

Identification, treatment and prevention of shoulder lesions in sows

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Shoulder lesions are most commonly observed in sows during the weeks following farrowing¹. Long periods of lying combined with poor body condition can increase the likelihood of sows developing shoulder sores. The prevalence of shoulder lesions varies greatly depending on farm and sow factors, with anywhere from 10 to 50% of sows being affected. Shoulder lesions, also referred to as shoulder sores or ulcers, typically appear as a circular sore on the upper shoulder.

In sows, shoulder lesions appear over the scapula, where the amount of soft tissue between the skin and bone is insufficient to distribute external pressure. Lying laterally (such as during nursing bouts) puts pressure on this area, and prolonged lying can restrict blood flow and result in localized tissue damage¹. Shoulder lesions in sows are comparable with pressure ulcers in humans, also known as bed sores. Once they have developed they are difficult to treat, and will often return during the next lactation¹. In practical terms this means sows are at their highest risk for developing lesions in the weeks after farrowing as they can spend over 90% of their time lying during this period.

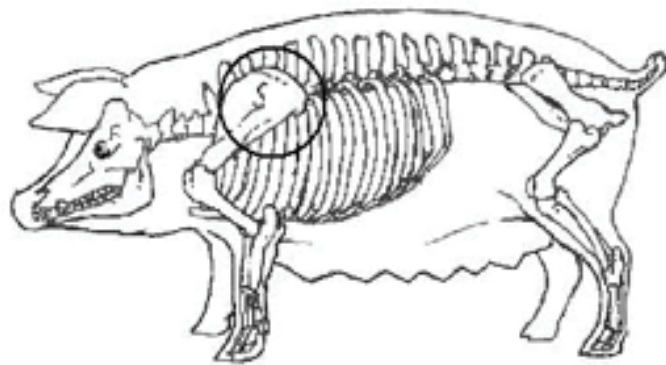


Figure 1. The sow's bone structure and typical location of shoulder lesions, where the scapula has minimal tissue coverage. Drawing J. Brown

The first indication of a shoulder lesion forming is reddening of the skin. The skin may become damp and flies can be attracted to the area. If the problem goes untreated, the sore can quickly progress to an open ulcer, and in extreme cases, the underlying bone may be exposed¹. The occurrence and severity of shoulder lesions varies greatly from farm-to-farm, reflecting the multifactorial nature of this problem.

Risk Factors and Causes:

Barn and sow management: Sow body condition at farrowing is widely recognized as a key risk factor for the development of shoulder lesions. Sows scoring <3 on a 5 point scale are at greatest risk due to not having enough fat

coverage over the shoulder, resulting in greater pressure when lying laterally². It is generally believed that persistent compression of the blood vessels in the skin around the tuber of the scapular spine results in insufficient blood circulation, ischemia, necrosis, and subsequent ulceration. Maintaining sows in good body condition is therefore one of the most effective tools for reducing the prevalence of shoulder lesions¹.

The barn environment can also influence lesion formation. In farrowing pens, some floor types can contribute to the development of shoulder lesions. Depending on their design, slatted floors may cause problems as they provide less support and can cause more pressure to

be placed on the shoulder compared to solid floors². Higher temperatures can also influence lesion formation as sows may spend more time lying in hot weather, and high moisture levels (eg. drip cooling) can soften skin and may also result in slippery floors with sows being less willing to relieve pressure by standing or changing posture.

The identified risk factors also suggest that the trend for increasing productivity, in particular feeding larger litters and increasing weaning age, may result in an increased risk of developing shoulder ulcers. It is widely acknowledged that some sows may have a history of shoulder sores and should be given extra attention (e.g. provided with rubber floor mats in farrowing). If a sow has had a shoulder sore in her previous lactation, the chances of her developing sores in the following gestation is greatly increased³.

Sows may also be reluctant to stand or change position in farrowing (thus not relieving pressure from the shoulder area) due to locomotive problems⁴. Looking at shoulder lesions in cull sows, researchers reported that open lesions were positively associated with rear foot abscesses⁵.



Thus, fast recognition and treatment of lameness issues can also help to prevent the development of shoulder lesions.

Genetics: Several studies have found that shoulder lesions are a heritable trait. Breed effects have been found, showing higher prevalence in Landrace and Duroc sows compared to Yorkshires². The heritability of shoulder lesions in (Swedish) Yorkshire sows was estimated at 0.13. With another study reporting heritability of the incidence of lesions ($h^2 = 0.18$) and the size

of lesions ($h^2 = 0.09$) in Landrace x Yorkshire crossbred sows⁶.

The estimated heritability of shoulder ulcers and the genetic correlations between shoulder ulcers, mean piglet weight and sow body condition were measured in Landrace sows. The estimated heritability of shoulder ulcers was 0.25, and a genetic correlation between shoulder ulcers

and mean piglet weight was also found. The correlation was low, but positive and therefore unfavourable (0.23) as it indicates that the sows' ability to raise heavy piglets increases her risk of shoulder ulcers⁷.

As shoulder ulcers are a heritable trait it should therefore be possible to identify genetic associations and reduce their prevalence by using this as a selection trait in breeding programs.

Consequences and treatment:

Shoulder lesions are believed to cause varying degrees of pain at different stages of severity¹. They also provide an entry way for pathogens which can cause infection. Presently, no pain relief is typically given for the treatment of the lesions,

however, based on the involved tissue structures and data from human pressure sore patients it is likely that their presence is a painful condition.

