The number of dogs that are obese has reached epidemic proportions in many industrialized countries. A large study in the United States found that 40% of dogs over one year of age were overweight or obese [1].

**Risk Factors for Obesity in Dogs**

1. Genetics- Breeds more likely to become overweight or obese include Shetland Sheepdogs, Golden Retrievers, Dachshunds, Cocker Spaniels, Labrador Retrievers, Dalmatians, and Rottweilers
2. Gender/neuter status- Neutered female dogs are about twice as likely to be overweight than are intact female dogs. Similar trends have been seen in castrated male dogs.
3. Age- Risk increases with increasing age; peak prevalence is between 5 and 11 years of age.
4. Activity- Reduced activity increases risk

**Disease Associations with Obesity in Dogs**

A landmark prospective study in Labrador retrievers documented shorter life span and greater disease morbidity in overweight dogs compared to lean, energy-restricted controls [2]. Causes of death did not differ between the 2 groups, but lifespan was increased by 1.8 years in the lean group (median lifespan 13 yr vs. 11.2 yr).

Specific adverse health effects that are seen clinically in overweight or obese dogs are pancreatitis, tracheal collapse, lower urinary tract disease (overall as a disease category and calcium oxalate urolithiasis), oral disease, neoplasia (greater overall risk and increased prevalence of mammary carcinoma and transitional cell carcinoma), portal vein thrombosis, hip dysplasia, osteoarthritis, cruciate ligament rupture, humeral condylar fractures, and intervertebral disc disease [1,3]. Hyperadrenocorticism and hypothyroidism are also associated with canine obesity [1].

Experimentally, dogs made obese develop abnormalities in circulating lipid profiles (dyslipidemia), hypertension, myocardial hypoxia, reduced immune function, expiratory airway dysfunction and glomerular disease [3]. Impaired glucose tolerance (insulin resistance) can be documented in spontaneously obese dogs but
data are currently weak or absent to link obesity to diabetes mellitus in dogs. Insulin resistance associated with obesity may play a role, however, in precipitating diabetes in prediabetic dogs with beta cell loss from immune destruction or chronic pancreatitis.

Preventing or treating obesity may delay or prevent many of these obesity-related diseases. Weight loss in obese dogs is associated with a reduction in triglycerides, cholesterol, thyroxine and leptin. In addition, weight loss leads to an increase in insulin sensitivity and lowering of adipokines linked with insulin resistance, such as tumor necrosis factor-α and insulin like growth factor-1 [4,5].

Obesity Management

A successful weight loss program requires a reduction in caloric intake and/or an increase in energy expenditure through physical activity. When possible, a weight loss plan that incorporates both of these elements is recommended.

Almost all purpose-formulated weight loss diets are restricted in fat and calories and relatively high in protein and micronutrients, relative to maintenance diets.

Optimizing macronutrient content (particularly protein and fiber) to maximize satiety has been a major focus in the development of weight loss foods [6]. A significant hurdle to canine weight loss programs is that energy restriction leads to hunger, which causes increased begging behavior and scavenging activity. Begging puts increased strain on the human companion-animal bond, causing owner noncompliance or complete abandonment of the program. Supplementing dietary protein appears to improve satiety in dogs (but not cats). Fiber enhancement is another strategy employed to try to enhance satiety. Recent work has demonstrated that enhancing both fiber and protein has the greatest satiating effect in dogs and such diets can improve the outcome of weight loss programs [7,8]. A dietary protein level between 25-30% of dry matter, or 10-20 g/100 kcal, and a dietary fat level between 5-15%, or 2-3.5 g/100 kcal are recommended for weight loss in dogs [9].

