

OBESITY MANAGEMENT IN SMALL ANIMAL PRACTICE

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Overweight and obese cats and dogs are encountered on a daily basis by most small animal veterinary clinicians. With appointment times of 15-30 minutes for many small animal practitioners, a complete weight loss assessment and plan may be difficult to complete. Successful weight management often needs additional time to address diet history, nutritional and exercise recommendations. The use of a dedicated technician or scheduling separate weight management appointments can often help to achieve these goals. All clients should realize that successful weight management for their animals does not occur with only one appointment, but with follow-up and this should be communicated to the client during the initial discussion. The scope of these proceedings will discuss weight management for otherwise healthy cats and dogs.

OBTAINING AN ACCURATE DIET HISTORY AND DETERMINING CALORIE INTAKE

Diet history is important for determining the source of a patient's excess kcal (kcal = Calorie) intake. From this diet history, a current estimation of kcal intake can be determined. Clinicians should question the owner about treats, table foods, foods used for medication administration, and even supplements (e.g. 1 teaspoon fish oil contains approximately 40kcal). Determining the kcal content of commercial products can be achieved by referencing the label, calling the manufacturer, or referencing online. Fortunately, the Association of American Feed Control Officials added a new labeling requirement to its 2014 model feed regulations to include the calorie content of pet foods and treats. Existing products have three years to comply with these new regulations. The USDA nutrient database can be used to reference kcal content of most human food products.¹ Many times the kcal intake from treats and table foods may exceed more than 10% of the total kcal intake. Identifying these patients and discussing this aspect of the diet history with the client can be helpful in changing the behaviors of the owner(s). Determining the kcal content may also be useful in patients who have low energy requirements to ensure new diet recommendations are below their current intake. Owners should also be questioned about food bowls and measuring devices. Pet owners may be more likely to portion out a larger amount of food when using larger bowls and larger scoops which may be improved with small bowls and/or scoops.²

Sometimes obtaining an accurate diet history is difficult if not impossible. Fortunately the majority of feeding practices by owners pre-weight loss does not influence the outcome of a weight loss plan.³ Owners can be advised to fill out a diet history form either before an appointment to discuss weight loss or after an appointment where overweight or obesity is identified by the veterinarian allowing for more time to be used for discussion or other medical needs. World Small Animal Veterinary Association provides a useful short diet history form for practitioners.⁴ Questioning multiple family members about the diet history can be helpful in identifying additional foods provided that not all family members are aware. More information may be gained by asking the owner which family members are responsible for the various aspects of their pet's care. Asking owners to describe their daily routine with their pet can help to determine if there are any non-negotiable food items such as a chew bone given during dinner each night or various food items for medication administration.

OWNER AND VETERINARIAN RECOGNITION OF OBESITY

Owners must believe their pets are overweight or obese and that this has important health implications for weight loss to be successful. Thirty nine percent of owners with overweight or obese dogs underestimated their dog's body condition score (BCS) even though they were aware of the BCS by a trained assessor.⁵ In another study, 53% of owners of overweight dogs agreed with the appropriate BCS, however 39% of these owners thought their dog's weight was acceptable or normal.⁶ A normal BCS has been skewed for many pet owners and they are unable to recognize what is ideal. Recent evaluation of show dogs, supposed breed standards, revealed that 18.6% of show dogs had a BCS > 5/9 and 1.1% had a BCS >7.⁷ This was worse for show cats with 45.5% and 4.5% of show cats at a BCS > 5/9 and >7/9 respectively.⁸

Several clinical tools are available to aid in the discussion of overweight and obesity.⁹⁻¹² BCS and Body Fat Index (BFI) are both validated scales associated with body fat % (BF%). The relationship between BCS and BF% is significant. Every increase in body condition score is equivalent to a 5% increase in BF% (Table 1). Cats and dogs are considered overweight when their BF% is $\geq 25\%$ and obese $\geq 35\%$. BF% rates have

been reported to be as high as 62% in cats and 65% in dogs, and in practice the author has encountered both cats and dogs as high as 70%.^{11,12} With a large number of animals >40% body fat, this may skew the perception of obesity by both the pet owner and veterinarian when assigning a BCS. Using these tools in the exam room and inviting the owner to participate in palpation of their animal is a useful way to help the owner recognize their pet's overweight or obese condition.

