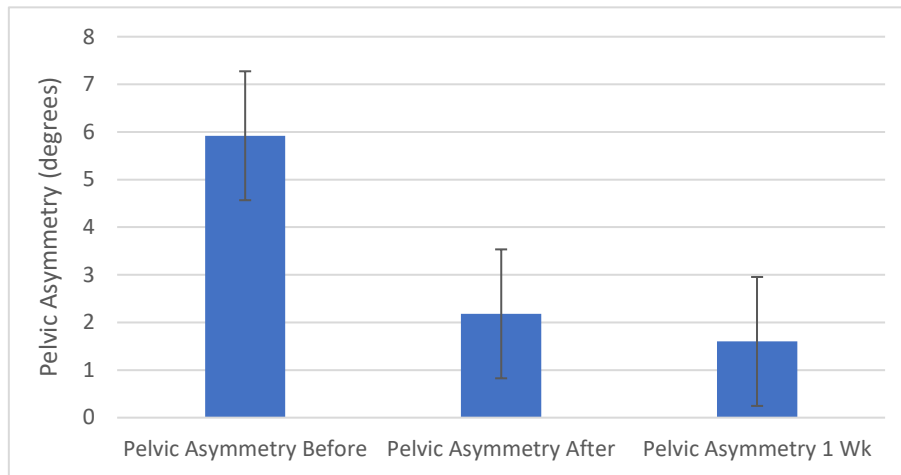


Figure 1: Pelvic Asymmetry at different stages of testing

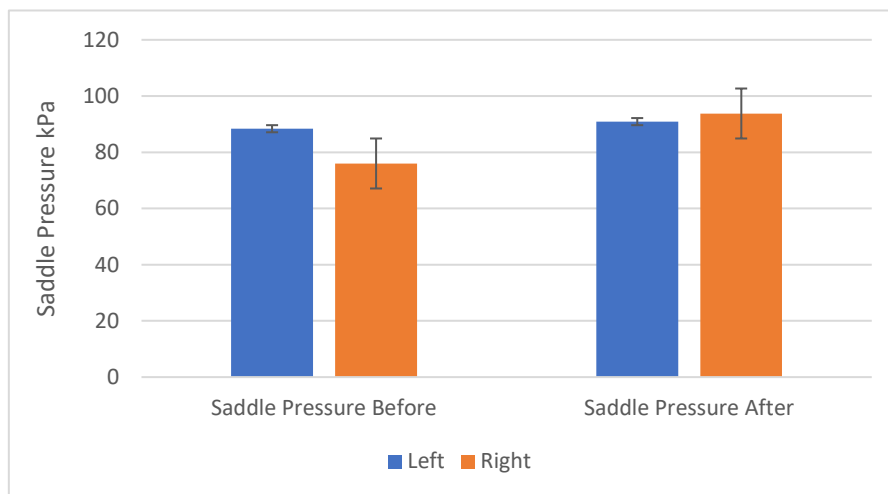


Figure 2: Saddle pressure before intervention vs saddle pressure after intervention

Discussion & Conclusions: The results of this study indicate that pelvic asymmetry does have a significant impact on weight distribution in the saddle and some impact on standing pressure on the walkway. This study was carried out to highlight the importance of pelvic asymmetry and weight distribution in the saddle and then emphasise the impact of MFR intervention and treatment on improving pelvic asymmetry. The fundamental point of this study is that by improving understanding of the impact of pelvic alignment on weight distribution, it is possible to utilise this information in the long term, to improve both rider and horse welfare.

References:

McGreevy, P.D., Rogers, L.J. (2005) Motor and Sensory Laterality in Thoroughbred Horses. *Applied Animal Behavioural Science*. **92**. 337-352.
Symes, D., Ellis, R. (2009) A Preliminary Study into Rider Asymmetry within Equitation. *The Veterinary Journal*. **181**. 34-37.

Undergraduate Oral Presentations

Should the Equestrian Rider Consider Themselves an Athlete?

Chanter, J, Pinno, L and May, S.J*

Duchy College, Stoke Climsland, Cornwall, PL17 8PB

Keywords: equestrian, fitness, sport, athlete

Introduction: Equestrian sports involve two athletic species working together as a partnership (Bye and Chadwick, 2018) and as a result, success is dependent on the performance of both horse and rider. Throughout all areas of ridden equitation, riders can experience high physical demands (Rodriguez and Rodriguez, 2014); however, physical fitness literature has previously had a key focus on the horse (Marlin, 2015). This study aimed to investigate whether riders believe more consideration should be given to the equestrian rider as an athlete.

Materials & Methods: A 22-question online questionnaire, consisting of multiple choice, short and long answer questions, was distributed on social media to investigate whether equestrian riders in the United Kingdom should consider themselves an athlete. In addition, perceptions of rider fitness in equestrian sports, riders' levels of physical activity and whether it is believed additional physical activity alongside riding can improve ridden performance were explored. Data were successfully collected from 138 respondents using Google forms and analysed using Minitab to determine descriptive statistics. Chi-squared tests were used to test for association between factors.

Results: Of 138 respondents, 129(93.5%) were female and the largest proportion of riders were 18-27 years (N=101,73.2%). Overall, 89.6%(N=134) of respondents stated equestrian riders should be considered as athletes and 97.8%(N=135) respondents believed that additional physical activity alongside riding can help improve equestrian rider performance, despite only 87%(N=120) of respondents taking part in physical activity outside of riding. There was no significant association between whether a rider was affiliated or unaffiliated and how many times a week they partake in physical activity alongside riding ($\chi^2=15.481$; $P=0.346$) but there was a significant association with whether they use additional health practitioners ($\chi^2=11.057$; $P=0.004$). There was a significant association between whether respondents considered their diet and whether they took part in additional physical activity ($\chi^2=13.332$; $P=0.004$).

In addition to physical influences, 93.4% (N=128) of 137 respondents who answered, believed that rider psychology has an impact on riding ability and popular techniques used in relation to riding were goal setting (57.7% N=79), breathing techniques (55.1% N=76) and positive self-talk (54.3% N= 75).

Thursday 1st July

Undergraduate Oral Presentations

In response to questions exploring the use of health practitioners, the most commonly used, from 136 respondents who answered, in the previous two years was a physiotherapist (36.8% N=50) and a chiropractor (25.7% N=35). A personal trainer was used by 18.4% (N=25) respondents and 41.9% (N=57) respondents stated they had not used any health practitioners in the last two years.

Discussion & Conclusion: The study highlighted that although many riders have a basic understanding of the physical requirements involved in riding, they do not take the same action in their own health and fitness, as they would their equine partner. Previous studies have suggested that additional physical activity outside of riding can enhance ridden performance and the findings of this study display that riders do understand this concept, yet it is perhaps not encouraged enough in amateur level riders. Further encouragement and education are needed from governing bodies at all levels on the importance of rider physical fitness for both the health and performance of equestrian athletes.

Acknowledgements: No financial contribution was given to the study.

References:

Bye T.L and Chadwick G (2018) Physical Fitness Habits and Perceptions of Equestrian Riders. *Comparative Exercise Physiology*. Volume 14(3) Pages 183-188.

Marlin, D (2015) Has the Golden Age of Equine Exercise Physiology Passed, and If o Have We Answered All The Big Questions? *Journal of Equine Veterinary Science*. Volume 35. Pages 54-60

Rodriguez G and Rodriguez R JR. (2014) Core Training for Equestrian Riding. *Strength Training*. Volume 1 (3). Pages 66-68

Undergraduate Poster Presentations

Owners' treatment preference in the event of a severe colic episode.

Cohen Neighbour, E. & Sparrow, S.

Moulton College

Introduction: The term “colic” refers to abdominal pain rather than a specific disorder, factors that commonly induce colic include, impaction of digesta, sand ingestion, parasite infection and gas accumulation (Blikslager, 2019). Colic remains a notable problem in terms of welfare and future complications providing they survive (Cianci, 2021). The most common treatment options in the event of a severe colic episode commonly include euthanasia, medication (phenylbutazone, buscopan) and surgery to remove the section of the gut that has become necrotic. Although in the first instance, treatment options are directed by veterinary recommendation, there is no research published to indicate owner’s preferences on choice of those treatments thereafter, in the event of a severe colic episode. The aim of this study was to establish the owner’s treatment choice in the event of a severe colic episode, and why this method was chosen.

