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# Tail Docking Dairy Cattle: Effects on Cow Cleanliness and Udder Health

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## KEYWORDS

cattle, tail docking, cleanliness, mastitis

## ABSTRACT

To determine whether tail docking would influence cow cleanliness and udder health in a free-stall system, we monitored milking cows after half the animals in a herd were docked. A sample of 223 docked and 190 undocked cows (reducing to 169 and 105 over the study as cows were dried off) were monitored for 8 wk. Cow cleanliness was scored in two areas: along the spine, and the rump adjacent to the tail at 1, 2, 3, 5, and 8 wk after docking. Cleanliness was evaluated by counting squares that were soiled (0 to 14 on a 5- x 17.5-cm grid) and judging soiling severity on a scale from 0 (clean) to 3 (thickly caked). Udder cleanliness was scored with the same scale (0 to 3) and by counting the number of teats with debris on them. Udder health was assessed by measuring SCC of two milk samples and the number of animals diagnosed as mastitic by the on-farm veterinarian. No treatment differences were found in four measures of cow cleanliness, two measures of udder cleanliness, or udder health. However, cow cleanliness did differ over time, and analysis of a subsample of cows illustrated individual differences in cleanliness.

## INTRODUCTION

Tail docking is a common practice in both lamb and pig production. Lambs are tail docked to prevent fecal soiling which can predispose animals to flystrike (French et al., 1994), and pigs are docked to prevent tail biting, which can lead to serious injury (Simonsen et al., 1991). Tail docking in dairy cattle may have originated for two reasons: to control disease transmission and improve milker comfort. In New Zealand, tail docking was used in an attempt to control the transmission of Leptospirosis (Stookey, 1994). *Leptospira* organisms are shed in the urine and are present on tails that contact urine. Because workers come into contact with tails during milking and other procedures, tail docking was thought to help minimize exposure. However, there is little research evaluating this claim. Other risk factors, including time spent in the parlor, contact with swine (another potential carrier of Leptospirosis), and a clinical history of the disease have been identified as important risk factors in Leptospirosis transmission (Mackintosh et al., 1980). Milker comfort is also thought to improve as a result of tail docking (Matthews et al., 1995; Petrie et al., 1996). Specifically, workers may be less likely to be hit by the tail and the cows may be easier to milk, especially in parlors in which milking occurs between the legs.

In North America, the practice of tail docking dairy cattle is on the increase. Producers cite a number of reasons for docking cows, including improved ease of milking, cow cleanliness, and udder health. There may also be disadvantages for the cow associated with the procedure, including pain, impaired social communication, and impaired fly control.

Cows sometimes defecate directly onto their tails, and tails can also become contaminated with feces and other debris when cows lie down. Tail movements can then splatter feces and other material onto the cow, her herdmates, and handlers. Removing a large portion of the tails is thus thought to keep cows cleaner. Two previous studies have addressed this idea. The first study found that docking only improved cow cleanliness in the area adjacent to the base of the tail, but all other areas (including the udder) were not significantly cleaner because of docking (Wilson, 1972). Cows were characterized as clean or dirty, but the method of assessment was not described. The second study found that udder cleanliness (as assessed by frequency of udder washing) did not vary between cows with intact, trimmed, or docked tails (Matthews et al., 1995).

Anecdotal reports have also suggested that docking may reduce SCC and incidence of environmental mastitis by reducing contact with bacteria via the tail (Jaquish, 1991). However, the study by Matthews et al. (1995) showed no effect of docking or switch trimming on SCC or mastitis, although the sample size may have been too small to detect differences.

The above studies used animals housed on pasture, and there has been no work examining the effect of docking on cow and udder cleanliness in a free-stall system. The objectives of the current study were to compare cow cleanliness and udder health of docked and undocked dairy cattle housed in a free-stall system.

## **MATERIALS AND METHODS**

### **Cows and Housing**

A British Columbia dairy producer who had decided to dock his Holstein herd agreed to participate in this study by leaving some animals with intact tails for 8 wk. The cows were housed as a single group in a barn with free stalls. Stalls were 225 cm long and 115 cm wide. Cows had access to a small, concrete-floored, covered outdoor area. Bedding was replaced once a week, and a flush system was used to clean the barn. The experiment was approved by the University of British Columbia Animal Care and Use Committee.

A total of 212 animals were left with intact tails, while 275 animals were tail docked by the producer by applying a rubber ring 12 cm below the vulva. Tails were removed by use of hoof trimmers 2 wk later. Because there was no restraint system on the farm, the farm staff docked animals that were readily caught. Thus, assignment to treatment was not strictly random because the ability to catch the animals and treatment are confounded. However, neither mean lactation number, DIM, nor predocking SCC differed in docked and undocked cows. This suggests the sample of docked and undocked cows were biologically indistinguishable. Over the course of the experiment, the original sample size declined, as animals were dried off, to 169 docked and 105 undocked animals at the end of the trial.

