Comparison of two treatments for preventing dogs eating their own faeces

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Twenty-eight domestic dogs with the behavioural problem of eating their own faeces were treated in two ways. Half of them were treated with a citronella spray collar, and the others were treated with sound therapy. To assess the relative efficacy of the treatments their owners rated the severity of their dog's faeces eating for a week before the study began, during each of three weeks of treatment, and at the end of a fourth week during which they had not been treated. The owners reported a significantly lower incidence of the behavioural problem during the first week of both treatments, but in the dogs treated by sound therapy its incidence subsequently increased. The behavioural problem was reduced most effectively in the dogs treated with the spray collar, and continued to decrease during the period of treatment.

COPROPHAGY is a behaviour involving the ingestion of dung or other forms of excrement, and two types can be distinguished: autocoprophagy, in which an animal eats its own faeces, and allocoprophagy, in which it eats the faeces of another animal of the same species (Galef 1979). Coprophagy is common among lagomorphs and rodents, and has been observed in other species, including pigs, horses and non-human primates (Soave and Brand 1991). The domestic dog, *Canis familiaris*, is also prone to coprophagy, and in this species it is generally considered to be a problem behaviour (Beaver 1994, Wells 1996, Wells and Hepper 2000). The close bond between dogs and their owners has led to a limited tolerance of a behaviour that is considered both unsavoury to watch and unhealthy for both the dog and its owner.

The aetiology of coprophagy in dogs is uncertain, although several suggestions have been proposed (Askew 1996, Overall 1997). For example, it has been suggested that faeces eating may indicate an imbalanced diet or pancreatic enzyme deficiency, the faeces being eaten in an attempt to gain more nutrients (Hart and Hart 1985). Another suggestion is that coprophagy may result from inappropriate operant conditioning; the attention directed towards the dog by its owner upon witnessing the undesired behaviour serving as a positive reinforcer, increasing the frequency of the behaviour (Hart and Hart 1985). The taste of the faeces may also act as a positive reinforcer. Many dogs, particularly those on rich meat-based diets, find the taste of faeces pleasant. O'Farrell (1992) suggested that faeces eating may be an expression of dogs' instinctive preference for decaying food, the behaviour being self-rewarding.

There is as little information on the treatment of coprophagy in dogs as on its aetiology (Askew 1996, Overall 1997). A change of diet is usually recommended by those who think that coprophagy is the result of a nutritional deficiency (McKeown and others 1988, O'Farrell 1992). It is believed that feeding dogs twice a day with a diet that is rich in fat, protein and fibre, but low in carbohydrate, may reduce any tendency to seek an alternative form of food. However, there is no scientific evidence that changing a dog's diet decreases its tendency to eat faeces, strengthening the idea that the behavioural problem may have a learned component (Dodman 1999).

Counter-conditioning is also recommended as a means of treating coprophagy in dogs. Flavouring the animal's faeces with an unpleasant, but harmless, substance, such as bitter apple, chilli powder or Tabasco sauce, can decrease the unwanted behaviour (Houpt 1991). This form of treatment, however, relies on the pet's owner approaching the faeces (and thereby the dog) and can thus unintentionally reward the animal's behaviour. Moreover, many dogs develop a taste for the flavoured faeces and their undesired behaviour pattern increases in frequency. The need for the owners to come into close contact with their dog's faeces also involves risk to their health.

There is little empirical information on how best to treat coprophagy in dogs, a behavioural pattern that is widely regarded as both unattractive and unhygienic. This paper describes a study designed to compare the effectiveness of two treatments on the reported severity of autocoprophagy in a group of dogs referred for behaviour therapy. The treatments were a spray collar and a loud noise, neither of which required the owners to come into direct contact with their dogs' faeces. The owners were required to assess the severity of their pets' coprophagy before the treatment began, during the treatment, and a week after the treatment had stopped. The effects of short or long exposures to the treatments on the reported severity of the dogs' coprophagy were also assessed.

MATERIALS AND METHODS

Dogs

Six months before the start of the study, 26 veterinary surgeons across Northern Ireland were asked for their help in referring labrador retrievers for potential participation in a study to assess the effectiveness of two treatments for coprophagy. Labrador retrievers were specified to reduce the possibility of breed differences influencing the results. All of the vets contacted agreed to participate.

Thirty-six dogs, 15 males and 21 females, were referred; their mean age was three years and eight months, with a range from two years and eight months to five years and two months. They had all been examined by their veterinary surgeon to establish whether their behaviour was pathophysiological in origin, and they were all considered healthy and suitable for participation in the study. In addition, a 30-minute standard interview was conducted with the owner of each dog, during which information was collected about the animal's living conditions and care, the nature of the dog's coprophagy, and the practices they adopted to control its behaviour. The dogs were considered suitable for participation in the study only if they met the following criteria: the dog was a purebred labrador retriever; the dog's coprophagy was triggered only by the presence of its own, as opposed to other animals', faeces; the dog engaged in coprophagy in its own garden rather than indoors or while out for a walk; and the dog's owner had adequate time to follow the treatment programme.

