Lameness and Injuries in Dairy Cattle: What Does the Science Say?

Prevalence, risk factors, treatment, and barriers to adoption of best practices for lameness and injuries in dairy cattle

Lameness and injuries are prevalent across the dairy industry and are considered to be significant welfare concerns. An invited review[1] was written for the Journal of Dairy Science on risk factors, prevalence, and treatment of lameness and injuries, as well as barriers to adopting best practices for these conditions. The following technical note summarizes this review and highlights some of the key take home messages on lameness and injuries in dairy cattle.

Key Points

- Lameness, as well as injuries to the hock (tarsus joint), knee (carpus joint), and neck of dairy cattle, are a welfare concern for the Canadian dairy industry
- Numerous risk factors have been associated with the incidence of lameness and injuries, notably housing, management, and cow-level factors
- Preventative approaches for lameness include: routine preventative and corrective hoof trimming, improved cushioning and traction, deep bedded stalls, sand bedding, and frequent use of foot baths
- Best practice for treating lameness includes a combination of therapeutic hoof trimming, hoof blocks, and the use of analgesics
- Farm advisors, such as the veterinarian, hoof trimmer, and nutritionist, are influential in implementing on-farm decisions related to lameness prevention, treatment, and control

What are the On-Farm Impacts of Lameness and Injuries?

Lameness and injuries are an important on-farm challenge for cow welfare and productivity, as well as industry risk and customer and consumer perspectives. The global estimated prevalence of lameness is around 23%; however, lameness estimates vary by type. The cow-level prevalence of infectious claw disorders (0-3%) is generally reported to be lower than non-infectious claw disorders (16–47%). Additional studies report that infectious cases are present in 70–94% of herds (affecting 9–23% of cows); sole ulceration is present in 70–92% of herds; and white line disease is present in 50–93% of herds (affecting 5–9% and 2–4% of cows, respectively). Estimates of injuries vary as well, with hock injuries, knee injuries, and neck injuries ranging from 0-81%, 6-43%, and 1-33%, respectively.

While all are painful conditions, lameness in particular is a leading animal welfare concern in the dairy industry and represents a significant challenge due to the many factors that contribute to its occurrence. Lameness has been associated with a reduction in feed intake and milk production, increased risk of being culled, and has impacts on reproductive performance and fertility. It is estimated that the economic impact of lameness ranges from $165-$300 CAD per case. Hock, knee, and neck injuries are not only a welfare concern, they are also associated with decreased production and lying time.

Housing, Management, and Cow-Level Risk Factors for Lameness and Injuries

Numerous risk factors have been associated with the incidence of lameness and hock injuries, particularly as it relates to housing, management, and cow-level factors.

Risk Factors for Lameness

Housing type, stall design, access to pasture, flooring, and bedding have all been identified as important risk factors for lameness. Risk of lameness is also associated with management factors, such as hoof trimming and foot bathing, cleanliness, time out of pens, and stocking density.

Factors associated with LOWER levels of lameness

- Deep bedding with organic material or sand
- Rubber flooring in alleyways
- Pasture access
- Preventative hoof trimming and management practices
- Higher milk production

Factors associated with HIGHER levels of lameness

- Mats or mattresses in lying areas
- Small stalls with large cows
- Higher curb height
- Wet, dirty stalls
- Tie-stall housing
- Longer time away from pen for milking
- Higher stocking density
- Lower body condition score (< 2.5/5)
- Older parity (> 1st lactation)
- Past presence of hoof lesions or lameness
- Overgrown claws
- Injured hocks
- Longer days in milk

Risk Factors for Hock, Knee, and Neck Injuries

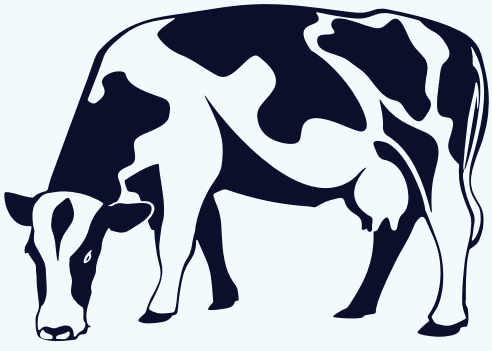
Similar to lameness, housing, management, and cow-level factors are associated with hock injuries. In terms of housing management, deep bedding, sand bedding, and access to pasture are consistently associated with lower levels of hock injuries. Older cows have been associated with a higher prevalence of knee injuries, and low neck-rails (< 140 cm in height) have been associated with a higher prevalence of neck injuries.

