

# Management of Obesity in Dogs and Cats — Maximizing Success

---

Alexander J. German, PhD  
School of Veterinary Science  
University of Liverpool  
Liverpool, United Kingdom  
E-mail: ajgerman@liverpool.ac.uk

## Abstract

Obesity, which is defined as an accumulation of excessive amounts of adipose tissue in the body, predisposes an animal to a variety of diseases including diabetes mellitus and osteoarthritis.<sup>1</sup> In most animals, obesity is the result of a simple imbalance between energy intake and energy expenditure. Therefore, at its simplest, successful management of obesity usually involves reversing this imbalance by reducing energy intake and/or increasing energy expenditure. This lecture will discuss current thoughts on both conventional and novel treatments for obesity in dogs and cats and will stimulate discussion on factors required for long-term success.

## Causes of Obesity

Obesity can arise secondary to a number of diseases including endocrinopathies (e.g., hypothyroidism and hyperadrenocorticism in dogs), drugs (e.g., polyphagia caused by glucocorticoids and anti-convulsant drugs) and rare genetic disorders (in humans), although most cases are primary, i.e., the result of an imbalance in the “energy balance equation.”<sup>1</sup> Thus, either excessive dietary intake or inadequate energy utilization can lead to a state of positive energy balance and cause increased white adipose tissue deposition. Numerous factors may influence the relative ease with which weight is gained. These include genetics, age, neuter status, concurrent diseases, amount of physical activity, and energy content of the diet. Many of these factors need to be considered when devising a weight program; for instance, the type and nature of physical activity will be greatly affected by the presence of concurrent disease.

## Overview of Treatment of Obesity in Dogs and Cats

In humans, current therapeutic options for obesity include dietary management, exercise, psychological and behavioral modification, drug therapy, and surgery. Temporary weight loss, by liposuction, does not have an equivalent effect and does not affect metabolic risk.

Liposuction removes only subcutaneous fat, which carries little metabolic risk, and energy intake is unaffected; therefore, body weight again will rise to achieve energy balance.

Bariatric surgery is the most successful method of weight loss in humans, and average weight loss is ~23%. Various approaches are described including gastric banding and the roux-en-y procedure. This success comes at a cost since the complication rate is high and includes perioperative mortality and short- and long-term consequences. For companion animals, it is not considered ethically justifiable to manage obesity through surgical means. However, pharmaceuticals are available for treatment of obesity in dogs.

Considerable evidence exists from randomized controlled trials as to the efficacy of dirlotapide for weight loss.<sup>2</sup> Nonetheless, for any therapy (pharmaceutical, dietary, etc.) to have long-term success, it is essential to modify owner and animal behavior. Unless steps are taken to change feeding habits and exercise patterns, weight regain will occur. This rebound effect is a well-known phenomenon of any weight-loss program. Therefore, to achieve long-term success, weight loss is only the start rather than the end of therapy. Conventional options for weight management include dietary therapy and behavioral modifications; such strategies are likely to remain for dogs and, given that no pharmaceutical agents have yet been approved for cats, this approach will remain the mainstay of therapy in this species.

## Dietary Management

The weight-loss protocol always should be tailored for the individual patient. Although complete starvation leads to rapid (~7%/week) weight loss, it has the disadvantages of causing excessive protein, and thus lean body mass loss, and requiring hospitalization to monitor. Further, adverse effects on body system function have been reported (e.g., compromised cardiovascular function). Therefore, it is preferable to use purpose-formulated diets, and most formulated rations are restricted in fat and calories and supplemented in protein and micronutrients.

Protein supplementation is important since, although weight loss is not more rapid, the amount of lean tissue lost is minimized.<sup>3,4</sup>

Micronutrients also are supplemented, relative to energy content, in order to reduce the chance of deficiency states arising during weight loss. Other diet components that have been employed in weight management include L-carnitine supplementation (to maintain lean mass) and alteration of macronutrient content (most notably fiber and protein) to maximize satiety (see below).

A major hurdle to conventional weight-loss programs is the fact that energy restriction causes hunger, leading to increased begging and scavenging activity. This puts increased strain on the owner-animal bond, causing owner noncompliance or complete withdrawal from the program. Therefore, developing strategies to improve satiety would greatly assist in case management. The results of many human studies have shown that absorption of macronutrients is lower following consumption of high-protein foods than after consumption of foods with high-carbohydrate or fat content. Supplementing dietary protein appears to improve satiety in dogs but not cats.<sup>5,6</sup>

Under certain conditions in humans, dietary fiber has been shown to exert a satiety effect, although some studies have failed to detect significant reduction in appetite. There are similar discrepancies in canine studies, although most recent reports suggest improved satiety. The most recent work has demonstrated that supplementing diets with both protein and fiber has the greatest satiating effect in dogs,<sup>5</sup> and such diets are known to improve outcome of weight-loss regimes.<sup>6</sup> However, given that protein content is a key determinant of voluntary food intake in cats, the best effect on satiety occurs with fiber supplementation and only modest increase of protein content.<sup>7</sup>