### **Cleanliness Measures**

Cow cleanliness was assessed during five visits to the farm on wk 1, 2, 3, 5, and 8 ( $\pm 2$  d) after docking. During each visit, two trained observers (of four who participated in the study) systematically scored cows by moving from one end of the barn to the other and recording the identity and cleanliness score of each cow encountered. Animals were not restrained in any way, and consequently, not all animals in the

original sample were scored on each visit. Only one side of the cow was scored. When the cow was lying, the side facing up was scored, and when standing, observers scored a default side that varied between observers. Observers placed a 5- x 17.5-cm wire grid with 14 equal square spaces on the cow's back (on the midline 5 cm anterior to the base of the tail) and then again on the rump, (on the haunch 3 cm from the midline) and counted the number of squares (0 to 14) that contained any debris. These two locations were representative of the area of contact between the tail and the body of the cow as determined with a visual marker. The severity of soiling in each grid area was scored on a subjective scale of 0 to 3 (0: no debris, 1: flecks of debris, 2: a film or thicker chunks of debris, 3: thick caking of debris). Debris was primarily fecal matter, but could also include food, bird droppings, or bedding adhering to the skin.

Udder cleanliness was scored in the parlor during one evening milking 2 and 4 wk ( $\pm 2$  d) after docking. Two scores were used: the number of teats with debris was counted and the same subjective score (0 to 3, described above) was applied to the back of the udder (visible to the milker, from above the teats to the top of the udder). Due to the design of the parlor, the observer was blind to tail treatment while scoring udder cleanliness.

Udder health was assessed with the number of cows that developed mastitis as diagnosed by the herd veterinarian, and by SCC from analysis of two milk samplings collected by the British Columbia Herd Improvement Services.

### **Statistical Analysis**

The four measures of cow cleanliness were analyzed by least squares analysis of variance using the GLM procedure of SAS (SAS, 1985). The model tested the effect of treatment (1 df) against an error term of cows within treatment (357 df) after adjusting for the observer and time effect (weeks). Differences between weeks (4 df) were tested against the interaction of cows and weeks (418 df), after adjusting for differences between observers (3 df).

To test for cleanliness differences between cows, we conducted a separate analysis with only those cows ( $n = 19$ ) that had been scored on each of the first four occasions when cleanliness was scored (wk 1, 2, 3, and 5). This model tested cows (17 df) against the interaction of cows by wk (51 df), after taking differences between treatments, weeks, and observers into account.

Animals treated for mastitis in the 3 wk before the trial were excluded from all analyses. Only the first treatment of mastitis was considered in the analysis. Chi-square analysis was used for the mastitis data with the 169 docked and 105 undocked cows from the original population that remained in the milking herd throughout the 8 wk. The same analysis was also repeated for the full 223 docked and 190 undocked cows in the herd at the time of docking and yielded the same results as the above test. SCC and udder cleanliness data were analyzed using a Wilcoxon test (SAS, 1985).

## **RESULTS**

The number of squares containing debris, and the scores representing the amount of debris, did not differ between the docked and undocked groups on either the back or rump (Table 1). Although cow cleanliness was not affected by docking, there was an effect of time. Regardless of treatment, cows were cleaner during the latter half of the trial (Figure 1). This time effect was seen with three of the four measures of cow cleanliness ( $P > 0.1$  for rump soiling severity score,  $P = 0.0001$  for the other three measures). No significant differences were found in either SCC or udder cleanliness (Table 2). The docked group had a 6.2% incidence of mastitis, while the undocked group had 2.4% (NS). There were also significant differences between cows for all measures of cow cleanliness except the back soiled area score in the subsample of 19 animals ( $P \leq 0.05$ ).

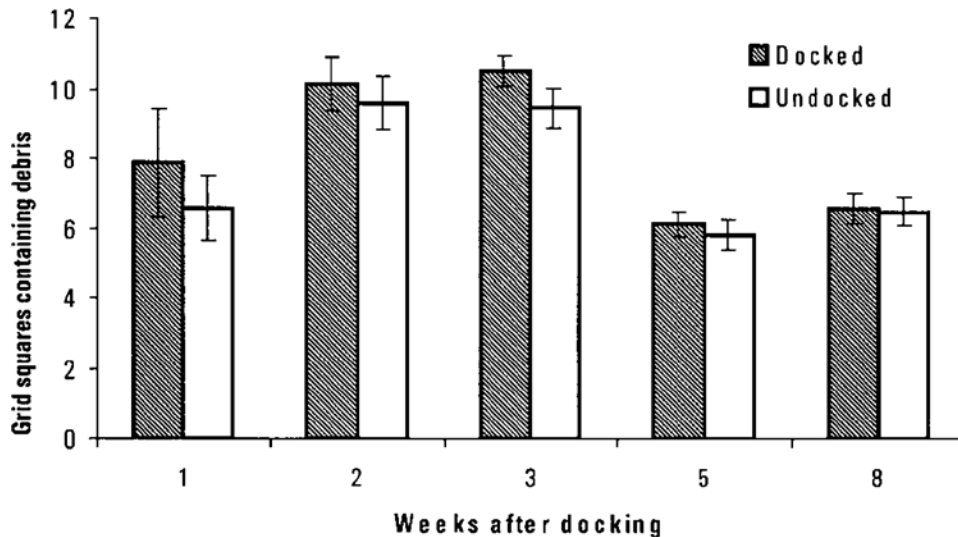
**Table 1. Cleanliness scores for cows with docked and undocked tails. Means  $\pm$  SE are provided for both the area affected (number of squares containing debris, 0 to 14) and a score of the severity of soiling (0 to 3). Measures are shown separately for the rump and back. *P* values correspond to a one-way ANOVA comparing the two treatment groups (df = 1,357).**

