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Foreword – Emerging issues in equestrian practice

Equestrianism is popular worldwide, with millions of horses and riders participating in competitive horse sports and non-competitive leisure riding (Williams and Tabor, 2017). Horse sports and related activities can also represent significant financial assets to many global economies, for example in the United Kingdom, the economic contribution of the equestrian sector was reported to be £4.7 billion in 2019 (BETA, 2019). Horse riders, owners and trainers are responsible for the management of their horses and have a duty of care to engage in practices which optimise equine health and welfare, and that promote ethical equitation practices (McLean and McGreevy, 2005). To discharge this duty of care, equestrians need to demonstrate they have met the moral and legal obligation to ensure the safety and welfare of others [the horse/s] (OED, 2019). Equestrian practice is multifaceted and to achieve optimum management due consideration of appropriate nutrition, housing, expression of normal behaviour including socialisation, the application of ethical riding and training practices, as well as ensuring the horse is sufficiently prepared in terms of fitness and skills development to meet the demands of the workload or competition expected is required (Williams, 2013). However, within worldwide recreational equine populations, a substantial proportion of welfare issues reported are associated with neglect due to owner or rider ignorance (Hemsworth *et al.*, 2015). Examples of poor knowledge contributing to poor welfare through increased injury can also be found in competitive equestrian disciplines, for example recent work in international endurance racing has identified that race pacing strategies which incorporate elevated average speeds and fast initial loops increased elimination and reduced completion rates in 120 km races (Marlin and Williams, 2018). Whilst industry guidelines exist for some aspects of management, such as feeding protocols and stable size, these are limited within wider equestrian practice, where many accepted practices are predominately based on anecdotal and historic methods (Van Weeren and Back, 2014; Williams and Tabor, 2017). Therefore, further work exploring the effectiveness and impact of equitation practice, equine management and training techniques on equine performance and welfare is warranted.

Equestrian sports, and equestrian practice more generally, are becoming subject to increasing public scrutiny, with non-equine stakeholders questioning if traditional training and management practices are ethical and necessary. This has led broader animal welfare advocates to introduce the debate that equestrianism requires a social license to operate (SLO) in the modern era. The concept of SLOs come from resource-based industries, where they were implemented to showcase their legitimacy to users and consumers because their practice was seen to cause environmental damage or be unethical (Duncan *et al.*, 2018). The implementation of a SLO provides a framework for an industry, sector or sport to define the boundaries in which they operate. Usually four key aspects are integrated into SLO development: legitimacy, trust (procedural), transparency and communication (Duncan *et al.*, 2018). These facets are not easy to achieve and the complexity of the horse-human relationship, and the multiple ways human engage with horses: recreationally, in sport, and as agricultural and working animals complicate developing a framework further. Add to this the international variation in equine management practices and different cultural

perspectives, then achieving global agreement on a SLO to protect equine welfare is challenging. Perhaps an effective starting point is to consider the four cornerstones of SLO development and to work towards developing an evidence-based approach where global equestrian practice can be seen to achieve, or be working towards achieving, these fundamental requirements. Legitimacy is defined as confirming to the rules or laws, or to be able to be defended with logic or justification (validity) (OED, 2019). For equestrian practice to operate legitimately then the management, training and ridden practices we adopt with our horses should be able to be fully justified and their purpose clearly articulate with the outcome observed.

