

Automated Detection of Lameness in Dairy Cows Using Measurements of Weight Distribution

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Introduction

Lameness in dairy cows may be difficult to detect by visual observation. The objective of the study was to assess whether measures of activity and how cows distribute their weight among their legs when standing can detect lameness.

Materials and Methods

From 45 lactating cows, daily lying time and number of steps per day for three days were recorded using activity loggers. On the third day, cows were gait scored using a 1 to 5 scale, and their weight distribution was measured with force plate scales. Using a gait score of 3.5 as the cut-off point, cows were classified as clinically lame or non-lame. Analyses were done with the LOGISTIC procedure of SAS.

Results

Daily lying time and number of steps per day did not differ between lame and non-lame cows ($P > 0.10$).

The variability over time (standard deviation (SD)) of the weight applied to the back legs (measure of weight shifting between the back legs) was the best predictor of clinical lameness. The odds of being clinically lame increased by 1.57 for each 11 lb (5 kg) increase in the SD ($P_{\text{Wald}} = 0.005$; 95% confidence interval = 1.14 to 2.15) and the SD accounted for 28% of the variation in the risk of being clinically lame.

Significance

Measures of weight shifting between legs while cows are standing show great potential as an automated method of detecting lameness. This method may provide a tool for future evaluation of lameness therapies.