Twenty-eight of the dogs, 12 males and 16 females, referred by the veterinary surgeons met these criteria; the mean and range of their ages were the same as those of the original 36.

Procedure

The dogs' owners were asked to collect information on the severity of their dog's coprophagy for a week. The owner watched from an inconspicuous site in the garden when the animal was allowed outside each day for elimination and/or exercise purposes, and counted the number of faeces the dog ingested in relation to the number of faeces available for

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ingestion. They were then asked to rate the severity of their dog's faeces eating on a scale ranging from 1 to 4, where 1 indicated 0 to 25 per cent of available faeces were eaten, 2 indicated 26 to 50 per cent of available faeces were eaten, 3 indicated 51 to 75 per cent of available faeces were eaten, and 4 indicated 76 to 100 per cent of available faeces were eaten.

The dogs were then divided at random into two groups to be treated either with a spray collar or by sound therapy.

Spray collar Fourteen of the dogs with a mean (se) reported severity of coprophagy of 3·57 (0·17) were treated with a first generation MasterPlus citronella spray collar (Dynavet). This device works by emitting a 'cloud' of spray, together with an audible hiss under the dog's nose, whenever the collar is triggered by the owner with a remote control. The owner can select a blast of spray lasting either for 0·2 seconds or one second. The spray is usually scented with citronella (although odourless sprays can also be used) because few dogs are accustomed to this odour (Juarbe-Diaz and Houpt 1996). It has been suggested that the collar functions as a disruptive stimulus, interrupting the dog's behaviour (Aubry 1997, Pageat and Tessier 1997a, b).

Sound therapy The other 14 dogs, with a mean (se) reported severity of coprophagy of 3·64 (0·17) were given sound therapy by means of a Dog Stop Alarm (The Company of Animals). This device works like a personal security alarm, emitting a 115 dB screech whenever the propellant spray is pressed and, like the citronella spray collar, it functions as a disruptive stimulus and interrupts what the animal is doing.

The owners were instructed to expose their dog to the effects of the spray collar or sound therapy every time and as soon as it started to eat its faeces, half of them giving the treatment for 0·2 seconds and the other half giving it for one second. Owing to the absence of any in-built timing system on the sound alarm these owners were trained and subsequently tested on their ability to let the alarm off for the correct time; they were able to do so accurately. They were told to administer the treatments as many times as necessary; for example, if a dog attempted to eat any of its faeces three times during a particular testing session, it was to be exposed to the treatment three times, but they were instructed that they should apply the treatment only if the animal actually started to eat its faeces; incidences of looking at, sniffing or urinating on, the faeces were to be ignored.

The treatments were applied for three weeks, and the owners were requested to continue monitoring the severity of their dog's coprophagy during a fourth week, after the treatments had ceased. They were requested to assess the severity of their animal's problem behaviour at the end of each of the three weeks of treatment and at the end of the fourth week. The owners were requested to restrict their pet to its regular diet throughout the study, given the anecdotal belief that diet may influence coprophagy, and to ensure that, as far as possible, they let their dog outside at similar times each day to avoid the possibility of an animal defecating considerably more or less during one week than another.

The owners were telephoned on the days they were required to assess the severity of their pets' problem behaviour, both to remind them to complete the survey and to ensure that they were complying with the treatment regimes.

Data analysis

A mixed-design analysis of variance (Howell 1992) for between-subjects factors of treatment (spray collar; sound therapy), and duration of exposure (short exposure; long exposure), and within-subjects factor of period of time (pretreatment; week 1; week 2; week 3; post-treatment) was applied to determine whether the reported severity of the dogs' coprophagy was related to the type of treatment, the duration of exposure to the treatment, and/or the length of time the treatment was administered.

The assumptions underlying a parametric analysis (Howell 1992) were sufficiently met in terms of population normality, sample independence and homogeneity of variance (a Mauchly's test for sphericity was not significant).

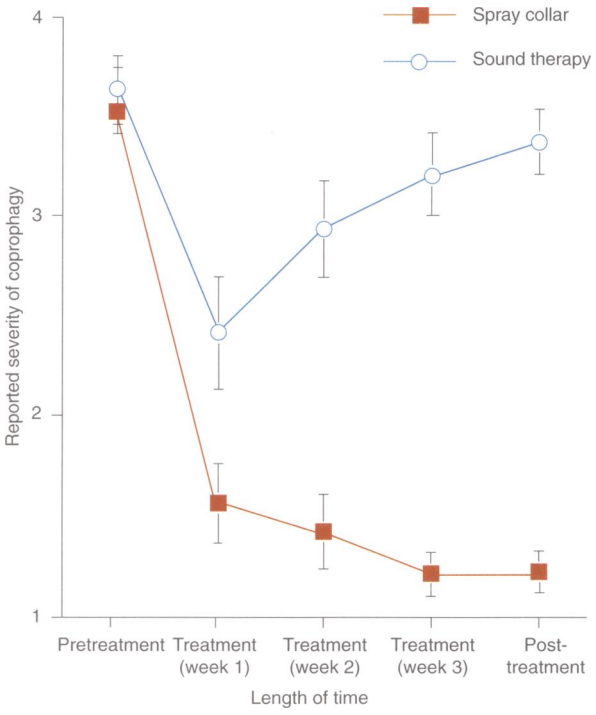

FIG 1: Mean (se) reported severity of coprophagy (1 = lowest level, 4 = highest level) exhibited by dogs which were treated with a spray collar or sound therapy, before, during and after treatment

RESULTS

Treatment

The reported severity of the dogs' coprophagy was significantly related to the treatment ($P<0·001$). The owners of the treated dogs with the spray collar reported a lower mean (se) severity of faeces eating in their pets (1·35 [0·15]) than the owners of the dogs treated by sound therapy (2·98 [0·18]).

