

Lameness in dairy cows: Helping unravel the mystery of claw horn lesions



The Challenge

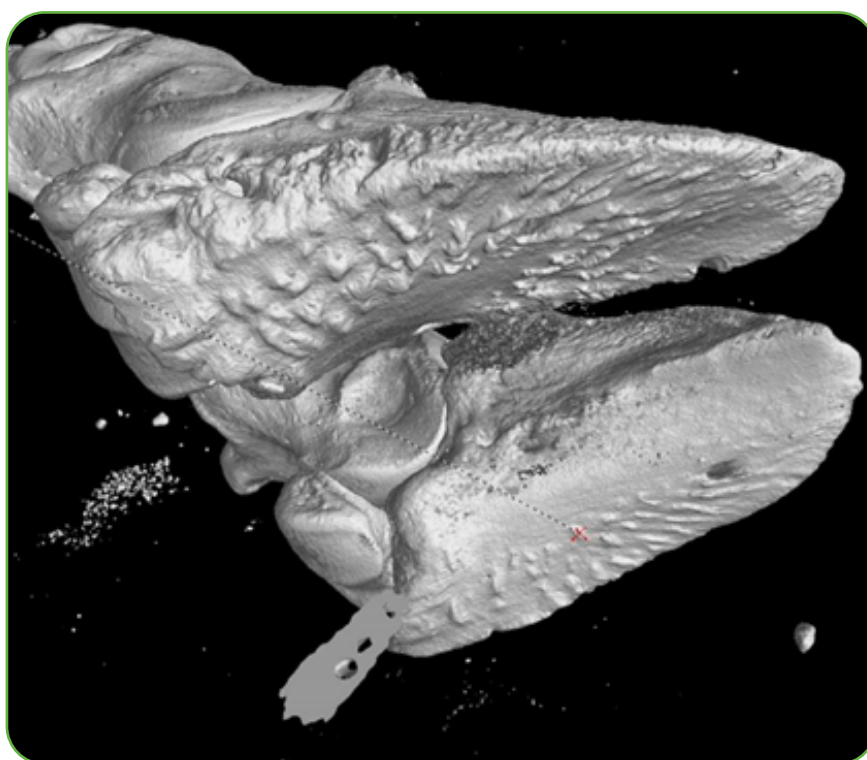
It is well recognised that lameness is a major cause of poor welfare and productivity in modern dairy cow systems worldwide which is of significant industry and consumer concern.

In some herds very low levels of lameness are possible, however the reported UK prevalence of approximately 30% (1) remains unacceptably high.

The Research

Comprehensive data recording of mobility score, hoof lesions and clinical lameness are carried out as standard for the Langhill herd. This data in combination with milk recording and body condition score data has provided a uniquely detailed resource for further analysis.

Studies using this data have examined the effect of heifer lameness in first lactation on future lameness and culling risk and the wider contribution of previous lameness events on the overall occurrence of lameness in dairy herds.



In addition, the link between low body condition score (BCS) and lameness risk has been investigated based on information from 724 cows in the Langhill herd over 8 years.

Feet from cull cows from the Langhill herd have been collected for detailed dissection, CT and MRI scanning. These studies have examined the degree of bony change to the pedal bone and changes to the digital cushion within the foot in relation to lifetime mobility score clinical lameness history. Outputs from this research have enabled significant advances in how claw horn lesions develop over time and are hard to fully cure.

The Results

Heifers with the highest claw horn lesion (CHL) scores 2–4 months post calving had a significantly increased risk of future lameness (2). In addition, between 79 and 83% of lameness events were estimated to be attributable to exposure to all previous lameness events (3).

The accumulation of previous lameness events, particularly in first lactation contribute toward an overwhelming proportion of the total amount of lameness in the herd. On farm, early intervention with claw horn lesions, particularly in heifers offers huge potential in reducing lifetime lameness risk.

Our data has clearly established the link between low BCS and lameness. Results indicate that a BCS <2 is associated with the greatest risk of mild or severe lameness in dairy cows. The results suggest that maintaining BCS ≥ 2.5 may be optimal for reducing the risk of lameness in dairy cows (4).

MRI studies of the digital cushion within the feet of Langhill cows help support and explain the link between BCS and lameness. The digital cushion acts as the shock absorber of the foot, vital in the prevention of CHLs and is composed of fat and connective tissue.

The volume of the digital cushion was negatively associated with the number of lameness events or CHLs recorded and animals with body condition score >3 , were more likely to have a higher volume of digital cushion in the lateral claws (5). Thinner cows have lower volume digital cushions, containing less fat and have less shock absorbing capacity within the foot as the cow walks.



The long term effects of chronic lameness and repeated lameness events in relation to CHLs was shown through CT studies of the pedal bones within the feet of Langhill cows. Excess bony development on the walking surface of the pedal bone was greater in cows with a history of lameness with CHLs as measured by our mobility scoring and foot trimming data (6). This helps explain why once claw horn lesions develop, long term damage to the foot can be established which is difficult to reverse.

The Impact and Future

All of the research work carried out has pointed to the importance of prompt detection, early and effective treatment for lame cows for better long term cow welfare.

The findings and advice are incorporated into lameness advice for farmers, vets and foot trimmers through AHDB Dairy's Health Feet programme.

One of the spin offs from this research has based on hoof dissection and CT scanning is a change to the standard recommendations to the Dutch 5 step foot trimming method used commonly for lameness prevention which have been adopted by the industry. (7)

Additional Information:

Publications:

Randall L.V., Thomas H.J., Remnant JG (2019) Lameness prevalence in a random sample of UK dairy herds. *Veterinary Record* 184, 350.

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Randall, LV., Green, MJ., Chagunda, MGG., Mason, C., Archer, SC., Green, LE. & Huxley, JN. (2015) Low body condition predisposes cattle to lameness: an 8-year study of one dairy herd. *Journal of Dairy Science*. 98, 3766–3777.

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Newsome, R., Green, MJ., Bell, NJ., Chagunda, MGG., Mason, CS., Rutland, CS., Sturrock, C.J., Whay, HR. & Huxley, JN. (2016) Linking bone development on the caudal aspect of the distal phalanx with lameness during life. *Journal of Dairy Science*. 99, 4512–4525.

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