Laminitis in Horses:

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What does racehorse legend Secretariat, star-performer Barbaro and many other fondly remembered pasture pets have in common? They succumbed to one of the oldest and most frustrating conditions that veterinarians and horse owners have to face: laminitis. Laminitis is a painful and life-threatening disease involving the equine foot. Laminitis is a term describing inflammation of the millions of laminae, which is the tissue that connects the horse's coffin bone to the inner hoof wall. The inflammation causes intense and debilitating pain and pressure, and in the most severe cases, separation of the hoof and bone.

For a better understanding of laminitis, a brief overview of the anatomy of the horse foot is needed. The equine digit is extremely complex and a simplified description will be discussed here. The horse foot consists of hoof capsule and its internal contents. The internal anatomy includes soft tissues structures such as ligaments, tendons, cartilage and connective tissue; three bones, specifically the distal phalynx (P3 or coffin bone), the distal end of the second phalynx (P2 or short pastern bone) and the navicular bone; synovial structures, namely the coffin joint and navicular bursa; and blood vessels and nerves. There is an intimate interdigitation that occurs between the coffin bone and inner hoof wall grooves or lamina, resembling the way Velcro functions, that keep the bone supported within the hoof capsule. The hard hoof capsule is not pliable, thus when injury causes swelling of inner tissues of the foot, there is no room to accommodate for any enlargement to occur.

Therefore when swelling of sensitive tissues attached to the inner hoof wall occurs, the interdigitations or lamina start to separate, allowing the coffin bone to rotate or sink depending on where the separation occurs and the severity of the inflammation. There are several stages of this disease process. During the subacute phase swelling between the lamina and coffin bone is present but without mechanical failure. This stage is characterized by hooves appearing normal on the outside and few, if any, clinical signs may be observed. If the swelling subsides, this phase ends without permanent damage. However, if the inflammation continues, there is a failure of attachment between coffin bone and the inner hoof wall grooves and the coffin bone begins to change position within the hoof capsule. At this stage, a laminitic horse shows a characteristic lameness with a "camped in front" stance to alleviate pressure on the toe of their front feet. Other signs during this stage include warm feet, bounding digital pulses, and possible sensitivity to hoof testers. The acute phase ends with mechanical failure and foot collapse, meaning rotation or sinking of the coffin bone within the hoof capsule. This abnormal positioning of the coffin bone inside the hoof capsule is able to be diagnosed on radiographs or x-rays.

Founder is another term quite often used interchangeably with laminitis. Founder refers to a chronic laminitis condition. This occurs after the acute phase and begins with separation of the coffin bone from the hoof wall. This phase can last from several days post-insult to life-long disease. Changes in the foot during this time vary from horse to horse. Clinical signs range from mild lameness, to severe foot pain, hoof wall deformation (classic “dished” appearance), deterioration of the laminar attachments and sloughing (or shedding) of the entire hoof capsule.

Theories about the causes and cures of laminitis abound in the horse industry, likely due to the fact research has not been able to provide solid, indisputable explanations for the exact mechanisms of the disease process and treatment. There are at least five theories of what causes weakening of the equine foot structures and rotation or sinking of the coffin bone. These include: decreased blood flow, enzymatic or toxic damage, inflammatory injury, metabolic or endocrine disease, and biomechanical failure. It is likely that many of these pathways are involved in the complex disease of laminitis. Common risk factors that may induce or worsen existing laminitis include: ingestion of excessive amounts of grain, grazing green and lush pasture grasses, excessive weight-bearing during recovery from injury on the opposite leg (support laminitis), overworking a horse on very hard surfaces (road founder), severe systemic disease (pneumonia, diarrhea), using black walnut shavings, and having endocrine or metabolic disease (Cushing’s or insulin resistance).

Most horses that suffer from laminitis can recover if the initial injury is not severe or the insulting agent is eliminated. However, they may be forever lame because of scar tissue left at the site of inflammation and some horses eventually never recover. As the cause of laminitis has many debatable causes, treatments are varied and disputed as well. Therapeutic options include cryotherapy (cold therapy), heat treatments, loading variation (limb support), vasodilatory drugs (that increase blood flow in the foot), anti-inflammatory medications, and diet/weight management. Long-term shoeing and support for feet affected by laminitis is often addressed by a combination of your veterinarian and farrier. Knowing and lessening risk factors, recognizing clinical signs and addressing them early you can help your horse never suffer from this debilitating disease. By working together, an owner, veterinarian and farrier can have a significant impact on the chances of the horse being affected by laminitis and greatly improve the outcome if a horse is afflicted.

Other foot facts:

1. The hoof grows approximately ¼ inch per month, taking between 9-12 months to completely replace the entire hoof wall.
2. Approximately 60-65% of a horse’s weight is placed on its forelimbs, making the front feet more susceptible to laminitis.
3. The horse literally walks on its middle finger