Table 1: Relationship between Body Condition Score and Body Fat %¹³

BCS (9-point scale)	Body Fat %
4	15-19
5	20-24
6	25-29
7	30-34
8	35-39
9	40+

DETERMINING BODY FAT PERCENTAGE AND ESTIMATING IDEAL BODY WEIGHT

An essential part of weight management is establishing a goal or ideal body weight (IBW). In some cases, with good medical records including both weight and BCS, ideal body weight can be determined from historical data. Equations are also available to estimate ideal body weight using BF% (Figure 1). BF% can be estimated through the use of BCS, BFI, or morphometric measurements.^{11,12} Morphometric measurements for dogs include head length, head circumference, front leg length, and hind leg length in centimeters. Cat morphometric measurements include head circumference, thoracic circumference, front leg circumference, front leg length, hind leg length, and body length. Predictive equation can then be used to determine to predict body fat mass, lean body mass, and body fat %.^{11,12} The author typically reserves the use of morphometric measurements for obese animals with a good disposition.

Figure 1: Equation to Estimate Ideal Body Weight

$$\text{Current Body Weight (kgs or lbs)} \times (100 - \text{current body fat \%}) / (100 - \text{ideal body fat \%}) = \text{IBW (kgs or lbs)}$$

It is important to note that BCS and BFI account for body fat and not lean body mass. As animal age, they may develop muscle wasting or sarcopenia. Sarcopenia is the loss of muscle mass that occurs with age unrelated to an underlying inflammatory or pathologic conditions.¹⁴ In older dogs this may be most evident along the epaxial musculature.¹⁵ Therefore animals with a degree of age related muscle atrophy an ideal BF% of 25 is acceptable.

ESTABLISHING A WEIGHT LOSS PLAN

Determining Energy Requirements for Weight Loss

To achieve successful weight loss in an otherwise healthy patient, the author advocates calculating the patient's resting energy requirement (RER) based on their ideal body weight (Figure 2) and applying a life stage factor for weight loss as the initial kcal goal (Figure 3). The energy intake needed to achieve weight loss in dogs has been reported to range from 53-86 kcal/IBW_{kg}^{0.75}/day.¹⁶ The linear equation to calculate RER can be used for patients under 25kgs. The linear equation is not advised in patients with an ideal body weight over 25kgs as it will over-estimate their kcal requirements (Figure 4).

Figure 2: Calculations for Resting Energy Requirement (RER)

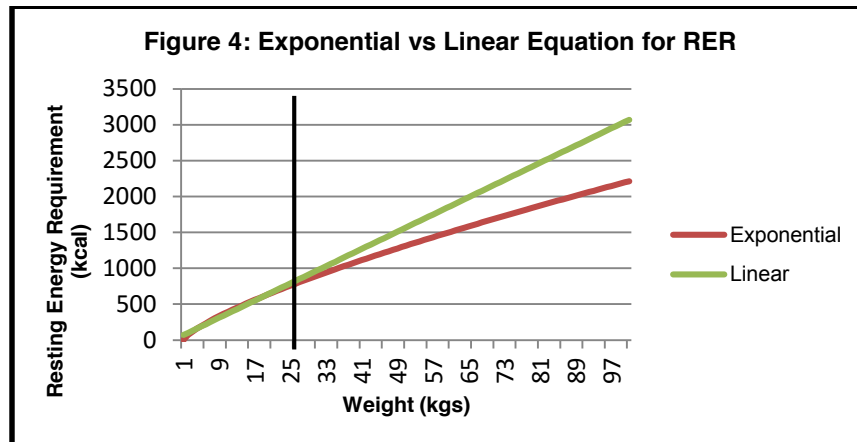
$$\text{Exponential Equation: Resting Energy Requirement} = (\text{Body Weight}_{\text{kgs}})^{0.75} \times 70$$

