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Long-term follow-up of the efficacy of a behavioural treatment programme for dogs with firework fears

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NOISE fears are a common behavioural problem in dogs (Overall 1997, 2002, Beaver 1999, Landsberg and others 2003) that can significantly reduce the animal's welfare (Beerda and others 1997, Ladewig 2000, Hydbring-Sandberg and others 2004, Dreschel 2004, Dreschel and Granger 2005). Treatment plans for noise fears, such as behavioural modification programmes, psychoactive medication and pheromone therapy, are often recommended (Askew 1996, Overall 1997, Beaver 1999, Horwitz and others 2002, Landsberg and others 2003, Houpt 2005). While these are commonly advocated treatment plans, few studies have examined the efficacy of such treatments. Studies that have investigated noise fear or phobia treatments (Crowell-Davis and others 2003, Mills and others 2003, Levine and others 2007) have been limited to short-term outcome (up to four months). This short communication describes the one-year follow-up of 38 dogs that were involved in an eight-week treatment trial investigating the efficacy of using noise recordings, in conjunction with dog-appeasing-pheromone (DAP; Ceva Santé Animale), for desensitisation and counter-conditioning of dogs with firework fears (Levine and others 2007). The goal of using the noise recording and the DAP was to help teach the dogs not to be fearful of noises by using a medium (a sound recording on a CD) over which the owners could control the level of exposure, according to the dog's ability to cope, in order to steadily build up its tolerance. DAP has been reported to reduce anxiety in dogs in a variety of contexts, especially in relation to noise stimuli (Sheppard and Mills 2003).

In the original study (Levine and others 2007), owners were given one of two self-contained noise reduction programmes and instructed to read and follow the instructions that accompanied their respective CD. The owners were not given any further clarification of the directions that accompanied the CD at this time. Half of the participants received a programme called Fear of Fireworks (FOF) (fearoffireworks.com) and the other half a programme called Sounds Scary (SS) (Sounds Scary Ltd). The distribution of the CDs to participants was matched based on initial owner perceived global fear scores (scale 0 to 10). Both programmes recommended the use of DAP. In order to help ensure even compliance with the use of pheromone therapy, DAP was distributed to all participants free of charge.

In order to monitor the level of fear exhibited by these dogs throughout the study and respective follow-ups, the same questionnaires were used throughout the study (baseline and two follow-ups in the original study, as well as the

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present follow-up study). In the questionnaires, owners identified both the frequency and the intensity of individual fear-related behaviours in which their dogs engaged during fireworks while inside the home. Answer options for frequencies of behaviours were never (0), rarely (1), frequently (2), and every time (3). Answer options about intensity of a behaviour were numerical ratings from 1 to 5 with 1 being a small amount and 5 being an extensive amount. The severity of individual behaviours was calculated by multiplying the frequency by the intensity of that behaviour. The total severity fear score for each dog was calculated by summing the severities of each behaviour. The total severity fear scores were then converted into percentages by dividing each individual total severity fear score by the total possible severity score. The owners were also asked to assign a global fear score on a scale from 0 to 10 relating to their perception of their dogs' firework fear. Zero related to a mild fear response whereas 10 was the most severe fear response imaginable to them. An option to say there was no fear present was also provided at follow-up. For all follow-up interviews owners were asked to give a global fear score.

The results of the initial investigation revealed that the majority of dogs showed behavioural improvement when exposed to real fireworks up to three months after the initial eight-week treatment programme. The current study (12 months after the initial eight-week programme) collected follow-up information in November 2005.

Of the original 38 dogs that completed the training programme, 30 were exposed to fireworks on Bonfire Night, November 5, 2005, while the dogs remained in their homes. The majority of owners (89 per cent) reported that the severity of firework exposures were either similar to or worse than the previous year. The median total severity fear score for the 30 dogs was significantly lower in November 2005 compared to August 2004 (baseline) (Wilcoxon matched pairs test, $P < 0.001$) (Fig 1). The global fear scores provided by the owners also significantly decreased from August 2004 to November 2005 (global fear scores of 8 and 5 respectively, $P < 0.001$) and there was a positive correlation between the global fear scores and the total severity fear scores (Pearson correlation = 0.816, $P < 0.001$). With regards to individual fear-related behaviours, only 23 dogs met the criteria to be included in the analysis (that is, information from all three exit interviews). Of these 23 dogs, there was significant improvement from baseline (August 2004) to each exit interview in eight behaviours (Fig 2). Pacing showed significant improvement in November 2004 and January 2005, but not in November 2005. The behaviours 'seeking the owner' and 'scanning the environment' did not show any significant improvement at any exit interview in this population. Vocalisation was only reported to significantly improve in November 2005.

