



Københavns Universitet



Is The Bovine Pedal Bone Sinking Around Calving?

Bach, Kurt; Nielsen, Søren Saxmose; Capion, Nynne

Publication date:
2017

Document Version
Publisher's PDF, also known as Version of record

Citation for published version (APA):
Bach, K., Nielsen, S. S., & Capion, N. (2017). Is The Bovine Pedal Bone Sinking Around Calving?. 175-176. Abstract from 19th International Symposium and 11th Conference Lameness in Ruminants, Munich, Germany.

Is the bovine pedal bone sinking around calving?

Author: Bach K¹, Nielsen SS¹, Capion N¹

¹Faculty of Health and Medical Sciences - University of Copenhagen

kurtbach@sund.ku.dk

Introduction

Softening of connective tissue of the claw suspensory apparatus around calving as described by Tarlton, et al. (2002) may lead to sinking of the bovine pedal bone resulting in compression of the digital cushion. The objective of this study was to describe changes in the thickness of the soft tissue on weight bearing claws in the weeks around calving.

Materials and methods

Thirty-five Holstein heifers were followed in a Danish dairy herd. Each heifer underwent an ultrasonographic examination of the hind claws four times, twice before calving and twice after calving, with a one-week interval. The ultrasonographic examination was performed through the sole horn as described in other studies (Bicalho, et al. 2009, Kofler, et al. 1999, van Amstel, et al. 2004) but on weight bearing claws, while the heifers were standing in a tub with a 10 mm. thick polyethylene bottom. The claws were covered with water to improve the image quality. At each examination, the body condition score (BCS) of the heifers was recorded.

The thickness of the soft tissue in the sole, defined as the distance between inner margin of the sole horn and the pedal bone, was measured on the ultrasonographic images at the apex of the claw and at the typical sole ulcer site.

Results

We made 1096 ultrasonographic examinations.

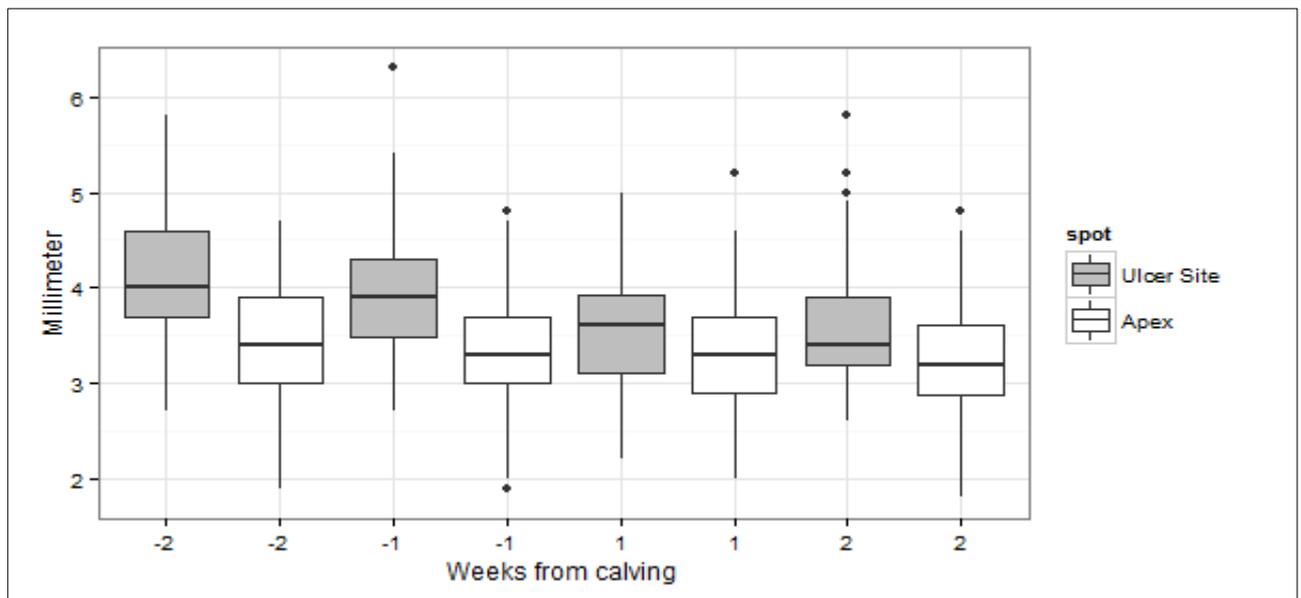


Figure 1. Thickness of the soft tissue in millimeter at the sole ulcer site (grey boxes) and at the apex of the claw (white boxes) in the weeks around calving. “-2” and “-1” is week two and one before calving respectively. “1” and “2” is the first and second week after calving

The mean thickness of the soft tissues at the typical sole ulcer site was reduced with 0.6 millimeters from the first to the last examination (Figure 1). This was a 15 % reduction of the thickness, in

approximately four weeks. The correlation between “days from calving” and “thickness of the soft tissue” was 0.31 (Pearson’s, $p < 0.001$).

At the apex of the claw only small changes were observed.

We did not observe any significant loss in BCS in the four-week period we followed the heifers’.

Discussion

The decrease in soft tissue thickness in the weeks post-partum could be the result of actual sinking of the pedal bone inside the claw capsule. This may lead to increased pressure on the dermis of the sole horn.

However, we do not know if the decrease in thickness entirely was a consequence of calving.

Changes in environment, feeding and handling of the heifers might also contribute to the decrease in the thickness and development horn related lesions as described by other authors (Bergsten, et al. 2015, Webster 2001) In future studies, multiparous cows and animals from more than a single farm should be included and the number of known risk factors related to claw horn lesions should be limited. A longer study period post calving to reveal a possible increase in thickness would be of interest.

Acknowledgements

Thanks to Helle Holstein for providing heifers.

References

- Bergsten C, Telezhenko E, and Ventorp M** 2015 Influence of Soft or Hard Floors before and after First Calving on Dairy Heifer Locomotion, Claw and Leg Health. *Animals* **5**: 0378.
- Bicalho RC, Machado VS, and Caixeta LS** 2009 Lameness in dairy cattle: A debilitating disease or a disease of debilitated cattle? A cross-sectional study of lameness prevalence and thickness of the digital cushion. *Journal of dairy science* **92**: 3175-3184.
- Kofler J, Kubber P, and Henninger W** 1999 Ultrasonographic imaging and thickness measurement of the sole horn and the underlying soft tissue layer in bovine claws. *Veterinary Journal* **157**: 322-331.
- Tarlton JF, Holah DE, Evans KM, Jones S, Pearson GR, and Webster AJF** 2002 Biomechanical and Histopathological Changes in the Support Structures of Bovine Hooves around the Time of First Calving. *The Veterinary Journal* **163**: 196-204.
- van Amstel SR, Palin FL, and Shearer JK** 2004 Measurement of the thickness of the corium and subcutaneous tissue of the hind claws of dairy cattle by ultrasound. *Vet Rec* **155**: 630-633.
- Webster AJF** 2001 Effects of housing and two forage diets on the development of claw horn lesions in dairy cows at first calving and in first lactation. *Veterinary Journal* **162**: 56-65.

Keywords: Ultrasound, Calving, Claw suspensory apparatus