Equestrian sport and practice are steeped in tradition and many existing training and management practices are based on anecdotal and historic methods rather than scientific evaluation of their effectiveness (McLean and McGreevy, 2010; Williams and Tabor, 2017). Evidence-based practice should be the cornerstone of an approach that encourages individuals to use the best evidence possible when making decisions about the methods, treatments and actions

employed to achieve their goals and to enable them to form a moral judgement as to whether their decision making is ethical (Waran and Randle, 2017; Williams and Tabor, 2017). Applying this approach would also underpin the concepts of trust and transparency with the SLO model. Whilst trust should exist in procedural and regulatory contexts, within equestrianism it could also be argued that trust should equate to human responsibility or duty of care to safeguard the health and welfare of the horses that are our partners. If trust is established and key stakeholders across the equine industry are using an evidence-based approach to underpin their decision-making, then transparency should follow as in essence the industry would 'have nothing to hide'. However, the horse-rider/owner relationship is complex, with the experience of the owner/rider influencing their riding capabilities, decision making and management of the animal's health and welfare (Williams and Tabor, 2017). Developing and maintaining a strong positive horse-human relationship can promote positive welfare and management, while the breakdown of this relationship is often associated with deficits within equine management and training systems (Holcomb *et al.*, 2012). Therefore understanding human behaviour and decision making is essential to create a positive horse-human relationship, both for riders and owners when working with their horses, but also for coaches, trainers, peers and the wider veterinary and ancillary teams, that support individual horse-rider performance, regardless of the level they ride at.

Education and research have a key role to play within the final construct of the SLO model: communication, as these stakeholders will produce the evidence base which is required to enable legitimacy, trust and transparency to be established across equestrian practice. Now is not the time for scientists to sit in ivory towers; the equine sector requires industry and researchers to work together to design and undertake projects that both parties value as valid and reliable (Williams, 2013). Alongside this, effective dissemination of research outputs is required to enable the wider equestrian professional and public to become aware of the growing evidence base, and to be able to judge this effectively, to enable them to use this information to make informed decisions when they are managing their horses. Self-evaluation, self-efficacy, confidence and knowledge are core attributes that inform effective decision-making and translate to successful careers or performance in sport. Interestingly, a recent preliminary study (Marlin *et al.*, 2018) found equestrians had inflated confidence in their equine related knowledge and demonstrated the Dunning Kruger effect, regardless of qualification level. This phenomenon identifies that people who perform poorly in social, and/or practical and/or intellectual domains are often unaware of how deficits that exist in their knowledge or expertise affect their practice, i.e. '*if you are incompetent, you can't know you are incompetent*' (Dunning, 2005). If, as the results indicated, equestrians had only moderate insight into their

abilities and think they know more than they actually know, then this over confidence could have serious consequences on the welfare of horses and reemphasises the need for improved education across the equestrian sector before the principles of SLO can be applied at the individual horse and owner/rider level.

This 'Equestrian Practice' special issue showcases research which has explored the complexity of the horse-rider relationship and evaluates how management and training practices can influence the performance of the equine athlete. The successful integration of sports science theory and technology to provide objective and repeatable data which can be used to inform evidence-based training approaches in racing is explored using qualitative interviews in Richardson *et al.* (2020). Thematic analysis identified that traditional attitudes and approaches are strongly embedded in racehorse training practices, and whilst the application of science is minimal, this was related more to the lack of a strong evidence base advocating its performance (winning) benefits and poor integration strategies. Trainers are willing to engage with science and research, but more effective dissemination strategies and educational initiatives are needed to showcase the potential benefits of applying an evidence-based approach to training. Objective assessment of progress during equine rehabilitation programmes is another area which is currently lacking in equestrian practice. Tabor and Williams (2020) apply a human practitioner perspective to equine physiotherapy practice, reviewing what existing objective measures exist for the veterinary physiotherapist, clinician or owner to reliably assess key outcome measures that denote progress during rehabilitation. Perhaps surprisingly no functional outcome scores, a common approach in human rehabilitation, are reported for the horse and the review concludes further development of this field incorporating combined assessment of pain, behaviour and validated outcome measures is warranted. Similarly, effective interpretation of performance data both in training and competition to identify trends that can be used to inform training and competition tactics is commonplace across human sports. Yarnell *et al.* (2020) utilised performance analysis techniques to evaluate if playing tactics and pony positions in Polocrosse were associated with an increased injury risk for participating ponies. Their work has identified ponies undertaking a defensive role in games were more likely to become injured and attain musculoskeletal injuries, perhaps due to the increased number of abrupt halts, sudden changes of direction and walk-gallop transitions they performed. These results represent the beginnings of an evidence base in polocrosse from which the sport can build to protect pony welfare and longevity.

