The role of nutrition and feeding in equine weight management

Increasing awareness of the prevalence of overweight and obese horses has shed light on to the importance of appropriate nutrition and feed management within weight loss programmes. The review presents a basic approach to weight loss programme design and appropriate feeding and shows that while there is sufficient information upon which to base weight loss programmes, the findings of recent research into compliance and communication is likely to improve future success. Further education for livery yards and establishments is also a pivotal piece of the weight loss puzzle. There is still ground with regard to the most appropriate conserved forage, and a shift in responsibilities and mindset when it comes to forage analysis may be required. Ultimately, success may lie in a multidisciplinary team approach to weight recognition and management, and the development of a framework for fostering and maintaining communication across paraprofessionals and owners is an essential first step.

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Nutrition and feeding for equine weight management has been well researched over the past decade. However, the focus has stemmed primarily from its association with other clinical issues – weight management commonly being subsequent to issues such as laminitis. Arguably, this research approach is mirrored when it comes to practical management and recognition, typically, a reactionary, as opposed to proactive, approach.

The following review summarises the role of nutrition and feeding in equine management, reviewing recent updates in these fields and highlighting best practice. The importance of designing a tailored weight loss programme, taking into account both the horse and owner, is discussed, along with the identification of a basic process to follow. Compound feed and forage elements of the weight loss ration will then be discussed, in addition to the importance and reported efficacy of feed management practices.

Background

The prevalence of both obese and overweight horses is high (Giles et al, 2014; Potter et al, 2016). However, how this is categorised and reported could be clearer, as defining whether a horse is overweight or obese heavily relies on measures of weight and body condition and the accuracy these infer. While many prevalence studies focus on identifying obese populations (likely because of the association with clinical issues) (Jaqueth et al, 2018; Pollard et al, 2019), when we look at the challenges of equine weight loss, it is arguable that earlier intervention and a focus on overweight, and not necessarily obese, animals may be warranted.

A key barrier to prevention and management of obesity is recognition. Methods available for determining and monitoring bodyweight and condition are not universally accessible or accurate, and many lack sensitivity in the early stages of weight loss (Wyse et al, 2008; Dugdale et al, 2010). Awareness of each method, their limitations and how to employ for best effect is essential (Rendle et al, 2018).

Currently, weight management is often subsequent to laminitis or metabolic issues (Morrison et al, 2017), so refocusing the conversation to a preventative approach to equine weight management should underpin future initiatives.

Designing a weight loss strategy

An informed approach to planning a weight loss programme is essential for success. This should consider not only an assessment of the horse's bodyweight and condition, but also a thorough appraisal of the current ration, management and facilities available (Furtado et al, 2021a; Hesta and Shepherd, 2021).

Weight loss plans should be based upon total intake as a percentage of either current or 'ideal' bodyweight (the latter is per-

