

The Next Decade for Sport Horses Will Be the Time of Wearable Technology

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Received: 23 July 2023; Revised: 01 August 2023; Accepted: 03 August 2023; Published: 15 August 2023

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Ensuring a high level of horse welfare is a critical factor in contemporary equine breeding. In specific disciplines, horses in equestrian sports start their careers at a young age while still developing and being physically and mentally immature. The exercise session activates both behavioral and physiological responses, which serve as stimuli for adaptation. Scientific understanding of the stressful stimuli and training load associated with equestrian sports can greatly enhance the development of well-balanced training programs, promoting better sports results and overall well-being. Improving the quality and safety of sports competitions is a relevant scientific topic, both in humans, but especially in other animal species that do not have free will, such as horses. Trainers, owners, and veterinarians need to improve the functional capacity in conjunction with the well-being of the athlete's horse. In recent years, there has been a significant advancement in obtaining real-time data from athletic horses during training and equestrian competitions, leading to improved performance and injury prevention. The development of equipment attached to the horse's body, also known as wearable devices, is rapidly evolving. Wearable technology is a relatively new phenomenon related to equestrian sports, supporting biomechanics, cardiovascular, respiratory, and thermometry biometrics studies [1]. As a line of research, this trend can contribute to the generation of health indicators, which could help prevent heat stress, musculoskeletal injuries, and catastrophic events during the athletic life of horses. These devices can aid the lameness diagnosis by detecting

movement asymmetries and assessing fitness levels. Some researchers seek alternative methods to improve performance and preserve the equine athlete's health and safety. The areas of exercise physiology and biomechanics, when approached jointly, could be an interesting interface between sport science and equine culture. Some breeds of horses are used almost exclusively for sport, requiring technical and rational training programs. In the last two decades, there has been considerable progress in research in both areas.

The use of wearable sensors in athletic horses is extensive, encompassing all physiological and biomechanical information-gathering systems that a horse may carry during training and competitions. Wearables should accurately assess biometrics such as locomotion, plasma lactate, heart rate, heart rate variability, respiration rate, and impact forces.

In articles that address human training protocols, the authors often use the concept of external or internal load to prescribe and evaluate conditioning programs to optimize training adaptation. The load concept considers volume and intensity for training prescription. External load is represented by duration, frequency, distance covered, average and maximum speed, treadmill or track inclination, duration and number of steps, duration and number of strides, and support time; in other words, external stimuli induce internal physiological responses. Internal load indicates systemic physiological adjustments of athletes that occur due to stimuli caused by an external load. Both heart rate and blood lactate levels can

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serve as classic indicators to measure internal load during running exercise. In this way, the physical conditioning of athletic horses should employ a training load to induce specific physiological responses, such as angiogenesis and muscle hypertrophy, as well as an increase in cardiac output, among others. In this scenario, monitoring external and internal load during acute training sessions and, even in official competitions, from wearables devices become crucial to improve prescription accuracy and post-exercise recovery. These affordable measurements have been obtaining more and more support of recent validation and accuracy studies performed by research groups worldwide.

Conflicts of Interest

The author declares that there are no conflicts of interest.

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How to Cite

Ferraz GC. The Next Decade for Sport Horses Will Be the Time of Wearable Technology. *Int J Equine Sci* 2023;2(2):1–2.