

Carcass Trims – A Look at Arthritis and Adhesions Trims from Severely Affected Herds

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■ Introduction

Pork carcasses require trimming when defects are present. Federal and provincial regulations require trimming of defects to reduce food safety hazards and improve product quality. Many trimmable defects are created on farm. The most frequent causes of trims in Alberta are arthritis, chest adhesions and abscesses. Other less common causes include injuries, belly ruptures, and erysipelas. While some barns routinely achieve trims rates of close to zero, up to 50% of hogs from certain barns require trimming. For a 300 sow operation, this can mean losses in excess of \$20,000 per year, when the reduced growth is factored in. The cost to the processor may be even higher due to the extra labour, line stoppages and loss of valuable cuts of meat.

Certain trim rates can be reduced by the producer because they are the result of disease or management problems on the farm. Similar trims may have more than one cause, therefore determining the cause in each barn is essential to designing a solution for that barn. This study investigated the causes of arthritis and adhesions, the two most common trims in Alberta.

■ Arthritis

Arthritis is inflammation of the joint. Typically there is swelling, and lameness, although this may not always be visible in the live pig. Government inspectors

observe swollen joints after slaughter and mark these carcasses to be held and examined on the “held rail”. Swollen joints should be removed before the carcass moves from the kill floor to the cut floor. The swelling is due to extra fluid in the joint. This fluid may contain bacteria that can infect staff or be a food safety hazard. For this reason, inspectors do not open joints to determine the cause of the arthritis. Trimming elbow, hock and stifle joints can damage important primal cuts such as the picnic and ham. These cuts must then be sold as low value trim rather than high value primals. The producer is only docked the weight of the joint trim, but the trim actually costs the processor more in the loss of the primal cuts and the extra labour of trimming.

Infectious Arthritis

Arthritis may be infectious or non-infectious. Causes of infectious arthritis include bacteria such as *Erysipelothrix rhusiopathiae* (erysipelas), *Streptococcus suis* (Strep. suis) or *Mycoplasma hyosynoviae*.

From the outside, it can be difficult to determine the cause of arthritis. Some clues that a swollen joint is due to an infection include the larger size of swelling, several joints affected, poor condition of the hog and other signs of disease such as swollen lymph nodes.

Non-Infectious Arthritis

Causes of non-infectious arthritis include osteochondrosis dissecans (OCD) and trauma (injury). Injuries are uncommon, but can occur on farm or during loading and transport. Sprains, torn ligaments and broken bones are examples. OCD, also known as degenerative joint disease, is caused by a defect in the cartilage covering the bone in the joint. Blood supply is interrupted sometime during growth causing areas to die or not properly form (Nakano & Aherne, 1988). Healthy cartilage is smooth and shiny, while cartilage affected by OCD has pits and flaps that can lift up. OCD commonly affects elbows, hocks and stifles. The causes of OCD are not well understood, but nutrition, rapid growth, flooring, genetics and exercise are all believed to play a role. Pigs are predisposed to OCD and develop it easily, sometimes as early as in the nursing pig stage (Nakano & Aherne, 1988; Perrin et al., 1978).

Bursitis

Bursitis is a condition where fluid filled sacs called bursa develop over the bony parts of the leg in response to pressure. The sacs protect sensitive bone from injury and pain. Bursa can look like abscesses, but most do not contain pus. When many large bursa are present, especially over joints, it can be difficult to determine if arthritis or abscesses are present and inspectors may mark the trim as arthritis or abscess. Bursitis has been reported in barns with rough and uneven floors, especially those with raised edges around slats, and

certain plastic floors with ridges. Overcrowding has also been suggested as a cause because overcrowded hogs may lie down for longer periods of time, and may lie in unusual positions with pressure on the legs.

Chest Adhesions

Chest adhesions are the scars resulting from pleuritis, an inflammation of the membrane lining the chest wall. As the inflammation heals, these scars form between the lungs and the lining covering the ribs. Adhesions are classified as localized or generalized. Localized

adhesions are small tough white bands that attach the lungs to the rib cage in one or two places. After lung removal, small fibrous tags must be trimmed from the ribs. Generalized adhesions are thick white fibrous scars covering most or all of the lining of the ribs, making removal of the lungs impossible on the line. These carcasses must go to the held rail where the chest wall lining is removed by hand. When hogs with high rates of adhesions are slaughtered, the held rail can fill up, causing the entire slaughter line to stop and costing the plant thousands of dollars in lost production. Some barns routinely have a zero adhesion trim rate, while others have rates of up to 60%.

