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Reciprocated cross sucking between dairy calves after weaning off milk does not appear to negatively affect udder health or production

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ABSTRACT

Cross sucking by dairy calves occurs most commonly before weaning, but is of most concern in older animals where it has been claimed to cause mastitis and udder damage. Providing ad libitum milk allowance via a teat and gradual weaning reduces cross sucking, but low levels of this behavior still persist. Our aims were to understand why this behavior persists in some calves after weaning off milk and to examine whether individuals which are cross sucked postweaning are more likely to sustain teat injury or develop mastitis during their first lactation. Fifty-six female Holstein calves were housed in groups of 8 and fed milk, grain, and hay ad libitum from automated feeders. During weaning, milk allowance was gradually reduced according to grain intake. Cross sucking was recorded using overhead video cameras (5 observation periods of 72 h). The effects of weaning on cross sucking were examined; to examine whether cross sucking affected udder health, all incidences of damaged quarters or clinical and subclinical mastitis in the first lactation were recorded, as was milk production. The overall level of cross sucking after weaning, at 4 to 5 mo of age, was low and a small proportion of individuals accounted for the majority of events. The duration of cross sucking that occurred at 4 to 5 mo of age was correlated with the amount of cross sucking done before and immediately after weaning. After weaning, the calves that cross sucked did so on certain calves, with the most sucked calf within each pen accounting for 73.98% of all cross-sucking events. No relationship was found between cross sucking and being cross sucked in the period before weaning but a positive correlation was found by 4 to 5 mo of age. The majority of calves reduced or ceased cross sucking after weaning. Individuals still observed to be cross sucking by 4 to 5 mo of age had formed pairs with other cross-sucking individuals and cross-sucking events occurred almost exclusively between these pairs. Cows that were cross sucked as heifers were no more likely to develop mastitis or have higher somatic cell count in their first lactation than those which were not involved in cross sucking. Cross sucking typically begins before weaning, but the formation of lasting pairs of reciprocal cross-sucking partners after weaning may be responsible for this behavior persisting in group housed dairy calves after weaning off milk. Low levels of cross sucking did not appear to have a negative effect on udder health.
Key words: dairy calf, cross sucking, weaning, social behavior, mastitis

INTRODUCTION

Cross sucking, which involves one calf sucking on another calf, can occur in group-housed milk-fed dairy calves. Although most calves cease this behavior once weaned (Lidfors, 1993), it may sometimes continue in older animals (Keil and Langhans, 2001; Keil et al., 2001; de Passillé et al., 2011) where it is thought to cause udder deformations, mastitis, and milk loss (Lidfors and Isberg, 2003). As a result, cross sucking may contribute toward the reluctance of some farmers to adopt group housing of pre-weaned calves.

Evidence indicates that cross sucking before and during weaning may reflect inadequate milk or energy intake (Jung and Lidfors, 2001; Roth et al., 2008) and be affected by weaning method (Roth et al., 2008). Although it has been demonstrated that cross sucking can be reduced by increasing milk allowance and an appropriate outlet for sucking behavior (Jung and Lidfors, 2001), this behavior is also observed in calves provided ad libitum milk via a teat, albeit at lower intensity. Typically cross sucking is directed toward a small proportion of calves within a group (Laukkanen et al., 2010) with the result that even a low overall occurrence of this behavior may be problematic for individual animals.

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Many studies cite cross sucking among weaned calves as a risk factor for udder damage or development of mastitis in lactating cows (Špinka, 1992; Keil et al., 2000, 2001). It has been hypothesized that cross sucking may open the teat channel, allowing bacteria to enter or that cross suckers may transfer bacteria from the teats of infected individuals to uninfected heifers (Lidfors and Isberg, 2003). However, to date no studies have been conducted to test the validity of the proposed link between cross sucking and incidence of mastitis and udder damage.

