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How can we help the busy dairy farmer control digital dermatitis?

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Recent studies of the productivity in Danish dairy herds have shown that the amount of milk produced per man hour range from approximately 200 to 600 kg. This means that an average Danish dairy farmer has less than 10 seconds to produce 1 kg milk. Leach et al. (2010) found that lack of time and labour were considered the most important barriers to lameness control by UK dairy farmers and Relun et al. (2013) reported that time and labour were seen as major challenges in relation to treatment and prevention of digital dermatitis by French dairy farmers. Dairy farmers are indeed very busy people!

Digital dermatitis is a major problem in dairy production in many countries worldwide. In Denmark, the prevalence of digital dermatitis is approximately 25%. In other words, at any given time one out of four cows has digital dermatitis.

Combining the two problems – the busy dairy farmer and a high prevalence of digital dermatitis – results in a very big challenge: Too many cows with digital dermatitis and too little time to deal with it. How to handle this dilemma has been the focus of research done at Aarhus University during the last 5-10 years.

If I can't find the lame cow, I can't treat her
In order to be able to handle a lame cow, the farmer must be able to identify the lame cow. This may sound obvious. However, previous research has shown that generally farmers are only able to identify 25-40% of the truly lame cows in their herd (Wells et al., 1993; Whay et al., 2003; Espejo et al., 2006; Leach et al., 2010).

The first step in controlling lameness – or more specifically digital dermatitis – therefore must be to identify the herd/diseased cows. This is necessary in order to get an overview of the magnitude of the problem in the herd and to be able to identify individual cows for treatment. If the farmer can't find the lame cow, he/she can't treat her!

Even though not all cows with digital dermatitis show obvious signs of lameness (Tadich et al., 2010), an evaluation of lameness may be a first step towards identifying cows with digital dermatitis.

A traditional locomotion scoring of a cow can be done in less than 1 minute and can be done by the dairy farmer after a limited amount of training. However, in an average Danish dairy herd with approximately 160 cows, this means that a ‘screening’ for lameness would last 2-3 hours. Very few farmers would have the time (and be willing) to do this on a regular basis. Therefore, there is a need for alternative methods for rapid identification of lame cows. At Aarhus University, we have been working with two alternative strategies: 1) a simple screening of lameness based on the arching of the back in standing cows and 2) the use of automatic recording of lying behaviour to identify lame cows and cows with specific hoof lesions.

Low tech approach to finding the lame cow
Many locomotion scoring systems use the arching of the back as one of several clinical signs indicating that a cow is lame. A cow with an arched back when standing is generally considered to be more lame than a cow with an arched back only when walking (Sprecher et al., 1997). We tested the hypothesis that a clinically lame cow could be identified using only the arching of the back in standing cows. Arching of the back was recorded in 454 standing cows and compared to a locomotion scoring of the same cows. We found that the method had a sensitivity of 0.50 and a specificity of 0.86. In other words, the method found half of all truly lame cows and when a cow was classified as lame based on the arching of the back, the probability that she was truly lame was high. The method is a significant improvement compared to the situation where many dairy farmers are only able to identify one out of every four truly lame cows in their herd. The method is much easier and quicker to use compared to a traditional locomotion scoring and can be used to get an overview of the lameness status in the herd (Thomsen, 2009).

High tech: even less labour, but costly
Automated methods for the identification of lame cows and cows with hoof lesions may require even less labour. On the other hand, the technical equipment needed often is quite expensive. In a recent study, we evaluated the use of locomotion scores and lying behaviour as indicators of hoof lesions in dairy cows. Based on locomotion scoring and automatic recordings of lying behaviour in 1,340 cows from 42 herds, we found that locomotion scores and the duration of individual lying bouts could be used as indicators of hoof lesions. Interestingly, we found that long lying bouts was a specific indicator for cows with digital dermatitis. In contrast, cows with hoof horn lesions (e.g. sole ulcers) did not have significantly longer lying bouts (Thomsen et al., 2012a).
Easy scoring of digital dermatitis

Looking more specifically at digital dermatitis, several recent studies have demonstrated that scoring of digital dermatitis during milking is an interesting alternative to scoring in a hoof trimming chute (Thomsen et al., 2008; Relun et al., 2011; Stokes et al., 2012). Scoring during milking can be done much easier and is not dependent on the availability of a hoof trimming chute. Due to the dynamic nature of digital dermatitis lesions (Nielsen et al., 2012), frequent scorings are needed in order to quantify the presence of digital dermatitis in a herd.

Overall, simple manual screening methods and automated methods as exemplified above allows the busy dairy farmer to identify lame cows and cows with digital dermatitis without the use of too much extra work. The choice of a specific methodology in the individual herd will naturally depend on an individual evaluation of the preferences of the farmer, the availability of skilled labour and financial constraints.

Knowledge about risk factors: Is it helpful?

Knowledge about risk factors may be seen as an important tool in the prevention of digital dermatitis. However, risk factors for digital dermatitis have been studied intensively and in many cases the effects across studies are not very consistent. Some studies e.g. find grazing to be associated with a lower risk of digital dermatitis, other studies with a higher risk and yet other studies find no significant association between digital dermatitis and grazing. Secondly, many of the risk factors for digital dermatitis can’t easily be changed by the farmer. As an example, the risk of digital dermatitis has been shown to be lower in older cows. However, the farmer naturally can’t have a herd with only parity 3 or older cows. Other risk factors (e.g. floor type) can only be changed at very high costs. In conclusion, this means that prevention based on the knowledge of risk factors for digital dermatitis may not be the best way forward.

Automatic washing of hooves

Systematic washing of hooves has been suggested as a means to control digital dermatitis. Anecdotal evidence from some Danish dairy farmers has indicated that manual washing of hooves may decrease the prevalence of digital dermatitis. However, manual washing is time consuming and the quality of the cleaning may vary. Therefore, Aarhus University in cooperation with two commercial companies developed and tested a system for automatic washing of hooves. An automatic hoof washer was developed and installed in 6 commercial dairy herds. The effect of washing the hooves with water and soap was evaluated using the cow as her own control; only left legs were washed leaving the right legs unwashed as a within cow control. Automatic washing of hooves with water and soap decreased the prevalence of digital dermatitis. The odds ratio of having digital dermatitis was 1.48 (p=0.02) in the control side compared to the washed side. Automatic washing of hooves was shown to be effective without the use of antibiotics or other adverse chemicals and required only a minimum of labour (Thomsen et al., 2012b). Automatic washing of hooves must not be seen as a ‘stand alone’ solution, but may be a help for the busy dairy farmer in the fight against digital dermatitis.

Two problems – and suggestions for solutions

I have presented two major problems in modern dairy production: Too many cows with digital dermatitis and too little time to deal with it. New methods for time efficient identification of lame cows and cows with digital dermatitis may have the potential to help the busy dairy farmer quantify the problem at the herd level and identify individual cows for treatment. Finally, automatic washing of hooves may have the potential to reduce the prevalence of digital dermatitis with the use of only a minimum of labour.

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