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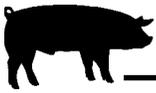
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# Shoulder Ulcers in Sows

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## Summary and Implications

*A literature review was conducted on shoulder ulcers in sows. Shoulder ulcers are caused by pressure that the shoulder blade exerts against tissues that overlie it. Those tissues lose blood supply and die. Because the pressure is directed outward, tissue damage occurs before the ulcer is evident on the skin surface. Ulcer prevalence is highly variable; 0 to more than 20% of the sows in 218 herds evaluated had shoulder ulcers. Ulcers usually develop during late gestation and early lactation and many heal shortly after weaning. Numerous risk factors for developing shoulder ulcers have been identified. Inactivity and thin sow body condition seem to be the most important ulcer risk factors. Thus, farrowing caretakers may be able to prevent ulcers by carefully monitoring each sow's lying behavior and attempting to fix any problem that restricts movement. Checking the gestation and lactation feeding programs to ensure that sows enter the farrowing area in proper body condition also may prevent ulcers. Experience from Denmark indicates a pad fixed to the shoulder of sows at the first sign of redness in the skin may prevent ulcers too. Sows starting to develop an ulcer benefit from treatment of underlying issues that cause inactivity, daily application of a topical disinfectant, early weaning and movement to a hospital pen, or a rubber mat to lie on in the farrowing crate. Close observation and appropriate care of sows especially around the time of farrowing should keep the incidence of shoulder ulcers low in the pork industry.*

## Introduction

Shoulder ulcers or pressure sores in sows are becoming an important issue in Denmark. Danish slaughterhouses recently begin pressuring pork producers to reduce the number of sows delivered to their plants that have or have had shoulder ulcers. Shoulder ulcers may be an indication of sow welfare. Moreover, it is possible that these sores may cause sows to change positions frequently in the crate to alleviate pain, thus increasing the chances of crushing piglets, according to Iowa State University researchers. Danish scientists suggest it's possible that open shoulder ulcers predispose the sow to septicemia or blood poisoning. The purpose of this paper is to examine why shoulder ulcers develop and what producers can do about them.

## Anatomy of the Shoulder

The shoulder blade or scapula has a ridge (spine) running its length that is the highest part of the bone (Figure 1). In some sows this spine is more pronounced than in others. When the sow lies on her side the bulk of her weight presses down on her shoulder. Because it sticks out the farthest, the spine of the scapula bears the most weight. The pressure actually comes from the weight of the sow that presses downward, resting on the point of the spine of the scapula, much like the weight is concentrated while wearing high heels. Continual pressure on the tissues overlying the scapula restricts their blood supply and eventually without blood, these tissues die. Because the nerves that supply the area also lose their blood supply and die, the condition is probably not painful.

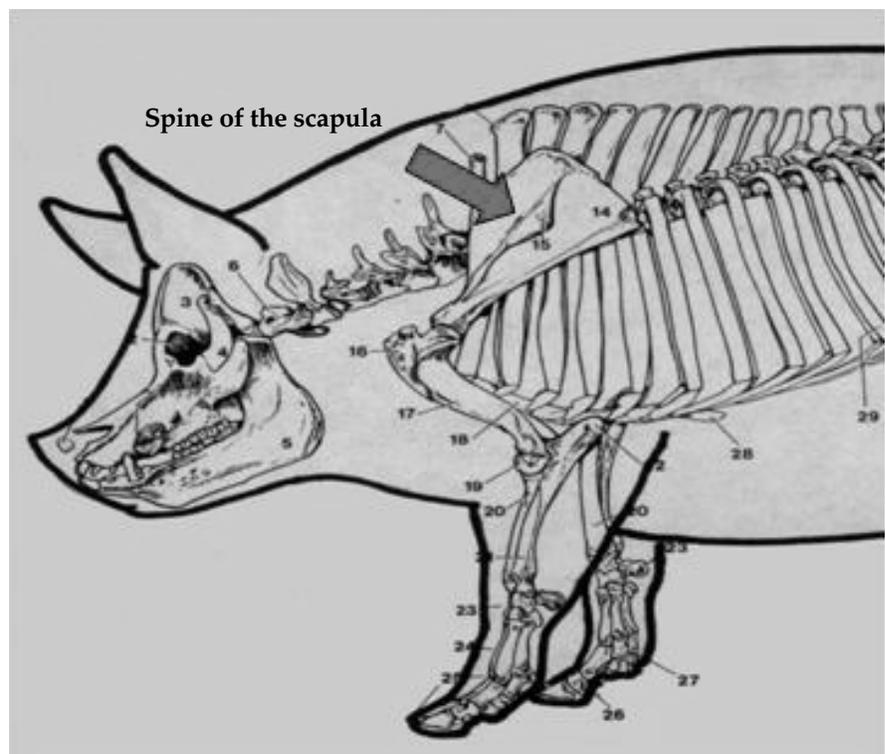


Figure 1. Anatomy of the shoulder of a sow.



