Addressing Sow Lameness with an Emphasis on Claw Lesions

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TAKE HOME MESSAGES:

- Regular lameness assessment, nutritional management, and proper housing are critical to reducing sow lameness and claw lesions
- Early intervention improves sow welfare, extends sow longevity, and increases profitability
- A multidisciplinary approach ensures long-term sustainability in swine production

What is Lameness?

Lameness in sows refers to impaired locomotion typically caused by pain, injury, or structural abnormalities in the limbs, joints, or claws. It represents a major animal welfare and productivity challenge on commercial swine farms. Studies show that lameness accounts for between 6% and 35% of sow culling, significantly reducing longevity and profitability (Anil et al., 2009). Lame sows often fail to reach the minimum target of 3.5 litters before removal, limiting economic return on gilt development investments (Bradley, 2010).

Lameness and the Importance of Claw Lesions

Claw lesions are among the most common and significant contributors to sow lameness. These lesions include heel erosions, overgrowth, sole and wall cracks, white line separations, and skin abrasions. Damage to the keratin-rich horn capsule, whether from trauma, poor flooring, or nutritional deficiencies, leads to pain and impaired mobility. Understanding the anatomical structures of the sow's foot is critical for identifying lesion locations and developing targeted prevention strategies. Figure 1 illustrates the key regions of the claw, including the dewclaw, heel, heel-sole junction, sole, wall, and white line, which are commonly affected by claw lesions. Recognizing these areas supports more accurate lesion scoring and facilitates earlier intervention to prevent lameness.

Claw lesions are extremely prevalent in commercial operations, with reports indicating that between 50% and nearly 100% of sows are affected (Anil et al., 2007). Left unmanaged, claw lesions compromise sow comfort, behavior, and performance.

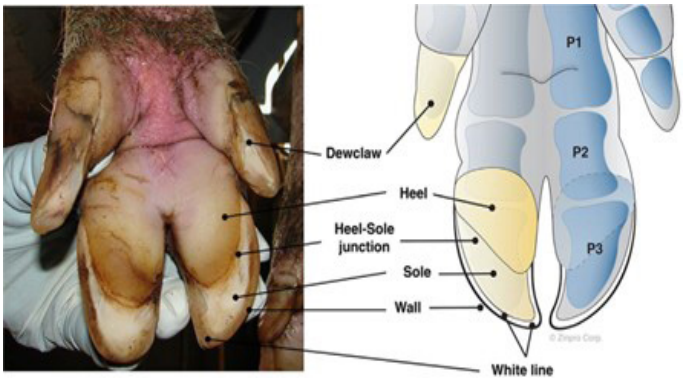

Figure 1. Anatomical features of the sow's claw, including dewclaw, heel, heel-sole junction, sole, wall, and white line (Image courtesy of ZinPro Corp.) (Nalon et al., 2013).

Monitoring and Assessment

Timely identification of lameness and claw lesions is critical to prevent progression and improve outcomes. Visual locomotion scoring is widely used on farms due to its low cost and practicality. However, its effectiveness depends on observer training, as untrained scorers may inconsistently identify lameness. More advanced technologies, such as pressure mats, force plates, and video gait analysis, provide objective measures of gait and weight distribution abnormalities. These high-tech systems can be labor-saving, especially when integrated into existing equipment like electronic sow feeders.

Mobile claw scoring tools, such as the Mobile Claw Scoring Device, allow efficient and standardized assessment of claw health in the field (Van Riet et al., 2012). Several claw lesion scoring systems exist, classifying lesions by type and severity. These systems enable farms to systematically record issues like heel erosions, white line cracks, and wall separations. Nalon et al. (2013) created a table summarizing widely used scoring systems (Table 1). Consistently scoring both medial and lateral claws helps track herd trends. For herd-level assessment, a sample size of at least 30 sows is recommended (Gjein & Larssen, 1995).

Despite the availability of assessment tools, subtle manifestations of lameness often go undetected or are diagnosed too late, compromising animal welfare and intervention success (Nalon et al., 2013).

