

# Case studies on the effect of sole ulcers on kinematic measures of dairy cow gait

Frances Flower, Anne Marie de Passillé, Daniel M Weary, David Sanderson\* and Jeff Rushen

## The Problem

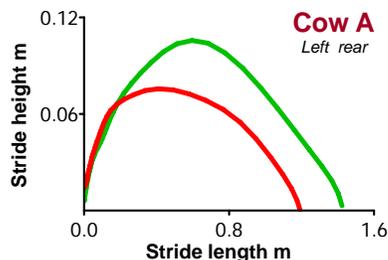
Lame cows often have multiple injuries on multiple hooves. We investigated how cows with a single sole ulcer on a front or a rear hoof changed their gait in comparison to healthy cows. We also looked at how this changed for cows with ulcers on 2 hooves.

Reflective markers, positioned on each leg, were digitized using motion analysis software (Peak Motus) to calculate basic stride variables of cows from 2 herds (n=38; n=30). Cows were classified into 2 hoof health groups: healthy and sole ulcers. Most cows had multiple injuries, but this case study focussed on 4 cows that had an ulcer on 1 or 2 hooves.

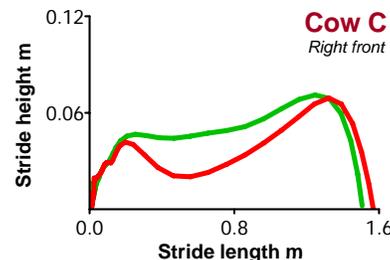


## Results

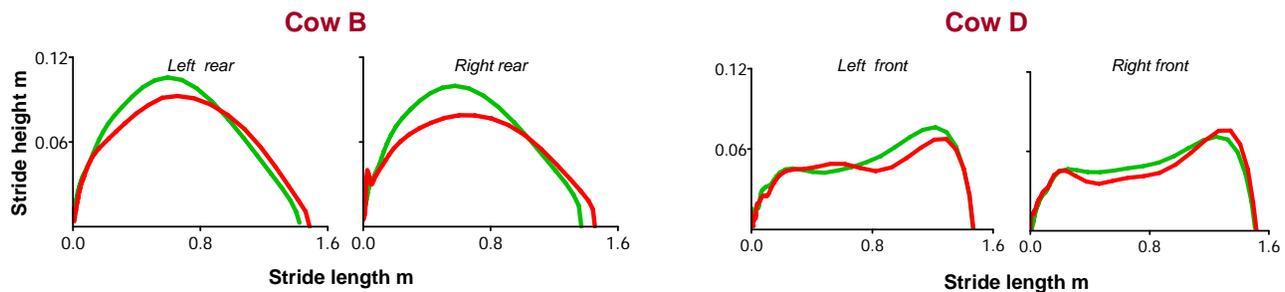
**Cow A with 1 sole ulcer on the left rear hoof** had shorter strides, lower stride height and longer triple support (85.1 vs. 65.1%) than **healthy cows**.



**Cow C with 1 sole ulcer on the right front hoof** did not differ in stride length, height, or triple support (65.3 vs. 72.1%) from **healthy cows**, although the hoof trajectory was 2.4 cm lower mid-stride.



**Cows B and D with sole ulcers on 2 hooves** did not differ in stride length, height, triple support, or hoof trajectory from **healthy cows**. These results suggest cows with multiple sole ulcers may be more difficult to identify as lame using these kinematic measures.



## Implications

These case studies indicate that ulcers on the front hooves have different affects on gait than those on rear hooves. As more hooves are affected, gait patterns become more complicated to interpret, illustrating the need for detailed work on the effects of specific injuries on gait.