Materials & Methods: The questionnaire was constructed using Google forms and then released into the public domain via social media on the 30th of December 2020 and retracted on the 8th of February 2021. To reach an audience of targeted horse owners the questionnaire was released onto 2 Facebook groups “horse chit chat” and “horses in the midlands”. During the period that the questionnaire was live 125 responses were collected and analysed. The data were assessed for owner’s treatment choice in the event of a severe colic episode and why the decision was chosen; prevalence of colic among different horse breeds; type of colic the horse had previously experienced and how often this has occurred. IBM SPSS version 27 was used to conduct a Chi² statistical analysis comparing owner’s treatment choice and why it was chosen.

Results: The most popular choice of treatment was medication (62.8%) of the same sample population. Of those horses that were medicated 33% of owners chose to do so due to quality of life (33 out of 125 participants) which was significantly greater than the 16.9% of participants that chose medicated due to the age of the horse (20 out of 125 participants; $P > 0.05$). Additionally, a further 12.9% of owners chose medicated due to finances (16 out of 125 participants). Only 23.3% of participants opted for surgery as the chosen treatment option due to quality of life (17 out of 125 participants). The least popular treatment was euthanasia (13.9%) due to quality of life (13 out of 125 participants). Subsequently there was no correlation between the reason for the decision and treatment the choice ($P > 0.05$).

Undergraduate Poster Presentations

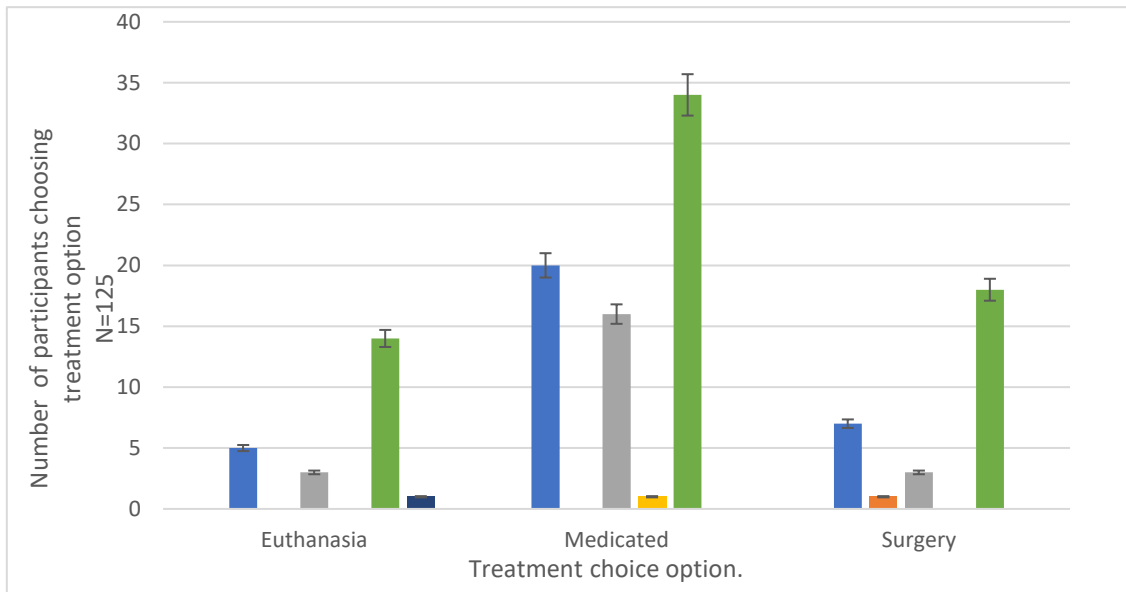


Figure 1- Owners treatment choice in the event of a severe colic episode and why the decision was made. Blue bars indicate the age of horse, grey bars indicate finance, green indicates quality of life and yellow indicates health issues.

Discussion & Conclusions: The most prevalent treatment choice was medication, followed by surgery then euthanasia. The most common reason for choosing medication as a treatment option was due to the quality of life. Although research has identified an 85% survival rate for severe colic (Mair, 2005), it is also understood that older horses do not recover as well from general anaesthetic, required for colic surgery. Therefore, it could be suggested that the medicated route offers opportunity to ‘free the animal from pain’ as stated by the 5 freedoms, while minimising the risk of further compromising health. However, further research should be conducted to establish the correlation between the age of the horse and the treatment choice. In addition, acknowledgement of the cost of colic surgery is important, however this was not as influential on the owner’s treatment decision as expected (figure 1), this could be due to owners having insurance for such events. A total of 62.8% of owners that participated chose medicated for the chosen treatment choice with the quality of life and age of the horse being the reason for choosing the treatment option.

References:

- Blikslager, A. T. (2019). Colic Prevention to Avoid Colic Surgery: A Surgeon's Perspective. *Journal of Equine Veterinary Science*, vol,76, pp. 1-5.
- Justine Cianci, A. G. (2021). Lack of Association Between Barometric Pressure and Incidence of Colic in Equine Academic Ambulatory Practice. *Journal of Equine Veterinary Science*, vol, 97, no. 103342.
- T.S.Mair, L. (2005). Survival and complication rates in 300 horses undergoing surgical treatment of colic. part 3: longterm complications and survival. *Equine veterinary Journal*.

Undergraduate Poster Presentations

Measure of anticipatory behaviour during the approach to regular feeding times.

Boyton. G*, Young. T

Glyndwr University

Key Words: Equine, Behaviour, Anticipation, Feeding

Introduction: Anticipatory behaviour within captive animals has been debated since 1918 providing an indication of the animal's welfare state Anticipation can reflect reward sensitivity which relates to previous experience (Peters, *et al*, 2012). Learning theory is defined as a process of adaptive changes to behaviour as a result of previous experience, when reward becomes part of an animals routine, anticipatory behaviour is expected to present (Mclean and Christensen, 2017). Therefore, this research aimed to investigate differences in behaviour exhibited by horses pre and post feeding and compare the amount and onset of anticipatory behaviour pre-feeding exhibited by horses fed forage *ad lib* or on a rationed diet.

Materials & Methods: Subjects consisted of four mares and one gelding, of variable breeds and ages (Mean age,17.4 years; SD,4.98). Subjects had all been stabled at the same yard for a minimum of 14 months and were stabled individually within one outside yard structure with visibility of each other. A CCTV camera was used to record data using an ethogram at two-minute intervals for one hour pre-feeding until one hour post feeding over five consecutive days. Two baseline measurements were recorded when anticipation was expected to be low, following the method of Peters *et al* (2012). Using IBM SPSS (version 26) data was explored and tested for significance. Comparisons were made between all timescale measurements. Using a Wilcoxon Signed Rank for non-parametric data and a Paired Samples t-test for parametric data to test for significance between each category of data. To test for the onset of anticipatory behaviour during pre-feeding, total behaviours were split into three 20 minute timescales. A Freidman test was carried out for non-parametric data and a repeated measures ANOVA test was carried out for parametric data to test for significance between the three timescale measurements, followed by Bonferroni Post Hoc test, with significance accepted at $P<0.05$.

Results: Maintenance and stationary behaviours were seen to be significantly lower ($P<0.05$) during pre and post feeding in comparison to baseline (Table 1). A significant increase in anticipatory behaviour was exhibited during the pre-feeding measurement ($P<0.02$), and specifically, greater anticipatory behaviour was shown in the 20 minutes immediately before feeding compared to the 40 minutes prior ($P<0.04$). A significant decrease in the amount of stationary behaviour was seen in horses during the hour pre-feeding ($P<0.01$). In addition, stationary behaviour was significantly lower 20 minutes immediately before feeding ($P<0.01$) than in the 40 minutes prior.

Undergraduate Poster Presentations

Subjects fed a rationed diet displayed higher amounts of arousal and stereotypic behaviour during both pre and post feed measurements in comparison to *ad lib* fed horses (P<0.05). Due to a low sample size further analysis was not possible.

Table 1. A comparison between the mean amount of behaviour exhibited by horses (n=5) pre-feed, post feed and baseline measurement.