$$\text{Linear Equation: RER} = 30(\text{Body Weight}_{\text{kgs}}) + 70$$

Figure 3: Calculations for Maintenance Energy Requirements (MER) for weight loss

$$\text{RER} \times 1 = \text{MER (dogs)}$$

$$\text{RER} \times 0.8 = \text{MER (cats)}$$



For animals that are consuming under their RER, recommend a reduction in kcal intake initially by 10-20%. The author does not advise restricting a dog or cat under 60% of their RER at their ideal body weight for weight loss. If this type of kcal restriction is required, consider screening for underlying endocrine disease (e.g. hypothyroidism) or consultation with a board-certified veterinary nutritionist to avoid potential complications or nutritional deficiencies. For animals with an accurate diet history and known kcal consumption, some practitioners may elect to decrease their current kcal intake by 20% to avoid sudden drastic reductions. In these cases, rate of weight loss may be slowed or unsuccessful if the pet was gaining weight prior to this reduction. While this method may be more conservative, challenges with owner compliance and frustration due to lack of success should be considered. Successful weight loss at subsequent visits is an excellent motivator for compliance. Regardless of which method is used to determine IBW and calculate energy requirements, these initial estimates are just that, estimates. Follow-up is necessary to tailor the pet's weight loss plan based on their individual metabolic requirements and to reassess their body condition to determine when IBW is achieved.

Choosing an Appropriate Diet

A therapeutic weight management diet is recommended in obese animals undergoing significant kcal restriction. These types of diets are high in protein to promote maintenance of lean body mass during weight loss and to avoid protein deficiency with kcal restriction. Therapeutic weight management diets, particularly for dogs, also contain high amounts of fiber to lower caloric density and may contribute to satiety. These diets are also fortified in micronutrients to avoid potential deficiencies that may occur with kcal restriction. One study evaluated the theoretical risk of nutrient deficiency in 3 over-the-counter and 2 therapeutic weight management diets when the diets were fed under kcal restriction.¹⁷ All diets had at least one nutrient deficiency at 87kcal/kg^{.75}/day and multiple deficiencies at 70kcal/kg^{.75}/day. The therapeutic weight management diets had the same amount or fewer nutrient deficiencies at each level of restriction when compared to the OTC diets. The most common nutrient deficiencies were choline and selenium. In a follow-up study decreased plasma choline was documented in dogs following a weight loss program while on a therapeutic weight loss diet, however no signs of choline deficiency were documented, most nutrients did not change significantly, and dogs remained healthy throughout their weight loss.¹⁸

Low carbohydrate (LC) therapeutic weight loss diets are often recommended for weight loss in cats. These types of diets may have a metabolic advantage over high fiber (HF) diets, particularly in obese cats with insulin resistance and diabetes mellitus.¹⁹ Selection of diet should include consideration of the patient's preference (dry versus canned) and preference of the owner. Dry LC diets tend to be calorically dense when compared to HF therapeutic weight loss diets. An obese cat with an ideal body weight of 5kg may need to consume 190kcal per day for weight loss which is approximately 1/3 cup of current therapeutic dry LC diets. Owner compliance may be easier with a larger food volume when a dry food is selected. Canned food for weight management in cats is preferred by the author due to the potential for increased satiety and weight loss through higher moisture content. Energy intake and body weight were significantly decreased in cats consuming a canned diet compared to the same diet but with a low moisture content (freeze drying) suggesting that high moisture foods may be of benefit over dry during weight loss in cats.²⁰ If canned food is selected, the author generally recommends a LC therapeutic formulation, although successful weight management has been achieved with

both LC and HF diets. If dry food is preferred, the author recommends a high fiber, low calorie dense food as LC diets tend to have higher fat levels, therefore a higher calorie density.

