



ORIGINAL RESEARCH

Detection and localisation of unilateral hindlimb pathologies in cattle using the cow pedogram

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Introduction

Limb pathologies are a major concern in cattle welfare. Change in gait characteristics is an important indicator to assess health and welfare in cattle, but the visual assessment of gait is known to lack consistency and detecting slight lameness is challenging.

In general, veterinary treatments and management decisions are more effective the earlier they are initiated relative to the onset of the disease. Methods of objective analysis of cattle locomotion could provide useful information for earlier, and more accurate, detection of lameness.

The aim of this study was to evaluate the validity of the cow pedogram as a tool to detect hindlimb pathologies and to differentiate between pathologies located in the proximal or distal limb.

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KEY FINDINGS

- The cow pedogram is a highly sensitive tool for detecting cows with unilateral hindlimb pathologies, including those without clinically visible lameness.
- However, the variables tested in this study were not suitable to distinguish between pathologies located in the proximal or distal limb.

Approach

Sixty-four cows with hindlimb pathologies located in either the area of the digit (up to and including the fetlock joint) or proximal to the fetlock joint were included in the study. Twelve cows without hindlimb pathologies were included as controls. The gait cycle variables of each cow were extracted using a validated cow gait analyzer. The variables of the cow pedogram (relative stance phase and peaks of foot load and toe-off) were calculated as the difference across hindlimbs (Δ MT).

Results

A significant difference was found between cows with hindlimb pathologies and

those in the control group for all gait cycle variables. Using the threshold of 2.09 per cent for Δ MT of relative stance phase duration, cows with unilateral hindlimb pathologies were detected with the sensitivity of 100 per cent and a specificity of 100 per cent.

Relative stance phase duration and peak foot load were significantly different between cows with distal and proximal pathologies. However, the pedogram variables tested were not suitable to differentiate between distally and proximally located pathologies.

Interpretation

Proximal pathologies may cause either swing phase or stance phase alterations or a combination thereof and are, therefore, less uniform than distally located pathologies, which cause mainly stance phase alterations. This is likely to be why the pedogram is not an ideal tool to distinguish between pathologies located in the proximal or distal limb.

Significance of findings

The cow pedogram is a highly sensitive tool for detecting cows with unilateral hindlimb pathologies, including cows with hindlimb pathologies that do not present with clinically visible lameness.



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