Approach to clinical nutrition

While there is no single 'correct' way of feeding horses, inappropriate diets and feeding regimens can negatively impact equine health, welfare, behaviour and performance. It is also well recognised that nutrition (taken here to include both the diet and nutritional management) can be part of the problem as well as the solution for several key clinical conditions such as obesity, laminitis and certain muscle disorders. In addition, nutrition, alongside veterinary support, has a role to play in the management of many clinical conditions, such as gastric ulcers. This means that nutrition competency, or having an experienced equine nutritionist as part of your support network, is key for veterinarians. This article provides guidance to veterinarians when they themselves, or in collaboration with their nutritional support team, evaluate a clinical case that requires more targeted and focused nutritional advice. This is intended to be an introduction to a series of more in-depth articles on specific conditions. https://doi.org/10.12968/ukve.2022.6.2.50

Pat Harris MA PhD DipECVCN VetMB MRCVS RCVS Specialist Clinical Nutrition (equine), Waltham Petcare Science Institute, Waltham on the Wolds, Melton Mowbray, Leics, LE14 4RT; **Sarah Nelson** BSc (Hons), MARS Horsecare UK Ltd, 29 Old Wolverton Road, Melton Mowbray, Bucks MK12 5PZ. pat.harris@effem.com

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Veterinarians are often asked to provide advice with respect to how best to feed and manage equines with a variety of clinical conditions (Murray et al, 2015; Nichols, 2018; Parker et al, 2018; Nichols et al, 2022). In addition, vets also need to be able to recognise when nutrition may be either a contributing factor to the clinical signs, or have a role to play in the management of a condition.

The American College of Veterinary Nutrition has issued guidelines on the nutrition competencies they believe equine veterinarians should have upon graduation (American College of Veterinary Nutrition, 2016). These include being able to score body condition using a recognised system (Henneke et al, 1983; Carroll and Huntingdon, 1988), and to estimate weight using a calibrated weight tape or morphometric measurements while appreciating the limitations of the various methods (Carter and Dugdale, 2013). They also suggest that the veterinarian should be able to:

- Determine if the individual animal or herd has a nutritionally-responsive condition
- Recognise classic clinical signs of common nutrient deficiencies or toxicities and select appropriate diagnostic tests
- Describe risk factors for and clinical signs of common feed-related toxicoses or contaminants.

However, surveys suggest that many veterinarians are not very confident in talking about nutrition, especially in complex cases, amid concerns about a lack of relevant available continuing professional development and the extent of nutrition education during their training (Roberts and Murray, 2013, 2014; Nichols, 2018; Parker et al, 2018; Nichols et al, 2022). Interestingly, in a survey of veterinary students, those at schools with a board-certified veterinary nutrition faculty were more likely to perceive a higher emphasis on nutrition education in their course (Kamleh et al, 2020). Veterinarians may therefore prefer to work with, or refer to specialised nutritionists. There are a few equine-focused veterinary nutrition specialists (Diplomates of the European College of Veterinary and Comparative Nutrition) and there are many internal medicine specialists with a strong interest in nutrition, who can be approached for advice and support. However, many veterinarians rely on the support of paraprofessionals working in the field of equine nutrition. Therefore, it is essential to be assured of their competency, as 'nutritionist' is an unregulated term and there is no widely recognised or compulsory qualification system. The Association for Nutrition, for example, organises the UK Voluntary Register of Nutritionists to distinguish practitioners that meet set training, competence and professional practice criteria, although only a very small number of equine nutritionists are registrants. Despite this, many of those working in the field of nutrition are very experienced and provide good evidence-based practical and applicable information. It is essential that they have sufficient up to date knowledge (by undertaking CPD) and equine experience when managing and advising on complex clinical nutrition conditions (Harris, 2016). It is important that veterinarians understand the core principles of nutrition so that they are able not only to recognise a nutrition-associated problem, but also to evaluate the nutrition advice being given (Geor et al, 2013; Harris and Shepherd, 2021).

Developing the nutrition plan

Overall, when forming a nutrition plan, the following key areas need to be considered. In addition, when advising on animals which may be competing under specific regulations, it is essential that the nutrition plan takes these into consideration. For example, advising the use of potentially low non-structural carbohydrate hay such as Teff hay to animals that may be competing under the International Federation for Equestrian Sports regulations may not be advisable (Bishop and Dzanis, 2021; British Equestrian Trade Association, 2021).