Figure 2. Shoulder ulcer on a sow.

Because the direction of the pressure is from inside out, most of the damage to the underlying tissue already has been done before it finally progresses to the skin (Figure 2).

#### *Prevalence and timing of ulcer development*

The prevalence of shoulder ulcers in sows has been reported by three groups of researchers. In 1996 North Carolina researchers found 8.3% of the 1,916 females of breeding age they examined in a farrow-to-wean operation had shoulder ulcers. In 2004 researchers in Denmark examined 570 lactating sows in 10 commercial herds and reported 12% of the sows had shoulder ulcers. In a second Danish study involving 23,794 sows from 207 sow herds, about 70 herds reported only 5 percent or fewer of their sows had shoulder ulcers while in about 15 herds there were 20% or more of the sows with shoulder ulcers. These results demonstrate that significant variation in ulcer prevalence exists in the pork industry. The variation is likely related to differences in production facilities and management strategies.

The North Carolina researchers determined that ulcer prevalence was strongly associated with time after farrowing. A year later

those researchers monitored late-gestation sows and gilts that did not have shoulder ulcers on day 0 (when they were moved into farrowing crates), and on days 5, 12, 18, 40, 54 and 68 thereafter. Ulcers were observed on 33 of 206 shoulders (16%) by day 5. The highest incidence of ulcers was observed on day 12 (99 out of 206 shoulders; 48%). All the ulcers had healed by day 68, although marked healing was observed between day 12 and 18 while the sows were still in the crates.

These results indicate that shoulder ulcers develop rapidly in early lactation and they can begin to heal rapidly. Sows do lie on their side a considerable amount of time during parturition so it makes sense most shoulder ulcers would develop during early lactation. In a previous study about half of the sows did not shift the side they were lying on while they farrowed. Perhaps these sows are most likely to develop shoulder ulcers.

#### *Risk factors associated with ulcers*

The North Carolina scientists used sow body condition, parity, date of farrowing and litter size born data in their analysis to determine risk factors for shoulder ulcers. In one Danish study sows were examined visually for

body condition, hoof length, leg disorders and skin integrity. The overall cleanliness of the farrowing area and sow parity and lying-down behavior also were assessed. In the second Danish study a total of 33 potential risk factors related to facilities and management strategies were evaluated. From these three studies a list of key risk factors can be compiled:

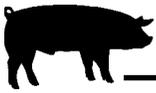
- Prolonged recumbency or lying during parturition
- Reduced activity in late gestation and early lactation
- Post-farrowing illness
- Sow body condition — thin sows have a greater ulcer risk
- Sow body weight — heavier sows have a higher ulcer risk
- Parity — ulcer prevalence increases with increased parity
- Moist skin — increases ulcer prevalence
- Duration of farrowing
- Source of replacement gilts — using one's own replacement gilts decreased ulcer prevalence
- Hospital or sick pen — use decreased ulcer prevalence
- Type of sow housing — confinement (stalled and tethered or tethered) increased ulcer prevalence
- Number of caretakers in farrowing area — increased ulcer prevalence was observed with two caretakers compared to one

This list demonstrates shoulder ulcers in sows is a multifactorial condition. That is, there are many factors that interact to contribute to the condition, making ulcer prevention difficult.

#### *Treatment and care*

Sows starting to develop shoulder ulcers should be closely examined to determine if there

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are any other problems that keep them from moving around. If a sow has a sore foot, if the floor provides poor traction or if the sow is too large to easily stand in the crate, these conditions should be attended to so that they don't contribute to the sow's inactivity. A topical disinfectant such as povidone iodine solution or wound dressing should be applied to the ulcer daily. If possible, wean the sow early and move her to a hospital pen to allow the ulcer to heal more rapidly.

In general it is not necessary to administer injectable antibiotics to sows with shoulder ulcers that appear dry or "meaty" as shown in Figure 3. If the ulcer contains pus or if the sow runs a fever or goes off feed, an antibiotic, usually penicillin, should be given in addition to applying a topical disinfectant and trying to correct the reasons that the sow is lying down so much. After weaning the sow will take better care of herself and not spend so much time lying on her side and irritating the ulcer. If the sow cannot be weaned for a while, place a rubber mat in the farrowing crate to help distribute the pressure on the sow's shoulder. Lay the mat on the floor so that when the sow is lying down her shoulders are on it.