If using dry extruded kibble, ensure the owner is using an 8 ounce measuring cup. However, measuring cups are imprecise. Over 12 studies, variable accuracy when measuring dry extruded kibble ranged from an 18% under-estimate to an 80% over-estimate in portion size.²¹ Weighing the food with a kitchen scale in grams is a more precise way of measuring the food and is preferred by the author. This can be particularly useful in small animals where there may be large kcal differences as cup size decreases or increases. Calorie information in kcal/kg should be available on the product label or through the manufacturer. Switching to a smaller food bowl may also help some pet owners avoid the perception they are feeding a smaller portion of food.²

Setting Treat Guidelines

Treats and table foods are often where weight loss plans fail. It is generally recommended that no more than 10% of total kcal intake should come from foods other than a complete and balanced diet for any pet. This is to avoid dilution of nutrients with foods that are not complete and balanced. Low kcal fruits or vegetables (baby carrots raw 4-5kcal per piece, green beans raw 31kcal per cup 1/2" pieces) can be recommended. Some owners may request or need food items to administer medications. The author typically suggests melon balls (4-5kcal per ball, melons include cantaloupe, honeydew, and watermelon) or mini marshmallows (2kcal per piece). Commercial treats may also be given, but kcal content should be identified and restrictions of the number of treats per day should be established. The use of a daily treat box or bag put together by one family member for the household has been a useful tool for many of the author's clients to ensure they are not over-treating.

Exercise Recommendations

Exercise can build and preserve muscle mass and increase energy expenditure however the role in obesity management for both cats and dogs is not well documented. Dogs at a brisk walk 10-10.5min per km expend 1.1kcal/kg/km.^{22,23} A recent study evaluated dogs undergoing weight loss with and without a physical training program that included underwater and land-based treadmill exercises 3 times per week.²⁴ Mean weight loss was similar between groups at 13.9% and 12.9% for the fitness + diet and diet only group respectively (p = 0.4). Dog in the fitness + diet group preserved lean body mass (gain 0.63 ± 1.12kgs) while dogs in the diet only group lost lean body mass (loss 0.46 ± 0.53kgs) (p = 0.01). In another study evaluating energy intake and activity in obese dogs, client owned dogs with a BCS > 7/9 were fed a therapeutic diet to maintain weight loss at 2% of body weight per week and were given a collar-mounted pedometer to record daily steps.²⁵ Both active (dogs with > 7,250 steps per day) and inactive dogs maintained the same rate of weight loss however active dogs were able to lose weight while eating more (each 1,000 steps = 1 kcal/kg^{0.75} increased intake).

The limitations of the owner (i.e. physical or timing) and of the pet (i.e. physical) should be considered before making exercise recommendations to determine what intensity and duration may be appropriate. Initial goals may include working up to an additional 20 minutes of walking per day or more depending on the dog and owner abilities. Consultation with a canine physical rehabilitation practitioner may be valuable for those patients with significant osteoarthritis or other orthopedic or neurologic disease to determine appropriate exercise regimens. Underwater treadmill exercises can help reduce the impact on joints while increasing energy expenditure and have been valuable in the author's experience to achieve initial weight loss goals. Increasing exercise in cats takes a more creative approach than dogs. Providing environmental enrichment, use of food dispensing toys, and other activities can be considered.

FOLLOW – UP

The initial weight loss visit should take place approximately 2 weeks after starting a weight loss regimen. At this visit the rate of weight loss (Figure 5) can be calculated, diet history since the start of the program can be reviewed, food intake can be adjusted, and potential compliance related issues can be addressed. Additionally BCS and evaluation of muscle condition should be assessed. Positive reinforcement should also be incorporated in some manner to all weight rechecks regardless of success.