Behaviour	Result of pre-feed compared with post feed	Result of pre-feed compared with baseline	Result of post feed compared with baseline
Maintenance	Wilcoxon Signed Ranks Test. (z = -2.03, (df = 4), (P= 0.04)	Paired Sampled T-test. t = (4) = -10.08, (P = 0.00)	Paired Sampled T-test. t = (4) = -3.41, (P = 0.03)
Arousal	Paired Sampled T-test. t = (4) = 2.23, (P= 0.09)	Paired Sampled T-test. t = (4) = 6.99, (P = 0.07)	Paired Sampled T-test. t = (4) = 2.97, (P = 0.08)
Investigatory	Paired Sampled T-test. t = (4) = -0.88, (P= 0.43)	Paired Sampled T-test. t = (4) = 11.39, (P = 0.00)	Paired Sampled T-test. t = (4) = 1.32, (P = 0.06)
Locomotion	Paired Sampled T-test. t = (4) = 1.48, (P = 0.21)	Paired Sampled T-test. t = (4) = 6.81, (P = 0.22)	Paired Sampled T-test. t = (4) = 2.29, (P = 0.26)
Stationary	Paired Sampled T-test. t = (4) = -1.54, (P = 0.00)	Paired Sampled T-test. t = (4) = -11.53, (P = 0.00)	Paired Sampled T-test. t = (4) = -2.59, (P = 0.04)
Stereotypies	Paired Sampled T-test. t = (4) = -1.12, (P = 0.32)	Paired Sampled T-test. t = (4) = 0.24, (P = 0.82)	Paired Sampled T-test. t = (4) = 1.85, (P = 0.14)

Discussion & Conclusion: The study provides evidence that feeding times cause arousal behaviour in horses. This may have negative impacts on welfare due to an increased sensitivity in stress response pending reward. Higher rates of anticipatory behaviour were exhibited as feeding time approached, with a significantly higher level seen 20 minutes immediately before the feeding. Subjects fed *ad lib* forage in comparison to a rationed diet, exhibited lower anticipatory behaviour suggesting an *ad lib* forage diet benefits horses at feeding times, thus positively impacting welfare. This study observed behavioural response, providing strong indicators of a stress response as feed times approached, this study demonstrates need for further research into the effects of husbandry routines and feeding practices within horse management, the use of both behavioural indicators and physiological measurements may provide more robust conclusions.

Thursday 1st July

Undergraduate Poster Presentations

Acknowledgements: Thanks goes to LLannerch Equestrian Centre, North Wales for allowing data collection and to all five horse owners for allowing data to be recorded from their horses.

References

McLean, A.N. & Christensen, J.W.,2017. The application of learning theory in horse training. *Applied Animal Behaviour Science*. 190. pp.18-27 DOI: <https://doi.org/10.1016/j.applanim.2017.02.020>

Peters, S.M., Bleijenberg, E.H., van Dierendonck, M.C., van der Harst, J.E., Spruijt, M., 2012. Characterization of anticipatory behaviour in domesticated horses (*Equus caballus*). *Applied Animal Behaviour Science*. 138 (1-2) pp.60-69 DOI: <https://doi.org/10.1016/j.applanim.2012.01.018>

Thursday 1st July

Undergraduate Poster Presentations

A snapshot of leisure rider self-assessment of their knowledge about prohibited and banned substances in equestrian sport

Ellis, R.L, *Twigg-Flesner, A**

Hartpury University, Hartpury, Gloucestershire, GL19 3BE

Key words: Prohibited substances, Cross-Contamination, Knowledge, Amateur riders.

Introduction: Intentional and accidental exposure to banned and controlled substances pose a risk to equestrian athletes. A prohibited substance is defined as “A substance, such as a drug, etc, that is banned or forbidden by law or other authority” (Collins English Dictionary,2021). With a controlled substance being defined as “A drug or other substance that is tightly controlled by the government because it may be abused or cause addiction” (National Cancer Institute,2021). Within the past five years, there have been 179 cases of equine anti-doping decisions at the Fédération Equestre Internationale tribunal (FEI tribunal, 2021). Little information about leisure rider awareness of prohibited and banned substances, or sources of contamination is available. Therefore, this study aims to investigate how accurately leisure riders can identify, and distinguish between banned and controlled substances, and whether demographic factors play a role.

Materials & Method: An online questionnaire was posted on Facebook Leisure rider groups and pages, alongside information about the study. Informed consent was provided by all participants, and only respondents aged 18+ were included in the analysis. The questionnaire combined open questions asking for definitions of terminology; and closed questions, collecting demographic information and self-reporting of confidence in identifying banned or controlled substances. The final section of the questionnaire was an MCQ, requiring participants to identify banned or controlled substances from a list of choices. Data were analysed using Kruskal Wallace and Chi Square tests on IBM SPSS v.26 to address the study objectives.

Results: Sixty-six responses were gained. No correlation was identified between participant age, job role or equine based education and their reported confidence of identifying controlled or banned substances, although 17% of participants experienced drug testing when competing. The majority of participants knew of the FEI prohibited substances database (76%), and also reported confidence in their understanding of prohibited substances, controlled substances, and sources of cross-contamination (74.2%, 66.7% and 63.6 % respectively). People working in the equine industry, and those with equine-related educational qualifications were more likely to be aware of sources of cross-contamination ($p=0.016$ and $p=0.029$ respectively), and the FEI database as an information source, ($p=0.025$ and $p = 0.000$ respectively), but there were no statistically significant differences in the

Undergraduate Poster Presentations

assessment of knowledge through the MCQ at the end of the questionnaire. People who had been tested in competition were more likely to know about the FEI database ($p=0.000$) but were not more confident in the recognition of banned or controlled substances ($p=0.957$ and $p = 0.150$ respectively).

Discussion & Conclusions: Even after experiencing testing, participants did not seem to have a higher confidence in their own knowledge to recognise banned or controlled substances in the future, although they are aware of the FEI database as an information source. Participants in the industry perceive themselves to be more knowledgeable on these topics, but assessment of knowledge indicates a concerning lack of knowledge. Therefore, more widespread, and accessible education initiatives to highlight the risk of (cross) contamination of banned and controlled substances is needed.

References

Collins English Dictionary. (2021). Definition of banned substance. Available: [https://www.collinsdictionary.com/dictionary/english/prohibited-substance#:~:text=\(pr%C9%99%CA%8A%CB%88h%C9%AAb%C9%AAt%C9%AAd%20%CB%88s%CA%8Cbst%C9%99ns\),by%20law%20or%20other%20authority](https://www.collinsdictionary.com/dictionary/english/prohibited-substance#:~:text=(pr%C9%99%CA%8A%CB%88h%C9%AAb%C9%AAt%C9%AAd%20%CB%88s%CA%8Cbst%C9%99ns),by%20law%20or%20other%20authority). Last accessed 26th May 2021.

FEI. (2021). 2021 FEI Equine Anti-Doping Decisions. Available: <https://inside.fei.org/fei/your-role/athletes/fei-tribunal/equine-anti-doping-decisions/2021>. Last accessed 26th May 2021.

National Cancer Institute. (2021). Definition of controlled substance. Available: <https://www.cancer.gov/publications/dictionaries/cancer-terms/def/controlled-substance>. Last accessed 26th May 2021

Thursday 1st July

Undergraduate Poster Presentations

A groom's job is never done: Working rights and the physical and mental health of equestrian grooms

*Coloe, C. & Cameron – Whytock, H.**

School of Animal, Rural & Environmental Sciences, Nottingham Trent University, NG25 0QF

Keywords: *Groom, Mental health, Injury, Stress*

Introduction: Improper working conditions and the absence of working rights could cause issues for employees. Working conditions refers to the working environment and circumstances, such as working hours, tasks and pay (Moss *et al.*, 2004). The British Grooms Association (2019) reported that only 33% of grooms were being paid at least the national minimum wage, indicating that working rights are not being implemented within the industry. Furthermore, there is a limited number of studies on employment conditions of grooms. The aim of this study was to investigate grooms' knowledge of their working rights and perception of employment conditions.

Material & Methods: A questionnaire was distributed (Bristol Online Surveys), to grooms within the equine industry through social media platforms. This was formed of four sections: 'understanding of working entitlements', 'your working environment', 'issues that have affected your ability to work' and 'improving knowledge of working rights'. A total of 306 responses were collected. A Chi-square test was performed to examine the relation between mental health issues and injuries, and mental health issues and stress. Post-hoc pairwise z-tests with a Bonferroni correction were conducted to identify statistically significant relationships between responses.

Results: There was a significant association between experience of mental health issues and injuries experienced in the workplace ($\chi^2_{306}=57.997, P<0.001$). Participants who strongly agreed with experiencing mental health issues were more likely to strongly agree with having experienced an injury in the workplace, with a linear trend along all choices scaling from strongly agree to strongly disagree. Post-hoc tests revealed that participants who strongly agreed with experiencing mental health issues were significantly more likely to strongly agree with experiencing stress in the workplace ($z = 6.1, p<0.001$). Additionally, 96.1% of grooms identified the need for grooms and employers to be more informed on working rights.

Discussion & Conclusion: Data showed a need for those working in the equine industry to be more informed on working rights. Further knowledge on working rights has the possibility to improve job satisfaction and security. Results indicate that there is an association between stress and injuries that grooms experience in the workplace, and mental health issues. More research is needed to investigate if grooms' mental health issues are causing higher rates of

Thursday 1st July

Undergraduate Poster Presentations

injury/stress, or if grooms that experience mental health issues are at a higher risk of injury/stress. This study has highlighted key issues within the workplace of grooms such as mental health issues, injury and stress.