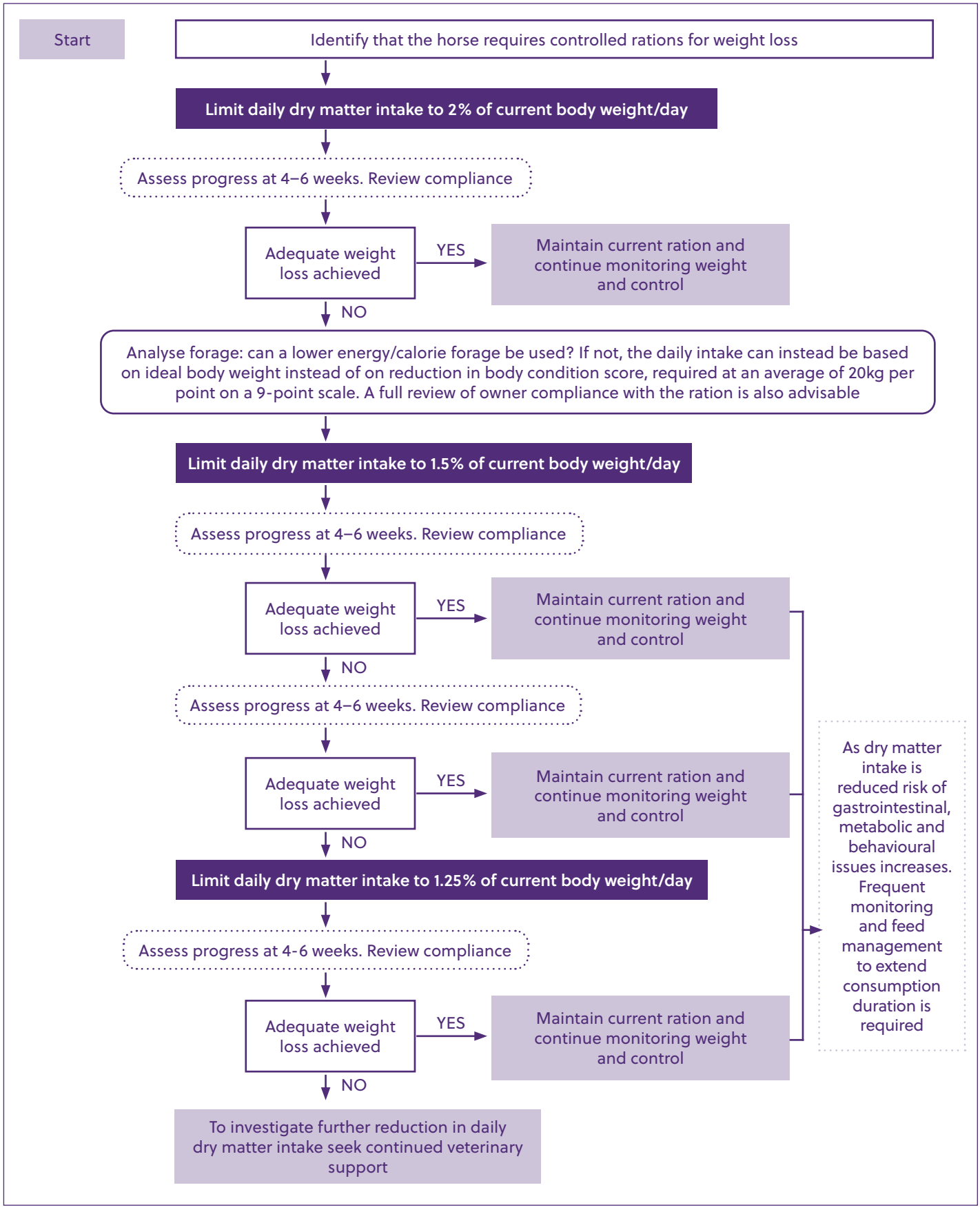

Figure 1. Basic principles and progression of a suitable weight loss plan. Adapted from Shepherd et al (2021).

haps less commonly used as this requires further estimates, carrying a potential for reduced accuracy) (Shepherd et al, 2021). The overall aim should be to create a calorie (energy) deficit, while simultaneously ensuring a balanced ration and that the individual is sated. This process should be approached in stages, with knowledge of the current ration being the starting point (avoiding drastic reductions in the first instance). Once the basic approach has been devised, the details of the ration can be decided. A simple flowchart illustrating suggested progression from an unknown starting point can be seen in *Figure 1*.

Managing weight loss is a long-term commitment. As such, all approaches to maximising compliance should be considered. The approach should be dynamic and include frequent reviews and adjustments, tailored to both the horse, horse-carer and the situation. Awareness of motivations and any barriers to implementation is a vital part of the process (Cameron et al, 2021; Furtado et al, 2021a).

A recent paper by Hesta and Shepherd (2021) outlines good practice in undertaking a nutritional assessment, with reference to compliance throughout. A key point from this paper is that clear and regular communication is an integral part of any nutritional intervention. Where managing the overweight horse is concerned, Morgan et al (2016) reported that a greater frequency of veterinary contact correlated positively with higher rates of owner compliance.

Human behaviour change and the issue of compliance is a prominent theme in both current research and across industry initiatives (BEVA, 2020; Furtado et al, 2021a). Language used by veterinary professionals and owners, along with owner narratives, has also been raised as a potential barrier to recognition and compliance. Furthermore, research suggests a perception among owners that body fat is almost indiscernible from body shape, leading to terms such as 'chunky cob' (Furtado et al, 2021a). A better knowledge of owner approaches and perceptions of their horses' weight would provide veterinarians and paraprofessionals with useful insights into how to communicate with owners.

Another barrier for weight loss management is cost (Morrison et al, 2017; Jaqueth et al, 2018; Cameron et al, 2021), along with ease of implementation and yard restrictions not allowing for recommended or preferred management (Cameron et al, 2021). Understanding these factors and the increased labour undertaking in caring for the overweight horse is imperative and must be reflected in a realistic, tailored approach to the weight loss plan.