## Lifestyle Management

Increasing physical activity is a useful adjunct to dietary therapy during weight management; studies in humans suggest that increasing activity promotes fat loss while preserving lean tissue during weight loss. The exact program must be tailored to the individual and take account of any concurrent medical concerns. Suitable exercise strategies in dogs include lead walking, swimming, hydrotherapy and treadmills. Treadmill sessions are known to improve outcome in weight-loss programs.<sup>8</sup> Exercise in cats can be encouraged by increasing play activity, using cat toys (e.g., fishing rod toys), motorized units and feeding toys. Cats also can be encouraged to “work” for their food by moving the food bowl between rooms prior to feeding or by the use of

feeding toys. Activity monitors (accelerometers, pedometers) recently have been validated for dogs and may help to provide a more objective assessment of activity during future weight-loss programs.

## Pharmaceutical Agents

In humans, diet and exercise are the main methods of achieving weight loss, but some patients require drugs to assist with and maintain the loss. The only drug currently licensed for weight loss in human is orlistat, an intestinal lipase inhibitor. Other drugs previously licensed (i.e., sibutramine and rimonabant) have been withdrawn due to concerns over side effects. All drugs in this category typically have only a modest beneficial effect; they increase weight loss ~4-6 kg beyond what can be achieved by diet alone, maintain weight loss by ~2-15 kg below baseline, and improve most cardiovascular risks in direct relation to weight loss.

Two drugs are currently approved to assist in the management of obesity in dogs. These drugs are neither licensed nor safe in cats. Both are microsomal triglyceride transfer protein inhibitors that block the assembly and release of lipoprotein particles into the bloodstream.

Mitratapide (licensed only in Europe) is a drug recently approved to aid in weight loss. It has both local (gastrointestinal) and systemic effects and is designed for short-term use in conjunction with dietary management and behavioral modification.

Dirlotapide (licensed in North America and Europe) can be used continuously as sole therapy for obesity for a maximum of 12 months. It partly acts by preventing lipid absorption but also by reducing appetite. The reason for the appetite effect is still debated but only occurs when the drug is given orally, suggesting that its origin is a local one in the gastrointestinal tract. It is possible that this local effect stimulates the release of a gastrointestinal hormone (i.e., peptide YY), which then has a central effect on appetite.

This effect on satiety targets one of the major reasons for poor compliance with a weight-loss regime, namely the development of negative behaviors such as begging and scavenging. It also is not necessary to change the current diet, provided that it is complete and balanced. In fact, the drug does not work as well when administered with a low-fat diet,<sup>9</sup> and, from an empirical point of view, using it concurrently with a conventional weight-loss diet does not appear to improve efficacy. The most common side effects are gastrointestinal, i.e., vomiting and diarrhea, which can occur in up to 20% of dogs using the drug. Further, many clinicians have empirically reported variations in efficacy among individual dogs. While on the drug, weight loss is highly successful, but a predictable

rebound occurs when the drug is discontinued. It is necessary to monitor weight closely and to implement other strategies (i.e., dietary and lifestyle changes) to minimize the likelihood of weight regain occurring.

### Monitoring Weight Loss

In addition to the above strategies, it is essential that the whole weight reduction regime be closely supervised. This is labor-intensive, requires some degree of expertise and training in owner counseling, and often requires a dedicated staff member. In the author's opinion, correct monitoring is the single most important component to the weight-loss strategy. A recent study has demonstrated that weight loss is more successful if an organized strategy is followed with regular weigh-in sessions.<sup>10</sup> It is essential to continue to monitor body weight, after ideal weight has been achieved, to ensure that weight is not regained; as with humans, a rebound effect has been demonstrated after weight loss in dogs. This has been seen in ~50% of dogs that successfully lose weight.<sup>2,11,12</sup>

### Review of Conventional Weight-Loss Programs

Conventional weight-loss regimes, involving dietary caloric energy restriction, are highly successful in obese colony dogs. Rates of weight loss of 1.3-2.6%/week have been achieved with caloric allocations of 50% to 87%. However, weight loss in client-owned dogs is slower (average 0.85% body weight/week) and requires a greater degree of energy restriction, i.e., mean 52% of mean energy requirement at target weight.<sup>13</sup> Mean energy intake during a weight-loss regime is 32 Kcal/kg TW has been reported in pet cats with naturally occurring obesity.<sup>14</sup> With this degree of restriction, the average rate of weight loss is 0.8% body weight/week.<sup>13,14</sup>