References

Moss, P.J., Lambert, T.W., Goldacre, M.J. and Lee, P., 2004. Reasons for considering leaving UK medicine: questionnaire study of junior doctors' comments. *British Medical Journal*, 329 (7477), 1263.

British Grooms Association, What I get paid survey [online], 2019, <https://britishgrooms.org.uk/uploads/pdfs/NMW%20Report%202019.pdf> Accessed on: 03/02/20

Undergraduate Poster Presentations

The Impact of Height and Breed on Equine Hoof Wall Thickness.

Armstrong, S. and Leśniak, K.

Hartpury University, Hartpury, Gloucestershire, GL19 3BE

Key words: Hoof, Height, Breed, Conformation

Introduction: The equine hoof is able to cope with large amounts of loading without excess deformation. Early texts define the structure and function of the hoof wall; however, more recent studies focus on the effect of external factors on hoof morphology. An increase in hoof wall thickness could be assumed to accompany an increase in horse height, or even with heavier type breeds, however, this is currently not evidenced. Therefore, the aim of the study was to investigate impact of horse height, and breed, on the thickness of the equine hoof wall.

Material & Methods: Data were collected retrospectively from Moore's thesis for the Fellowship of the Worshipful Company of Farriers. The original data were collected from nineteen cadaver hooves whereby a transverse section of the hoof wall was cut at 90° to the hoof wall axis using a band saw. The hoof wall thickness was measured (mm) at seven points along the hoof circumference (toe, medial toe quarter, medial quarter, medial heel quarter, lateral toe quarter, lateral quarter, and lateral heel quarter), using digital callipers. For the current analysis, wall thickness at each region for horses over 162.5cm (16.2hh, n=8) were compared with those of ponies and small horses under 162.5cm (n=11) via an Independent Samples T-Test. These height groups (<162.5 and >162.5cm) were used to ensure an even split of data for analysis and to align with those used by Lesniak *et al.* (2019). Kruskal Wallis with Post hoc analysis and Bonferroni correction were employed to test for differences between breed type (Welsh pony (n=4), Warmblood (W/B, n=4), Thoroughbred (T/B, n=5), Irish Draft (I/D, n=4) and Other (OTHER, n=2). Data were analysed using SPSS (IBM, version 26) software with a P value of ≤ 0.05 used to determine significance throughout.

Results: The only breed difference identified was significantly greater ($p \leq 0.05$) toe thickness in Warmbloods than the Welsh pony group. Horses >162.5cm had significantly greater toe ($p \leq 0.01$), medial toe quarter ($p \leq 0.01$), medial quarter ($p \leq 0.05$) and lateral toe quarter ($p \leq 0.01$) wall thickness to that of ponies and small horses <162.5cm. A strong positive relationship was identified between an increase in wall thickness at the toe ($p \leq 0.001$), medial toe quarter ($p \leq 0.01$), medial quarter ($p \leq 0.05$), lateral toe quarter ($p \leq 0.001$) and lateral quarter ($p \leq 0.001$) and an increase in horse height. The results demonstrated a proportional increase in hoof wall thickness as height increased.

Thursday 1st July

Undergraduate Poster Presentations

Discussion & Conclusions: The results highlight both a proportional increase in hoof wall thickness as height increases, and a difference in specific regions of the hoof wall thickness, depending on the height of the horse/ pony. This supports Lesniak's et al. (2019) finding that the hoof wall becomes more upright when required to support larger horses. The greater angulation in smaller horses makes the wall at the point of ground interaction appear wider. The more vertically orientated horn tubules of more upright hooves increase their capacity to resist compression and act as support columns (Thomason et al. 2005). Toe thickness differences between the Warmblood and Welsh pony groups is also likely to be due to differences in loading forces, however, as horse weights were not included in the current study further research is needed to confirm this and better understand the implications for hoof care practitioners.

Acknowledgements: We would like to thank Simon Moore FWCF for agreeing to allow us to use the data captured for his Fellowship thesis for this research project.

References:

Leśniak, K., Whittington, L., Mapletoft, S., Mitchell, J., Hancox, K., Draper, S. and Williams, J., 2019. The influence of body mass and height on equine hoof conformation and symmetry. *Journal of Equine Veterinary Science*, 77, pp.43-49.

Thomason, J.J., McClinchey, H.L., Faramarzi, B. and Jofriet, J.C., 2005. Mechanical behaviour and quantitative morphology of the equine laminar junction. *The Anatomical Record Part A: Discoveries in Molecular, Cellular, and Evolutionary Biology: An Official Publication of the American Association of Anatomists*, 283(2), pp.366-379.

Undergraduate Poster Presentations

Evaluation of the impact of manual massage intervention on stride length of the equine forelimb over time.

Adams. K, Keith. S*

Bishop Burton University Centre, Bishop Burton, Beverley, HU17 8QG

Keywords: massage, forelimb, stride length, horse

Introduction: The use of manual massage is ubiquitous across sporting disciplines for multiple reasons including injury prevention, physical maintenance and performance enhancement. Hill and Crook (2010) suggest that massage to the caudal muscles of the equine hindlimb increases active protraction, reflected by an increase in stride length. However, there is no indication as to how long this is sustained. Correlations between increased stride length and performance success in dressage and racing (Hobbs *et al.*, 2020) suggest that it would be beneficial for trainers to be aware of when massage would be most appropriate to coordinate peak performance at a competition. Human studies suggest that the effects are short-lived, some reporting return to baseline measurements within 24 hours, however there is no equine literature supporting this theory. This study aims to investigate if massage increased forelimb stride length and how long this is sustained for.

Materials & Methods: Nine mixed breed horses between 14hh and 16.1hh, aged 8 to 21 years old were recruited from one yard through convenience sampling. Pre-existing exercise and management regimens bespoke to the individuals remained consistent throughout the study. Each horse received a 20-minute massage to the forelimb muscles consisting of effleurage, compressions and myofascial release from the same veterinary physiotherapist.

Six 2-centimetre markers were attached to the distal interphalangeal, metacarpophalangeal, carpal, humeroradial and glenohumeral joints and the dorsal process of the withers (Novoa-Bravo *et al.*, 2018). Horses were videoed completing eight meter in-hand trot ups using a 240-fps camera. Horses were handled by the same person and allowed to trot at their natural pace for consistency of speed. Three repeats per time condition were taken and analysed using Quintic Biomechanics V33 software. Measurements were taken pre massage, post massage, three days post massage and seven days post massage.

A Friedman test with post hoc Wilcoxon Signed Ranks Test assessed the effect of massage on SL across the time conditions. Analyses were conducted on SPSS; significance was set at $P < 0.005$.

Results: There was a significant increase in stride length post massage in comparison to pre massage ($P < 0.05$). Pre massage the mean stride length was $1.79 \pm 0.17\text{m}$, peaking on Day 3 at $2.45 \pm 0.23\text{m}$, showing a 37% increase in SL.

Undergraduate Poster Presentations

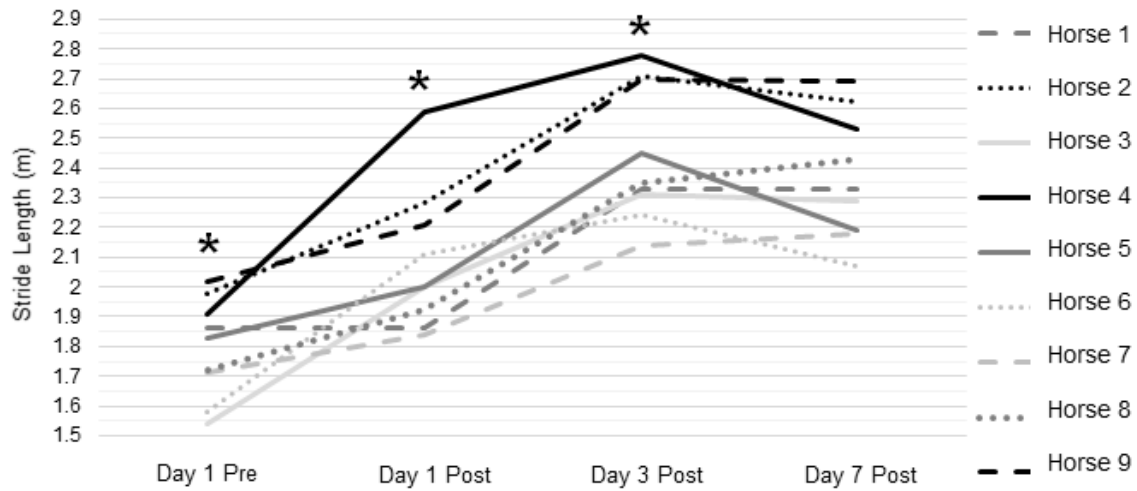


Figure 1: The progression of each horse's stride length post massage (* $P < 0.05$)

Discussions and Conclusions: It is suggested that massage has a vasodilatory effect on blood vessels due to increasing the surface temperature of the skin and improving the elasticity of the muscles, resulting in increased extensibility during protraction and therefore stride length. (Miyamoto and Hirata, 2019). However, associations between stride length, frequency and speed suggest that these factors may have influenced the overall increase alongside massage. Head and neck angles were not assessed in this study although it is possible that they may have impacted the protraction. Based on the findings of this study, massage to increase stride length may be most beneficial three days prior to competition, however potential limitations concerning the control of confounding variables including stride speed and management consistency suggest further research would be useful.