Clinical diagnosis and nutritional assessment

Having a robust clinical diagnosis, or list of likely differential diagnoses, is essential before any focused nutrition plan can be developed. This typically requires a full clinical assessment (including an in-depth clinical history) and potentially, additional diagnostic tests in order to determine the most appropriate diet and feeding regimen for that individual.

As illustrated in a recent paper by Galinelli et al (2022) discussing the feeding and management of a horse with pituitary pars intermedia dysfunction (PPID), the diagnosis of PPID is just the start. It is then essential to consider body condition as well as insulin dysregulation status. The diet then needs to be adapted according to comorbidities such as any age-associated conditions, particularly those associated with dental abnormalities, as well as activity level.

However, it is not always possible to determine the primary cause of some conditions. Weight loss, for example, can be insidious and even accepted by some owners in older animals as being normal. Therefore, a methodical approach to the clinical assessment is essential (Jarvis and McKenzie, 2021). Getting a good history is very important but may be especially relevant when considering certain myopathies (Urschel and McKenzie, 2021), as well as in cases of poor performance (Leahy et al, 2010).

It is also important to note that if the nutritional recommendations for a specific condition are at odds with the recommendations for that individual animal's core requirements (National Research Council, 2007; Geor et al, 2013), then appropriate time limits and procedures need to be put in place; for example, while it is recommended that all horses are fed at least 1.5% of their current bodyweight in dry matter as long or short chopped forage (Harris et al, 2017), this may not be appropriate for animals requiring a more severe weight loss diet (Shepherd et al 2021). Therefore, the use of feed extenders, slo-feeders and double haynets, as well as ways to enrich the environment, need to be considered (Shepherd et al, 2021).

Nutritional assessment

Global nutritional assessment guidelines for dogs and cats have been developed by the World Small Animal Association (Freeman et al, 2011). These involve the identification of nutritional risk factors and include a thorough evaluation of lifestyle history and dietary background, as well as a clinical assessment including both body condition and muscle condition scoring. These guidelines are now supported by a ´Global Nutritional Toolkit' (World Small Animal Veterinary Association, 2021). However, a survey concluded that "*Despite the fact that nutritional recommendations are a regular part of treatment plans, nutritional risk factors may be missed due to a lack of completely performed nutritional assessments*" (Blees et al, 2022) and emphasised the importance of thorough nutritional assessments.

While such international guidelines are not available for the horse, the principles are similar, as discussed in a recent collaborative article (Hesta and Shepherd, 2021). These authors highlight that evaluating the patient, as well as their current (and sometimes previous) diet, ration and management, is essential to creating the most effective nutritional plan.

Any assessment requires a review of the current diet with the aim of determining:

- Whether any aspect(s) may have contributed to the clinical condition
- Estimated energy intake in relation to current and desired body condition
- The current feeding regimen practicalities (including the number and times of feeding occasions).

This requires spending time communicating with the owner or caregiver and checking that it is really clear what is being fed (including supplements and treats), when and how. As an example, feeding hay *ad libitum* can mean very different things to different people.

It is also important to know not only exactly how much the horse is being offered, but also how much it is actually eating. Feed and forage intake should be recorded by weight (pre-soaked weight for mashes and soaked hay) and it is essential that the person completing the assessment understands the implications of dry matter intake vs 'as fed' or 'fresh weight' intake for forage, particularly in relation to haylage and soaked hay. Soaking hay, for example, results in a loss of dry matter (Argo et al, 2015) which may result in too marked a restriction in dry matter intake (even in overweight animals), if the feeding rate is not appropriately adjusted. Haylage typically contains 50–70% dry matter (Harris et al, 2017), but can be up to 80% dry matter. Therefore, a change in supply (and in some cases, even between bales from the same batch) can result in a significant change in dry matter intake. It is also important to remember that owners may be unaware of the variation in density and the subsequently significant difference in the 'weight per scoop' of different complementary feeds. In practice, many owners feed 'by scoop' (which are not consistent in size). It is common for the amount and nutritional value of soaked feeds or mashes being fed to be over-estimated as a result of the significant increase in volume post-soaking.

When undertaking a nutritional assessment, the following key areas should be considered (Dunnett, 2013; Hesta and Shepherd, 2021).

