

# LAMINITIS IN DAIRY COWS

Daniela Rodrigues Alves, Donna Amaral-Phillips and Patty Scharko  
University of Kentucky

The term laminitis is applied to a condition which causes the impairment of blood circulation to the horn-producing tissues of the hoof. The pathogenesis and clinical features of the disease in dairy cows are still poorly understood.

A clearly recognizable, but infrequent form, is acute laminitis or foundering, where walking is very painful and clinical symptoms of general distress become present. The time elapsed between the start of this process and the appearance of these symptoms may be only a few days and it is usually a result of a sudden, often accidental, over-consumption of high-energy concentrate.

A second form, less readily recognizable, is called subclinical laminitis and is considered to be responsible for the real problems seen in dairy herds. The primary process of the disease is subclinical, because cows do not show clear symptoms of the disease; however, impairment of the circulation of the corium (hoof bed) occurs, resulting in subtle changes in the quality of the sole horn. As the texture of the horn softens, it becomes more prone to wear and damage. Diseases such as sole ulcer, white line disease, double sole and specially hemorrhage of the sole become more prevalent in herds in which subclinical laminitis has become established.

It is generally agreed that laminitis often starts with disturbance of digestion, and that excess amounts of readily fermentable carbohydrates predispose a cow to laminitis. Sudden increases in carbohydrate intake or the continued intake of high amounts of carbohydrates or starch may result in excessive accumulation of lactic acid leading to a disturbance in the microbial environment of the rumen, and a decrease of the ruminal pH. The resulting acidosis is associated with production of lactic acid, histamine and endotoxins, and damage to the rumen's lining, allowing bacteria and their toxic products to escape into the bloodstream. These products are assumed to affect the microvasculature of the digital corium. If cows stand for prolonged periods, the blood pressure inside the claws will rise. The horn-producing tissues will lose their viability and the toxic products will not be removed.

The amount and particle size of fiber consumed is considered to be a critical factor in the etiology or cause of laminitis. Some recommend that roughage level should never be allowed to drop below 40% of the dry matter intake, and diets with chopped forages should have at least 15% of the particles 1.5 inches or greater. Particles with this size or higher stimulate a cow to chew her cud. Cud chewing produces saliva. The bicarb in saliva helps control rumen pH and improve digestion.

High grain feeding prior to calving or suddenly increasing the amount of grain fed after calving increase the cow's predisposition to laminitis. It is recommended that cows be fed a close-up diet before calving or after calving cows should be introduced gradually to a high-energy ration. Also, high energy ration fed herds should incorporate sodium bicarbonate into the diet at rates of 0.5 to 1% of the dry matter intake to maintain rumen pH.

Laminitis can cost the dairy producer as much as \$627/case in delayed reproduction, body weight loss and decreased milk production, and it can increase culling. Therefore, it is better to adopt a preventative program, with controlled nutrition and cow comfort, than spend time and money treating cows.