The most important factors that influence response include breed, gender and neuter status. Previous work with colony dogs has demonstrated breed differences in the level of energy restriction required to achieve the same rate of weight loss, with Labrador retrievers requiring a greater level of restriction than beagles. Age, sex, neuter status and activity level also have been shown to be important. The main factor that has been shown to affect the rate of weight loss is the level of caloric energy restriction. Nevertheless, while the level of protein does not appear to affect rate of weight loss, the proportion of lean tissue loss is lower on a high-protein diet compared with a diet of moderate-protein content.<sup>3</sup> As mentioned above, the use of formulated weight-loss diets that are supplemented in both protein and fiber improves outcomes of weight loss in dogs.<sup>5</sup>

### Preventing Weight Regain

In humans, long-term success of weight-management strategies is disappointing, with some studies suggesting that some participants on diet-based weight-loss strategies regain more weight than they originally lost. While the reasons for this "regain" are still unclear, the most likely explanation is that when obese humans are returned to a lean state, their resting metabolic rate is lower. Experimental studies in dogs have demonstrated a similar tendency for weight regain,<sup>2,11,12</sup> with maintenance energy requirements decreasing significantly after weight loss.<sup>2,11,12,15</sup>

A recent study has examined long-term follow-up in obese pet dogs that had successfully reached target weight.<sup>16</sup> Forty-two percent maintained weight, 9% gained further weight, and 48% regained weight. Dogs fed a purpose-formulated weight-management diet during the weight-maintenance phase regained less weight than those switched to a standard maintenance diet.

### Summary

Successful weight loss in dogs and cats requires dedication and commitment. Conventional weight-loss strategies involving diet and exercise can be highly successful in both dogs and cats, while pharmaceutical agents provide another means to achieve target weight. Successful weight loss involves not only achieving an ideal body weight but also maintaining it. In the author's opinion, preventing the known and predictable rebound effect seen with any weight-loss strategy requires changes in both owner and pet behavior and is the key factor in true success.

### References

1. German AJ. The growing problem of obesity in dogs and cats. *J Nutr.* 2006;136:1940S-1946S.
2. Gosselin J, McKelvie J, Sherington J, et al. An evaluation of dirlotapide to reduce body weight of client-owned dogs in two placebo-controlled clinical studies in Europe. *J Vet Pharmacol Therap.* 2007;30:73-80.
3. Diez M, Nguyen P, Jeusette I, et al. Weight loss in obese dogs: evaluation of a high-protein, low-carbohydrate diet. *J Nutr.* 2002;132:1865S-1687S.
4. Blanchard G, Nguyen P, Gayet C, et al. Rapid weight loss with a high-protein low-energy diet allows the recovery of ideal body composition and insulin sensitivity in obese dogs. *J Nutr.* 2004;134:2148S-2150S.

5. Weber M, Bissot T, Servet E, et al. A high protein, high fiber diet designed for weight loss improves satiety in dogs. *J Vet Intern Med.* 2007;21:1203-1208.
6. German AJ, Holden SL, Bissot T, et al. A high protein high fibre diet improves weight loss in obese dogs. *Vet J.* 2010;183:294-297.
7. Bissot T, Servet E, Vidal S, et al. Novel dietary strategies can improve the outcome of weight loss programmes in obese client-owned cats. *J Fel Med Surg.* 2010;12:104-112.
8. Chauvet A, Laclair J, Holden SL, et al. Exercise and Active Client Motivation Improve Rate of Weight Loss in Obese Dogs. *Can Vet J.* (In press.)
9. Gossellin J, Peachey S, Sherington J, et al. Evaluation of dirloapid for sustained weight loss in overweight Labrador retrievers. *Vet Pharmacol Therap.* 2007;20(Suppl 1): 55-65.
10. Yaissle JE, Holloway C, Buffington CAT. Evaluation of owner education as a component of obesity treatment programs for dogs. *J Am Vet Med Assoc.* 2004;224:1932-1935.
11. Laflamme DP, Kuhlman G. The effect of weight loss regimen on subsequent weight maintenance in dogs. *Nutr Res.* 1995;15:1019-1028.
12. Nagaoka D, Mitsuhashi Y, Angell R, et al. Re-induction of obese body weight occurs more rapidly and at lower caloric intake in beagles. *J Anim Physiol Anim Nutr.* 2010; 94:287-292.
13. German AJ, Holden SL, Bissot T, et al. Dietary Energy Restriction and Successful Weight Loss in Obese Client-Owned Dogs. *J Vet Intern Med.* 2007;21:1174-1180.
14. German AJ, Holden SL, Bissot T, et al. Changes in body composition during weight loss in obese client-owned cats: Loss of lean tissue mass correlates with overall percentage of weight lost. *J Fel Med Surg.* 2010; 10:452-459.
15. German AJ, Holden SL, Mather NJ, et al. Low maintenance energy requirements of obese dogs after weight loss. *Brit J Nutr.* (In press.)
16. German AJ, Holden SL, Morris PJ, et al. Long-term follow-up after weight management in obese dogs: the role of diet in preventing regain. *Proceedings of the 54th British Small Animal Veterinary Association Congress, Birmingham, U.K.* March 2011.