As a primary source of trusted information, veterinary staff are well-placed to educate and increase owner knowledge when it comes to nutrition, and are frequently named in literature as a main source of advice (Hoffman et al, 2009; Arana-Valencia et al, 2017). Parker et al (2018) reported high confidence levels surrounding nutritional advice for obesity given by vets. Similarly, previous studies also report high confidence in communicating nutrition advice regarding obesity, although this is likely to be very much dependant on the continuing professional development available (Roberts and Murray, 2013; 2014).

Dietary Provision

Forage

As forage (hay, haylage, pasture) represents the majority of the ration, management of this is fundamental to the success of any weight loss programme. Although, it is the most challenging as-

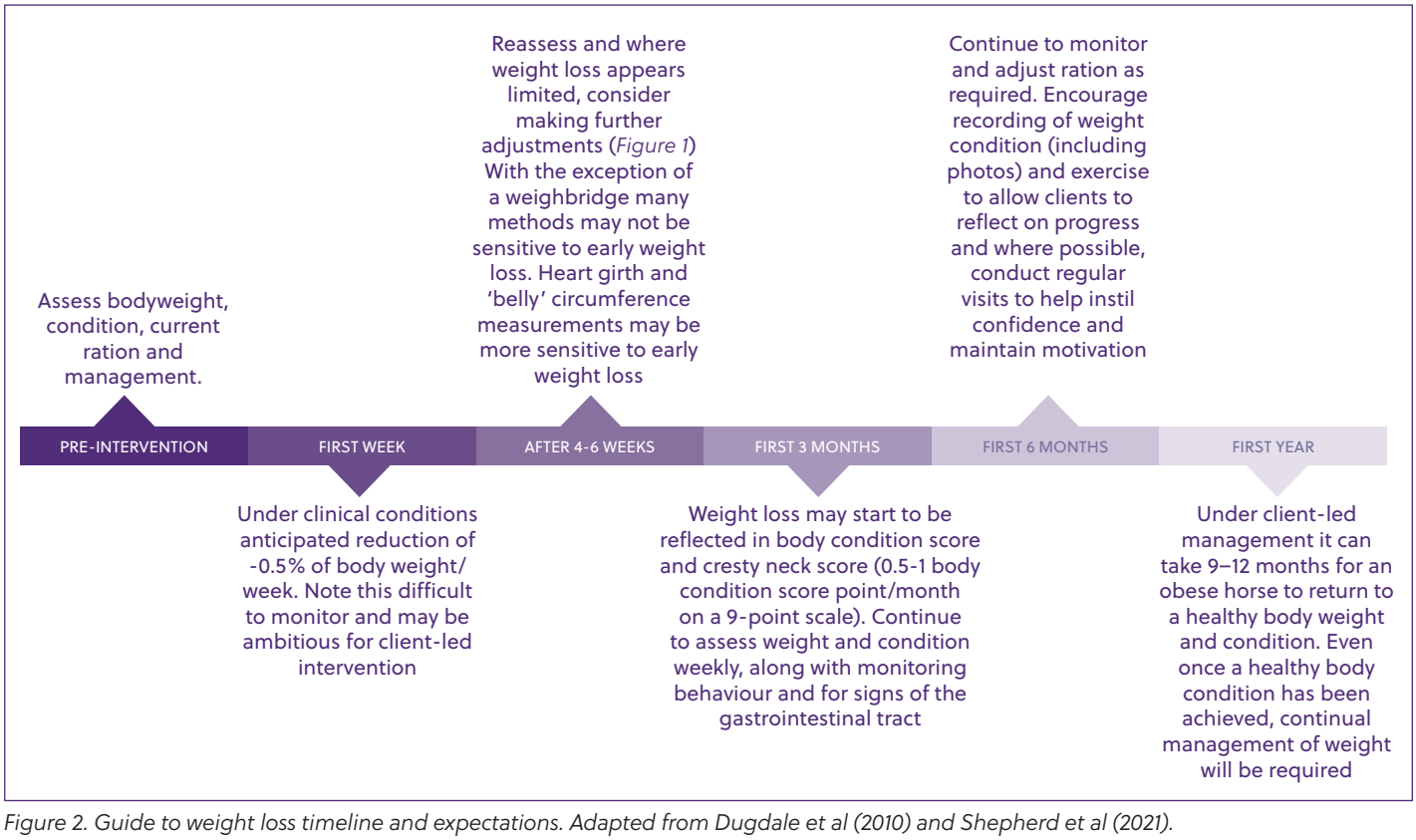

Figure 2. Guide to weight loss timeline and expectations. Adapted from Dugdale et al (2010) and Shepherd et al (2021).

pect to control and manage, as many owners do not have the facilities or flexibility to procure or manage their own forage.

