Improve the way you feed your horse

Haygain® - That’s Pure Horse Sense
The way we approach feeding horses today is very different from their natural habitat where they would spend:

**60% feeding - 40% exhibiting** other natural herd behaviours (such as sleeping, grooming and other social interactions)

Many horse owners feed high energy concentrate meals two to three times a day with little forage available. Leaving the average stabled horse spending:

**10% feeding - 90% exhibiting** other behaviours

Meal feeding of high energy feeds with little access to forage has negative health implications and can lead to gastric ulceration, colic, obesity, and laminitis. The development of undesirable stable vices particularly weaving and crib-biting have also been linked to reduction in foraging opportunity and stress inducing housing conditions.

This paper discusses ways in which you can return to a more natural feeding routine for your horse. It will discuss how a good feeding strategy goes beyond simply meeting the horse’s nutrient requirements. How you feed your horse can impact their behaviour both positively and negatively. It will examine ways to control the intake of forage without compromising the health or behavioural status of your horse. It also outlines some of the consequences of modern feeding techniques and the implications they have on the health and wellbeing of your horse.
Horses have evolved to survive on a varied low-quality forage diet. In the wild they divide their time between activities to meet their need for water, food, movement, rest and socialisation.

Horses are trickle feeders, their health and wellbeing is dependent on an almost constant access to forage throughout the day and night.

In the wild horses spend approximately between 60-70% (Kondo et al 1993, Ellis et al 2010) of the time exhibiting foraging behaviour which accounts for 12-16 hours per day, with voluntary non-feeding periods such as drinking, resting and social interaction rarely lasting longer than 4 hours. However, in the domestic environment horses only spend up to 10% of their time feeding, which can potentially result in the onset of behavioural and physiological problems.
Health and Behavioural Consequences Associated with Modern Feeding

Feeding practices in the domestic environment are very different from the diet seen in wild horse populations. High energy concentrate meals are fed two to three times a day with little forage available. This results in long periods of food deprivation and prevents the horse from exhibiting its natural feeding behaviour. This feeding scenario has negative health implications and can lead to gastric ulceration and the onset of undesirable stereotypical behaviours such as weaving and crib-biting.

What is Equine Gastric Ulcer Syndrome (EGUS)?

EGUS describes a range of ulcerations in which there is damage to the mucosal lining of the stomach, often referred to as ulcers or erosions, caused by acid exposure. It is a common condition affecting most horses.

50% Foals - 37% Leisure Horses - 63% Performance Horses - 93% Racehorses in Training

Like most animals, acid is released into the horse’s stomach to break down food, but because horses are grazing animals this acid is released constantly, even when they are not eating. This means that damage can occur when horses are subjected to long periods of time without food or those that are on a high cereal/low forage diet as they will not chew as much and so the normal buffering effect of the saliva will not take place. High intensity exercise especially without previous access to forage can cause acid to splash up onto the squamous region of the stomach hence the high occurrence in performance and race horses.
Symptoms

Many horses show no obvious symptoms and this may result in EGUS going unnoticed. Signs to look out for are as follows:

- Poor appetite
- Weight loss
- Reduced performance
- Chronic diarrhoea
- Distress when girthing up
- Coat changes/ poor coat condition
- Behavioural changes
- Acute or recurrent colic

The prevalence and severity of ulcers vary between cases and can be diagnosed via gastroscopy.

Where do Ulcers Form – The Equine Stomach Structure

The horse’s stomach consists of a single large compartment that can be divided into two regions, differentiated by the type of mucosal lining, either ‘squamous’ or ‘glandular’. The first third of the stomach has a smooth, squamous non-glandular lining. The remaining part is lined with glandular mucosa which secrete acid, digestive enzymes and mucus.

Ulceration can occur in both regions:

1. Squamous ulceration is the most common and occurs as a direct result of prolonged contact between acid and the mucosa lining.
2. Glandular ulceration occurs when the protective mucus layer is compromised.

Prevention

To reduce the prevalence and occurrence of EGUS it is important to manage the horse's feeding regime and environment, paying attention to exercise, forage intake and stress. Feeding forage before exercise helps to create a fibre matt which protects the non-glandular region of the stomach from acid exposure. Ensuring that horses have access to forage throughout the day helps prevent the build-up of acid coming into contact with the stomach mucosa and should reduce the incidence of EGUS. Reducing stressful conditions caused by travelling or the stable environment will also minimise the risk. In addition, any feeding system that promotes trickle feeding so keeping the stomach 2/3rds full will help support the natural stomach physiology to prevent the occurrence of EGUS.
What Is Colic?