The animal itself:

- Core signalment, such as age, sex, breed, life stage and activity level, required performance or level of possible activity
- Measured or estimated and desired body weight and/or body condition, as well as cresty neck score (Carter et al, 2009)
- **Muscle condition**: although formal muscle condition scoring systems are not currently universally available for equines (unlike for dogs and cats), there are some published suggested systems that may be helpful (Walker et al, 2016; Herbst et al, 2022)
- **Appetite**: not only with respect to any recent changes which may be linked with the primary condition or comorbidities, but also any particular likes or dislikes (both of the horse and the owner or caregiver). For example, some horses are reluctant to eat certain feed formats or in certain environments. Some horses may be reluctant to eat if separated from companions, while changes in herd dynamics may mean others are prevented from accessing feed, forage or water.

- Any changes in faecal output, including the number, frequency and consistency of droppings passed, should be recorded. Faecal consistency is especially important when considering conditions associated with the gastrointestinal tract (Hesta and Costa, 2021) and dental conditions (Jarvis and McKenzie, 2021). Look for and enquire about any evidence of undigested feed or forage in faeces. In a practical setting, counting the number (and weight) of droppings may be a useful way of monitoring changes in intake, particularly in animals with access to pasture.
- **Ingestive behaviour**: ideally observe the animal eating to determine signs of discomfort and evidence of quidding or dropping feed . In the authors' personal experience, for example if there is more than one animal in a field, any unaffected animals may 'hoover up' quids so that they are not obvious. For some animals, the only sign of an oral or oesophageal obstruction may be a desire or keenness to eat, but then turning away and not eating when at the feed bowl. Look for and enquire about evidence of pica, copraphagia or crib biting.

The current diet, including:

- **Water**: including hygienic quality and accessibility (Cuddeford, 2013, Hesta and Shepherd, 2021), as well as how it is provided and whether there could have been any failure of provision (from equipment failure, temperature issues, or unfamiliarity). The source of water, such as whether it is bore hole water or mains water, may be of particular relevance in regard to certain nutritional toxicities or imbalances. Also consider any factors that may be affecting voluntary intake, such as water temperature (senior horses may be reluctant to drink very cold water because of sensitive teeth), herd dynamics, a reluctance to drink unfamiliar water or the position of buckets or troughs (for example, pain when lowering the head may result in a reluctance to drink from buckets on the ground).
- **Forage**: consider both fresh and preserved, evaluating aspects such as quality, both with respects to nutrition and hygiene, type (age/maturity), storage, how it is provided (for example, high tied haynets may not be helpful for animals with neck arthritis); timings of provision, and when and how the transition from one batch to another is made (Harris and Shepherd, 2021; Harris et al, 2017; Richards et al, 2021).
- **Complementary feeds**: including what owners or feeders call supplements and 'treats', as well as any herbal remedies, consider:
  - Is there a feed or 'supplement' that is being fed that you are not familiar with, which might be worth obtaining more information about from the client (or information on the pack), the internet and sometimes the manufacturer (regarding specific nutrient levels, quality control procedures, efficacy, safety or any potential doping issues for example).
  - If fed, establish exactly what and how many treats are given and how they are fed. Could any of this be a potential concern?
  - While intake from salt licks and mineral blocks cannot be accurately measured, access to such blocks as part of the diet fortification still needs to be considered. Are they molassed and might that be relevant to the clinical case (as pica can occur)? Look for any evidence of under or over using, and check whether they are equine specific.
  - Overall, especially in performance animals, is there evidence of over- or under-provision of electrolytes – and how are they being provided?
  - The number, size and timing of meals, the specific nutrient profile of the individual feeds and the total diet, and the likely quality control processes of the manufacturer
  - Hygienic quality: it is always worth checking how feeds (and forage) are being stored, to determine whether there may be any possible issues with hygienic quality (Kamphues, 2013)
  - How and when changes in feeds and forages occur. Too rapid a transition of both complementary feed and forage is a major risk factor for certain types of colic (Durham, 2013; Hesta and Costa, 2021). It is important to consider that owners may not be aware of exactly what constitutes a dietary change, such as the significant nutrient variation that may occur between bales of hay or haylage, even from the same field or farm, highlighting the importance of thorough questioning.

It is important to spend time communicating with the owner or caregiver and check that you have really understood what is being fed, when and how. In the authors' personal experience, deeper questioning often highlights that what may be reported on a nutritional screening form, may not reflect what is fed or what happens in practice. Ideally, the person completing the nutritional assessment should go into the feed room to determine exactly what is being fed and how feeds are prepared and stored.

