Behavioural Changes of Dairy Cows During Drying-Off Using Abrupt Cessation of Milking

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The dry period between successive lactations is crucial for regeneration of productive function of mammary tissue, and preparation for high production in the subsequent lactation. Commercial herds largely use abrupt cessation of milking for drying-off. In addition, antibiotic therapy, with or without teat sealants, is used to prevent new intramammary infections (IMI). With continually increasing production levels over time, the stress of abrupt drying-off could be a welfare concern,[1] as well as an increased risk period for new IMI.[2] To minimize production, some producers feed diets of reduced energy density, and/or decrease milking frequency. Decreased milk production associated with decreased energy density has been found to increase lying time.[3] However, general behavioural changes associated with abrupt drying-off remain largely unknown. New monitoring technologies offer the opportunity to study cow behaviour without intensive and laborious time-lapse video recording. The objective of this project was to document the changes in standing and lying behaviour following drying-off by abrupt cessation of milking, and to evaluate the impact of parity number and production level.

Materials and Methods

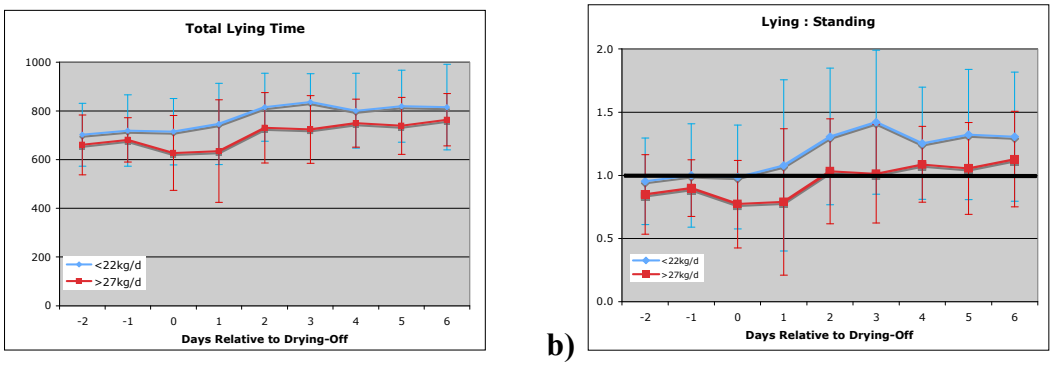
From June to October 2009, 76 cows from a commercial free-stall herd milking three times per day were enrolled onto this study. Prior to drying-off, cows were fitted with HOBO® data loggers (HOBO Pendant G Data Logger, Onset, Pocasset, MA) on the outside of the right hind leg, parallel to the floor (longitudinally), at about 10cm above the fetlock. The last milking before drying-off occurred at noon (d 0, noon). The HOBO® device was set to commence recording at 7am, two days prior to drying-off, and to continue for six days following drying-off. The HOBO® device time-stamps leg orientation at 1 min intervals to allow for determination of lying and standing activity. Data was analyzed to calculate total lying time, average time per lying bout, frequency of standing bouts, and the ratio of lying to standing, on a per day basis. These behavioural indices were calculated by production level (<22kg/d versus >27kg/d for 10 days prior to drying-off) and by parity (lactation 1 versus lactation 2+).

Results and Discussion

By production level, there were 26 low production (<22kg/d) cows, and 24 high production (>27kg/d) cows that averaged 17.92 ± 3.17 kg/d and 30.49 ± 2.54 kg/d, respectively. By parity, 26 lactation 1 cows and 46 lactation 2+ cows were enrolled with production levels of 25.46 ± 5.13 kg/d and 22.76 ± 5.38 kg/d, respectively. It is noteworthy that lactation 2+ and low production cows dried off at higher average DIM than the lactation 1 and high production groups (340 and 350 versus 324 and 318, respectively).

Cows at high production levels had lower lying times, of approximately 40 min less per day, leading up to drying-off. High production cows also showed a greater average reduction in lying time (53.9 min) on the day of drying-off. Alternatively, low production cows decreased lying

time by only 4.6 min. Lying times significantly differed on d 1 ($p<0.05$) and d 3 ($p<0.005$) by over 100 min. Both groups increased their lying time by d 2 after drying-off. Specifically, high versus low production cows increased lying time by 96.8 min compared to 68.7 min, respectively. Figure 1 a) shows the lying times of both groups over the 9 days and 1 b) displays the lying to standing activity ratio.



a) b)

Figure 1: Activity measures for dairy cows by production level at drying-off (<22kg/d versus >27kg/d), showing **a)** total lying time per day and **b)** the ratio of lying : standing per day.

Lactation 2+ cows steadily increased their lying time by almost 100 min from d -2 to d 3. Comparatively, lactation 1 cows showed a marked reduction in lying time from drying-off to d 1 (83.2 min). Lying times differed between groups by 179.3 min ($p<0.001$) on d 1. Lactation 1 cows increased their lying time by d 2, but the average lying time was still 43.1 min less than lactation 2+ cows.

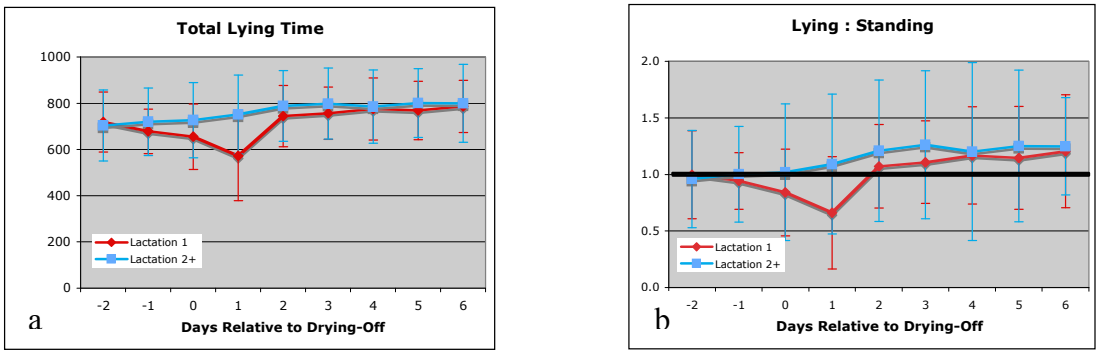


Figure 2: Activity measures for dairy cows by lactation number (lactation 1 versus lactation 2+), showing **a)** total lying time per day and **b)** the ratio of lying : standing per day

Conclusions

High production and first lactation cows experienced greater decreases in lying time following abrupt drying-off. These changes in behaviour may be indicative of greater discomfort experienced by these groups when dried off by the abrupt method, and the need for management intervention.

References

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