Colic is the onset of abdominal pain and discomfort. The pain can be caused by a multiple of reasons ranging from trapped gas to sluggish rate of passage to blockages including a thick, sticky mass of fermenting feed or a compacted mass of forage in the stomach or intestines. Pain associated with colic increases and decreases in conjunction with intestinal smooth muscle contractions. A survey in 1986 by the Morris Animal Foundation reported that colic was the leading cause of death in horses and the No. 1 health concern of horse owners.

Causes of Colic

The horse has a highly specialised large intestine, evolved to deal with the ingestion of large amounts of fibre. Domestication and stabling have considerably altered the natural diet of the horse; as a result of high level concentrate feeding the horse is susceptible to increased gastrointestinal problems. The causes of colic are numerous, they include:

- High grain-based diets/Low forage diets
- Poor quality hay which is less digestible
- Abrupt change in feed
- Lack of water consumption leading to impaction colics
- Parasite infestation
- Sand ingestion
- Stress
- Dental problems
- Horses between 2 and 10 years most susceptible
- Link to crib biting and windsucking

Preventing Colic

In order to reduce the risk of colic it is important to keep to a set feeding regime avoiding sudden changes to the diet. A clean fresh water supply should always be available and the highest quality feed and hay should be given. Hay racks, feeding containers should be kept clean and free of mould and dust. Frequent dental visits ensure that horses are free from dental problems that may cause chewing issues. Increasing time spent at pasture or feeding the appropriate amount of forage (at least 50% of the total diet) will aid digestion and gut health.

Slowing down how fast the horse eats their forage will mean that it lasts longer and prevent long periods without forage.
What is Obesity?

Obesity is the accumulation of excessive adipose (fat) tissue and is the most common nutritional disorder in companion animals. Equine obesity is an increasing but under-recognised welfare issue in the UK.

Management Factors Associated with Obesity

- Age group (reduced risk <5 years)
- Breed – Cob and Welsh types more susceptible
- Companion animals
- Amount/intensity of exercise and fitness level
- Access to pasture/hay and concentrate feed

Managing Weight

Horse owners must try to control calorie intake and monitor weight. Using a body condition scoring system (see below) 3 on the scale is ideal, 5 indicative of obesity and 0 malnourished. A weigh tape is also a useful tool to help owners to identify which category their horses are in.

Obesity is known to cause metabolic disorders such as laminitis, cardiovascular disease, respiratory problems and impaired performance making it vital to monitor weight. Drastically reducing calorie intake in horses can lead to digestive upsets and promote the onset of stereotypical behaviour, due to long bouts of food deprivation (Moore-Colyer et al 2015). The method used to restrict access to feed/forage needs to be chosen sensibly.
What are Stereotypic Behaviours?

Stereotypies are the names given to a group of behaviours which are commonly referred to as ‘stable vices’.

There are a variety of different stereotypies seen in horses, which come under two categories: oral and locomotive.

**Oral**
- Windsucking - Arching of the neck and engulfing of air into the cranial oesophagus, without the grasping of a fixed object.
- Crib biting – fixing of the incisor teeth onto a structural object, pull back and contract the neck muscles, longissimus dorsi and gluteal muscles whilst drawing in a gulp of air.

**Locomotive**
- Weaving - Lateral swinging of the head, neck and forequarters.
- Box Walking - repetitive circular walking in the stall.

Performance of these behaviours is very time and energy-consuming for the horse and often interferes with other vital behaviours such as resting and eating, which can lead to a reduced ability to maintain body weight (Waran, 2007). In addition, horses that perform locomotory behaviours can experience physical problems with their joints due to the sideways repetitive movement. Oral stereotypies have been linked to gastrointestinal irritation, ulcers, colic and reduced performance.

**The Causes of Stereotypy**

Instead of preventing these behaviours it is important to understand their cause so that management practices can be adapted to reduce their onset and frequency.

The development and performance of stereotypic behaviours has been linked to keeping animals in an unnatural environment; such behaviours are not seen in the wild. The main factors linked to the development of stereotypic behaviours are: when an animal is in social isolation, kept in a confined space with reduced movement and where feeding behaviour is restricted.

Feeding of high energy concentrate feeds with low fibre content and restricted access to forage (less than 6.5kg per day) has been associated with a higher incidence of stereotypic activity (McGreevey et al 1995 and Gillham et al 1994). Feeding regime is also a trigger; horses that weave often increase this behaviour prior to receiving a concentrate feed (Cooper et al 2000).
Reducing the Behaviour

Increased foraging and eating time has been seen to reduce performance of stereotypic behaviours. When horses are provided with ad-lib access to hay, they have been observed to spend half as much time in free choice movement that horses that are given restricted forage (Stanley et al 2015). Increasing eating time has been seen to reduce performance of stereotypic behaviours. It is not always appropriate to provide ad-lib hay due to concerns of obesity, an alternative would be to provide an environmental enrichment tool that allows foraging behaviour to occur when the horse chooses. Introducing a slow feeding strategy for the forage is very important as it should form the largest part of the horse’s diet. Increased time at pasture, exercise and socialisation are also key factors. The use of stable mirrors, particularly in weaving horses, has been found to be a good alternative to social interaction in yards where joint turnout, or open stabling is not available.

