

Modern Problems

How modern care and feeding can affect horse health, behavior and performance

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Horse owners, breeders and trainers, especially those with horses used in performance, are familiar with common equine digestive tract health conditions such as colic and ulcers. At the same time, equestrians deal with a variety of performance and behavioral issues in their horses virtually every day which adversely affect their progress and experiences in training, competition or leisure riding. These two categories of issues may be partially or entirely related.

Many aspects of modern equine care may actually lead to a multitude of potentially serious digestive health conditions. They may also be reflected in earlier states of digestive imbalance, which has observable effects on the horse's appearance, attitude, behavior and performance. Modifying aspects of the horse's care and feeding may be impractical. By using nutritional means to support the digestive system's natural structure and function in the face of these challenges, owners and trainers may be able to avoid serious digestive tract diseases while enhancing the horse's condition and performance ability.

What is Digestive Imbalance?

In survey research conducted among race horse trainers in 2003, respondents were asked about the published incidences of gastric ulcers in horses. Generally, the survey respondents were in agreement with the reports of 80% to 90% incidence, depending on the type of horse (race, show, specific breeds, etc.). However, these same trainers believed that the incidence of ulcers in their own barns was significantly lower.

Such appears to be the attitude of most horse owners and trainers. Horses with ulcers, colicky horses, or horses prone to digestive health issues like diarrhea or inappetence are believed to be few and far between. Digestive tract disease states, such as colic and ulcers, while serious clinical conditions, are also induced states. Prior to reaching this state, the horse's digestive system is in a state of imbalance that is almost unavoidable.

What many people may not realize is that their own horses – even the horses they consider to be healthy – are likely living in a constant state of digestive imbalance. That is, the horses' digestive systems are less than optimally healthy in structure and function. Optimal health means the physical structure of the digestive tract is in good condition and functioning properly, at a cellular level on up.

Healthy digestive structure and function

The digestive system provides three broad functions, as a method of delivering nutrients to the bloodstream. These functions are as follows:

1. *Moving feed from mouth, through the system, and out through the rectum*

Feed is effectively pushed along through a series of muscular contractions in the wall of the digestive tract, in a process called peristalsis.

2. *Breaking feed down into component nutrients*

Feed is broken down mechanically, chemically, and through microbial fermentation in various parts of the digestive tract, through a process generally referred to as metabolism. Chewing in the mouth begins the process of mechanical breakdown of feed. Acids and enzymes in the stomach and small intestine chemically break the various nutrients down into smaller components – proteins into amino acids, fats into fatty acids and glycerol, and carbohydrates (starches and complex carbs) into shorter chain carbohydrates and sugars. In horses, the cecum holds a large population of bacteria and other micro-organisms that ferment grass and other fiber in feed (known as structural carbohydrates) to produce volatile fatty acids (VFAs). This represents an important source of the horse's energy.

3. *Absorbing nutrients into the blood stream*

The nutrient products of metabolism, as well as water, vitamins and minerals, are passed through the digestive tract wall, called the mucosal lining. The mucosa of the small intestine, where a large proportion of nutrient absorption occurs, contains finger-like projections called villi. This provides a vast surface area through which nutrients can be absorbed, carried across specialized cells in the mucosa called epithelial cells. The blood carries the nutrients throughout the body where they can be stored and utilized for energy or for further chemical change.

Nature vs. performance

Horses in nature have a lifestyle pattern very different from that of their modern, domesticated counterparts. But the design of the digestive system in a horse reflects the natural lifestyle and feeding patterns, and does not naturally accommodate current common feeding and care regimens. The relatively small stomach, which secretes acids continuously, is designed to accommodate a small and continuous flow

of high fiber material – the result of constant grazing on grass. Without this constant grazing pattern, horse's stomachs are left empty for long stretches, and the acids unbuffered.

The large cecum, and the corresponding bacterial environment within, is designed to accommodate this high fiber diet as well. Horses, like people, cannot digest structural carbohydrate (fiber). The bacteria and other microbes in the cecum can, however. Thus, the fermentation of grass to produce VFAs is a significant aspect of normal digestion in a healthy horse.

