

## **Validation of the Polar heart rate monitor for collection of heart rate variability measures in horses**

Devyn Enwright, Laurie McDuffee, Etienne Cote, William Montelpare

Department of Health Management (Enwright and McDuffee), Department of Companion Animals (Cote), Atlantic Veterinary College; Department of Applied Human Science (Montelpare), University of Prince Edward Island, Charlottetown, Prince Edward Island

Heart rate monitors can be helpful tools when studying as well as training equines. Heart rate variability (HRV) measures specifically can be used as objective data in equine studies investigating stress and pain. The equine Polar heart rate monitor and portable electrocardiogram (ECG) are the two most common methods of obtaining HRV data in horses. The portable ECG monitor is considered the gold standard method of obtaining data for HRV measures; however, these monitors are expensive making them cost prohibitive for use by many researchers. In addition, these monitors may not be accessible when research is conducted in the field. However, the use of the more accessible Polar monitor is still controversial and validation per study is recommended. The aim of this study is to validate the accuracy of the Polar monitor compared to the portable ECG for analysis of HRV measures during three activities. HRV data was obtained from horses using the equine Polar monitor and portable ECG simultaneously while they were free in the stall, tied, and walking, which allowed for comparison of measures. Time domain, frequency domain and non-linear HRV measures were analyzed using Kubios software and compared statistically. The descriptive statistics demonstrated consistency between methods within each activity. Preliminary analysis of mnHR, PNS, and SNS, during the activities, using the Bland-Altman method showed a 95% agreement between the data from the two monitors. Further analysis will be conducted for the remaining HRV measures across the three activities. The findings demonstrate that the equine Polar heart rate monitor is comparable in accuracy to that of the gold standard portable ECG in obtaining HRV data in horses.

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