Modern Feeding Practices

Forage should make up the majority of a horse’s diet (at least 50% of the total diet) and can provide between 50-100% of their energy. The amount and way in which we feed forage to stabled horses is incredibly important. There are a variety of methods to feed forage to horses to reduce intake rate, and wastage caused by contamination with urine and faeces in the stable which is also uneconomical.

Feeding Hay from the Ground

This is the most natural way to feed horses, it helps with natural drainage of the respiratory tract, prevents muscular tension in the neck and back and helps to maintain teeth alignment. Hay is easily accessible and horses can feed at will.

Negatives to Feeding from the Ground

When hay is placed on the stable floor it is easily contaminated with bedding, faeces and urine which causes wastage. Access to hay is not restricted which means intake rate cannot be altered – this is not an ideal circumstance for overweight horses!
Benefits of Haynets

Haynets of varying sizes are used to try to lengthen the feed intake time of the stabled horse by reducing the availability of the forage. Research has revealed that small holed haynets increased eating time in horses by 50-67% when compared to eating from the floor (Glunk et al 2014). This scenario is particularly valuable to those with obese horses needing to reduce calorie intake.

Eating from small-holed haynets increases chewing time by 20% when compared to larger holed nets. Increased chewing time results in an increase in production of saliva which is important for neutralising stomach acidity and preventing stomach ulceration. Haynets help to keep forage clean and away from bedding, faeces and urine. They are easy to fill and manoeuvre, making them ideal for use at home and during competition.

Consequences of Using Haynets

Firstly beware of the impact on human health, filling hay nets of dry hay will result in respirable dust being breathed in by the person which is not good for their respiratory health either! Although small-holed haynets slightly reduce the intake rate and overall feeding time, horses are still able to consume their hay ration quickly.

Haynets tend to be hung high up on stable walls to reduce the risk of horses becoming injured by trapping their hoof in the empty net.

The unnatural feeding position causes horses to eat with their head in a raised position, compromising their natural grazing posture. Whilst eating from haynets, horses have been seen to exert a high level of force when pulling hay from the nets, causing haynets to lift off the wall and upwards, which is applying a lot of pressure on the head joint, neck, back. This can potentially contribute to muscular tension in the neck and back of stable horses.

Horses have also been seen to display frustration behaviours, caused by restricted access to forage which is displayed through head-pushing of the nets.

Stabled horses fed via haynets have a greater prevalence of dental disorders, in the form of uneven incisor wear, potentially due to chewing only in one direction, as well as presenting less pronounced molar movement which can result in an increased formation of dental hooks.

- Furthermore, this unnatural feeding posture coupled with the stable environment has a negative effect on the respiratory tract of the horse. The airways become less efficient at clearing inhaled particles. Hay net feeding has been found to increase exposure to respirable particles by 5 times compared to hay fed from the ground. This is because as the horse pulls at the hay net, more respirable particles become disturbed and airborne. To make matters worse the horses head is up in making it harder for the respiratory tract to expel the particles.

- Respirable particles inhaled from conserved forage can result in inflammation of the airways and can induce allergic respiratory disorders.
Benefits of a Hayrack

Wall mounted hay racks provide a permanent container for forage in the stable. They keep hay away from bedding, preventing it from becoming contaminated. They do not restrict access to forage or induce frustration, whilst being easy to fill and keep clean.

Negatives of a Hayrack

Most importantly, hayracks cause the horse to eat in an unnatural raised position, which has negative health implications similar to that experienced when using a haynet. They also do not restrict access to forage at all, so horses can eat their hay ration quickly. The bars on the hayrack are spread apart, which means horses can pull large amounts of hay out at a time and this can end up mixed into the stable bedding, creating waste.

Benefits of a Corner Feeder

Corner Feeders allow the horse to feed in a downward position, which is much more natural. They act as a hay container and similarly to the hay rack do not restrict access to forage and do not cause frustration.

Negatives of a Corner Feeder

Due to the way in which they are fixed to the corner of the stable they can be hard to keep clean. Access to forage cannot be restricted, which means this may not be a suitable choice for horses that are overweight and require calorie intake management. Hay can easily be pulled out and mixed with bedding which again can result in wasted and contaminated forage.
Slow Feeder Solution

Research carried out at Nottingham Trent University in 2012 highlighted the potential benefits of slow feeding via a novel feeding management system. They found horses would eat forage from haynets at a rate of 22 minutes/kg, their slow feeding device slowed down that rate to 50-65 minutes/kg. In addition to this by offering almost constant access to forage this removed the stress of traditional feed times, reduced time spent foraging in and eating their bedding and reduced stereotypic behaviour.