Acknowledgements

I would like to acknowledge Sarah Keith PG Dip, NAVP who performed the massage intervention. Also Bishop Burton University Centre for the opportunity to conduct this research.

References

- Hill. C, Crook. T (2010) 'The relationship between massage to the equine caudal hindlimb muscles and hindlimb protraction' *Equine Veterinary Journal*, **42**
- Miyamoto. N, Hirata. K (2019) 'Moderate associations of muscle elasticity of the hamstring with hip joint flexibility' *International Journal of Sports Medicine*, **40:11**
- Novoa-Bravo. M, Jäderkvist Fegraeus. K, Rhodin. M, Strand. E, García. L.F, Lindgren. G (2018) 'Selection on the Colombian paso horse's gaits has produced kinematic differences partly explained by the DMRT3 gene' *PloS One*, **13:8**

Undergraduate Poster Presentations

Investigating the possible presence of learned helplessness in horses (*Equus caballus*)

Losonci, O. and Verwijs, R.*

Writtle University College

Key words: learned helplessness; horses; behaviour

Introduction: Learned helplessness (LH) is a psychological condition, the result of an animal being exposed to repeated, inescapable aversive stimuli over which it has learned to have no control. To this date, no empirical studies have yet defined the existence of LH in horses. However, Goodwin *et al.* (2007) hypothesised its existence in horses. According to Goodwin *et al.* (2007), studies in this topic would be beneficial for equine welfare and could potentially also reduce wastage in the equine industry. The aim of this study was an initial investigation into the views of equine veterinarians and behaviourists on the potential occurrence of LH in horses.

Material & methods: A thorough literature review of the topic was conducted, followed by the formulation of a questionnaire consisting of 21 questions. Questions asked for background information on professionals' years of experience, encounters with horses that were likely to have LH and their general thoughts on the topic. The survey also contained pictures of horses, including one depicting the "withdrawn posture" identified by Fureix *et al.* (2012). The questionnaire was translated into three different languages (German, Spanish and Hungarian). Over one thousand questionnaires were sent out to equine veterinarians and certified equine behaviourists from 14 different countries to allow for a broad spectrum of views. The data were analysed with Chi-Square using SPSS (V.20) software.

Results: Out of the 112 completed surveys, 80.36% were completed by equine veterinarians, 16.07% by equine behaviourists and 3.57% by professionals who were qualified as both. 89% of the professionals agreed that LH could exist in horses (Figure 1) and 81% agreed that facial expressions could potentially also be associated with LH. There was a significant correlation between the professionals' years in practice and encounter with a horse with potential LH during their practice ($\chi^2(3) = 10.42; p < 0.05$). Furthermore, professionals identified a link between horses' characteristics (breed, gender and age) and an increased risk of developing LH. Behaviours suggesting active- and passive coping states, a prerequisite of LH (McGreevy and McLean, 2009), were also reported.

Thursday 1st July

Undergraduate Poster Presentations

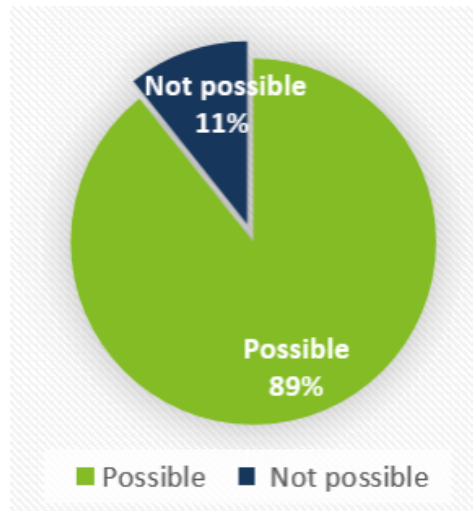


Figure 1: Views of equine veterinarians and behaviourists on the possibility of LH occurring in horses

Discussion & conclusions: Viewpoints of equine professionals on postures and behaviours of horses associated with LH matched with those defined by Fureix *et al.* (2012) as characteristics of a "withdrawn state". Furthermore, 87.5% of professionals have witnessed horses actively coping that then over a period of time changed into passive coping over the same stimulus. Because LH can only occur in mechanisms that are capable of active coping (McGreevy and McLean, 2009) these findings are essential and could serve as a steppingstone for further studies in the topic. In the hopes of using this study to set up further research investigating LH in horses, more applied studies will be required to identify these views in practice.

References:

- Fureix, C., Jégo, P., Henry, S., Lansade, L. and Hausberger, M. (2012) Towards an Ethological Animal Model of Depression? A Study on Horses. *PlosOne*. **7**(6), e39280
- Goodwin, D. (2007) Equine learning behaviour: What we know, what we don't and future research priorities. *Behavioural Processes*. **76**(1), pp.17-19
- McGreevy, P. and McLean, A. (2009) Punishment in horse-training and the concept of ethical equitation. *Journal of Veterinary Behaviour*. **4**(5), pp.193-197

Undergraduate Poster Presentations

Comparison of activation in thoracic stabilising muscles of horse-riders in a 2-point and 3-point seat at canter on a mechanical-horse.

*Curtis, M., *Hart, J.,*

Writtle University College, Chelmsford, UK

Keywords: Muscle Activation, Asymmetry, Performance

Introduction: A horse and rider combination performs challenging and complicated skills demonstrating their unity and work ethic; scientific research is directed towards equines behaviour, fitness and strengthening muscles through training. Equine performance and welfare has a direct correlation with rider's ability, posture and knowledge; rider core musculature is suggested to affect both horse and rider collaboration and performance (Hampson and Randle, 2017). Analysis of rider performance is limited, however, asymmetric loading from riders can cause discomfort and pain for horses among other issues (Byström *et al.*, 2020). This study investigates the rectus abdominis (RA) and erector spinae (ES) muscle activation using surface electromyography (sEMG) and is linked to pressure under the saddle using tekscan, displaying potential performance and welfare implications.

Method/ Materials: COVID-19 restrictions, required personal protective equipment to be worn by researchers and participants; eight volunteers with BHS stage 2 riding experience and above participated. sEMG was attached to the RA and ES and tekscan mean pressure was used to discover relevant data, comparing (1) rider musculature asymmetries and saddle pressure asymmetries, (2) comparison of light seat and full seat on RA and ES muscle activation and saddle pressure, and (3) additional abdominal muscular engagement in riders on RA and ES and its effect on saddle pressure. A mechanical horse in canter with a general-purpose saddle were used with all participants reducing variables and increase reliability and repeatability. Upon completion the data was studied through SPSS, version 27, Shapiro-Wilk normality test, paired t-test and Wilcoxon were used dependent on the parametric or non-parametric data outcome.

Results: The results for tekscan indicate a statistical significance ($p < 0.05$) for asymmetry in light seat only ($p < 0.009, 0.003$), however, sEMG displayed significance in full seat in ES ($p < 0.044$). Rider position, sEMG indicated in all ES conditions a significant difference ($p < 0.012, 0.012, 0.001, 0.005$) and in tekscan a significant difference was found to the right ($p < 0.022, 0.003$). sEMG displayed in all conditions, apart from ES muscle in light seat significance with an increase mean in additional activation (figure 1).

