

Factors Associated with Lameness and Injury in Tiestalls

By Lindsay Ferlito

A lot of research has been done on the relationship between freestall housing factors and lameness, lying time, and injuries, with fewer studies on tiestall dairies. Two recent Canadian papers in the Journal of Dairy Science, however, have shed some more light on the impacts current tiestall housing systems are having on lameness and injuries. Both studies found hock injury prevalence to be over 50%, knee injury prevalence to be over 40%, and one of the studies also noted that 33% of cows had neck injuries and 25% were lame. Additionally, the majority of stalls measured in these studies did not meet the industry recommendations for size.

Stall Width, Length, and Base

On freestall dairies, deep-beds and mattresses with more bedding are associated with fewer injuries and reduced lameness. With tiestalls, the story is the same, as the odds of a cow having a knee injury were 3.01 and 2.01 times greater when the stall base was concrete or rubber mats (respectively) compared to mattresses.

If the stall width was equal to or greater than the recommendation, cows lay down for longer, and had a reduced risk of neck lesions and reduced risk of being lame. Also, knee injuries were reduced with increased stall width. If the stall length was at or above the recommendation, cows had a reduced risk of knee lesions. The odds of having a knee injury increased 1.1 times with every 2 inch reduction in stall length. The downsides were that wider stalls were associated with dirtier cow flanks and legs, and longer stalls were associated with dirtier udders.



A cow in a tiestall that is long, wide, and has ample bedding to reduce injuries and lameness.

Tie Rail and Chain

One of the measures that was short of the recommended target on the most dairies was tie chain length. Increasing tie chain length had very little impact on cow hygiene, but large impacts on cow comfort. Cows housed in stall that had at least the recommended length of chain had a reduced risk of neck, hock, and knee injuries. One study found an increase in tie chain length of 4 inches was associated with an 8-10% decrease in the odds of a neck lesion, while the other study found that a 4 inch reduction in chain length was associated with the odds of knee injuries increasing 1.1 times.

Another factor significantly associated with cow comfort was tie rail position, which measures whether the tie rail is positioned right over the manger curb or if it is moved forward over the feed area. When the stalls had met or exceeded the recommendation for tie rail position (meaning it was moved forward), cows had a reduced risk of neck and knee injuries, a reduced risk of lameness, and increased lying time, but an increased risk of having a dirty udder. Specifically, for every 4 inches the tie rail was moved forward in the stall, lying time increased by 4 min/d.



A tiestall cow with a neck injury due to rubbing on tie rail.

Similar to freestalls, the trade off in tiestall design is that larger stalls provide better cow comfort in terms of reduced injuries and lameness, but lead to dirtier stalls and reduce cow hygiene. Cow and stall hygiene can be improved by management of the stalls, including cleaning and bedding more frequently and adequately. Overall, in these two studies, the rates of dirty cows were low, and the benefit of improved cow comfort due to properly sized tiestalls far outweighed the negative of reduced cow hygiene.