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Using gait score and lying behavior to detect hoof lesions in cows

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The problem

Gait scoring likely remains the most practical method for detecting lameness on-farm. Improved gait scoring to detect lameness requires knowing which changes in gait best indicate hoof lesions. Other measures of behavior such as changes in lying time might also provide useful indicators of lameness and hoof pathology.

The objective

To determine whether changes in the different components of gait and lying behavior predict the development of hoof lesions in lactating Holstein cows.

Conclusions

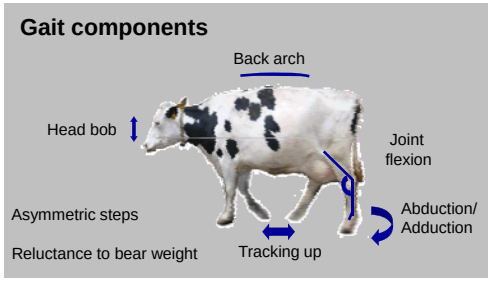
Gait scoring can detect lame cows with a sole ulcer before the ulcer is apparent on the hoof. An arched back and asymmetric stepping are the gait attributes that best indicate sole ulcers. Changes in lying behavior around calving could be a good indicator of later development of a sole ulcer.

Methodology

47 cows housed in a free-stall barn and with no initial hoof lesions were:

- Scored for overall gait (scored 1 to 5) and 7 gait components (scored 0 to 100) every 4 wks from wk - 4 to wk + 24 relative to calving
- Examined for sole hemorrhages and ulcers every 4 weeks from wk - 4 to wk + 24 relative to calving
- Continuously monitored with activity loggers for lying behavior from wk -3 to wk +5 relative to calving

6 cows that developed ulcers (ULC) after calving were matched with 6 cows by parity and DMI that developed only sole hemorrhages (HEM) and 6 cows that did not develop any sole lesion (NOLES).



Results

Table 1. Before calving, there were no differences (P>0.10) between the three groups in any measure of gait. After calving, cows that developed sole ulcers (ULC) scored higher than cows that did not develop sole ulcers (NOLES and HEM) for overall gait score, back arch, joint flexion, asymmetric gait and reluctance to bear weight. There were no differences between cows that did not develop any lesion (NOLES) and those that only developed hemorrhages (HEM).

	Wk 4 to 24 after calving		
Behavior	**NOLES**	**HEM**	**ULC**
Overall gait	2.3 ± 0.1	2.4 ± 0.1	3.1 ± 0.1**
Abduction/ Adduction	28.2 ± 5.0	17.6 ± 5.0	22.1 ± 5.0
Back arch	24.9 ± 2.8	27.6 ± 2.8	45.0 ± 2.8*
Joint flexion	41.2 ± 2.9	45.4 ± 2.9	55.4 ± 2.9**
Asymmetric steps	40.3 ± 2.8	45.2 ± 2.8	62.2 ± 2.8***
Tracking up	4.1 ± 2.0	7.5 ± 2.8	15.6 ± 8.0
Reluctance to bear weight	1.3 ± 0.8	0.6 ± 0.2	11.7 ± 4.2**

Figure 1. Overall gait score, back arch and asymmetric stepping were higher (P<0.05) among cows that developed an ulcer 4 wks before the ulcer was diagnosed.

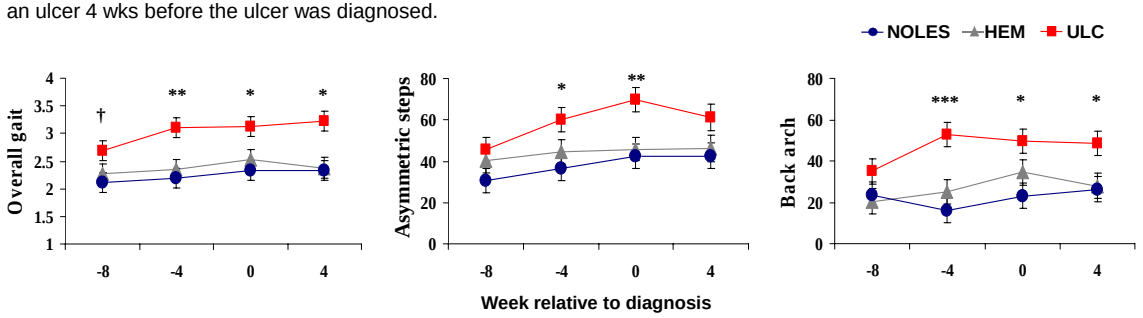
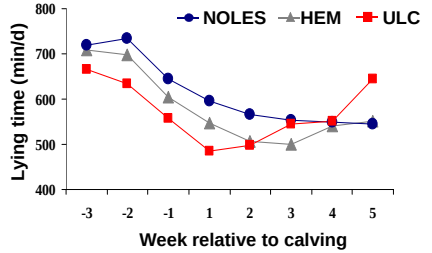


Figure 2. An interaction between hoof health and time was found for lying time (P = 0.02). In cows that developed an ulcer, daily lying time decreased more quickly before calving and increased more quickly after calving.



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