An Update on the Assessment and Management of Pain Associated with Lameness in Cattle

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KEYWORDS

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Lameness affects the cattle industry via both economic losses and welfare considerations. In addition to production deficits, the pain and distress associated with lameness have been documented.[1] Furthermore, the evaluation and prevalence of lame cattle are among the primary factors in third-party welfare audit programs, including the National Dairy FARM (Farmers Assuring Responsible Management) Program, Validus, and the New York State Cattle Health Assurance Program (NYSCHAP).[2–4] Involuntary culling of lame cattle continues to be an important reason for losses in both the dairy and beef industries.[5,6] Mean lameness prevalence in herds has been reported to be as high as 33.7% and 36.8% in Wisconsin and the United Kingdom, respectively; however, in other survey studies, a less than 10% prevalence of lame cattle was reported by producers.[7–9] Note that lameness is usually underreported by producers compared with independent observers, potentially because of a decreased sensitivity in detecting lame cattle.[10,11]

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In efforts to improve earlier detection and treatment of lameness, locomotion scoring systems have been developed for routine use by farm employees.[12,13] It has been suggested that earlier analgesia treatment may aid in the alleviation of acute pain perception or in the mitigation of wind-up, which can lead to central sensitization.[14] Central sensitization is responsible for the observed pain-related behavioral changes through increased sensitivity of pain (hyperalgesia) and pain from nonpainful stimuli (allodynia).[14] Whay and colleagues[1] reported hyperalgesia in lame cattle compared with sound animals through significant decreases in nociceptive thresholds at the time of lameness detection and 28 days later, suggesting prolonged chronicity. Analgesic treatment difficulties in chronic lame cattle may be best explained through the aforementioned central sensitization based on current pain models. As a result, preemptive analgesia that is usually advocated is difficult, if not impossible, to implement in lame cattle.[14] Recommendations for pain management often include a multimodal approach. In lame cattle, pain can be best alleviated following a multimodal approach, including primarily corrective claw trimming and placement of foot blocks with additional benefits provided by analgesic compounds. Excerpts of this article were published in a previous edition of *Veterinary Clinics of North America Food Animal Practice*, but data were updated to include current research.[15]

ASSESSMENT OF PAIN IN LAME CATTLE

Locomotion or Lameness Scoring Systems

Behavioral changes associated with lameness indicate attempts by the animal to protect the affected limb from further injury.[16] Although these may vary between individual animals, signs such as head bobbing, an arching of the spine, or changes in stride length allow rapid identification of lame individuals.[16] Changes in posture associated with lameness have been summarized in an excellent review article by Whay[16] and form the basis of most locomotion scoring systems. An arched back is frequently associated with lameness and is the key behavioral change evaluated in the Sprecher lameness scoring system (1997) (**Table 1**).[12] Other behavioral changes associated with lameness that can be visually scored include[16]:

1. Hanging or bobbing of the head during locomotion
2. Shortening or lengthening of the stride
3. Changes in the degree of abduction or adduction of the limbs with an increased deviation from the vertical seen in 1 hind limb
4. Changes in claw placement (overextension or underextension of the stride) resulting in the hind claw not being placed in the same location as the front claw after initiation of the stride

Table 1
Sprecher lameness scoring system

LS	Clinical Description
1	Normal: stands and walks normally, with all feet placed with purpose
2	Mildly lame: stands with flat back, but arches when walks; gait is slightly abnormal
3	Moderately lame: stands and walks with an arched back, and short strides with 1 or more legs
4	Lame: arched back standing and walking, with 1 or more limbs favored but at least partially weight bearing
5	Severely lame: arched back, refuses to bear weight on 1 limb, may refuse or have great difficulty moving from lying position