Laminitis in cattle.

Laminitis is, as its name implies, inﬂammation of the laminar tissue. This disease, which affects all ruminants, as well as horses, is referred to as founder when it becomes chronic. Laminar tissue, or the laminae, is the sensitive connective tissue that holds the pedal bone to the wall of the hoof. When the tissue swells, it puts pressure on the wall, and cuts off the circulation in the blood vessels of the corium so that the laminae become starved for blood, oxygen, and nutrients. As the tissues die, the bond that holds the pedal bone to the hoof wall weakens, and the bone begins to separate from the wall. With less support, and a weaker bond to the wall, the pedal bone begins to pull from the deep ﬂexor tendon and rotates in the hoof. Hooves that are afﬂicted with laminitis also begin to grow at abnormal rates due to increased vascularization, altering the shape of the hoof and adding more discomfort to the animal. The chronic condition of laminitis is then called founder.

In cattle, laminitis itself is not nearly as detrimental as the side effects that it produces. Although laminitis will produce lame cattle, the other hoof problems that develop as side effects of laminitis are usually more severe.

Laminitis in cattle results from dysfunction of the blood vessels serving the laminae and from softening of the ligaments of the suspensory apparatus leading to rotation of the pedal bone and compression of the digital cushion. This causes hemorrhages in the sole, as well as formation of lower quality horn in the hoof. When the bone begins to separate from the wall, it can cause the sole to separate from the wall at the white line, a disease known as white line disease. If the white line pulls too far away from the sole it can open the hoof up to infections. Laminitis can also lead to problems such as solar abscesses, and a condition known as under run heels, which results from the excessive overgrowth of the toe Although the exact causes of laminitis are not certain, it is generally accepted that the primary cause of laminitis in cows is rumen acidosis. Acidosis results either from a diet that contains too much starch or one that does not contain enough ﬁber. Starch in the rumen is broken down and produces lactic acid. When acidosis occurs, the level of lactic acid exceeds the capacity of rumen microbes to metabolize it. The increase in acidity can kill populations of rumen microbes and this is thought to release toxins which are responsible for changes in the foot. Since the diet is a key trigger of laminitis, changing a cow’s ration is necessary if a cow develops laminitis. Also, a regular trimming and maintenance program will be needed on hooves of animals with laminitis. After an episode of laminitis, the hoof will not grow normally at the toe again, and must be kept welltrimmed in order to ensure that it retains its shape, as well as provide proper weight-bearing surfaces