### Prevention

Studies indicate that many risk factors are involved in the development of shoulder ulcers in sows. Some factors are not easy to address. It's clear that lack of animal movement especially during late gestation and early lactation is an important factor in development of shoulder ulcers. Thus, it seems important for caretakers to carefully monitor each sow's lying behavior and attempt to fix any problem that restricts her movement. Also, it might be useful to get sows up soon after they have finished farrowing to relieve



Figure 3. A meaty or dry shoulder ulcer in a sow.



Figure 4. Shoulder pad fixed to a sow in Denmark.

pressure on the tissues in the shoulder. Sows that appear stained or that have indentations of the flooring design on one side probably have been lying on that side for some time. Providing these sows a rubber mat to lie on probably will prevent an ulcer from developing.

Ulcer risk is also higher in thin sows so it is reasonable to reevaluate the sow feeding program during gestation and lactation in an attempt to reduce the number of thin sows that enter the farrowing area. Don't over-feed sows in gestation, because too much weight gain will cause



sows to be too heavy at farrowing and therefore increase the risk of shoulder ulcers.

If shoulder ulcers occur more frequently during the summer and drip cooling is being used in farrowing, perhaps repositioning the coolers over the sows' heads or reducing the drip rate might be useful in reducing ulcer risk.

Some producers in Denmark are using a "Skulderpude" (shoulder pad) to help prevent shoulder ulcers (Figure 4). The pad is strapped very firmly to the shoul-

der of the sow using nylon straps and Velcro. Thus, it is out of her reach and piglets can't destroy it. It has foam padding on the inside and a thick canvass material on the exterior.

Producers are installing the pads on sows as soon they observe any redness of the skin on the shoulder. The pads appear to be relieving some of the pressure that is placed against tissues overlying the scapula and preventing further damage. They fit so tightly to the shoulder that it is

not advised to place them over an open sore. Pads usually remain on until sows are weaned. Then they are washed and reused.

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## Out-of-Feed Events in Grow-Finish Pigs: Causes and Consequences

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### Introduction

One of the most common responses to critics of modern production practices, especially confinement grow-finish facilities, is "we put pigs in these facilities to better provide for their daily needs." Yet, evidence is mounting that many producers are failing to meet this claim if the daily needs include unlimited access to feed.

A majority of finishing facilities have bulk bins and automated feed delivery systems. In theory, these bins and delivery systems assure an uninterrupted flow of feed to the feeder. In practice, growing-finishing pigs have varying disruptions in feed availability, some of which may have serious consequences.

### Causes

The three major causes for out-of-feed events in grower-finisher facilities are:

1. human errors,
2. bridging of feed,
3. equipment malfunction.

*Human Errors.* Human errors generally are associated with empty bins, which occurs when feed is not ordered, prepared, and delivered in a timely manner. While preventable, this cause of out-of-feed events occurs more often than producers like to admit. It is most likely that this cause has increased as an increasing percentage of feed processing and delivery is provided by commercial mills, rather than on the farm. When feed is processed on the farm, an empty feeder or empty bin is relatively easy to resolve. The producer immediately processes enough feed to fill the bin and/or feeder.

However, with commercial mills, feed preparation and transport scheduling becomes an issue. Instead of a producer making an independent decision that feed processing is a high priority due to an empty (or near empty) bin or feeder, a central mill may require 24-hour or even 48-hour notice. Even if a mill accepts same-day orders, an order placed at 7 a.m. (when the empty bin is discovered) may not be delivered until

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### Summary and Implications

*In theory, bulk bins and automated feed delivery systems assure an uninterrupted flow of feed to the feeder in swine grow-finish facilities. In practice, growing-finishing pigs have varying disruptions in feed availability, some of which may have serious consequences. While every swine grow-finish facility has occasional disruptions due to mechanical failures in the feed delivery system, there are additional disruptions due to human errors associated with keeping feed in the bulk bin and feed bridging associated with feed removal from the bin. Out-of-feed events are a known cause of ulcers in pigs and are suspected of being associated with increased incidence of hemorrhagic bowel syndrome and ileitis. It is speculated that each 20 to 24 hour out-of-feed event results in an increase in variation in growth within a population of pigs and results in a reduction in daily gain.*