Reference	Type of lesion/ affected area	Score	Description
Claw lesion classification systems described in the literature **Gjein and Larssen (1995a)** and subsequent adaptions (S.S. Anil et al. 2007; Enokida et al., 2011)	Side wall cracks	1	Normal
	Heel lesions	2	Small, superficial cracks or lesions in the epidermis
	Overgrown heels	3	More serious lesions that were confined to the epidermis
	White line cracks	4	Serious, deep lesions that extended into the corium
	Cracks in heel-toe junction	5	Very serious or deep cracks that extended into the corium or subcutis
	Toe cracks		
Bradley et al. (2007)	Heel erosion	1	Mild
	Fischer's crack	2	Moderate
	Heel overgrowth	3	Severe
	White line cracks		
	Horizonal wall cracks		
	Vertical wall cracks		
	Hardship grooves		
	Haemorrhage		
	Abscess		
Available claw lesion scoring guides			
Reference	**Type of lesion/ affected area**	**Score**	**Description**
Hoofs (2006)	Heel overgrowth and erosion	1	Normal
Zeugenklauwen Check	Dewclaws (length/integrity)	2	Slight
	Claws (length)	3	Moderate
	Wall (vertical + horizonal cracks)	4	Severe
	Skin lesions above coronary band		
Deen et al. (2009)	Toes (length)	1	Mild
Feet First© by ZinPro	Dewclaws (length/integrity)	2	Moderate
	Heel overgrowth	3	Severe
	Heel-sole crack		
	White line		
	Cracked wall (horizontal)		
	Cracked wall (vertical)		

Table 1. Published claw lesion classification criteria and scoring systems (Nalon et al., 2013).

The Role of Nutrition in Lameness Prevention

Nutrition directly influences claw horn production and bone integrity. Calcium and phosphorus are vital during late gestation and lactation when mineral demands increase. Trace minerals such as copper, zinc, and selenium play key roles in keratin and connective tissue formation. Copper deficiency, for example, can reduce osteoblast activity and impair horn quality, increasing the risk of claw lesions (McDowell, 2003).

High demands for amino acids during late gestation and early lactation may also impair horn production if nutritional needs are not met. Disturbances in horn development, articular cartilage metabolism, or bone remodeling contribute directly to lameness in sows (Van Riet et al., 2013). The composition, intake, and bioavailability of nutrients in sow diets are therefore predisposing factors for lameness, and proper adjustment for physiological stage is essential to support hoof integrity. Preventing lameness requires careful adjustment of sow diets to account for changing mineral and protein needs throughout gestation and lactation.

How Lameness Effects Sow Welfare, Health and Production

Lameness severely compromises sow welfare by restricting mobility and causing pain. Behavioral changes such as decreased feeding, social withdrawal, and prolonged lying are common indicators of distress. Managing lame animals also increases labor requirements and caretaker burden.

Economically, lameness results in early sow removal, lower litter productivity, and increased replacement costs (Pluym et al., 2012). Herds with higher lameness prevalence face significant losses in sow longevity and reproductive performance, impacting overall farm efficiency (Johnson, 2010). From a production standpoint, lameness leads to early culling, fewer litters, reduced piglet output, and increased replacement costs. Lameness is associated with higher sow mortality and herd turnover, reducing reproductive efficiency and long-term productivity (Heinonen et al., 2013). Prompt treatment and timely culling decisions are essential to minimize both welfare issues and production losses.

Treatment and Prevention

Preventing lameness and claw lesions in sows requires a multifactorial approach that includes environmental management, nutritional strategies, and early detection. Regular observation of sow behavior, particularly during feeding, can help identify early signs of locomotion issues, such as reluctance to stand, shortened stride length, or uneven weight bearing. Flooring design is a critical factor. Abrasive or slatted surfaces, combined with poor drainage, can lead to excessive horn wear and trauma, especially in group-housed sows.

Claw trimming has been explored as a management tool in sow herds with variable results. Some studies indicate that trimming may help reduce the severity of claw lesions or improve locomotion in certain cases (Seddon et al., 2013; Tinkle et al., 2017). However, other studies have found no consistent improvements in sow longevity or lesion incidence, particularly under group-housed conditions. For example, Vestergaard et al. (2006) reported that the lack of consistent benefit may not justify the added labor and cost associated with routine trimming. As such, claw trimming may be beneficial for some farms depending on herd history, facility design, and management practices.

Similarly, the use of foot baths has been proposed for claw lesion prevention and treatment in pigs, with products such as copper sulfate, zinc sulfate, and formalin historically suggested. However, these recommendations are based on older studies, and recent peer-reviewed data under modern group-housing conditions are lacking. Moreover, copper and zinc sulfate raise environmental concerns, and formalin poses serious human health risks due to its carcinogenicity. While alternatives like glutaraldehyde and quaternary ammonium compounds exist, there is no recent, validated scientific literature supporting their effectiveness in sow footbaths. Additionally, the potential for sows to lie down in or drink from foot baths raises welfare and safety concerns. Impregnated mats may offer a safer alternative, but additional research is needed to evaluate their effectiveness and practicality when incorporated into group-housed sow pens.

Looking forward, precision livestock technologies such as pressure mats and automated locomotion monitoring integrated into electronic sow feeders present opportunities for real-time, non-invasive assessment. Genetic selection for improved structural conformation, particularly related to claws and limbs, offers promise for long-term reduction in lameness prevalence. Proactive monitoring and management, grounded in current science, remain the best strategies for supporting sow welfare and performance.

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