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SRP SECTORRAAD PAARDEN

Body Condition Score

Dugdale et al., 2012: The selected BCS system required that six anatomically distinct body regions (neck, withers, loin, tailhead, ribs, shoulder) were independently scored from region-specific lists of nine graded descriptors (Kohnke, 1992).

Owers & Chubbock, 2013: Then we get onto the ultimate issue – obesity – where perception is the first critical challenge. Overweight equids are now so common that it has become the norm, and convincing people otherwise is a diplomatic nightmare. One of the most difficult challenges to overcome is getting people to recognise that fat is a health risk. The vast majority of people will readily recognise that an emaciated horse is 'ill' or at least has health risks but relatively few will have the same perception for one that is overweight, misguided perhaps by a glossy coat and a 'nice rounded appearance'. Part of the problem is that horses do not die simply because they are fat – they die of other, often chronic, conditions associated with it. It is then all too easy for owners to disassociate the two. Until everyone accepts that long-termexcessweight is seriously damaging, these problems will persist. Help is at hand as recently published work addresses new means for body condition scoring in ponies (Dugdale et al., 2012). Recent research has shown that overweight animals that develop laminitis tend to have more severe signs than those that are of optimal weight and that when laminitis does occur overweight animals are more likely to die of the disease than their thinner counterparts (Menzies-Gow et al., 2010). And laminitis is just one condition – there are many more associated with or, at the very least, exacerbated by, excess body fat, including hyperlipaemia, respiratory compromise, some strangulating colic lesions, reduced exercise tolerance and poor fertility (McGregor-Argo, 2009). Buckley and colleagues (2013) report that in horses and ponies the risk of owner-reported misbehaviour was increased in fat or obese animals. This might provide some horse owners with a compelling reason to alter their management regimens, even if they are unconvinced by the health-related arguments.

Foreman, 1998: Losses in body weight are usually insidious and chronic in nature but may be surprisingly rapid in the face of acute overwhelming systemic infections. Causes have been variously classified as gastrointestinal, nutritional, infectious, or hypoproteinemic. Differential mechanisms include decreased feed intake, decreased absorption of nutrients, decreased nutrient utilization, an increased loss of energy or protein leading to a catabolic "sink". Decreased feed intake may be caused by management factors, poor dentition, dysphagia, or esophageal obstruction.
In horses with an increased body weight, education of the client is important with regard to feeding practices, especially if it is determined that the overweight horse has simply been overfed by a novice owner. Dangerous consequences, including colic and laminitis, should be explained to the client.

Christie et al., 2006: Body condition scoring provides an estimate of body fat cover, and the score can reflect several aspects of welfare. For example, a low BCS may be due to a heavy parasite burden, inadequate nutrition, poor dental care, or systemic disease, some of which are welfare concerns in themselves. A high BCS is more difficult to interpret, but it too may indicate reduced welfare, as overweight horses are at a higher risk of laminitis (Linford, 1996). Horses with a high BCS were clinically healthy, but their future welfare may have been at risk due to an increased probability of developing laminitis (Sloet van Oldruitenborgh-Oosterbaan, 1999).

Johnson et al., 2009: The prevalence of obesity in animals is underrecognized by both veterinary clinicians and owners.1 In fact, many animal owners deem a degree of obesity as normal, acceptable,

and even desirable. Although there have been few published studies that report on the incidence of obesity, it is commonly believed, albeit anecdotally, that obesity is an underrecognized and common problem in the equine species. In one study, 45% of 319 randomly selected horses were scored subjectively as either “fat” or “very fat” (Wyse et al., 2008). Interestingly, in that study, the owners of the same horses generally underestimated the significance of obesity and failed to recognize its development in their animals.
Some equine health consequences of obesity have been ascribed to the simple acquisition of excessive adipose tissue within the individual. Examples of adverse effects of obesity include exercise intolerance (reduced athleticism) (Kearns et al., 2002; Lawrence et al., 1992).
New information points to the fact that, as clearly recognized in other species, obesity contributes to worsening insulin resistance in horses (Hoffman et al., 2003; Vick et al., 2007). Specific equine conditions that have been associated with IR may therefore be more likely in obese horses. Specifically, insulin resistance (and, by extension, obesity) has been implicated in the pathogenesis of laminitis (Treiber et al., 2006; Coffman & Colles, 1983; Field & Jeffkott, 1989), pituitary pars intermedia dysfunction (PPID) (Johnson et al., 2004a), osteochondrosis (Ralston, 1996), diabetes mellitus (Johnson et al., 2004b) and endotoxemia (systemic inflammation) (Tóth et al., 2008).

