

Relationships between type of hoof lesion and behavioral signs of lameness in Holstein cows housed in tie-stall facilities

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Introduction

Hoof lesion type and severity may or may not influence a cow to change their gait. Previous studies have shown that the presence of a sole ulcer (SU) was associated with changes in gait score, whereas digital dermatitis (DD) and sole hemorrhage (SH) were not. In tie-stall facilities it can be difficult to assess cows for lameness using locomotion scoring. An alternative method, known as stall lameness scoring (SLS), allows observers to assess tie-stall cattle for lameness, while they are standing in their stall, based on behavioral changes in weight bearing and foot positioning. The aim of this study was to examine relationships between hoof lesions and the behavioral changes noted during SLS assessments.

Materials and Methods

Lameness was assessed by 1 trained observer looking for the following 4 behaviors: shifting weight, resting 1 foot, standing on the edge of the stall, and uneven weight bearing when stepping side to side. Hoof trimming records were collected, at the time of routine trimming, from 2 hoof trimmers. The agreement in lesion identification was measured between the 2 hoof trimmers through lesion identification quizzes, both at the beginning and mid-way through the study, with excellent agreement being achieved and maintained ($\kappa > 0.80$). To ensure there was no effect of trimming on the lameness evaluation, SLS was always performed prior to trimming. The SLS behavioral changes occurred primarily in the hind limbs, therefore, the analysis was confined to hind limb lesions only. Logistic regression was used to examine associations between the presence of a hoof lesion and the SLS behavioral changes.

Results

A total of 557 cows from 7 tie-stall herds, were evaluated. Two-thirds of these animals were trimmed within a week of their lameness assessment. The longest time between trimming and assessment was 7 weeks. There was no significant effect of time between trimming and lameness assessment on the associations between hoof lesions and behavioral changes. Seventy-five percent of the cows had no behavioral changes, whereas, 11%, 12%, and 1% had 1, 2, and 3 behavioral changes, respectively. At least 1 hind limb lesion was noted during trimming in 19% of cows. Of those with a lesions, 37% were identified as DD, 34% were SU, and 21% were SH. A cow with at least 1 lesion had a higher odds of resting 1 foot (odds ratio [OR] = 2.96; $P < 0.001$) and bearing weight unevenly when moving side to side (OR = 3.75; $P < 0.001$) than a cow without a lesion. Cows with a SU had a higher odds of resting 1 limb (OR = 5.59; $P < 0.001$) and bearing weight unevenly (OR = 3.50; $P < 0.01$) than a cow without a SU. A cow with SH had a higher odds of shifting their weight from 1 foot to another (OR = 4.89; $P < 0.01$) than those without SH and cows with DD had a higher odds of bearing weight unevenly (OR = 3.63; $P < 0.001$) than those without DD.

Significance

Using behavioral changes in weight bearing and foot positioning can help identify cows in tie-stalls with hind limb hoof lesions. Producers could routinely observe their cattle for these changes to detect cows which may require treatment. This could help reduce the duration of clinical lameness through earlier intervention.