The management and the environment, including determining:

- Who cares for the horse normally, and importantly, have there been any recent changes to the regimen? If there are multiple feeders or caregivers, are they all following the same procedures?
- If relevant, how access to pasture is controlled and how the pasture is managed:
  - Is the pasture suitable, both in the nature and topography for the animals concerned?
  - Are there potentially toxic plants or trees in or around the pasture (Votion et al, 2020)?
  - What is the water source when out at pasture? Consider factors such as quality of any bore water or lack of water during turn out and the risk of gastric ulcers.
- As mentioned before, determine timings of complementary feeds and forage access.

The clinical and nutritional assessment should lead to a nutrition plan that takes into account the individual's core nutritional requirements (National Research Council, 2007; Geor et al, 2013), as well as specific nutritional considerations of the primary underlying clinical condition, with any comorbidities noted – for example, <1g/kg body weight of non-structural carbohydrate per meal for those prone to gastric ulcers (Luthersson et al, 2009; Andrews et al, 2017). Different nutritional recommendations are required depending on the specific condition, which is outside the scope of this article.

However, any plan is only as good as the owner or caregiver's ability and/or willingness to implement it.

KEY POINTS

- Providing an in-depth nutritional plan requires a full history and, ideally, a full clinical examination in order to understand the current health status, and the presence of any co-morbidities.
- To develop an in-depth nutritional plan also requires a review of the current diet including determining a) if any aspect(s) may have contributed to the clinical condition, b) the estimated energy intake in relation to current and desired body condition, c) the current feeding regimen (number and times of feeding occasions), d) the feasibility of implementing the necessary recommendations.
- Once the plan has been agreed with the owner or caregiver, appropriate monitoring needs to be put in place and adjustments made with respect to clinical progress, as well as changes with age, season, management or feeding practices.
- Establishing and maintaining good communication is key with any nutrition plan, especially in complex cases.

Ability to implement

- The plan needs to take into account the availability of feeds and feedstuffs, as well as the owner's facilities and any time or financial constraints, for example, track systems for reducing grass intake and encouraging more unstructured exercise may not be practical under all circumstances, nor all year round.
- The owner needs to have 'bought into' the plan and be able to implement appropriately the recommended measures, for example, understanding the need to reduce grass intake when the animal is turned out, how to fit a grazing muzzle appropriately and how to monitor its use (Cameron et al, 2021).

Ideally, provide a written summary of the key messages and the main 'to do's', including how and who to contact if there are any questions or issues in complying with the recommendations. Finally, to be robust, the plan needs to take into account appropriate monitoring procedures.

Monitoring procedures need to be agreed and put in place:

- Be clear about the exact goals of the programme and what success might look like, with a guide to likely timelines.
- How and what to monitor and how frequently. For example, it has been shown that body condition score may not change during the initial weight loss programme, even when weight loss has occurred (Dugdale et al, 2010), potentially owing to the loss of internal rather than external fat. This is where other monitoring modalities are important (both in terms of monitoring progress and maintaining owner motivation), such as belly girth and rump width (Rendle et al, 2018; Shepherd et al, 2021).
- Where necessary, clear advice should be provided as to when further interventions or changes may need to be discussed or implemented. Try and set up to be more future proof. Accepting that it is important to consider how:
  - The condition itself may develop with time.
  - Recommendations that might be appropriate during one season, set of environmental conditions or activity level may not be appropriate for another.

Communication

Finally, throughout the whole process, good communication between all the parties concerned is key. Owners may have undertaken their own internet research, which may lead them to either have tried or want to try certain feeds, especially supplements, or to ask relatively complex and potentially confusing questions.

Those providing a nutritional plan need to be able to navigate such situations and have enough nutritional expertise to be able to refute or support certain suggestions. It is also important to have the ability to translate potentially complex information into clear and easily understandable advice to help prevent owners and caregivers feeling overwhelmed and to maximise compliance. As discussed by Hesta and Shepherd (2021) "*taking a diet history with close-ended questions (such as yes/no, or what) will likely limit the information gathered*" and "*Care should be taken not to judge the owner during the assessment (such as embarrassing the owner for overfeeding their obese equine, or making an owner feel like they have made an obvious mistake that caused an illness). Judgment and guilt are barriers to communication, limit information gathered and prevent effective care*".

There is perhaps greater emphasis on support and training with respect to engaging with clients who need to be active participants, rather than the passive recipients of facts, as illustrated by this microlevel analysis of farrier–client interaction when managing a horse with laminitis (Lynden et al, 2020).

Conflicts of interest

The authors have no conflicts of interest to declare.

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