Sessions et al., 2004: Peripheral insulin resistance is the failure of proper cellular glucose uptake in response to insulin. Insulin resistance and hyperinsulinemia are associated with several disease states in the horse and reproductive function disturbances in humans, including polycystic ovarian syndrome. To test the hypothesis that insulin resistance (IR) and hyperinsulinemia disrupt the estrous cycle in mares, two experiments were conducted to first develop a model to induce IR and to then examine the effect of this model on the duration of the estrous cycle. In Exp. 1, a hyperinsulinemic-euglycemic clamp (HEC) procedure was performed on seven mares to determine insulin sensitivity before and immediately following infusion of a heparinized lipid solution. The HEC procedure was repeated 1 wk after lipid infusion. Mares developed IR following the lipid infusion ($P < 0.05$), and some individuals maintained IR for up to 1 wk. Mares also exhibited increased blood insulin both immediately following treatment and 1 wk later ($P < 0.05$). In Exp. 2, induction of insulin resistance by lipid solution was not accompanied by changes in circulating concentrations of luteinizing hormone, and duration of the luteal phase, compared with the duration of untreated luteal phases. Nonetheless, lipid infusion and the resultant insulin resistance were associated with an increased interovulatory period ($P < 0.05$), and peak concentrations of progesterone ($P < 0.05$) were higher during the treated vs. untreated luteal phases of the estrous cycle. The results from the preliminary study suggest that infusion of a lipid solution may induce transient insulin resistance and hyperinsulinemia. The resulting insulin resistance and hyperinsulinemia may modify characteristics of the estrous cycle, perhaps at the level of the ovary.
In the horse, obesity is associated with insulin resistance and may predispose individuals to the development of several pathologies, including laminitis (Coffman and Colles, 1983). In addition, obesity and insulin resistance have been associated with disturbances in the duration of the breeding season (Fitzgerald and McManus, 2000) and the duration of the estrous cycle (Fitzgerald et al., 2002).

Robin et al., 2013:
Aims: To estimate prevalence of owner-reported obesity in British veterinary-registered horses and ponies, and identify risk factors associated with obesity.
Methods: Thirty veterinary practices randomly selected horse owners to complete an ethically approved, self-administered postal questionnaire. Owners estimated body condition score using a modified Carroll and Huntington method (1–6) and animals were classified as obese if they were

scored as 5 (fat) or 6 (very fat). Factors associated with obesity were assessed using logistic regression analysis.
Results: Owner-reported prevalence of obesity was 31.2% (n = 247/792, 95% CI 27.9–34.2). A greater proportion of obese animals (n = 47/225, 20.9%) had a history of laminitis compared with normal/underweight animals (n = 69/511, 13.5%, P = 0.01). Univariable logistic regression analysis identified several management and horse-level risk factors. Data from 785 horses were included in the final multivariable logistic regression model, and factors associated with an increased risk of obesity were breed (P<0.001), ease of maintaining weight (P<0.001) and primary use (P = 0.002). Compared with Thoroughbreds, draught-type (odds ratio [OR] 7.3; 95% CI 3.5–17.1), cob-type (OR 5.8; 95% CI 2.6–12.8), native (OR 3.1; 95% CI 1.7–5.7), andWelsh breeds (OR 3.5; 95% CI 1.9–6.2) were more likely to be obese. Animals described as 'good doers' were more likely to be obese compared those described as readily maintaining normal weight (OR 3.7; 95% CI 2.6–5.3). Compared with animals whose primary use was competition, animals predominantly used for pleasure riding were more likely to be obese (OR 2.5; 95% CI 1.4–4.3), and risk increased in non-ridden horses compared with competition horses (OR 2.9; 95% CI 1.5–5.5, P = 0.002).
Conclusion and practical significance: Identification of breed and other horse characteristics as risk factors for obesity will enable optimal targeting of owner education regarding preventive management to reduce the risk of obesity among the British horse population.

