

Heading Off Colic.

Colic is a term, for horse owners, which can strike terror into the most hardened heart. But, to a large extent, this can be somewhat lessened by understanding exactly what is colic, and why it happens.

Unhelpfully colic basically means a gut pain and there are many reasons why a horse may experience discomfort along the gastrointestinal tract. Some reasons may be relatively harmless but some may be lethal, and so care and action must be taken promptly. Obviously the best care is avoiding the situations where colic arises and to help do this an understanding of the structure and physiology of the gut will help.

Many articles have been written, pointing out the relative small size of the stomach for such a large animal, and how the large intestine, especially the caecum, is the fermentative powerhouse of the gut. They will also draw attention to the fact that the small intestine is “wrapped” in mesentery (a sheet of thin tissue), anchored at one point only and the large intestine is basically only fixed at the anus. It seems a very weak situation, just waiting for disruption to occur.

However, the design of the gut of the horse is ideal for the horse, or at least what a horse was before domestication. Being a trickle eater, grazing for up to 16 hours a day, it does not need a large stomach, food being constantly moved into the small intestine. As it is a hindgut fermenter, unlike the ruminant, food passing into the large intestine is fairly fibrous and bulky; and it is this bulk that keeps the equine gut healthy.

Food passes down the gut by peristalsis. Waves of contraction force the food along the gastrointestinal tract and, because the diet has a high proportion of fibre, the gut is bulked and the contents can “negotiate” the twists and turns without difficulty. And because there is bulk there will be movement of the gut itself, and so it cannot be firmly anchored at several points. The problem comes when this, ideal, scenario is compromised.

Categorising colic is a complex and multifactorial epidemiology and incidence can be affected by geography, season, behaviour, parasites and nutrition. At first glance it seems that the nutritionist could only influence the last factor but, with understanding of types and factors, can play a role in other areas.

When you look at the various types of colic that are recognised then you can see a pattern emerging. Looking at the “physical” colic such as impaction, twisted gut, spasmodic and distension – although varying in the degree of severity, there is a common link and this is the bulking of the food in the gut.

If the gut is full, but not overfull, with a fibrous content then the gut contractions will move the contents along. These waves are governed by the emptying of the stomach contents into the small intestine and disruption in the stomach will disrupt peristalsis. Large infrequent meals would be a factor, especially those high in grain. The stomach will tend to hold onto low fibre diets, as the physical bulk is less, and the action of

squeezing a mush is less effective than a bolus of fibre. This would have a two fold effect. Firstly there would be areas of the gut that are “fuller” than others leading to increased risk of passing the contents around bends and causing twisting (like the kink in a hosepipe) and secondly there is a risk, even if there is no twisting, these gut content bulges build up at points of resistance leading to compaction. Other factors, such as parasites and moulds may sensitise the gut leading to inflammation. These would implement feedback mechanisms that would disrupt peristalsis, may cause scouring and thus leave the gut vulnerable to twisting. Furthermore, behavioural factors, such as crib biting and wind sucking have been implicated in these types of colic (Simple Colonic Obstruction & Distension – SCOD). It is probably due to the stress of not carrying out normal behavioural activity, such as foraging and grazing, disrupting gastric and small intestine secretions, which themselves play a role in gastric emptying and gut peristalsis.

When food enters the hindgut it is held far longer than in the small intestine and is attacked by the microbes that inhabit it. There are vast numbers of different types and many of them are specialised. They require precise conditions in which to flourish and are very sensitive to change. Rapid changes in feeding behaviour can cause population shifts. For example, introducing cereal starches to the hindgut will cause a population explosion of microbes such as lactobacilli, which are specialised sugar users. They flourish producing waste products that create an environment favourable to themselves, and this causes a decline in cellulose utilising bacteria. Moreover the end products can be potentially dangerous to the horse when absorbed, and can also encourage bacteria whose own end products are gaseous, or ammoniacal. In such situations gas colic and Equine Grass Sickness (EGS) can occur. As with the small intestine other factors such as disease and parasites can also affect normal fermentation.

As can be seen seasonal factors and geography will influence this gut. As mentioned early grass (rich in fructans) can disrupt the gut, but so can autumn grass (seed heads, rich in starch) as well as contaminants picked up when grazing. Sand and soil, swallowed with grass can produce enteroliths (clay, for example can bind many minerals and some organic matter) which can compact. Regional variations in the type of soil will favour enteroliths, California, for example, being a higher risk area than the UK.

