Effect of lameness on behaviour of dairy cows

Partners

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Background

Lameness in dairy cows causes significant economic losses to modern dairy production and has adverse effect on animal welfare. Bruijnis *et al*. (2010) estimated that annual loss caused by foot disorders per cow is 66 € and 32 % of this sum arise from subclinical cases. Reduced milk production and culling are the main factors causing economical losses (Bruijnis *et al.* 2010). Other important factors causing economical losses are treatment costs, additional management time, discarded milk and impaired fertility (Huxley 2013).

Early detection and effective treatment of lameness may limit the economic losses and improve animal welfare. However, lameness detection is problematic. Commonly used subjective lameness scoring methods are laborious and unreliable (Schlageter-Tello *et al.* 2014). It is also possible that locomotion score is not sensitive enough to detect all different kind of lesions (Schlageter-Tello *et al.* 2014). However, hoof lesions and lameness affect the behaviour of the cattle; lame animals have increased lying time (e.g. Walker *et al.* 2008, Chapinal *et al.* 2009) and they stand and walk less (Walker *et al.* 2008) compared to sound animals. Various lesions may affect the behaviour differently (e.g. lying time: Chapinal *et al.* 2009, walking distance: Frondelius et al. 2015). Lameness affects also eating behaviour (e.g. Miguel-Pacheco *et al.* 2014).

Day-to-day variation in the behaviour can be used to detect lameness (de Mol *et al.* 2013). Different activity and lying time measurements have been used in many lameness detection studies (e.g. Chapinal *et al.* 2009, de Mol *et al.* 2013). However, measuring walking time and distance with accelerometers is problematic. Modern indoor positioning technology allows also following of the spatial behaviour of the farm animals (Spink *et al.* 2013) and allows us to measure e.g. the daily walking distances of dairy cows (Frondelius et al. 2015).

We have studied the effect of hoof lesions on the moving, lying and eating behaviour of dairy cows. This was a pilot study focusing on the first analysis of positioning data in relation to hoof lesions and comparing the correlation different behavioural measures.

Aims of STSM

The aim of STSM is to analyze data collected with longitudal measurements in order to study the behavioural changes in cows when hoof health changes. We are focusing on the analysis of indoor positioning data in a relation to hoof lesions and visual locomotion scores. The data used for analysis has been already collected in Smart Integrated Livestock Farming (SILF) -project and the work carried out during the STSM involves data analysis and publishing the results. Additionally STSM enables participating in lameness experiments during the stay in ILVO.

Materials and methods

The position of 72 cows, 48 cows at a time, was recorded continuously with 1.2Hz sample rate over 7 months (0.5 – 7 months/cow) using UWB-based indoor positioning system. The cows were housed in two 24 cow compartments in a freestall barn with slatted floors and a milking parlour. Both compartments have their own concentrate feeder and 12 Insentec Roughage Intake Control -system (RIC) -feeders. The cows were locomotion scored using a 4-scale scoring system. Scoring was conducted by two observers every two weeks, in total of 16 times (1-12 times/cow, in total n = 402). The cows were inspected for hoof lesions every three months (three times during the experiment) according to Nordic Claw Atlas (2013). The effect of hoof lesions and the locomotion score on daily walking distance (measured with indoor positioning system) and individual feeding behaviour (measured with Insentec RIC -system) will be analyzed.

Expected results

Our preliminary results indicate that the type of hoof lesion affects the changes in animal behavior (Frondelius et al. 2015). The work done during the STSM is expected to deepen our understanding on behavioural changes connected to changing hoof health. The results will be published in a peer-reviewed scientific journal and presented in an appropriate DairyCare-conference.

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