As with many problems, the prevention of shoulder sores is much more effective than treatment. However, due to the many factors that contribute to this problem it may be hard to eliminate them completely. A standard on-farm

"Maintaining sows in good body condition is one of the most effective tools for reducing the prevalence of shoulder lesions."

protocol for identifying and treating shoulder lesions should be established in conjunction with your veterinarian. Key points in any treatment plan include:

1. Hygiene: When lesions appear, they should be cleaned with soap solution, rinsed thoroughly and an antibiotic ointment or spray applied.
2. Monitoring: Affected sows should be monitored daily. All sows should be checked as they enter or exit the farrowing room in order to record and monitor the prevalence of shoulder lesions. Body condition and any signs lameness can also be monitored at this time and can provide a useful benchmark of herd health over time.
3. Treatment: Sows with established shoulder ulcers should be provided with a stall mat or moved to a pen with softer flooring. Deep straw bedding provides the correct properties for improving comfort, including increased distribution of pressure for lying sows. However, this may not be feasible in many production facilities, due to the use of liquid manure disposal systems or increased labour and production costs⁹.

Research on different treatment options has focused primarily on the use of rubber floor mats. Sows provided with a mat had significantly decreased lesion healing time compared to sows housed in a conventional farrowing crate, or those provided with solid stainless steel plates under their shoulder region. Sows were also much more likely to choose to lie on flooring with a mat than without².

Another study compared the effectiveness of a combination of rubber mats and zinc ointment (25% zinc oxide) with a local antibiotic treatment (*Identification, treatment ... cont'd on page 9*)

barns (Control room). Eight replicates (4 winter, 4 summer) were carried out.

Figure 1 shows the ventilation design configuration of the two experimental rooms. In Treatment rooms, air inlets were located at one end of the room and exhaust fans at the opposite end allowing air to flow horizontally through the entire length of the room (Figure 1A). In Control rooms, inlets were located on the ceiling while the fans were on one of the external walls; this configuration represented a downward air flow direction which is typical in commercial sow barns (Figure 1B).

Conclusions

Results from the computer simulation work have confirmed the need to re-design the ventilation system of a newly-converted group sow housing facility. Among all the design configurations tested, horizontal flow ventilation system was the most effective in removing heat from the animal occupied zone (AOZ) in the room during both summer and winter seasons.

In-barn evaluation of the selected ventilation system design showed about 21% reduction in natural gas consumption during heating season and 14% reduction in electricity consumption in the room with the horizontal flow ventilation system.

The horizontal ventilation system design for group sow housing has provided better air quality and cleaner floors than the unmodified ventilation design.

Animal performance and productivity were not adversely nor beneficially impacted by having a horizontal flow ventilation system in a gestation room.

In terms of behavior and welfare, enrichment use was greater in the room with the horizontal ventilation design which implies that sow comfort was better in the Treatment room.

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(*Identification, treatment cont'd from page 3*) (chlortetracycline spray) on healing of shoulder ulcers in three sow herds. Sows were paired according to the grade of their ulcer and were randomly divided into two treatment groups: i) mats and zinc ointment, or ii) antibiotic spray.

The rubber mat and zinc treatment had a statistically significant effect for lean sows, the average shoulder ulcer size was smaller on day 14 (3.8cm² versus 9.5 cm²) than when antibiotic spray was used⁹.

Prevention of shoulder lesions:

Based on previous scientific studies, two methods were identified as most effective for reducing the prevalence and severity of shoulder lesions: 1. Ensuring good body condition when entering farrowing, and 2. Using rubber mats to reduce pressure on the shoulder region of the sow.


Monitoring and maintaining body condition prior to farrowing and throughout the first weeks of lactation is critical. Increasing movement in the most vulnerable sows could be a strategic management strategy to prevent the development of sores in at risk sows. Interrupting the lying bout by getting the sow up periodically will theoretically increase blood flow to the tissue and restore the oxygen supply⁹. It has also been found that the odds of a sow developing shoulder ulcers during lactation is three times higher in sows housed without rubber mats than in those with rubber mats extending to their hind limbs¹⁰.

The true incidence of shoulder lesions is likely underestimated due to their multifactorial nature and lack of accuracy in reported reasons

for culling. Because these lesions cause pain and contribute to the culling of sows, they raise concerns for animal wellbeing as well as representing a significant economic cost to producers. Future research should focus more on preventative management of sows, as this is a far more effective and useful approach, however robust strategies to deal with shoulder ulcers once they appear must also be developed, as the problem will persist until such time as an effective means of prevention can be implemented.

Take Home Message:

The prevalence of shoulder lesions in sows is associated with higher weaning weights, suggesting that higher producing sows are more susceptible to this condition. Thus, it is important to monitor sow body condition and adjust feeding levels as needed and to treat shoulder lesions promptly when they occur to promote the wellbeing and productivity of the herd.

However, both sow and farm factors influence the prevalence of shoulder lesions. Environmental factors which can play a role include the type and condition of flooring, temperature and humidity conditions, and to some extent, genetic selection. Regularly monitoring sows in farrowing and following up with rapid treatment of early signs of lesions (eg. use of mats) are useful steps in preventing these injuries from developing. Reducing the prevalence of sow shoulder lesions can save money and reduce losses to producers due to veterinary treatment, lost production, and the cost of replacement sows which currently represents a significant economic loss. 

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