Facts on ulcers
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Forage, friends and freedom
The horse you own today is not that different to the horses we began domesticating thousands of years ago. Our selective breeding over time has mainly targeted conformation characteristics and suitability for the different work required, however, the horse’s physiological and behavioural characteristics are virtually unchanged.

This means that your horse is essentially a herbivore whose focus is foraging in an accurate and targeted way.

It is no coincidence that when we let our horses out on grass they put their heads down and often don’t stop grazing for several hours.

In nature, a horse grazes on average 15-16 hours and in special situations sometimes 19 hours. This means that feeding is an important moment for the horse. Feeding is an important moment for the horse. This is the case especially for the horse’s health and good dietary management. A proper diet means using food plans that fulfill its anatomical and physiological needs:

• A stomach made to accommodate small amounts of food continuously throughout the day, unable to accept a volume overload because of its small size and the horse’s inability to vomit.

• A very long and tortuous small intestine where the secretion of enzymes for the starch digestion is limited.

• A highly-developed large intestine dedicated to the fermentation of fibre, with considerable variations in diameter, such as the passage from cecum to colon or from small to large colon.

Understanding and creating optimal management and nutritional needs for your horse can help reduce the incidence of problems.

Basic facts on ulcers
Equine Gastric Ulcer Syndrome (EGUS) is an important and frequent problem which has been attributed to incorrect feeding practices.

EGUS is referred to as a ‘syndrome’ because it has several causes and a complex nature.

Current studies suggest that EGUS is very common and not just found in horses that are in intensive training.

Thoroughbred racehorses have shown a 90% incidence of EGUS, whilst some studies report 37% of horses used for light or recreational activities have gastric lesions, irrelevant of discipline.

Events such as transport or a simple stay at a competition venue could trigger the conditions that result in the formation of an ulcer. Horses at pasture such as broodmares and foals have been reported to suffer from ulcers, even if they are not intensively managed. This is why it is not the activities you and your horse do that are important.

EGUS should be considered a consequence of inadequate management of any horse regardless of the type, level or intensity of its nutrition, training, transport, changes to the environment, meal feeding, use of specific drugs, social and behavioural stress.

The anatomy and physiology
Understanding the reasons why any of the above predisposing factors can act fairly quickly is easier when you study the very particular physiology and anatomy of the horse’s stomach.

The stomach of the horse is a relatively small organ where it is possible to identify two different parts: the non-glandular stratified squamous mucosa and the glandular mucosa. The transition area that delineates the border between the two parts is called margin pilatus.

The ulcers or lesions could be located in either part of the stomach, but the causes can be different.

The non-glandular mucosa is not designed to produce nor handle the gastric juices composed of chlorhydric acid and enzymes to digest proteins; it is not protected.

Esophagus: The esophagus is a muscular tube that carries food from the mouth to the stomach. In the horse, food only moves down this tube - horses cannot throw up.

Duodenum: The duodenum is the superluminal part of the small intestine that plays an important role in the digestive function. Carries partially digested food out from the stomach.

Pylorus: This is the lower portion of the stomach that leads into the small intestine.
against these factors. On the other hand, the glandular mucosa is protected by a thick layer of mucous and bicarbonate buffers that prevent the gastric juice from affecting the stomach wall.

This is why there are several risk factors for the formation of an ulcer.

Risk factors

In the non-glandular mucosa, the lesions are mainly due to exposure to the gastric juice. Whilst the glandular mucosa lesions are essentially due to the decrease of the mucosa’s defenses.

In general, lesions are located in the squamous mucosa just near to the margus plicatus.

In nature, horses are virtually continuous grazers. Generally they spend no more than 3 to 4 hours without feeding. This means that the stomach almost always contains food and for that reason they constantly secrete gastric juice. When stabled, their natural feeding pattern is altered, both in meal schedule and composition.

Many times, horses experience sustained fasting; just think that when a 500 Kg horse receives his last meal of 4 Kg hay at 6pm and has to wait for breakfast at 6 or even 8am the next day with no other forage available, he is going to be fasting for many hours.