The ration should be based on long-stem forage that is low (<10–12% dry matter) in non-structural carbohydrates (NSC) and high in fibre (neutral detergent fibre 60–65%; acid detergent fibre 35–45%) and low in calories (energy) (≤8 MJ/kg digestible energy). Sourcing an appropriate (typically mature) forage will allow for more volume to be fed, helping to satisfy hunger without increasing risk of metabolic or clinical concerns, while also promoting weight loss (Rendle et al, 2018) (*Box 1*).

The absence of forage analysis and the innate variability of conserved hay and haylage can make selecting an appropriate fibre source challenging. While visual appraisal can be employed, mature forage being 'crunchy in the hand' (higher stem to leaf content, visible seed heads) this can be misleading. Where weight loss is not apparent, despite reducing overall intake, if feasible, forage analysis should be recommended as a next step before further reduction, alongside soaking hay (*Box 2*).

Where sourcing appropriate forage is not possible, available forage can be combined with straw (Dosi et al, 2020; Jansson et al, 2021). Replacing 30–50% of the forage ration with straw can help reduce overall calorie (energy) intake, while helping to satisfy appetite (Rendle et al, 2018; Dosi et al, 2020; Jansson et al, 2021). Where straw is incorporated, ensure a gradual introduction (10–14 days) and monitor intake and progress closely (Dosi et al, 2020). Commercially available forage replacement products can be used, but long-fibre should be prioritised wherever possible to promote 'chew-time' and natural behaviours.

Compound feed

Ensuring a balanced ration alongside a calorie deficit is often overlooked. Forage only diets, particularly where intake is restricted, are unlikely to meet micronutrient and quality protein (amino acids) requirements (National Research Council, 2007; Equi-analytical Laboratories, 2021).

Pelleted balancer products are widely available and provide vitamins, minerals and quality protein when fed at typical rates of 100g per 100kg body weight. Alternative options include fortified chaffs and soaked fibre feeds. While either may be suitable, 'as fed' volumes can appear deceptively large, which can result in underfeeding and inadequate nutrient provision. In addition, salt should also be fed (30 g of table salt per day is sufficient to meet the maintenance requirements of a 500 kg horse), alongside vitamin E for those without access to fresh forage (NRC, 2007).

Feed management

Weighing all feeds (dry weight), and not feeding by volume, is an essential part of feed management for weight loss (Honoré and Uhlinger, 1994). All feed should be weighed and considered as part of the ration, however small. When weighing out forage in nets or other feeders, be sure to consider the weight of the forage presentation (average haynets weigh between 0.4–0.6 kg, hay balls as much as 2 kg).

The focus of feed management should be on extending 'chew-time' (Shepherd et al, 2021), while promoting opportunity for natural behaviour and a range of feeding positions.

Box 1. Hay or haylage

Owing to the significant variation between individual hays and haylages, a blanket recommendation of either cannot be provided (Equi-analytical Laboratories, 2021). Despite an often-suitable nutrient content, higher digestibility and palatability (Müller and Uden, 2007) may deem haylage inappropriate for some with the potential for quicker consumption and a higher calorie yield. While hygiene and consistency can be a challenge with hay, additional management practices like soaking can be employed to manipulate water-soluble carbohydrate content and improve suitability (Martinson et al, 2012). Hay that has been stored for long periods (such as last year's hay) does not infer lower sugar content, determined at the point of harvest (Müller et al, 2015).

As forage rations are devised based on dry matter, the choice between hay or haylage has a direct impact on the volume or 'as fed' amount. For example, at 1.5% of body weight, the dry matter requirement for a 500 kg horse is 7.5 kg dry matter. Based on typical dry matter (90% for hay, 60% for haylage) the horse would require 'as fed' either: 8.3 kg of hay (7.5 kg dry matter; 0.83 kg moisture) or 12.5 kg of haylage (7.5 kg dry matter; 5 kg moisture).

Box 2. Soaking hay

The nutrient content of hay can be manipulated and often reduced through soaking from 1–12 hours (Martinson et al, 2012; Longland et al, 2014; Müller et al, 2016), the efficacy of which is dependant on the original specification of the forage. The practice is variable in outcome, so selecting suitable forage at the outset or verification of nutrient content via analysis is recommended wherever possible. Shorter soak times can be coupled with warmer water temperatures to maximise losses (Longland et al, 2014; Rendle et al, 2018).