| Variable               | Docked           | Undocked         | <i>P</i> |
|------------------------|------------------|------------------|----------|
| Rump                   |                  |                  |          |
| Soiled area (0-14)     | 8.03 $\pm$ 0.25  | 7.37 $\pm$ 0.26  | 0.37     |
| Soiling severity (0-3) | 1.56 $\pm$ 0.04  | 1.53 $\pm$ 0.05  | 0.55     |
| Back                   |                  |                  |          |
| Soiled area (0-14)     | 12.49 $\pm$ 0.20 | 11.93 $\pm$ 0.26 | 0.17     |
| Soiling Severity (0-3) | 1.46 $\pm$ 0.04  | 1.52 $\pm$ 0.05  | 0.29     |

**Table 2. SCC and udder cleanliness scores for cows with docked and undocked tails. Medians (with 25th and 75th percentiles) are shown for SCC (in thousands) sampled in December and February and for udder cleanliness scores, and the number of teats with debris on them. *P* values correspond to the Wilcoxon test comparing the two treatment groups.**

| Variable                  | Docked        | Undocked    | <i>P</i> |
|---------------------------|---------------|-------------|----------|
| SCC                       |               |             |          |
| December                  | 34.5 (12-136) | 34 (14-116) | 0.72     |
| February                  | 40.5 (17-155) | 66 (18-165) | 0.62     |
| Udder soiling score (0-3) | 1 (0.5-1.5)   | 1 (0.5-1.5) | 0.31     |
| Soiled teats (0-4)        | 3 (2-4)       | 3 (2-3.5)   | 0.67     |

**Figure 1. Mean  $\pm$  SE of rump area in relation to the number of weeks since docking. Although the herd became cleaner over time, docked animals (filled bars) were no cleaner than their undocked counterparts (empty bars).**



## DISCUSSION

Tail docking did not provide cleanliness or udder health benefits to dairy cattle in this experiment. The cow cleanliness scores did not differ between treatment groups, indicating that the cows were soiling their backs, rump, and udder areas in ways that were not strongly influenced by the tails of these lengths.

However, our results do indicate that cow cleanliness varies between cows and over time. Cleanliness may be subject to seasonal or other time effects. For example, when this experiment began, a bout of winter dysentery had spread throughout the herd. In addition, the farmer added back brushes accessible to the entire herd during wk 4, which may have helped keep the cows cleaner. The variation between cows within treatment groups supports the widespread idea that some cows tend to be more dirty regardless of management practices. Only back grid score did not show significant differences between cows and this measure tended to be near the maximum possible for all animals.

Udder health also did not differ between docked and undocked animals. A study by Matthews et al. (1995) found no difference in udder cleanliness, SCC, or incidence of mastitis for cows on pasture with docked versus intact tails.

Although our study corresponds with earlier work showing no cleanliness and udder health benefits of tail docking, milker comfort remains a possible benefit of tail docking. Research suggests that workers have relatively little contact with the tail (average two contacts per milking) in rotary style parlors (Matthews et al., 1995), but milking between the legs may yield different results.

Tail docking may also involve disadvantages to the cow, including pain associated with the procedure and permanent lack of use of the tail to perform its normal functions. Cows can use their tails to control flies, and three studies have found more flies on the hind ends of docked animals and more fly removal behaviors, such as tail flicking and leg stamping (Matthews et al., 1995; Phipps et al., 1995; Wilson, 1972). Tails are known to be important in social signaling in some animal species. Albright and Arave (1997) have described how different tail postures communicate information to other cattle and handlers, but there has been no work on how these signals may be disrupted by tail docking.

There also may be short and long-term pain associated with docking. Previous work looking at the effect of tail docking and castration using a rubber ring in lambs found differences in posture as well as other active behaviors as a result of pain (Molony and Kent, 1997; Molony et al., 1993). One study on calves found no increase in plasma cortisol levels among docked calves over handled controls (Petrie et al., 1996). However, some calves docked with a rubber ring were more restless, and more likely to shake their tails and vocalize. Providing a local anaesthetic prior to ring application inhibited these responses for 150 min (Petrie et al., 1995). In addition, Wilson (1972) reports more swelling, tail swishing, and an increase in plasma cortisol in adult animals 6 h after application of the ring. However, by 24 h after docking, these differences disappeared (Wilson, 1972).

Given these disadvantages and the lack of cleanliness and udder health benefits associated with docking, we see little merit to adopting this procedure. Significant differences between cows suggest that cow behavior or use of stalls may affect cleanliness. Further investigation of these effects could suggest ways of improving cleanliness.

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