Despite the fact that cross sucking is of most concern in older animals, previous studies have focused on cross sucking occurring in calves before and directly after weaning off milk (see Jensen and Holm, 2003). The link between cross sucking in milk-fed calves and that observed in older animals is supported by both epidemiological (Keil et al., 2001) and smaller scale experimental studies (de Passillé et al., 2011). Why this behavior develops and persists in some individuals but not in others is a question that remains unanswered, however, some evidence suggests the role of the recipient may be important for persistence of this behavior (Laukkanen et al., 2010).

Our first objective was to understand the factors that lead some calves to persist in cross sucking long after being weaned off milk. In particular, we examined the role of reciprocated cross sucking, which has been suggested as a contributing factor in continued cross sucking (de Passillé et al., 2011). Finally, we followed heifers through their first lactation to examine if being cross sucked had an effect on udder health or production.

MATERIALS AND METHODS

This study was conducted at the University of British Columbia's Dairy Education and Research Centre in Agassiz, BC, Canada. All experimental conditions and procedures met the requirements of the Canadian Council for Animal Care.

Animals, Housing, and Management

Female Holstein calves (n = 56) were removed from their dam and fed 4 L of colostrum within 6 h of birth and transferred to individual concrete-floored pens (1.22 m × 2.44 m) with sawdust bedding. Within the first 24 h of age, calves were weighed and identification ear tags attached. Ear tags were fitted with transponders that communicate with feeders to allow feed and water intakes of individual calves to be recorded. Between 1 and 5 d of age, calves received up to 12 L of pasteurized whole milk/d (i.e., ad libitum) in 2 meals (approximately 0800 and 1500 h) via an artificial teat attached to the pen wall. At 6 d old (±1 d), calves were moved to a group pen until 8 calves were within the pen, whereupon a new group pen was begun. Group pens consisted of a 4.74 m × 4.64 m bedded area (wood shavings) and 4.74 m × 2.48 m feeder area with expanded metal floor. Within each group, the maximum difference between the oldest and youngest calf was 4 wk.

The feeding area contained one automated milk feeder and one automated grain starter feeder (DeLaval CF 1000 CS Combi, Sweden), one hay feeder and one water feeder (Insentec, Marknesse, the Netherlands). The automated milk feeder provided calves with filtered and pasteurized waste milk from dairy cows at the center via an artificial teat. Grain feeders dispensed commercial calf starter mix with 17.4% protein, 6.37% fiber, and 4.38% fat content (Unifeed Ltd., Chilliwack, Canada) in 20-g portions, at a maximum rate of 9 kg/d (i.e., ad libitum). Hay and water were freely available.

The milk and grain feeders measured the daily individual milk and grain intakes for each calf using the volume of feed dispensed. Both grain and milk feeders recorded timing, number, and duration of visits. The hay feeders and drinkers were equipped with hydraulic scales which allowed for consumption of hay and water to be measured. Data from milk and grain feeders was recorded and stored by Kalbmanager and Win_Institute programs (Foerster-Technik, Engen, Germany). Water and hay consumption was recorded by Insentec RIC–System IV TIRIS Identification Roughage/Water Version 11 UH7802 (Insentec).

Calves were weaned off milk according to starter intake. For purposes of another experiment (de Passillé and Rushen, 2012), the calves were allocated to 4 weaning treatments (low-low, low-high, high-low, high-high) according to birth order, with weaning commencing when calves had consumed the target intake of either 200 g/d (low) or 400 g/d (high) of starter and weaning completed when calves had consumed the target intake of either 800 g/d (low) or 1,600 g/d (high) for 3 consecutive days. However, because we found no effect of the targets used on energy intake or on cross sucking, we do not discuss these further. Once a calf's mean grain intake over 3 consecutive days met or surpassed the first grain target, milk allowance was reduced from the full ration of 12 L to 9 L. This process was repeated for the subsequent targets, with milk allowance reduced by 3 L for each step. Milk allowance was reduced to 0 L (weaned) upon achieving the final grain target. The computer was programmed to wean those calves not achieving their grain intake targets by 74 d old automatically, across a mean of 7 d (range 6–9 d). This method of weaning resulted in large differences between calves in the age and duration of weaning. Weaning