Undergraduate Poster Presentations

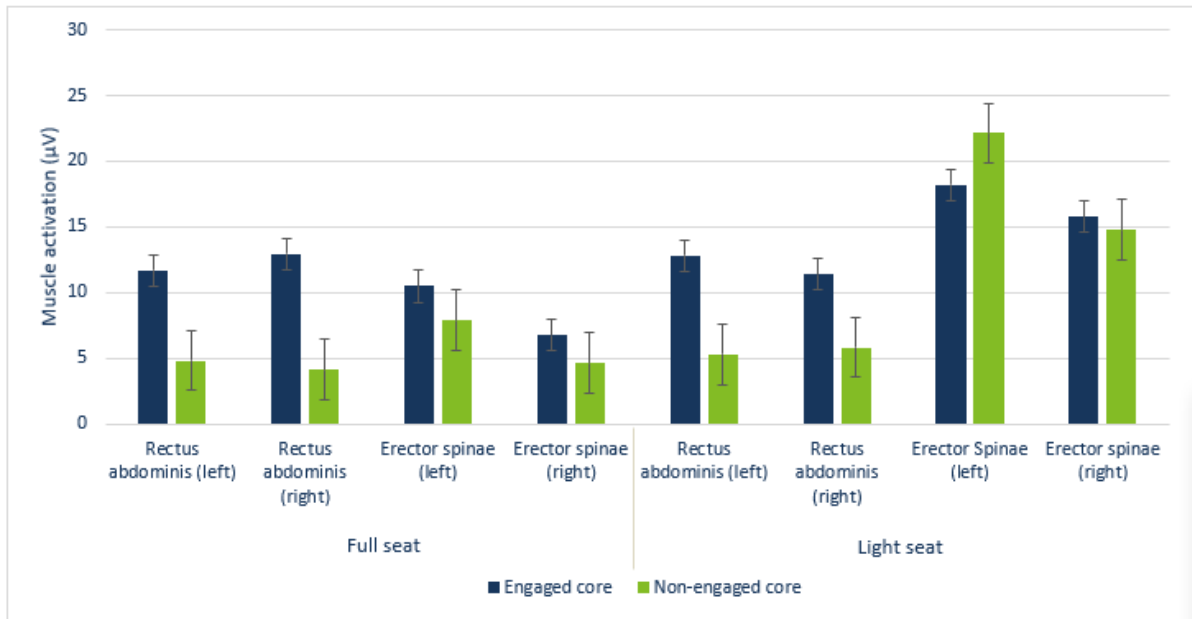


Figure 1: A bar chart to display the comparison of a contracted core to a core with has no additional contraction when riding in a full seat and light seat on the left and right of the RA and ES

Discussion/ Conclusion: Rider asymmetry may not stem from the RA or ES musculature and activating core muscles does not impact horse welfare due to no change in saddle pressure. The results do display a higher musculature activation and potentially a higher physiological demand present for both horse and rider in light seat. These results may highlight bodily areas which are at risk; such as lower back which has been previously reported as a common area of pain (Lewis and Kennerley, 2017) and the high muscle activation of the ES. Further research is required to understand how riders effect horse’s performance and indicates how riders improve their ridden ability by potentially performing core exercise programs and flexibility exercises to improve core activity and reduce tension through tight muscles within the trunk of the rider. Rider side dominance may have an association with horse sidedness and performing similar trials on horses to analyse stride length in the different conditions would be interesting.

References:

Lewis, V., Kennerley, R., (2017). A Preliminary Study to Investigate the Prevalence of Pain in Elite Dressage Riders during Competition in the United Kingdom. *Comparative Exercise Physiology*. **13**(4), pp. 259-263

Hampson, A., Randle, H., (2017). The Influence of an 8-Week Rider Core Fitness Program on the Equine Back at Sitting Trot. *International Journal of Performance Analysis in Sport*. **15**(3), pp. 1145-1159

Byström, A., Clayton, H., Hernlund, E., Roepstroff, L., Rhodin, M., Braganca, F., Engell, M., Weeren, R., Weishaupt, M., Egenvall, A., (2020). Asymmetries of Horses Walking and Trotting on Treadmill with and without a Rider. *Equine Veterinary Journal*. **53**(1), pp. 157-166

Thursday 1st July

Postgraduate Oral Presentations

Coaching in British showjumping; is long term athlete development (LTAD) plan being used efficiently

*Hilton, J and *Brigden, C*

University Centre Myerscough

Key words: Showjumping, Coaching, Athlete development, Retention

Introduction: Successful elite athletes have natural talent and likely have an underlying genetic predisposition, but it can still take 10,000 hours of training for a high-level performance (MacNamara *et al.*, 2010). Long term athlete development (LTAD) plan is a framework written in 2004 to identify and develop talented individuals and increase mass participation. It develops the understanding of maintaining a young person's motivation for sport to reduce the likelihood of drop out. LTAD plans are designed to create all round athletes that can deal with the psychological and physical pressures to become active for life. This study allowed comparative investigation of equestrian athletes' variables into drop out, to allow the analysis of whether the equine specific LTAD plan is effective in supporting riders' physically and psychologically. The aim of this research was to explore the factors which influence showjumpers' career experiences; to investigate understanding of the LTAD plan among equine showjumping coaches and riders; and to understand the pathways taken by international showjumpers.

Materials & Methods: Ten riders of varying levels were used for interviews; this decision was influenced from Guest *et al.* (2006) who stated interviewing should take place until data saturation. There were two groups of riders; five that currently compete with British Showjumping at international level and five that had dropped out from the sport. Additional questions were asked if they held coaching qualification. Three podcasts called "Under the Saddle" by Adam Cromarty were also analysed, which explored personal experience and the differences between coaching. Transcripts were coded line by line, inductively by the researcher to start and agreed by the supervisor. Thematic analysis was then used to find codes throughout the work which were collated into themes and linked to compose theories (Guest *et al.*, 2011).

Results: Improving coaching was felt to be needed to improve athlete quality and retention within the sport. The LTAD plan has had a positive impact but could be better implemented. The thematic analysis was used to generate the following six hypotheses as per Sullivan & Sargeant, (2011).

Postgraduate Oral Presentations

- H1 - Relationship with all involved is important
- H2 - Motivator needs to be sustainable
- H3 - Mentorship in a coach is important
- H4 - Qualifications need to be improved
- H5 - Rider needs physical and psychological support mounted and unmounted
- H6 - LTAD plan needs better implementation and development

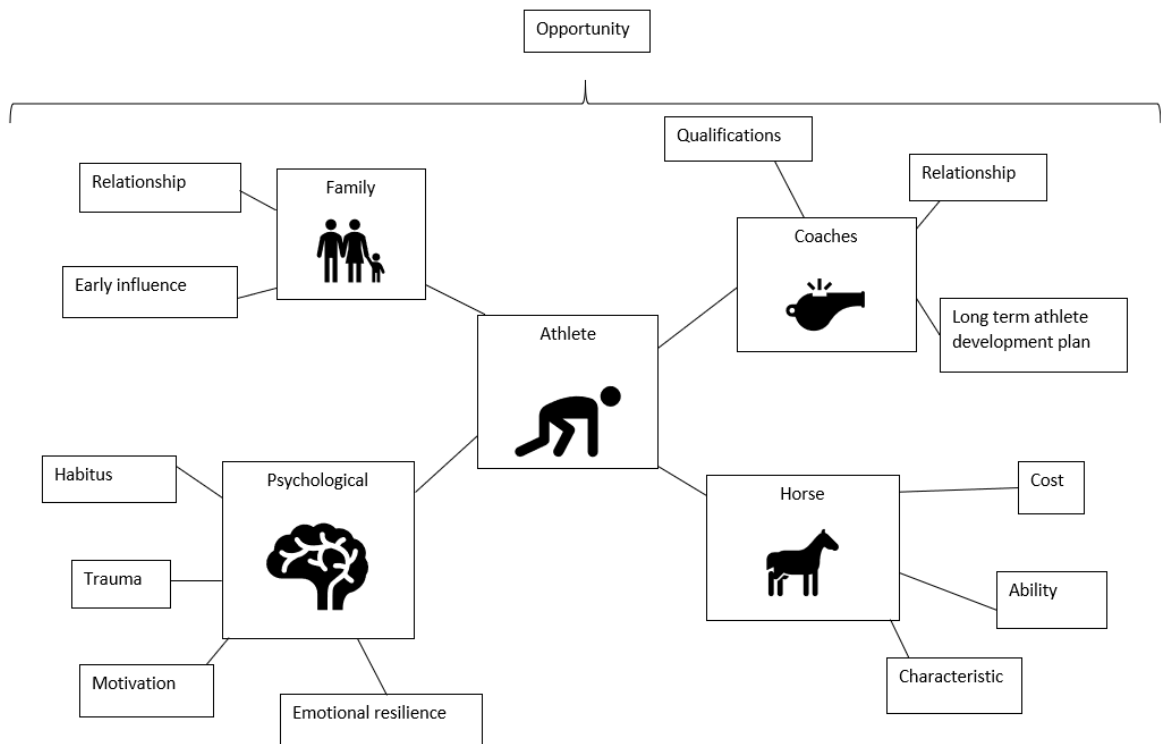


Figure 1 – Conceptual model to show initial factors affecting active and drop out equestrian athletes.