Figure 5: Calculating Rate of Weight Loss per week:

$$\left[\frac{\text{Weight loss since last recheck}}{\text{weight at last recheck}} \times 100 \right] / \text{number of weeks since last recheck}$$

A rate of weight loss between 1-2% of body weight per week is recommended. In cats 0.5-1% is acceptable. If the patient is within this acceptable range, provision of positive reinforcement should be provided and a weigh-in scheduled before the client leaves the office. For patients whose rate is outside this acceptable range, a complete review of the patient's diet history should be obtained to determine if owner or pet compliance related issues are at fault. If the rate of weight loss is outside this acceptable range and no compliance issues are identified, the food intake should be adjusted accordingly. Increasing or decreasing food by approximately 10% of calories or convenient cup or can size can be done. Weight should be monitored every 2 weeks until the patient is losing at an appropriate rate, and then weigh-ins can be performed monthly.

Trouble shooting failure

Failure to lose weight can be due to lack of owner compliance, lack of patient compliance, or potentially an underlying metabolic condition (e.g. hypothyroidism). Dogs with good owner compliance, consistent failure, and excessively low metabolic demands can be screened for underlying metabolic conditions and treated accordingly. Client related issues may include failure to change diet or noncompliant members of the household. Pet related issues may include excessive begging, scavenging for food from trash or other pets, or refusal to eat the recommended diet. With any of these issues, possible solutions should be discussed with the owner. A comprehensive list of potential issues with suggested solutions is provided in the AAHA Weight Management Guidelines.¹³

Begging behavior in particular may cause the owner guilt or fear of depriving their pet and can contribute to weight loss failure. Owners should be reminded that their pets are trained to go to them as providers of food. By ensuring an appropriate rate of weight loss, owner should be assured they are not depriving their pet. Dogs completing a weight loss plan had improved quality of life (increased vitality and decreased emotional disturbance and pain) when compared to dogs that failed to achieve their ideal body weight.²⁶ Cats undergoing weight loss for 8 weeks had an increase in pre-feeding behaviors such as begging, following, meowing, pacing however owner reported their cats became more affectionate post feeding.²⁷ Overall, the vast majority of animals will experience an improved quality of life that owners will also recognize over time.

Keeping the weight off

Depending on the degree of obesity, successful and safe weight loss may take several months and sometimes a year or more. Once the patient has reached their ideal body weight, their kcal intake can be adjusted to maintain their current body weight. Increasing kcals by 10-20% is recommended initially. Additional follow-up (usually 1 – 3 rechecks) is needed after this adjustment to make sure weight is maintained and further adjustments are no longer needed. Maintenance energy requirements following weight loss may remain low. Dogs had a maintenance energy requirement of 52 – 104kcal/kg⁷⁵ following weight loss in one study demonstrating low energy requirements to maintain their body weight.²⁸ Following a weight loss program, 48% of dogs were shown to regain >5% of their body weight.²⁹ Dogs in this study switched to a standard maintenance diet consumed more kcals and were more likely to gain weight. This study suggests that purpose formulated weight management diets can significantly limit regain. Under these circumstances, continuation of a weight management diet with a low kcal density, treat allowance, and exercise recommendations should be recommended to avoid relapse of weight gain.

CONCLUSIONS

The key to successful weight management in companion animals is follow-up.

Diet history should include not only the main diet but also treats, table foods, supplements, and foods used for medication administration.

Every increase in body condition score starting with a 4/9 is equivalent to a 5% increase in body fat.

Resting energy requirement should be calculated based on ideal body weight for weight loss. These initial calculations for ideal body weight and energy are estimates. A more accurate determination of these parameters will be determined at subsequent weight rechecks.

Therapeutic weight loss diets are recommended for obese patients undergoing kcal restriction due to their high protein content to support lean body mass and to avoid possible nutrient deficiencies including protein restriction that may occur with over-the-counter diets.

Treat kcals should not exceed 10% of total kcal intake for any cat or dogs.

Exercise recommendations should be incorporated in to weight management recommendations based on the owner and patient's abilities.

Recommended rate of weight loss is 1-2% of body weight per week. A rate of 0.5-1% loss per week is acceptable in cats.

Troubleshooting issues related to failure during weight recheck appointments and providing solutions to specific issues and positive reinforcement will enhance compliance.

Prevent obesity in the first place!

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