

Using accelerometers to monitor calf behavior

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Accelerometers have been validated for measuring dairy cow activity. These devices generate activity data that indicate oestrus and are currently being assessed for monitoring health in adult animals. Young calves spend the majority of their time lying down. Previous intermittent studies of calf behaviour show that the amount of time spent lying decreases with ages. The aim of the present study was to use accelerometers to continuously monitor lying times and activity in calves during the milk-fed phase of rearing. Dairy heifer calves (n=18) were recruited on the day of birth (day 0). IceQubes (Ice Robotics Ltd, Edinburgh, UK) were attached to their left foreleg to measure the amount of time spent lying down and the number of steps taken. The calves were removed from their dams as soon as they were dry and housed in an individual straw-bedded hutch. Twice a day (6:00 - 7:00 and 15:00 – 16:00) they were fed 2.8 litres milk replacer (Advance Superstart; 23% crude protein, 20% oil; 150 g/litre) from teated bottle. Concentrates and fresh water were available ad libitum throughout. Manual observations of the activity of 5 calves were conducted across 2 days to validate the IceQubes. There was a positive correlation between the two measures of time spent lying down ($r^2=0.89$, $p<0.001$). The amount of time spent lying down depended on the age of the calves. During their first day (day 1) calves spent 20.5 ± 0.40 h lying down. This had fallen to 18.9 ± 0.37 h/d ($p=0.006$) by day 4 and 17.6 ± 0.35 h/d ($p<0.001$) by day 10. From day 14 to 35 lying times were similar (17.0h/d). Lying time and steps showed a diurnal pattern with the greatest amount of time spent lying down from 1:00 to 6:00 and 19:00 to 24:00 and the least amount of time spent lying down from 7:00 to 8:00 and 15:00 to 16:00. Steps increased co-incident with the reduction in lying time. The extent of the change in diurnal pattern was greatest in older calves. Activity monitors show changes in calf activity with age. Further studies are necessary to show whether they can be used to assess health status of calves.

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