

## Validating accelerometer technology to detect play behaviour in weaned dairy calves

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Animal welfare, in particular calf welfare, is an increasingly important subject that is gaining interest from multiple stakeholders within the dairy industry. The drive for higher welfare standards has increased the need for research to better understand the needs and nature of animals. Play behaviour is commonly observed in young animals and is regarded as an indicator of positive welfare states. Traditional observational methods of measuring animal behaviour can be labour intensive and impractical for on farm assessment or for studies of long duration. The increase in commercially available accelerometer technology has allowed for detailed analysis of animal behaviours, such as play, in a more efficient manner than continuous visual observations. Accelerometers have been validated for detecting play behaviour in newborn ( $\leq 48$  h old) calves but not in any other age group of cattle. Therefore the objective of this study was to determine the ability of accelerometers to detect play behaviour in weaned dairy calves. Eight weaned female Holstein-Friesian calves (aged 3-5 months) were recruited from a 50-cow dairy herd in central Scotland. Accelerometers (IceTag, Peacock Technology) were attached to one hindlimb of each calf for a 48-hour period. Sensor activity data including step counts, lying times and a measure of overall activity termed “motion index (MI)” were downloaded at the end of the study period in 15-minute intervals. Calf behaviour was filmed continuously over the same 48-hour period and analysed using one-zero sampling to identify the presence (1) or absence (0) of play within each 15-min interval corresponding to the IceTag data output. A significant, positive correlation between MI and visually recorded play was found ( $r=0.59$ ,  $p<0.01$ ) and therefore this output metric was selected for further analysis. Using 2x2 contingency tables and Classification and Regression Tree (CART) analysis, it was determined that the MI threshold which best correlated with visual identification of play behaviour was  $MI \geq 69$  (sensitivity = 94.42%; specificity = 93.60%; balanced accuracy = 94.01%). The results of this study suggest that IceTag generated MI data can be used as a more time efficient alternative to visual analysis to detect play behaviour in weaned dairy calves.