Determining the energy requirement for the individual dog is crucial to a successful weight loss regimen, especially in the first few weeks when owners can easily become discouraged if caloric calculations are too high and not adjusted accordingly. For a dog whose body weight is stable, current intake calculated from a detailed diet history or, even better, a 3-day food diary, is often the best indicator of a patient’s actual energy requirement due to large individual variation (+/- 50% of the calculated requirement based on body weight). Obese dogs are often very efficient users of calories. Once current intake has been calculated, provide 70-80% of current calories with the selected weight-loss food [9]. Be sure to include calories provided by treats in the daily caloric totals. If the diet history is incomplete, the dog’s resting energy requirement (RER) can be estimated based on target weight. Using the formula RER = 30 (BWkg +70), initially feed 60-70% of RER at the target weight [10]. A weight loss goal of 1-2% of body weight per week is safe and provides positive reinforcement to the owner. When serious co-morbidities such as tracheal collapse, brachycephalic syndrome or severe arthritis are present, attempt to maximize weight loss to 2% of body weight per week [9].

Considerable evidence has been gathered from randomized controlled clinical trials that microsomal triglyceride transfer protein (MTP) inhibitors are efficacious for weight loss in dogs [11,12]. The MTP inhibitors, dirlotapide and mitratapide, block the assembly and release of lipoprotein particles from enterocytes
into the bloodstream. It appears that a major effect on satiety occurs because the local effect on the gastrointestinal tract stimulates the release of a gastrointestinal hormone, peptide YY (PYY), that has a central effect on appetite. Use of an MTP inhibitor may be a particular consideration when a dog has a serious medical condition related to obesity, such as collapsing trachea or brachycephalic airway syndrome, when the dog’s mobility limits lifestyle change (sometimes until some weight has been lost) or when a previous attempt at weight loss has been unsuccessful. As the mechanism of action of MTP inhibition relies on some accumulation of fat in intestinal cells, weight loss will be most successful if the dog is fed a diet with a moderate fat content during weight loss. In fact, the drug does not work as well when administered with a low fat diet. Owners should be advised that vomiting, often a single episode, occurs in 20% of dogs receiving the drug. Additionally, owners must be forewarned that appetite cannot be used as an index of their dog’s health and vitality during the period of drug administration, which is a significant paradigm shift for many owners. While on the drug, however, weight loss is highly successful. To avoid a predictable weight rebound when the drug is discontinued, it is critical to have the owner make lifestyle alterations to incorporate a higher exercise level and make a diet change to a low fat diet suitable for long-term weight maintenance.

The importance of exercise in mitigating loss of lean body mass during weight loss cannot be overemphasized, and serves the dual role of increasing energy expenditure. Longer term, exercise helps maintain the target weight.

Maximizing Success of Weight Loss

Conventional weight loss programs involving dietary calorie 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 50-87% [13]. However, weight loss in client-owned dogs is slower (average 0.85% body weight/week) and requires a greater degree of energy restriction (average 52% of mean energy requirement at target body weight) [14].

For any weight loss therapy 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-recognized phenomenon of any weight loss program. In various canine studies, about 50% of dogs that successfully lost weight show weight rebound[11-15]. The reason for weight regain is not entirely understood, but one explanation is that resting metabolic rate is lower in formerly obese humans and pets, when they return to a lean weight. This lower maintenance energy requirement after weight loss must be recognized in long-term dietary planning. Therefore, to achieve long-term success, weight loss is only the start, rather than the end, of therapy. A recent study examined long-term follow up in obese pet dogs that had successfully reached target 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 [16]. The entire weight loss and weight maintenance regime must be closely supervised in order to be successful[17].

References


Electronic Resources
http://vet.osu.edu/nssvet Click on “Diet search” to access an excellent resource that provides comparative nutrient information on many commercial (therapeutic and non-therapeutic) canine and feline diets.

http://www.petobesityprevention.com An informative and fun resource for pet owners and veterinary teams with information on diets, exercise plans, etc. for the obese pet, along with obesity-awareness and obesity-prevention information.

info@dvmconsulting.com Balance IT is a fee-based program that assists with calculation-based weight-loss feeding plans, including adjustments based on weight loss achieved.