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Validation of an accelerometer to quantify inactivity in laying hens with or without keel-bone fractures

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Abstract

Accelerometers are used to remotely monitor activity in various species in studies that quantify pain, document behavioural patterns, and measure individual activity differences. Studies validating accelerometers typically quantify various active states; however, targeting states specific to periods of inactivity, such as sitting, sleeping, and standing, has the potential to more accurately quantify inactive behaviours commonly associated with behavioural changes related to pain, sickness, or injury. Our objectives were two-fold: first, validate a commercially available accelerometer (Actical[®]) for quantifying inactivity in laying hens and, second, compare inactivity levels between hens with severely fractured keel bones and hens with minimal to no keel damage. Correlation between the inactivity level as measured by the accelerometer compared to live, focal observation of stationary, inactive behaviours was high; therefore, the Actical[®] accurately quantifies inactive states in laying hens. Following validation, the Actical[®] accelerometer was used to quantify inactivity level differences between hens with or without keel-bone damage. Severely fractured hens spent less time motionless, than hens with minimal to no keel damage. Further investigation into inactivity differences related to keel status before and after acquisition of keel fractures is warranted. Use of the accelerometer has the potential to improve animal welfare research by quantifying the effect of pain or sickness on activity level, mapping daily activity patterns, and measuring individual differences in general activity.

Keywords: accelerometer, activity, animal welfare, inactivity, keel bone, laying hen