How we feed horses is typically quite different than this model. Horses are commonly fed intermittently – two or three times a day – and their diets consist of large amounts of processed grain feed. The method of feeding and the nutritional makeup of the feed are both completely different. One major consequence of this is the high concentration of starch in the diet, which has a great potential of reaching the hindgut undigested. When this happens, the microbial fermentation process in the cecum produces lactic acid. This creates a more acidic environment in the hindgut (lowering the pH), resulting in a state of “hindgut acidosis.”

The risk of hindgut acidosis

Hindgut acidosis is itself a health risk, as the lower pH can kill beneficial bacteria and allow pathogens to prosper. A high volume of lactic acid in the bloodstream may reduce the ability of muscles to clear lactic acid that builds as a result of anaerobic metabolism during exercise. This may, in turn, lead to a slower recovery from exercise or tying up. Hindgut acidosis is also known to lead to laminitis, colonic ulceration and potentially to colic.

When modern equine care is considered in the broader sense, we find a number of lifestyle attributes that differ from that of a natural horse, and which may contribute to less than optimal digestive health. Horses today are often kept confined in stalls, with minimal turnout. They are used for breeding and performance, subjected to regimented training schedules, competition and trailering. All of these increase the demands for energy and nutrients, and can suppress the horse's immunity so they are more prone to illness.

At the very least, horses today are expected to do more, but are kept in a manner that prevents horses, and their digestive systems, from being at their best.

Because this reflects an incongruity between the horse's natural design and the conditions in which we place them, this condition is referred to as "digestive imbalance."

The Conditions We Face

Much research has been done to document the incidence, potential causes and treatments of ulcers, colic and various other diseases of the digestive system in horses. Articles in equine magazines and websites report these findings with regularity, ensuring that anyone who owns, rides or trains a horse is familiar with these conditions.

At the point that a horse is diagnosed with ulcers, a veterinarian is involved and the condition is serious. And if the diagnosis is colic, then it is likely the horse has already had a potentially life-threatening episode, may already be deceased, or may require major surgery. Recognizing the early signs of digestive imbalance in terms of the horse's appearance, attitude and performance would be of tremendous value for avoiding serious health problems for the horse, reducing the costs of these issues for the owner, and enhancing the horse's performance ability for the trainer.

Some link has been established between equine ulcers and external symptoms. These typically include aspects of the horse's condition, including poor coat quality, a general lack of condition, an inability to maintain weight, diarrhea, loss of appetite and more. What is less understood is how a horse's attitude and performance may reflect a state of digestive imbalance. In simplest terms, horse owners, riders and trainers should consider the variety of problems they face with their horses almost daily are potential signs of digestive disturbance.

Bad behavior or early symptoms?

Poor stall behavior, or "stall vices", may reflect digestive discomfort or poor health. Cribbing,

commonly considered a learned or genetic pattern, has been shown to potentially have its roots in the stomach. Because a horse may only be fed two or three times a day, it is often forced to withstand hours with nothing in its stomach. This allows stomach acids to build, causing discomfort and potentially leading to the development of gastric ulcers. Horses may be sucking in air – the primary action of a cribbing horse – to relieve this discomfort. Withdrawn horses, or stall walking and weaving may be outward signs of digestive upset as well.

Whether a horse is training for a high level of competition, occasionally shows or competes in events, or is used exclusively for trail riding or other leisure activities, it can be prone to irritability, poor trainability, or a general "poor attitude." Horses may be known to pin their ears back at the site of the trainer or the owner, and show general signs of being grouchy. Poor ground manners may include biting at the rider or groom while being saddled.

Such behaviors, often attributed to general bad habits or training issues, can negatively affect the relationship between horse and rider. This, in turn, can affect the rider's confidence and overall equestrian experience. It can also disengage a horse during training sessions, preventing the horse from progressing effectively. Horses that are responsive, more engaged and enthusiastic toward their work provide for a more positive experience for the rider and can enhance the reputation of the trainer.

The major portion of the digestive system is the hind gut – the colon and cecum – which, in turn, makes up the majority of the abdominal face (that is, the belly) of the horse. When a rider sits on a horse, the stomach rests behind the legs, well protected between the ribs and under the spine. The colon and cecum, however, are directly in line with the rider's legs and the girth. As a result, the common complaint of horses being touchy around the girth may reflect hindgut discomfort.