Another aspect of season and geography that has not been looked at is where these combine to grow plants with too much fibre (or at least too much poorly fermentable fibre) or over high mineral levels. Too high a bulking capacity would seriously compromise the ability of the small intestine to push the food through to the hindgut where it can be fermented.

Exercise also has an influence. Slow movement – as you would find in a grazing animal, flexes the abdomen and helps with peristaltic movement. No exercise reduces peristalsis and heavy exercise can interrupt or over-ride normal peristalsis, imposing abnormal rhythms. If the contents of the gut are not optimum this can exacerbate the problems previously described.

Although this is by no means an extensive list of colic and their causes, it can be seen that the single theme running through all these situations is the feed. Some colic is caused by infection but many are caused by disruption to normal feeding.

But what is normal feeding? Every manufacturer of horse feed, every vet and every equine nutritionist will stress the need of providing a sizeable portion of the horse's daily feed as some form of forage. And by forage they are mainly referring to fibre. Fibre, however, is not a single nutrient, but a whole range of complex carbohydrates that have a structural role in plant physiology. Some fibre, such as cellulose, is structurally rigid and some – like pectin – are structurally diffuse and the challenge of the nutritionist is to find the optimum balance of all these different aspects of fibre. This is complicated by regional, seasonal and even diurnal variations in plants, post harvest treatment and any additive benefits or penalties when combined with sources of protein, carbohydrate and fat.

What is agreed by veterinary research is that colic incidences can be reduced by providing the horse with a range of complex carbohydrates; that is a range of fibres. This fits with the behavioural activity of a ranging horse, where it is supplementing a base diet (grass) with other plants and herbs, whilst constantly returning to grass. Basically, for the wild animal the gut is kept full and peristalsis optimal by eating a product high in fibre, of moderate quality, and ironing out nutrient deficiencies by selecting other sources. It maintains constant, gentle exercise to reinforce the peristalsis and the effects of parasites and enteroliths are probably lessened by the scouring of the fibre along the gut wall, thickening and de-sensitising it.

So how can we, as keepers of domestic horses, emulate the best bits of horse behaviour to reduce situations where colic may occur? Often it is not practical, or possible, to have horses at pasture all the time and many horses are kept to be exercised, and exercised hard.

The single most important factor is to keep the gut moderately full at all times. It is no coincidence that racehorses are particularly prone to colic, due to their lifestyle and the perceived need to feed high energy grains and reduce the gut load and therefore overall weight of the horse.

However to reduce the risk of colic, the majority of food, passing down the intestine must be high in fibre, and as consistent as possible. Starch and sugars can be introduced as long as this base is kept, and as long as large amounts do not leave the small intestine.

Also the fibre must be as consistent as possible. Sudden changes (a new batch of hay, for example) can be disruptive and the prime advice from all sources is to introduce new feeds gradually (this allows the hindgut microbes to adapt to the new regime, and reduces the opportunities for opportunist "bad bugs"). Many companies provide other forage sources that when fed with grass/hay will provide a different profile of fibre and so iron out inconsistencies of the base diet. Alfalfa, soya hulls & sugar beet fibre are all examples of this.

The problem is when we need more energy for the horse's lifestyle than forage alone can give. Providing a horse cube is one answer, but for the colicky horse this will increase the risk. We need to provide enough bulk and the correct fibre profile to allow the gut physiology to avoid the physical risks and to ensure the microbial population in the hindgut is that best suited for the horse's wellbeing.

Speedi-Beet and Fibre-Beet are suppliers of Super Fibre. Both products have a complementary fibre profile that will help maintain the microbial population by improving the consistency of the fibre of forage, and also provide the extra needed energy. Because of the unique manufacturing process, the beet fibre has improved fermentability. Therefore it can pass through the small intestine as a bulker, and then more effectively fermented to extract extra energy per unit than any other fibre source. Thus it allows less dependency on cereal based products (which are excellent as long as the starch threshold is not exceeded), and it also satisfies the horses behavioural needs for other fibre sources.

By feeding Fibre-Beet or Speedi-Beet, alongside forage and compound the gut stasis should be such that the threat of colic is reduced.