When food is not available, the pH in the stomach becomes very low. Why? Because the saliva’s buffer is not present and there is no food in the stomach.

Forage in particular forms a ‘mat’ between the mucosa and the acid, and contributes to the dilution of gastric juices.

If your feeding schedule provides intermittent periods of food and quite long periods of fasting, the non-glandular mucosa is easily exposed to acidic conditions. In comparison, a horse with unlimited access to forage has a higher stomach pH, therefore, lowering the amount of acid.

Forage first

As you can see, forage is absolutely essential to your horse. When your horse receives forage he produces more saliva.

A horse that receives 10 Kg of hay can produce at least 35 litres of saliva, whereby a horse on a diet of concentrates with very low levels of forage, produces less than 20 litres of saliva.

The action of chewing stimulates the production of saliva that is rich in a bicarbonate buffer that dilutes the effect of acid in the gastric juices.
### The risks of concentrates

A concentrate-based diet with reduced forage availability increases the risk of ulcers due to a lack of adequate chewing time.

The long periods of fasting (especially longer than six hours) associated with most high-starch diets cause an increase in the volatile fatty acids produced in the stomach by the fermentation of bacteria like Lactobacillus and Streptococcus which in turn contribute to lesions in the mucosa.

### Minimum roughage quantity

A horse requires a minimum of between 1 and 1.5 Kg of roughage per 100 Kg body weight. Ideally, though, and taking into account the time it takes to consume, it should be closer to between 1.8 and 2 kilos of forage per 100 Kg bodyweight.

### Roughage quality

Good quality meadow hay (cut from a biodiverse pasture) is a good choice for horses. The nutritional value of the hay we choose can only be established through laboratory testing, and this is invaluable in order to ensure the horse’s nutritional requirements are met in accordance with his body condition and exercise level.

This means that a horse weighing 500 Kg should receive 9 to 10 Kg of forage spread throughout the day.

Splitting the daily intake of roughage into several feeds and using feeding systems designed to slow down intake and prolong chewing times also helps maximise chewing times and saliva production.

### The paddock effect

Grazing on pastures for as many hours a day as possible is good for your horse’s mind and the gut. Outside in the paddock your horse enjoy the freedom, exercise, forage and friends. Optimal management: freedom, forage and friends.

### Drugs and supplements

Some studies have reported that horses who are regularly administered electrolyte pastes (such as endurance horses) could experience a greater incidence of ulcers.

The suggestion is to use these supplements only when required, and to mix them into the feed or water instead of administering them directly into the mouth.

Some drugs, and especially NSAIDs such as ‘bute’ should be used only according to veterinary advice. NSAIDs have also been reported to induce ulceration because they inhibit the formation of some substances that protect the stomach mucosa, and they increase the acid production.

### What can you do?

The management of your horse should be based on the natural behaviour and physiologic needs of horses. This is the only way to avoid physical and psychological stress that can harm your horse’s wellbeing. A good nutritional plan is fundamental to keep EGUS away, however, it is not the only factor. Transport, competition, training and drugs such as NSAIDs, are some examples of risk factors involved in the onset of the problem.

When formulating your nutritional plan for a stable horse ask the help of a nutritional expert because feeding is complex and mistakes are common.

### Your horse could have EGUS if he or she...

- has lost weight and has difficulties maintaining a good body condition
- has a dull and rough coat
- has poor appetite
- reduced performance and different results both in training or competition
- shows a change in attitude and behaviour, e.g. suddenly displaying out of the ordinary flight or fear responses, or became very dull or too calm
- has recurring bouts of colic with mild pain
- abdominal pain can also be shown by frequent stretch to abdominal pain
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**Grade 1 Ulceration** - mucosal reddening and hyperkeratosis

**Grade 2 Ulceration** - small multifocal lesions

**Grade 3 Ulceration** - extensive multifocal lesions

**Grade 4 Ulceration** - extensive pathology