Davidson & Harris, 2002:
Conditioning the underweight horse: The ideal condition of any horse is dependent on its breed, work, life stage and health (for example, you would not wish to allow a horse with problems with its joints to become over-weight). The sick horse is outwith this chapter, however, there may be occasions when a healthy horse is below its desirable weight, and requires changes to its dietary regimen in order to improve its condition. Assuming that the horse has not been starved, has been on a suitable antihelminthic programme and has no dental problems, the rules for increasing weight are as outlined below. All changes must be made gradually, particularly to horses that are extremely underweight, as rapid introduction of feed may result in death (Kronfeld, 1993).
The horse should be fed at the level to maintain its weight at the midpoint between its current and desired weight. Once this weight has been attained then the feed may be increased gradually to a level which will maintain the horse at the goal weight. Such a programme of weight increase may take several weeks and care is needed with respect to mineral intake, in particular phosphorus and magnesium, especially in severe cases. If the horse has trouble with maintaining weight (*i.e.* is a 'poor doer'), the forage should have a high digestible energy and additional energy in the form of oil rather than grain should be offered. Vitamin and mineral content of the diet should match the energy level, therefore if feeding below recommended levels of concentrates, or adding oil, it may be necessary to add a vitamin and mineral supplement. All of this is based on increasing the amount of digestible nutrients available to the horse. Changes may be required in other management factors such as for example, reducing heat loss through appropriate shelter/rugs.
Reducing weight: Ponies, especially pregnant ones, must not be abruptly starved to reduce their body weight or prevented from eating for prolonged periods as they have an increased risk of developing hyperlipaemia under such circumstances. It is much safer to gradually reduce the diet to a half maintenance level, if necessary, than to completely starve a pony for weight loss purposes. Wherever appropriate the diet can be made up to near appetite levels by feeding low energy forages but poorly digested, highly silicated forages such as wheat straw, may cause impaction.

Adams et al., 2009: The findings demonstrate that **age-related obesity** potentially plays a role in the dysregulation of inflammatory cytokine production by the immune system with age or inflamm-aging in the horse.

Suagee et al., 2008: A Body Condition Score (BCS) derived only from the body areas of neck, shoulders, ribs, and tailhead was found to accurately predict the six body area-derived mean BCS. The results of this study provide justification for modifications of the BCS system for use in Thoroughbred geldings and also demonstrated that fewer body areas can be used to accurately predict mean BCS.

Subjectieve Body Condition Score, gebruik van een adaptatie van het BCS syteem van Henneke et al. (1983) door Kohnke (1992)

Dugdale et al., 2011: In this relatively homogeneous group of animals, while BCS offered an almost perfect index of total somatic (skeletally-associated) soft tissues, it was markedly less useful in predicting total body fat. Therefore, BCS is unlikely to be a sensitive index of body fat for animals in moderate-obese states. Morphometric measurements (body girths and retroperitonel fat depth) may be useful to augment subjective BCS systems.

Dugdale et al., 2012: This study suggested that while subjective BCS scoring, using the Kohnke (1992) adaptation of the BCS system proposed by Henneke et al. (1983), may be useful in estimating the body fat content of non-obese animals, it was less accurate in the evaluation of obese horses and ponies. The refinement of current BCS descriptors could help to minimise observer errors and potentially allow the introduction of clearer classifications for obese animals (BCS ≥ 7). However, in its current form, the BCS system adapted by Kohnke remains a useful predictor for the quantification and monitoring of body fat content in non-obese animals and correctly identifies those individuals for which intervention is required to limit the risk of obesity-related disease.
Whereas BCS was not useful as an indicator of early weight loss, belly girth and rump width may provide proxy measures where weigh-scales are unavailable.

Henneke et al., 1984: Results of this study point to the conclusion that the often recommended practice of bringing mares into the breeding season in thin condition and placing them on an increasing plane of nutrition is not likely to improve reproductive performance above that of mares which are brought into the breeding season in moderate to high body condition.

