

Canine obesity pandemic: Integrating the objective measurement of physical activity and the role of the human/companion-animal bond

Discusses the issue of canine obesity and explores the bond between animals and humans, its significance in perpetuating the problem and the role of veterinarians in controlling pet obesity.

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Introduction

Obesity is the most important form of poor nutrition in dogs in the developed world and as such, one of the major welfare issues (Stafford, 2006). Concerns about overweight and obese dogs are reinforced by emerging veterinary literature, which demonstrates correlations between excessive canine weight and chronic conditions such as osteoarthritis, diabetes and heart disease (Gossellin *et al.*, 2007; Lund *et al.*, 2006). Obesity is defined as a condition in which an animal exceeds its optimum bodyweight by more than 21% (Burkholder & Toll, 2000). Current estimates are that approximately 30% and 50% of people and their dogs, respectively, in the Western world are overweight or obese and these figures are expected to climb (Flegal *et al.*, 2010; Lund *et al.*, 2006). This essay will focus on the increasing prevalence of obesity in the canine population and the potential role of physical activity (PA) and the human-animal bond for its prevention and treatment.

Discussion

The vast wealth of studies on canine obesity published to date have focused on subjective measures, such as questionnaires and interviews, where owners were asked to assess PA levels in their dogs (Courcier *et al.*, 2010; Robertson, 2003; Slater *et al.*, 1995). Inevitably, such methods are prone to a high degree of both imprecision and bias. On the other hand, accelerometry has been widely used to objectively measure PA in humans (Reilly *et al.*, 2008; Troiano *et al.*, 2008) and has emerged as a valid tool for the measurement of PA in dogs across a wide range of breeds (Dow *et al.*, 2009; Michel & Brown, 2011; Yam *et al.*, 2011). In 2013, Morrison *et al.* conducted a preliminary study to investigate the association between obesity and PA using accelerometers. A sample of healthy mixed sex, neutered and entire adult dogs (n=39) of various breeds were recruited over a six-week period. An accelerometer was attached to the dorsal aspect of each dog's collar. Activity was recorded in 15-second intervals over 7 consecutive days. Authors calculated 4 constructs from the set of PA data collected, including total volume of PA, time spent in sedentary behaviour, time in light-moderate and vigorous intensity PA. Data analysis revealed that obese dogs were significantly less vigorously active than dogs of healthy weight.

In a follow-up study published in 2014, accelerometers were used to measure PA and sedentary behaviour in a sample of 29 Labrador retrievers and 25 cocker spaniels (Morrison *et al.*, 2014). Study design was identical to that conducted by Morrison *et al.* (2013). Five potential correlates (age, sex, breed, neuter status, and Body Condition Score) were tested for associations between total volume of PA as well as between PA of varying intensities and sedentary behaviour. The results demonstrated that the total volume of PA, light-moderate and vigorous intensity PA, significantly decreased with age. In contrast to the 2013 study, differences in PA and/or sedentary behaviour between ideal weight and overweight or obese dogs was not observed. This reflects a weakened association between PA measured by accelerometry and other correlates due to the inclusion of an excessive number of variables. Additionally, inclusion of different age groups may have contributed to the vast variation in PA.

Despite the limitations, the two accelerometry studies have showcased the ability of this device to objectively measure PA in canines. Consequently, the objective measurement of PA allows for a more accurate estimate of the energy requirements of dogs. However, no matter how accurate the energy requirement estimate is, it will still be influenced by owner characteristics.

This brings us to the topic of the companion animal-human bond. There is a strong correlation between physical activity levels and weight status of dogs and patterns of human activity (Bland *et al.*, 2009; Cutt *et al.*, 2008). Recent studies also indicate that human individuals and populations at higher risk of developing weight-related health problems are more likely to own overweight dogs (Courcier *et al.*, 2010; Nijland *et al.*, 2010). This inevitably draws connections between human and companion-

animal health. Degeling *et al.* (2013) examined how veterinary and human medicine account for and treat obesity. Despite the similarities, in that both medical practitioners and veterinarians associate obesity with genetic susceptibilities, diet and exercise levels, the authors have underlined an apparent discrepancy in how veterinary and human medicine approach obesity treatment regimens. Veterinarians still concentrate on biological causes of obesity and clinical interventions, whereas human medicine has broadened its model of causation to include social factors.

Degeling *et al.* (2013) have also demonstrated that the species division resulting from separation of medical practices and the coincidental increase in obesity and burdens of chronic disease have consequences for healthcare providers' ethical obligations. Inevitably, companion-animal veterinarians have to find a balance between a client's preferences and concerns for animal welfare. This said, veterinarians have a duty to protect and promote animal welfare. For example, it is clear that opportunities for exercise in dogs are determined largely by their owners' own social and cultural preferences. Therefore, it is morally imperative for veterinary practitioners to appreciate the effect an owner's lifestyle and social and physical environment may have on the welfare of the companion animal. Consequently, this will aid in designing a treatment regimen for the affected animal.

Conclusions

In conclusion, the accelerometer studies have objectively demonstrated that there is a link between low PA and obesity as well as an increase in the incidence of obesity with increasing age. It has also been suggested that obese owners may increase the likelihood of obesity in their pets. However, the exact relationship between these two variables is not clear. Given that companion-dog obesity is on the rise, it is essential that research is conducted to investigate what influence the human-animal bond has on pet-dog health and wellbeing. Drawing a connection and understanding the link between human and companion-dog health will undoubtedly lead to far-reaching positive changes in the welfare of pet dogs.

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