Discussion & Conclusion: Within showjumping each rider had a unique experience and many factors affect athletes as seen in figure 1, but riders felt that positive relationships, correct strategy, and mentorship could help long term participation and development. All coaches felt better implementation of the LTAD plan was needed, along with other factors to improve the sport. Barriers of participation have been recognised and overcome with mental resilience. To conclude, this research showed that further development of a sport specific LTAD plan could better support coaches and athletes with suggested areas being psychological and mindset.

Thursday 1st July

Postgraduate Oral Presentations

References

Guest, G., Bunce, A., & Johnson, L., 2006. How many interviews are enough? An experiment with data saturation and variability. *Field Methods*, 18(1).

Guest, G., MacQueen, K.M. and Namey, E.E., 2011. *Applied thematic analysis*. Sage Publications.

MacNamara, Á., Button, A. and Collins, D., 2010. The role of psychological characteristics in facilitating the pathway to elite performance part 1: Identifying mental skills and behaviors. *The sport psychologist*, 24(1), pp.52-73.

Sullivan, G.M. and Sargeant, J., 2011. Qualities of qualitative research: part I. *Journal of graduate medical education*, 3(4), p.449.

[Under the Saddle with Adam Cromarty \(horsenetwork.com\)](http://horsenetwork.com)

Postgraduate Oral Presentations

The Effectiveness of the ‘Activate your Seat’ Training Programme in Horse Riders.

Ure, K¹., Leśniak, K¹., Nankervis, K¹.

¹ Hartpury University, Hartpury, Gloucestershire, GL19 3BE

Keywords: Rider, Fitness, Performance

Introduction: The rider is required to maintain postural control and be balanced and co-ordinated with their horse (Williams and Tabor, 2017). Off-horse training programmes are increasingly used by riders aiming to improve on-horse performance. This project assessed the effectiveness of the Activate Your Seat resistance band training programme on rider functional movement and riding performance.

Materials & Methods: Nine female riders, aged 19-44 years, from various disciplines and levels participated in a 4-week Activate Your Seat programme. Riders were assessed using the Functional Movement Screen (FMS), Toe Touch Test (TTT), Wall Sit Test (WST) and Sport Specific Plank Test (SSPT) via online meetings in Microsoft Teams the week prior to (week 0) and the week after (week 5) the 4-week programme. A control group (n=7) completed the same tests at weeks 0 and 5 but did not use the Activate Your Seat programme. All riders completed questionnaires providing anthropometric data, activity levels, previous injuries, riding discipline and level. Video footage of riders completing a bespoke designed prelim level dressage test allowed riders’ to be analysed by a qualified coach qualitatively on-horse in walk, trot and canter on both reins providing lateral, anterior and posterior views. Differences within groups between weeks 0 and 5 were analysed using the Wilcoxon signed rank test (IBM SPSS version 26). The Mann-Whitney U test was employed to assess differences between the groups at the two time points. The Spearman’s correlation test assessed how rider variables correlated against fitness tests and exercise levels. This study was approved by the Hartpury University Research Ethics Committee (ETHICS2020-120-LR).

Results: Between weeks 0 and 5, the training group’s total FMS scores (p=0.007), rotary stability (p=0.034) and trunk stability (p=0.024) increased significantly. Post training, the training group scored significantly higher in the in-line lunge (p = 0.012) and hurdle step (p=0.031) tests than the control group. The TTT was significantly positively correlated with age (p=0.027), weight (p=0.016) and height (p=0.043). A significant negative correlation between competition level and additional activity level (p=0.016) was recorded, with 66% of participants carrying out little to no additional exercise. Five participants (training n=4, control n=1) made improvements in ridden symmetry and kinematic position during the study, all also improved their total FMS score, three improved their WST time and four improved their SSPT time.

Thursday 1st July

Postgraduate Oral Presentations

Discussion & Conclusion: The average total FMS score in week 0 showed riders were predisposed to injury, however, by week 5 the training group improved to a level within the healthy range for active individuals (Cook, 2010). The negative correlation between competition level and activity level supports Douglas (2017) in suggesting higher level riders partake in less, but more targeted training, although this study showed higher level riders participated in less targeted exercise than lower level riders. The variables correlating with the TTT may be specific to the riding population, as riders require a strong and supple seat. In conclusion, the Activate Your Seat programme was effective in improving riders' functional movement, strength and riding position, and riders participating in the programme were three times more likely to improve their ridden performance.

Acknowledgements: Thanks to Maeve Sheridan (Founder of Activate Your Seat) for her support in resourcing the equipment for the study and delivery of the training programme.

List of References:

Cook, G., 2010. *Movement Functional Movement Systems: Screening, Assessment, Corrective Strategies*. 1st ed. On Target Publications.

Douglas, J., 2017. 'Physiological Demands of Eventing and Performance Related Fitness in Female Horse Riders.' PhD. University of Worcester.

Williams, J. and Tabor, G., 2017. 'Rider impacts on equitation.' *Applied Animal Behaviour Science*, **190**, pp. 28-42.

Postgraduate Oral Presentations

Anticipation of trotting: is there an effect on the horse and rider?

Reega, S.J.¹, Lancaster, B.E.^{1}, and Randle, H.^{2*}*

¹The Royal (Dick) School of Veterinary Studies, The University of Edinburgh, Easter Bush Campus, Midlothian, United Kingdom

²School of Animal and Veterinary Science, Charles Sturt University, Wagga Wagga, NSW, Australia

Key words: heart rate, behaviour, welfare, stress

Introduction: Human stress, including that caused by anticipation, may affect the human-horse connection in terms of horse welfare, equestrian performance, and human safety. Research examining the effect of rider stress on the horse's physiological and psychological state remains limited (König von Borstel et al. 2017). The aim of this study was to examine the effect of novice rider anxiety resulting from anticipation of a walk-to-trot transition on horse stress, as quantified by changes in horse heart rate and behaviour.

Materials & Methods: Seven human participants were recruited for the study. Eligibility was based upon both self-identified feelings of anxiety regarding trotting and lack of previous riding experience. The control rider had 19 years of riding experience and did not report any anxiety about performing sitting trot in the trial scenario. The four horses in the study were involved in a beginner to intermediate level lesson program at least once per week. Eleven horse-rider pairs (comprising four horses, seven novice riders who had confirmed feelings of anxiety via questionnaire/survey prior to commencing the study, and one control rider) took part in ridden trials (control rider=4 control trials) involving activities typical of a novice-level riding lesson. The stated objective of the trial was that the rider would perform sitting trot for approximately five strides between a set of cones for a total of four passes. Horses were led by an experienced leader for the duration of each trial. Horses and riders were equipped with heart rate monitors, and horse behaviour was recorded. A post-ride survey was completed by every rider indicating their level of anxiety throughout each stage of the trial. Heart rate and behaviour data were analyzed for predetermined phases of the trial. Horse behaviours which may indicate stress (head toss, ears pinned, head raised, head down, head shake, head turn, moving tail, defecation, bite at leader) were quantified in post-hoc recordings utilizing The Observer XT 15 software. Rider and horse HRs were visualized using Kubios Standard software. JASP statistical software was utilized to determine normality and subsequently to conduct Kruskal-Wallis tests and paired sample Wilcoxon signed-rank tests on stress-related measures of both horse and rider.

Results: Heart rate and behavioural data were nonparametric. Rider HR was higher ($p < 0.05$) when being introduced to trotting for the first time compared to warm-up, and rider HR was

Postgraduate Oral Presentations

higher ($p < 0.05$) during the preparation to trot phase compared to during the introduction to trotting and to all other phases of the trial (Figure 1). No effects were seen with the control rider (all $p > 0.05$). Neither horse HR nor behaviour differed significantly between phases of the trials with novice riders (all $p > 0.05$).