Laterality, in horse and rider, is a key performance attribute in equine sports where the ability to perform symmetrically is of importance. Bystrom *et al.* (2020) review the existing

evidence base to determine if biomechanical (motor) laterality is inherent in clinically sound horse. They conclude that it is relatively straightforward to determine a horse's sidedness when working in a straight line but that measuring laterality and asymmetry in more complex ridden work is difficult. The concept that functional asymmetries exist in the horse and that whilst these may contribute to an individual's laterality, they may not be of sufficient magnitude to represent a detrimental influence on musculoskeletal health is further developed in Lesniak's work. Lesniak (2020) investigated if functional and non-functional conformational traits in event horses can predict individuals' future performance potential. Interestingly, event horses which had achieved a higher (advanced) level of competitive performance recorded increased symmetry in key traits such as metacarpal length and width and nostril length, which could potentially confer an advantage in competition. Finally, Merckies *et al.* (2020) applies an alternative approach to evaluate if thoracic asymmetry can be determined from analysis of retrospective saddle fitting. Using data obtained with a wither tracing tool they found 60% of horses, regardless of breed, sex, height, level of training or rider factors, demonstrated larger measurements on the left side of the thorax. However, whether this asymmetry is inherent or acquired, requires further work.

Across equestrianism there is increased interest to fully elucidate the impact of rider position, posture and practice on horse-rider performance. Randle and Loy (2020) pose the question that Da Vinci's Vitruvian man represents 'ideal' symmetrical geometric proportions and that this template could translate to ideal anthropometric values for the rider. Evaluation of measurements across 51 female riders found that only arm span, shoulder width and upper chest to top of the head in relation to height aligned with Vitruvian ratios. Whilst this evidence refutes the application of the Vitruvian approach to identify 'ideal' riders, it does suggest that rider height and arm length are key attributes which will influence riding ability, and therefore impact horse performance and welfare. The effect of different forms of tack on rider performance is also of interest across equestrianism. Bye and Lewis (2020) build on recent studies investigating the impact of stirrup length and type on rider position, by analysing the effect of riding in sitting and rising trot with and without stirrups. The use of the riding simulator removes potentially confounding variables the live horse could introduce as well as protecting equine welfare in case detrimental effects occurred. Mean and peak forces applied by the rider to the saddle and stirrups were measured in amateur female riders. The results suggest these riders applied increased pressure across the right-hand side of the rider-saddle interface accompanied by higher peak vertical forces unsurprisingly in sitting trot. In contrast, stirrup forces were larger on the left-hand side, suggesting some form of balancing mechanism is in action

and that asymmetry is a potential performance limiting factor in rider performance.

Throughout the research presented here, the practical impact of gaining increased insight into common equestrian practices is apparent. However, there are many questions that remain unanswered. Future studies exploring the role of the human within the horse-human relationship are essential. Understanding more about how human behaviour influences equestrian practice and informs rider owner decision making will support the development of interventions, enhanced education and dissemination strategies to enhance equine welfare through human behavioural change. Scope also exists to learn lessons from other sports, applying performance analysis techniques to the equestrian disciplines to develop more evidence-based approaches to training and competition tactics. Alongside these areas, as technology, diagnostics, nutritional science, veterinary medicine and our understanding of how horse's learn continue to advance a focus on the horse is warranted to ensure how we manage the health, welfare and training of our equine partners progresses at an equal pace to these. It is therefore essential that future research continues to apply a pragmatic approach to research combining industry and academic expertise to ensure validity, reliability and credibility are embedded in studies to further develop the existing evidence-base to support implementation of a personalised SLO approach within individual equestrians.

Guest editors special issue 'Equine practice'

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