In recent years, various versions of a forage slow feeder have been developed in an attempt to reduce intake rates and restrict availability of forage without compromising the health status of the horse.

A slow feeder has many benefits:

**Ensures the horse eats** from their natural grazing position, which is particularly important for:
- Maintaining teeth alignment and prevention of uneven wear
- Natural drainage of the respiratory tract
- Prevention of muscular tension by allowing the horse to stretch its neck and back over its top line

Significantly **reduces forage wastage** caused by contamination with bedding, faeces and urine, as forage is inside a container.

**Forage intake time should increase**, so horses feed for longer. This reduces the consequences associated with food deprivation such as colic and gastric ulcers, and improves gut health.

**Slowing down their rate of eating** means they consume less per hour and spend more hours nibbling with their head down, similar to grazing. The slow feeder ensures the horse eats from their natural grazing position, which is particularly important for: This should be put at the top, as part of the reasons why it is important that a horse feeds naturally (60% of the time, nibbling, head down, moving head)

**Maintaining teeth alignment** and **prevention of uneven wear**

**Research has shown** there was a significant increase in time spent feeding. The slow feeding system has also had a positive effect on stress and behaviour, foraging in bedding and heart rate reduced during this trial.
However, although good in theory many slow feeder designs have limitations. The main feature which causes problems is the interface between the horse’s muzzle and the hay. Firstly, how does it move as the level of the forage drops? It is important this easily slides down with the forage but also that the grid cannot be tipped so the horse can bypass the grid and have free access.

The second important feature is the shape and size of the apertures that the horse pulls the hay through. If these are too big then it is no longer a slow feeder but if these are too small then the horse will get frustrated and stressed. This may result in aggressive behaviour towards the slow feeder or they will give up and refuse to eat because it’s too difficult both outcomes would a negative effect on the horse.

The size of the holes needed to slow the horse down without frustrating it, will vary between horses. It is dependent on factors such as the size and conformation of their mouth. How motivated by food they are, will determine how much effort they are prepared to put in to get the hay out. This will vary not just between horses but also between seasons (summer compared to winter) and how long they have been using the slow feeder as an adaptation period has been seen and they get more efficient at extracting the hay after they have been using a slow feeder for a while. It is therefore important to be able to vary the size of the holes.

Finally, the material that the interface is made of is important, metal grids have been shown to cause serious damage to horse’s teeth. Veterinarians have reported regularly treating fractured incisors and even pulp horn infections in horses who have been feeding out of a slow feeder with a metal grid. The interface should be strong but flexible and a material which will not harm their teeth or gums.

In conclusion, the design of the slow feeder should be open and inviting to the horse with a large, well ventilated forage container. It should slow down their rate of eating effectively but without causing frustration. It should allow them to feed in the natural position and help mimic grazing behaviour.
The Forager is a versatile feeder which can be used in conjunction with the patented forage regulator system to slow down intake rates and make feeding times last longer.

The forager has been designed in such a way that an inter-changeable regulator system is positioned between the horse and their hay or haylage, meaning they have to forage around and pull the hay or haylage through the holes of the regulator. Each mouthful takes longer to extract, so their forage lasts them longer.

The forager has a wide opening with a light coloured top ring, which was found to be the most attractive to horses during field trials. The generous capacity allows for large quantities of forage and plenty of room for the horse’s head and nose to move around while they forage around. Four slits down the sides of the hay container where the regulator grid attaches to the outer ring allows for light, drainage and airflow.

The forage regulator has been designed with different shapes and sizes of holes so that the horse naturally forages around pulling the forage through the holes a bit at a time. The regulator is attached to an outer ring so that unlike other slow feeders it is easily installed and removed.

Even when the forager is filled to maximum capacity, the horse’s head is still in the important downward position.

As the regulator grid is easily removed, it is very easy to fill and change between the different regulator grids. Each forager comes with two grids; the light-coloured one is the easier of the two options. Of course, if you do not want to slow you horse down, simply do not attach a grid. A combination of both would be to put half of the forage in, then insert the regulator grid and finally put the rest of the forage on top.

On a practical note, it is easy to fill, clean and flat-pack to take to shows.

For the ultimate forage feeding regime, combine Haygain steamed hay with the forager.

Once the hay or haylage has been steamed, the harmful dust, mould spores and bacteria are eliminated.

Feeding from the Forager will keep the forage clean, off the floor, out of their bedding and they can savour the taste as they enjoy their steamed hay for longer!!
References:
Abrahamsson, V. (2012) Restriction of eating rate and feed consumption by obstructing the horses intake of roughage (Msc Thesis)

www.haygain.com
Feeding at a natural pace;
That's pure Horse Sense.