The Impact of Lameness on Welfare of the Dairy Cow

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KEYWORDS

• Lameness • Animal welfare • The five freedoms

KEY POINTS

- The five freedoms offer a useful framework for the discussion of lameness and its impact on the welfare of lame cows.
- Altered feeding behavior may be an important cause of reduced body condition, a smaller digital cushion, and lameness due to sole ulcers and white line disease.
- Providing a comfortable environment for lame cows during the post-treatment period is critical to their recovery and welfare.
- Pain associated with injury or disease of feet and/or legs is manifested by lameness. Pain management is an important part of therapy. In cases of severe lameness (SL), euthanasia may be the preferred option to end otherwise uncontrollable suffering.
- Lameness interferes with an animal's ability to exhibit natural behaviors by altering lying time, social interaction, ovarian activity and estrus intensity, and possibly rumination behavior.

INTRODUCTION

The estimated cost (in today's US dollars) of clinical lameness in dairy cattle approaches $500 per case.[1] Less finite is the actual welfare cost of a problem, such as lameness, because much of an animal's internal experience is inaccessible to humans. The welfare of animals is measured in different currencies. For example, how can the welfare consequences of a change in a cow's ability to express a normal behavior be compared with a case of severe acute mastitis? It is like comparing the price of a product in Japanese yen and US dollars without being told the conversion ratio. Regardless of the difficulty of placing a value on welfare problems, an overview of the welfare challenges experienced by lame dairy cattle is still valuable. An

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appreciation of the more subtle as well as the obvious compromises to welfare resulting from lameness is the first step in considering how to better support lame cows and minimize the impact of a problem.

A useful framework for considering the welfare impact of lameness on dairy cows is the five freedoms,[2] which suggest that a basis for provision of good animal welfare is to deliver

Freedom from hunger and thirst
Freedom from discomfort
Freedom from pain, injury, and disease
Freedom to express normal behavior
Freedom from fear and distress

To move beyond the five freedoms requires an environment where animals not only survive but also thrive, an environment where the positive experiences outnumber the negative.[3] Opportunities to improve the welfare of lame cows are abundant.

FREEDOM FROM HUNGER AND THIRST

Provisions of freedom from hunger and thirst are met by providing ready access to fresh water and a diet to maintain full health and vigor.

The impression of most veterinarians is that lameness causes cows to become thin. It is assumed that when cows become lame they lose weight because of inappetence and changes in eating behavior associated with the debilitating effects of the lameness condition. This seems logical because lameness causes pain, reducing the number of trips to the feed bunk, time spent eating, and the ability of the cow to compete for feeding space.

Alternatively, it may be that cows that become thin are more likely to become lame.[4–6] Researchers investigating the relationship between claw lesions, body condition, and thickness of the digital cushion (DC) found that the prevalence of sole ulcers and white line disease increased as thickness of the DC decreased. They also observed that thickness of the DC decreased steadily throughout lactation, reaching nadir (ie, its lowest point) at 120 days after calving. Body condition scores (BCSs) of cows were positively associated with thickness of the DC, whereby an increase in BCSs was associated with a corresponding increase in mean thickness of the DC.[4] The highest prevalence of sole ulcers occurred near peak lactation (ie, 60–100 days in milk), the point at which shrinking of the DC was approaching nadir. This is not unlike observations from other studies and supports an association with a thinner, less functional DC. The rumen acidosis-laminitis complex, the effects of hoofase or activation of metalloproteinase activity, and/or the impact of peripartum hormonal changes, however, can all be theorized as causes of these conditions in a similar time frame.[7–9] Therefore, these observations do not preclude or reduce the significance of other causative factors. Rather, they highlight lameness' complicated pathogenesis and its multifactorial causes.

It seems likely that there is some level of interaction between these 2 theories. BCS can be viewed as a proxy indicator of hunger and loss of body condition through a combination of inappetence, lack of time for eating, inability to successfully compete for food, and burning of energy as the body mounts a defense against the clinical disease of lameness. Whether hunger in dairy cattle results in an experience similar to hunger in humans is unknown, but if the term, *hunger*, is used in its broadest sense as a catch-all term for suboptimal nutrition, then hunger seems to be a problem associated with lameness.