The effect on performance

Beyond the effects of general behavioral and attitudinal issues, digestive imbalance in the horse can have a more direct impact on training and performance.

Horses with digestive imbalance may be regularly feeling discomfort. An overly acidic hindgut environment (a state known as hindgut acidosis), ulcers in the colon and poor colonic motility may reduce the horse's ability to extend or "collect" its hind legs effectively beneath it. These both have an effect, in turn, on the horse's ability to jump or move freely. The state of hindgut distress may also limit a horse's ability or willingness to bend, essential in many performance disciplines, such as barrel racing or dressage.

Of course, with a digestive tract in poor health, or even suboptimal health, the horse is not getting the nutrients and energy it needs for optimal performance. Hindgut acidosis, which results directly as a consequence of undigested starches reaching the hindgut, can impair the horse's natural ability to produce volatile fatty acids in the cecum and colon, which is a primary source of energy. With less fuel for long-term energy, horses in performance are more likely to fatigue quickly, less able to recover quickly, and are prone to injury and illness.

Quite simply, a healthy digestive system is critical to the horse's appearance, attitude, behavior and performance.

The Limitations of Common Treatments

The diagnosis and typical treatments of digestive tract conditions are inherently limited, for a number of reasons.

To begin with, most people do not recognize the problem before it is too late and the situation is critical. This is not entirely surprising, given the widespread lack of understanding of digestive health, even among veterinary professionals, and the fact that symptoms are so easily misappropriated to other causes.

Too often, common treatments, including FDA-approved pharmaceuticals, are designed to treat or mask symptoms and not root causes. This alone has significant consequences for the horse and the owner or trainer, as they can find themselves continually

dealing with the same issue time after time (and the corresponding vet bills and loss of productivity). Horses can easily be pushed to perform when their health is truly less than sufficient for the demands being placed on them.

Many of these treatments are also typically designed to address one part of the digestive system, particularly the stomach. But in reality, the stomach is a very small portion of the digestive tract (representing less than 10% of its total volume). The hindgut is often overlooked.

This is an unfortunate reality of modern equine medicine and health care. The fact is that while the research shows that 80% to 90% of performance horses suffer from gastric ulcers, a full two-thirds of performance horses likely suffer from colonic ulcers. Consider the relative importance of the colon and cecum (the hindgut) in digestion in horses. Consider also the severity of issues that can occur there – the aforementioned hindgut acidosis and colonic ulcers, not to mention colic, the number one cause of death in horses. When assessing the digestive health of a horse or considering management and treatment options, the hindgut simply must be considered.

The Solution: Addressing the Root Causes

Rather than waiting for conditions in a horse to reach a critical, clinical condition, and then treating the symptoms, a more comprehensive approach to managing digestive health is necessary. Such an approach requires a different way of thinking for horse owners, trainers and veterinarians alike, as well as some different behaviors.

Returning to nature

To address root causes of digestive imbalance in literal terms means allowing the horse to live as nature intended – provide plenty of turnout, allowing the horse to heal itself and function normally. But for many horses and their keepers, grain feed, stalls, training and other aspects of the modern husbandry are

necessary aspects of modern life. The prospect of a lifestyle of grazing in herds is a dream of the past.

Even temporarily turning the horse out may be difficult or undesirable. The land for grazing may simply not be available in some areas. Where there is land, there may not be sufficient forage for grazing. Many owners and trainers may prefer to avoid the risk of injury, and the prospect of their horses being off their training schedules, off the track and out of competition for a length of time is untenable.

Beyond these practical considerations, putting a horse out to pasture temporarily may not be sufficient for treatment of digestive disorders. While the horse may appear to recover, it eventually will be returned to the lifestyle that led to the problems. As such, the cycle continues.

A natural, nutritional approach

An alternative approach that is gaining in popularity is taking a natural, nutritional approach to managing the health of the digestive tract, while continuing to maintain the modern lifestyle. In nutritional science, the use of feed-based material to target specific anatomy and physiological functions is known as “functional feeding.” An equine digestive supplement product called SUCCEED® Digestive Conditioning Program® was formulated as a Functional Feed program targeting the structure and function of the digestive tract in horses.