To account for dry matter losses during soaking, pre-soaked hay rations should be increased by 20% (Rendle et al, 2018). In addition to losses in water soluble carbohydrates, soaking hay also leaches minerals which need to be compensated for through provision of a ration balancer (or another appropriate compound feed) (Moore-Colyer, 1996).

The environment created through soaking hay can lead to significant bacterial proliferation, so soaked hay should be fed immediately and the water disposed of carefully (Moore-Colyer et al 2014). Methods of limiting bacteria buildup, such as soaking in shaded areas and reducing soak time during hot periods, may be considered. Steaming in a high-temperature steamer post-soak is considered the gold standard (Moore-Colyer et al, 1996).

Both compound feed and forage can form part of the strategy to extend overall feeding duration. For example, compound feed can be divided over multiple meals or provided using slow bucket-feeders, while the forage ration can be divided throughout the day, or provided in multiple feeding sites (Ellis et al, 2015), or using small-holed nets or feeders (Hallam et al, 2012; Aristizabal et al, 2013; Glunk et al, 2014; Morgan et al, 2016; Rochais et al, 2018). However, the effectiveness of these methods varies between indi-

viduals and may wane over time (Ellis et al, 2015). Research on the use of different presentation types, such as slow feed nets, and their impact on behaviour has highlighted their potential to cause frustration (Rochais et al, 2018), but also to improve welfare of stabled horses (Corrêa et al, 2020). Therefore, when incorporating these into a weight loss programme, initial use should be supervised, intake and behaviour should be monitored regularly, and the appropriateness of mesh or opening-size should be assessed on a case-by-case basis.

Pasture

Grass intake is difficult to estimate and regulate. For some, complete removal of pasture from the ration is necessary, as this can allow for more control. Weight loss programmes that exclude pasture appear to improve losses in body weight and condition (Gill et al, 2016).

There are many options available for restricting pasture intake. Implementation depends on the time and facilities available, the individual horse and owner preferences. Subsequently, recommendations for best practice and efficacy are limited. Recent studies acknowledge the management of pasture and its role for many in the acute and longer-term management of the good doer (Cameron et al, 2021). This is key, as complete exclusion of pasture from the ration is not always feasible and may be a significant barrier to compliance.

The use of grazing muzzles is a common method employed for weight management (Jaqueth et al, 2018; Cameron et al, 2021). Other commonly used methods include starvation paddocks, stabling, dry lots (grass free turnout), strip grazing and track systems (Cameron et al, 2021). More recently, the use of alternative grazing systems, such as track systems, Equicentral systems and woodland turnout has received attention (Furtado et al. 2021b). While cost and access to appropriate facilities can be a barrier, these practices could provide alternatives for long-term weight management.

For pasture restriction to work, any method to limit intake should not be employed alongside free access to grass. Instead, restricted access to pasture should be coupled with stabling or dry lot access where a suitable hay or haylage can be provided.

Where grazing is restricted by any means, weekly monitoring and progress reviews, along with regular dental checks, are recommended (Furtado et al, 2021b).

Conclusion

Compliance is a key area that could not only transform how professionals interact with clients, but also the success rate of equine weight loss programmes. To see further progress in this field, pasture management, availability of appropriate forage and barriers to implementing change must be addressed.

Further clarity for owners on pasture restriction, to streamline methods and enable research on efficacy, is needed, as well as a change in mindset (through education) on livery yards and other establishments to improve weight loss efforts.

Responsibility for forage analysis perhaps needs to shift from the owner (where quantities may not justify testing) to either producers or equine establishments. It is clear that sourcing a more appropriate forage at the outset may not only reduce costs and labour for the owner, but also have implications for welfare and weight loss success.

Accountability for education and assistance of horse owners should be a shared approach between a multidisciplinary team of paraprofessionals. This will encourage more frequent owner contact by utilising those with existing regular attendance (such as farriers and physiotherapists). To enable the latter to be effectively realised, clear guidelines establishing best practice and communication between paraprofessionals needs to be enhanced. EQ

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KEY POINTS

- While information on appropriate feeding for weight loss is available, there are still barriers for communication and implementation of feeding plans.
- Initial assessment of the horse, ration, management and facilities should inform the proposed plan. Restricting pasture access is heavily reliant upon facilities and other barriers such as time and cost. Numerous options are available, but trial and error is often required.
- Focus on investigation into compliance, communication and realistic forage options is required to progress further in the realisation of successful weight loss programmes.
- It is clear that a team approach is likely to be pivotal in terms of both prevention and managing weight long term.

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