Wright et al., 2009: A long hair coat can be misleading. Some conformational differences make it difficult to apply certain criteria to a specific animal. For example, animals with prominent withers, or flat across the back and mares heavy in foal (weight of the foal pulls skin taut over the ribs) may cause body condition scores to be lower than they actually are. However, when properly applied, the scoring system is independent of size or conformation of the horse.

Verdere toelichting Body Condition Score

- http://www.paardenkenniscentrum.nl/index.php?main_page=document_general_info&cPath=89_91&products_id=327
- http://www.worldhorsewelfare.org/Right-Weight

Fokmerries

Nagy et al. (1998): Body condition also play an important role in influencing postpartum ovarian activity. The interval to the second ovulation is increased in mares with poor body condition and the luteinizing hormone-level during foal heat is decreased (Henneke et al., 1984; Hines et al., 1987).
Effect of body condition change. Data from 79 mares was used to test the effect of body condition change after parturition. There was a significant decrease in mean body condition score after foaling (7.6 ± 0.12 and *6.9* ± *O. 16* within 5 and 60 d after foaling, respectively; P<0.001). In 41 mares body condition decreased and in 38 mares it remained unchanged. The season of foaling and the parity had no effect on body condition change (P=0.866, P=0.715, respectively). Although body condition change after parturition had no significant effect on any parameters of postpartum ovarian activity some tendencies were observed. The interovulatory interval between the first and the second postpartum ovulation was longer in mares with decrease in body condition after foaling (21.2 + 1.4 vs 30.5 ± 4.7 d without and with body condition change after parturition, respectively; P=0.069). The same was found for the second follicular phase (8.2 ± 1.1 vs 15,4 ± 3.9 d without and with body condition change after foaling, respectively; P=0.089).
Postpartum ovarian activity is negatively influenced by poor body condition in mares (Henneke et al., 1984; Hines et al., 1987). However, parturition is such a powerful stimulus for inducing ovulation that the interval from foaling to the first ovulation is not affected by body condition, although the interval to the second ovulation could be lengthened. Under normal stud farm management, mares do not loose weight before foaling, and special attention is paid to postpartum nutrition in order to maintain proper condition during lactation. In our case, the mean body condition score right after foaling corresponded well to that reported by Henneke et al. (1984). There was a decrease in mean body condition 2 mo after foaling but only a few mares (4 animals) had substantial weight loss (body condition decrease with more than 2 scores). For that reason we found no significant effect of body condition change after foaling, although there was a tendency of increased interovulatory interval and second follicular phase among mares with body condition changes. It is concluded that at stud farms with appropriate management practices body condition does not seem to play an important role in influencing postpartum ovarian activity.
Owing to the unbalanced distribution of mares between studs and years the effect of these factors could not be differentiated. The time of the occurrence of stud farm (and year) effect was similar to that of the body condition change. The interval from foaling to second ovulation and the length of the second follicular phase were affected. The difference among farms may be the combined effect of several factors such as nutrition, body condition, housing conditions, year, microclimate and the like. In our study, there was no interaction between farm and body condition. The other parameters could not be described sufficiently to be included in the analysis.

Cavinder et al., 2009: An increase in time to ovulation after parturition could result in economic loss if the mare does not successfully conceive within a short time after foaling. To evaluate whether a difference exists in reproductive efficiency between mares of either fat (BCS of 7 to 8) or moderate body condition (BCS of 5 to 6), 24 mares were allotted to and maintained in their respective group from late gestation until pregnancy was confirmed after breeding on the second postpartum estrus. No differences were found between the groups in the number of days to foal heat ovulation (14.4 vs. 16.2 d), interovulatory interval (22.9 vs. 24.3 d), and conception rates (91.7 vs. 83.3%; P > 0.05) for fat- and moderately conditioned mares, respectively. This suggests that mares maintained in a fleshy body condition (BCS 7 to 8) are not prone to reproductive dysfunction or lowered levels of fertility. Nevertheless, mares in a moderate body condition did lose a greater percentage of body fat after foaling as compared with fleshier mares (0.82% vs. 0.35%; P < 0.05). The significance of these results reassures breeders that mares in a fleshier body condition are not prone to demonstrate subfertility, but does allude to the fact that mares benefit by foaling at a BCS of at least 6 to avoid diminished reproductive capability that may result from the loss of body fat that occurs at parturition and in early lactation.

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