The concept that gave rise to SUCCEED is to provide a daily feed supplement program that allows the digestive system of horses to function normally, while supporting the higher level of nutritional requirements, stress, feeding and training regimens necessary for performance, breeding and modern life. Specifically, SUCCEED was constructed of specific nutrients that support various aspects of digestive system structure and function, given these limitations. Different components work together, with a variety of functions - acting directly to feed beneficial bacteria, working to reduce the prevalence of pathogens in the gut, supporting the immune system, enhancing the absorption of nutrients, strengthening the gut lining and intestinal villi, and more. It includes the following key components:

Polar lipids – lipids are a broad group of naturally occurring molecules which includes fats and oils, waxes, phospholipids and steroids, among other compounds. Lipids are prominent in the cellular membranes of plant materials that make up the natural horse’s diet.

In SUCCEED, oat oil is specially processed to retain a higher share of polar lipids than traditional oil extraction processes. These dietary polar lipids are valuable for helping to form the tight junctions between the epithelial cells that line the digestive tract, providing a natural protective barrier against digestive juices, toxins and pathogens.

Because of their unique properties, polar lipids have also been shown to enhance the performance of products by increasing ingredient solubility, thus improving ingredient bioavailability. In other words, the polar lipids act as a “ferry” to aid the transport of other nutrients to the blood stream so they are more readily available.

Beta-glucan – a soluble fiber commonly derived from oats, yeast or barley, beta-glucan has been shown to have a number of beneficial effects in animal health. Beta-glucan is the most powerful natural immune system booster. It does this by stimulating macrophages, a type of white blood cell that ingests foreign material.

Beta-glucan forms a hydro-gel with feed matter in the digestive system. This can help moderate the rate of feed transit and allowing for more complete digestion of starches in the small intestine. Further, beta-glucan moderates the release of sugars from the digestive system, helping to prevent the sugar highs and lows

The beta-glucan in SUCCEED is found in the oat flour. A special process is used for producing this flour, to ensure a large portion of beta-glucan is retained.

Glutamine – known generally as a muscle fuel, Glutamine is an amino acid that is both in high demand and, typically, in large supply in the body. However, Glutamine has recently been classified as “conditionally essential” in that under severe stress or high exertion, the body’s demand exceeds its ability to synthesize it.

Glutamine is involved in more metabolic processes than any other amino acid. It serves as a source of fuel for cells lining the intestine, and supplies nitrogen to the immune cells of the intestinal mucosa.

Threonine – an essential amino acid, Threonine is particularly important for maintenance of the gut. It is essential for the production of intestinal mucins, important structural components of mucus which protects and lubricates the digestive tract. It is needed for both healthy skin and wound healing, and is also useful in stabilizing blood sugar levels and stimulating the immune system.

Nucleotides – dietary nucleotides, present in complex yeast sugars in SUCCEED, are molecules that make up structural units of RNA and DNA. Research with nucleotides in the diets of animals has demonstrated that dietary nucleotides support immune health, tissue growth and thickness of the gut wall, and the growth of beneficial bacteria.

Mannan oligosaccharides – complex yeast sugars (*saccharomyces cerevisiae*), mannan oligosaccharides (MOS) are known to bind pathogens, allowing them to be safely excreted from the body. Two forms of MOS are available in SUCCEED – one targeting bacteria, and the other targeting mycotoxins. MOS has also been shown to support immune health, encourage the growth of intestinal villi and improve digestion.

A number of research studies have demonstrated the effectiveness of this formula in supporting health and wellness in a variety of situations. This includes prevention and long-term treatment of digestive health disorders in performance horses, immune support in brood mares and their foals, general support of health and wellness in weaning, and enhancing the value of yearlings.

By feeding SUCCEED with regular feed once each day, a trainer, owner or breeder can manage their horse's digestive health, which can provide benefits in enhanced performance, appearance and temperament. Further, a proactive health and wellness program with SUCCEED may help reduce longer term health and treatment costs. ■

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