Length of time

Dogs in both of the treatment groups showed a significant ($P<0·001$) decrease in the reported severity of their coprophagy during the first week of treatment, although those animals treated with the spray collar showed a significantly ($P=0·02$) greater decrease in the problem behaviour than those treated with the sound therapy. Dogs in the spray collar group continued to show a significant ($P<0·001$) decrease in the reported severity of coprophagy over the remaining weeks of treatment, while dogs in the sound therapy group showed a subsequent increase in the behavioural problem over weeks 2 and 3 (Fig 1).

Duration of exposure to treatment

The reported severity of the dogs' coprophagy was not significantly affected by whether the treatments were given for 0·2 seconds or one second.

DISCUSSION

The results indicate that autocoprophagy by domestic dogs can be reduced by these two disruptive stimuli, but that the

reduction was more effective in the dogs treated with the spray collar than in the dogs treated with the sound therapy. This difference may be related to the number of senses triggered by the two devices. The spray collar targets three senses: smell, hearing and touch, whereas the sound therapy stimulates only the animal's hearing. The results suggest that faeces eating, and possibly other behavioural problems, for example, barking (Wells 2001), may be more effectively curbed if the treatment programme stimulates a variety of senses.

Environmental factors may also have had an influence on the efficacy of the treatments. Strong winds, noise from passing traffic and/or other noises may have reduced the effectiveness of the sound therapy. However, the effects of the spray collar, which was placed around the dog's neck, close to its nose and ears, are less likely to be interfered with.

The reported severity of the dogs' coprophagy changed significantly during the study. During the first week of treatment the severity of the problem decreased markedly in both groups of dogs, although the decrease was significantly greater in the dogs treated with the spray collar. Furthermore, in this group the decrease was maintained throughout the three weeks of treatment, whereas in the dogs treated by sound therapy there were increases in the incidence of faeces eating during the second and third weeks of treatment, suggesting that the animals became habituated to the action of the sound alarm, and a further slight increase during the fourth week with no treatment. By this time the incidence of faeces eating in this group had reverted almost to the pretreatment level. In contrast, the incidence of faeces eating in the dogs treated with the spray collar remained unchanged during the fourth week and much lower than during the week before the treatments began. The duration of the effectiveness of treatment with a spray collar warrants further study.

Whether the dogs were given the treatments for 0·2 seconds or one second had no apparent effect on the reported severity of the dogs' coprophagy, although it might have been expected that the longer treatment would have been more effective. It is possible that the time difference was too short for it to have a significant effect or, alternatively, the duration of the treatment may be irrelevant.

It is possible that a difference in the number of times that the owners administered the treatments may have influenced the results. They had been instructed to 'punish' their pets' problem behaviour as many times as necessary during any one bout of coprophagy, and it is possible that one of the treatments was used more frequently than the other, thus influencing their relative effects. However, follow-up inquiries revealed that none of the participants had had to use either treatment more than once during any specific bout of coprophagy. This is a positive finding, suggesting that the treatments were effective in stopping the dog returning to the faeces it was punished for ingesting.

This study was concerned solely with assessing the effectiveness of two commercial products. Their effectiveness in relation to more traditional treatment programmes, for example, change of diet or counter-conditioning, is unknown, largely owing to the lack of empirical studies of the effectiveness of these treatments. The effectiveness of the spray collar in relation to more traditional methods of dealing with dogs which eat their own faeces warrants investigation.

When using manufactured products that provide disruptive stimuli, it has been recommended that owners try to redirect their pet's behaviour while their attention has been diverted from the problem behaviour (Aubry 1997, Pageat and Tessier 1997a, b), but the effectiveness of this strategy is unknown. It would be valuable to investigate the usefulness of the recommendation.

It has been suggested that both the spray collar and the sound therapy functioned as disruptive stimuli, simply interrupting the dogs' behaviour, but it is also possible that they provided aversive stimuli. Both products are widely available and frequently purchased by owners of dogs with problem behaviours. However, their effects on the welfare of the animals is unknown and warrants investigation.

The results of this study suggest that a citronella spray collar may be a more effective means of reducing the severity of faeces eating in domestic dogs than sound therapy. From an animal welfare point of view it may be wiser to use a spray collar that emits an odourless, rather than a citronella-scented, spray, because there is evidence that both types of collar are equally effective in disrupting unwanted behaviour (Beaudet 2001).

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Notes