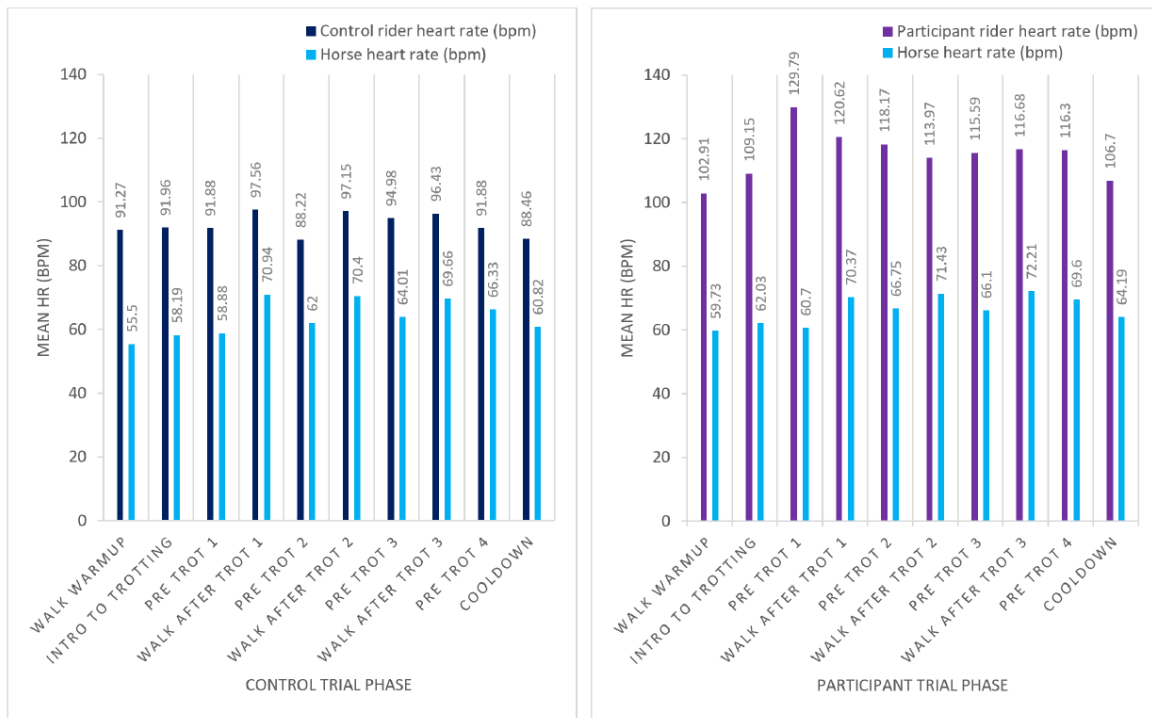


Figure 1. Rider & horse mean heart rate in measured phases of control trials (left) & participant trials (right)

Discussion & Conclusions: Overall, novice rider anxiety regarding trotting did not appear to have a significant effect on the horse’s physiological or psychological state based on the parameters measured. One possible reason for the absence of observable effect on the horse was the lack of direct physical influence which nervous riders had on the horse due to a consistent, pre-determined rein length and the presence of a horse leader, which contrasts with previous research (Keeling et al. (2009). Contrary to common belief, individuals who report as fearful or hesitant may not actually have a negative impact on the horse (Merkies et al. 2014). The lack of apparent stress in horses observed in this study has positive implications in relation to equine welfare in a wide range of equestrian contexts.

Thursday 1st July

Postgraduate Oral Presentations

References:

Keeling, L. J., Jonare, L., & Lanneborn, L. (2009). Investigating horse – human interactions: The effect of a nervous human. *The Veterinary Journal*, 181(1), 70–71.

König von Borstel, U., Visser, E. K., & Hall, C. (2017). Indicators of stress in equitation. *Applied Animal Behaviour Science*, 190, 43–56.

Merkies, K., Sievers, A., Zakrajsek, E., MacGregor, H., Bergeron, R., & von Borstel, U. K. (2014). Preliminary results suggest an influence of psychological and physiological stress in humans on horse heart rate and behavior. *Journal of Veterinary Behavior: Clinical Applications and Research*, 9, 242–247.

Thursday 1st July

Postgraduate Oral Presentations

A scientifically grounded case study to explore how a self-care intervention can help an elite rider manage their stress recovery balance and enhance their well-being.

Dampney, S, Davies, E, & Collins, R*

Hartpury Sports Academy, British Psychology Society, Health Care Professionals Council (HCPC), Hartpury University, Hartpury, Gloucestershire, England

Key words: Sport Psychology, stressors, equestrian, energy

Introduction: There is currently scarce evidence of self-care research amongst equestrian athletes. Equestrian sports have additional stressors such as aesthetic requirements, challenging training routines and daily demands of owning and looking after horses, as well as the potential physical risks associated with riding (Butler-Coyne, Shanmuganathan-Felton & Taylor, 2019). This may create a further strain on resources leading to a more stressful lifestyle, which has been shown to be an additional mental health risk factor (Schinke, et al., 2018). The aim of this case study was to explore whether a self-care intervention improved the stress recovery balance and well-being of an elite equestrian athlete.

Material & Methods: A single case A-B experimental research design was used. The data were collected over six days on two occasions whilst the rider carried out their normal routine of training at home, approximately three months apart, using a biofeedback device: *Firstbeat Bodyguard 2*. This is a heart rate variability (HRV) device that captures R-R intervals and movement data continuously. The World Health Organisation-Five Well-Being Index (*WHO-5*) measured participant's well-being. Between the data collection points, an intervention was introduced to the participant. A thorough debrief of Assessment A was facilitated to recognise the key areas of the participant's routine that would benefit from self-care activities. A single session was used to introduce the brief intervention highlighting the specific self-care activities. The participant then had time to implement these strategies before Assessment B, which was then debriefed, noting intervention adherence and the impact of these self-care activities.

Results: Visual analysis of the data (the traditional way of evaluating single case designs, Gage & Lewis, 2013), shows an improvement in the participant's stress-recovery balance. The lifestyle assessment score, stress and recovery balance and restorative effect of sleep all increased by at least 20%, as shown in Table 1.

Visual inspection of the daily measurements showed that during Assessment B the stress and recovery balance score was higher every day (positive improvement), the amount of stress reactions were similar between the two assessment periods, but the amount of recovery

Postgraduate Oral Presentations

reactions were higher. Daytime recovery was markedly higher in the second week, as was the restorative effect of sleep. See Table 2.

Table 1: Overall scores pre- and post-intervention

	A (/100)	B (/100)	Difference	% improvement
Lifestyle assessment score (0-100)	70	85	+15	21%
Stress and recovery balance (0-100)	49	73	+24	49%
Restorative effect of sleep (0-100)	61	87	+26	43%

Table 2: Visual comparison of daily measurements

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Overall stress and recovery balance (scale of 0-100) ^a	40	n/a	52	51	54	n/a
^b	75	69	53	n/a	95	
Amount of stress reactions (%) ^a	22	19	27	21	27	40
^b	23	23	33	13	20	
Amount of recovery reactions (%) ^a	23	9	23	25	25	2
^b	33	30	25	32	36	
Daytime recovery (mins) ^a	0	15	63	18	43	17
^b	13	31	30	49	136	
Restorative effect of sleep (0-100) ^a	63	n/a	54	71	75	n/a
^b	98	97	66	92	85	
Length of sleep (hr, min) ^a	8h 57	8h 3	8h	8h	7h	n/a
^b	8h	9h	8h45	8h	8h	

^a Assessment A scores

^b Assessment B scores

Postgraduate Oral Presentations

Visual analysis of the scores shows that the WHO-5 scores increased over the duration of the intervention, as shown below in Table 3.

Table 3: Table outlining the Who-5 scores throughout the intervention

	24 th January 2021	18 th February 2021	24 th March 2021
I have felt cheerful and in good spirits	4	4	5
I have felt calm and relaxed	3	4	4
I have felt active and vigorous	3	4	5
I woke up feeling fresh and rested	3	4	5
My daily life has been filled with things that interest me	5	5	5
Total	16	21	24
Total (multiplied by 4)	72	84	96

Discussion & Conclusions: Findings suggested that a self-care intervention is effective for increasing recovery and well-being. The athlete reported that the intervention strategies she had been introduced to had made her feel much better, she had more energy and she no longer felt ‘all-consumed’ by the horses. This case study is a positive first step in recognising that the subject of self-care and well-being needs more attention in the equestrian industry. In order to reach the high number of equestrian athletes in the UK, national governing bodies need to be made aware of the findings and implications. Equestrian athletes can then be educated about the physical and mental impact that their stress-recovery balance can have on them and be made aware of the behaviours that can increase recovery. Self-care behaviours can make a significant difference to an equestrian athlete’s mental health and they can be easily incorporated into athletes’ current routines.

References

Butler-Coyne, H., Shanmuganathan-Felton, V. and Taylor, J., 2019. Mental Health in Equestrian Sport. *Journal of Clinical Sport Psychology*, 13(3), pp.405-420.

Gage, N.A. and Lewis, T.J., 2013. Analysis of effect for single-case design research. *Journal of Applied Sport Psychology*, 25(1), pp.46-60.

Schinke, R.J., Stambulova, N.B., Si, G. and Moore, Z., 2018. International society of sport psychology position stand: Athletes’ mental health, performance, and development. *International journal of sport and exercise psychology*, 16(6), pp.622-639.