Factors associated with LOWER levels of injury

- Deep bedding
- Access to pasture
- Sand bedding

Factors associated with HIGHER levels of injury

- Time spent lying on abrasive surfaces
- Collisions of the hock with stall fittings
- Prolonged local pressure or friction on hard surfaces
- Herringbone parlors
- Stalls with mattresses
- Short stalls
- Cows in higher lactation or days in milk, lame cows, cows with low body condition score
- Older cattle
- Low neck rails (<140cm in height)



How can Injuries and Lameness be Prevented?

While limited research has been done on prevention of injuries, proper housing design and use of deep bedding are the most consistently identified factors to reduce hock, knee, and neck injuries. When it comes to lameness, key preventative approaches include:

- Routine preventative and corrective hoof trimming
- Improving hoof cushioning and traction (i.e., rubber flooring, pasture access)
- Deep bedded stalls
- Sand bedding
- Appropriate stocking density
- Routine foot bathing
- Reduced standing time
- Proper stall design

How are Lameness and Injuries Treated?

Therapeutic trimming, the use of hoof blocks, and providing pain management are effective strategies for treating lameness. Therapeutic trimming is the practice of removing necrotic horn tissue, followed by adjusting weight bearing on affected claws, to reduce pain and improve healing of the foot. The application of a block to the healthy claw in order to relieve pressure on the affected claw is also a useful practice, commonly applied during therapeutic trimming. The use of analgesics has also been shown to aid in lameness recovery. Best practice is to treat lameness using a combination of all three interventions. Research on treatment of hock and knee injuries is limited; however, improving the cushioning of cows' lying surfaces and bedding helps with recovery.

The Impact of Farmers and Their Advisors on Injuries and Lameness

Both extrinsic (e.g., time, money, space) and intrinsic (e.g., farmer attitude, perception, priorities, and mindset) barriers exist to addressing lameness and injuries on dairy farms. Reducing lameness in dairy herds requires farmers to adapt or change existing practices, which often requires investment and a change in behavior. To reduce the levels of lameness and injuries, it is important to account for producers' attitudes and intention to take action. While economic aspects impact decision-making, the producer's understanding of the condition and its impacts are most influential over their determination of whether to intervene or not.

Ultimately, advisors play an important role in guiding and influencing on-farm decision-making. Lameness and injury management involves various stakeholders (i.e., farmer, staff, advisors), who are influencing and implementing on-farm decisions related to prevention, treatment, and control. Veterinarian involvement, monitoring, and support has been shown to increase the likelihood of farmers implementing more on-farm changes to improve lameness and an overall reduction in lameness over time. Farmers particularly value the pre-established relationship they have with their advisors, their expertise in health and welfare, the opportunity for an outside perspective, the ability to compare and contrast with other clients' farms, and the ability to advise and offer farm-specific recommendations. Communication and collaboration between the farmer, veterinarian, and hoof trimmer is important in creating and implementing an effective plan to reduce, treat, and prevent lameness.

A Call to Action

Lameness and hock, knee, and neck injuries pose a challenge for the dairy industry, not only due to their significant impacts on animal welfare, health, and production, but also the economical impact that these conditions can have for farmers. This summary highlights the importance of addressing these prevalent and costly conditions, as well as the evidence-based best practices that exist to help guide farmers and their advisors in reducing lameness and injuries on their farms.

References

1. Roche, S.M., D.L. Renaud, J. Saraceni, D.F., Kelton, and T.J. DeVries. 2023. INVITED REVIEW: Prevalence, risk factors, treatment, and barriers to best practice adoption for lameness and injuries in dairy cattle: A narrative review. J. Dairy. Sci. In Press. https://doi.org/10.3168/jds.2023-23870

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