*Some barns routinely
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trim rate*

Adhesions can result from either pneumonia (lung infection) or septicemia (systemic infection of the whole pig). Pneumonia due to APP (Actinobacillus pleuropneumonia) is a common cause of chest adhesions. Septicemia is an infection of the blood, resulting in fever and inflammation of chest, heart, abdomen, brain or joints. Bacteria that commonly cause septicemia in pigs include Strep. suis (Streptococcus suis), A. suis (Actinobacillus suis), Glasser's disease (Hemophilus parasuis). These are known as the "suicide diseases" and can be challenging to control. Mixing pigs from multiple sources, overcrowding, stress, inadequate immunity, and irregular weaning age are all factors that can increase septicemia. Affected pigs often recover when treated with antibiotics, but the adhesions will remain for the life of the pig.

■ Study of Arthritis and Adhesion Trims in 20 Canadian Herds

The twenty herds with the highest trim rates for arthritis and the twenty herds with the highest trim rates for adhesions were selected from a western Canadian abattoir. Trim rates were assessed for the first 6 months of 2004. A minimum of 10 trimmed carcasses were selected from each herd and examined by pathologists over the last 6 months of 2004. From arthritis herds,

joints were collected and dissected. The “pluck” (heart, lungs, and liver) was collected from carcasses with adhesions. Carcasses were examined and photographed on the held rail. A survey on disease status, management and environmental risk factors was administered to herd veterinarians and producers. Survey data were not yet available when this paper was written.

■ Results and Discussion

Arthritis

There were 154 joints examined from 18 herds. In 10 herds, OCD was the main cause of trims. In 6 herds, both erysipelas and OCD caused trims. At least one OCD trim was found in 16 herds. In the two herds without OCD trims, severe extensive bursitis was identified as arthritis trim. The majority of arthritis trims were due to OCD (64%), with erysipelas being second (18%). The hock was the most commonly trimmed joint (61%) and the elbow the second most common (33%). Injuries accounted for only 3.8 % of trims. It was difficult to obtain large numbers of affected carcasses from certain herds due to their small size and some conditions may have been missed.

These results support the importance of an accurate diagnosis. Erysipelas vaccination can reduce trims due to erysipelas, but no erysipelas trims were seen in over half of the study herds. Reducing bursitis trims requires correcting flooring, stocking density or other factors that might be causing injury. OCD trims are challenging because the causes are not well understood. In some herds, genetics is important, but likely not the only cause. Several factors may need to be present to cause OCD, such as genetics, nutrition and flooring. Carlson (2003) suggests minimizing physical stress such as transport, crowding and hard flooring between 8-13 weeks of age when blood vessels are growing. OCD lesions may be present in a joint, but if there is no significant swelling, it will not be trimmed. The exercise involved with moving and transport may cause swelling in joints that are already damaged by OCD, but more research is needed to investigate this.

Adhesions

A total of 267 pigs from 18 herds were examined. Only 23% of carcasses with adhesions had signs of pneumonia. Lesions consistent with septicemia were seen in all 18 herds. APP lesions were seen in 20% of carcasses and in 8 herds. Liver scars due to ascarid (roundworm) migration were seen in 10 herds. Rates of pneumonia, ascarids, pericarditis were higher than plant averages for most of these herds, indicating a higher overall rate of disease and possibly greater management challenges. The herd surveys will assist in further identifying the diseases present in these barns since examination of carcasses is not always sufficient to determine infection status.

While APP lesions were seen in nearly half the herds, septicemia was seen in all herds. Both septicemia and APP could cause adhesions in the same barn. APP might be present in those herds where no signs were seen, because sampling occurred over a short time. Controlling adhesions trims can be challenging in herds infected with APP or dealing with septicemia. Getting a diagnosis and working with a veterinarian to set up a control program specific to each barn is critical. The focus should be on preventing illness rather than treating it, because those hogs that recover will have permanent adhesions. Herds with high rates of adhesions also have slower growth rates and higher production costs (Cleveland-Nielsen et al., 2002). Preventing illness through depopulation, reducing or eliminating mixing, reducing stocking density, and standardizing weaning age is usually necessary to reduce trim rates significantly.

■ Action List

- Monitor trim rates routinely and set action limits
- Invest in a veterinary diagnosis and diagnostic testing to find the cause of trims
- Ask the processor or herd veterinarian to examine and photograph affected hogs at slaughter to aid in diagnosis
- Design a prevention program with a swine veterinarian
- Prevent septicemia and pneumonia rather than treat it

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