For this 12-month follow-up study, only 30 per cent of the owners reported using the CD before Bonfire Night 2005 and only 23 per cent reported using DAP before the final follow-up. Sixty-six per cent of these owners reported either a moderate or great improvement with respect to their dog's fear of fireworks with one owner reporting that their dog was worse. Seventy-four per cent of owners reported that they were either moderately or very satisfied with the results they had seen. Both owner-reported improvement and owner satisfaction results were similar to those reported in November 2004 and January 2005 (Levine and others 2007). Eighty-

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three per cent of owners stated that they would use this programme again if they were to acquire another dog that was fearful of fireworks.

The positive correlation between the reported global fear scores and total severity fear scores in the current study and in the previous study (Levine and others 2007) are encouraging, as it appears, for this population, the owners' overall impression of their dog's level of fear is correlated with the reported severity of individual fear-related behaviours and reflected behavioural improvement. However, it should not be assumed in other instances that global fear scores will reflect improvement in signs, since it is possible that the global fear assessment scores may be identifying components of the fear behaviour (for example, the overall emotional state of the animal) that are not revealed by simply scoring individual behaviours, or may be biased towards certain signs of particular concern to the owner (Crowell-Davis and others 2003). Thus Mills and others (2006) have recently argued that reliable global measures of emotional state may be more useful measures of treatment response than specific behaviours in studies such as this, not least because they might also require fewer subjects for a reliable result. Further research is needed to validate the use of owner-reported global fear scores.

The sustained improvement for up to one year after the training period with very few individuals repeating the training or continuing the use of DAP before the last exit interview is of interest and provides, for the first time, solid evidence of the longer-term outcome of such programmes, assuming the original data were reliable. Owners are commonly advised to continue with desensitisation and counter-conditioning even if they believe their animal has improved; however, if, as in this report, animals appear to display sustained improvement one year following treatment with no or little retraining periods in between, such continuation therapy may be unnecessary. Clients may be more compliant if they are told at the outset that it is unlikely that they will need to repeat training on a permanent basis following initial resolution. However, it is worth noting that the majority of the individual fear-related behaviours scores did start to show an increase from the second exit interview (January 2005); therefore, retraining may be necessary at a later date, if the problem continues to re-emerge over time.

For the 23 dogs for which individual behaviors were statistically analysed, neither owner-seeking nor scanning the environment improved throughout the study. Owner-seeking behaviour may not have improved as owners frequently tend to reinforce their dog seeking them out by rewarding them with vocal, eye or physical contact. Scanning the environment, or vigilance, may not have improved as this behaviour may be related to information gathering. Vigilance may be related to the orienting response. Identifying the source of a potentially threatening sound would be evolutionarily advantageous, as locating the source of the sound would give the animal information to help execute the most appropriate behaviours; for example, running in a direction away from the source. Therefore, it may be expected that this particular behaviour will take longer to dissipate than behaviours such as panting and trembling, which do not have the potential to provide information to the animal, but are an expression of a more intense emotional response. Interestingly, pacing improved for the first two exit interviews (November 2004,

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January 2005), but was not improved significantly by the third exit interview one year later. It may be that certain behaviours are more likely to need 'retraining' more frequently than others in order to sustain improvement or that certain behaviours emerge at different times. An ethological analysis of the emergence of this problem might be a useful future study.

The majority of owners were satisfied with their dog's improvement and stated they would be willing to use this protocol again if they were to acquire another dog that was scared of fireworks. Despite their reporting willingness to use it for a new dog, it is interesting to note how few of them reinstated training for their own dogs in this study.

In summary, it appears that an eight-week training period of desensitisation and counter-conditioning with a noise recording and the use of DAP for firework fears can result in significant reported improvement in the long term, and so should be used as a routine part of a treatment plan for firework fears in dogs.

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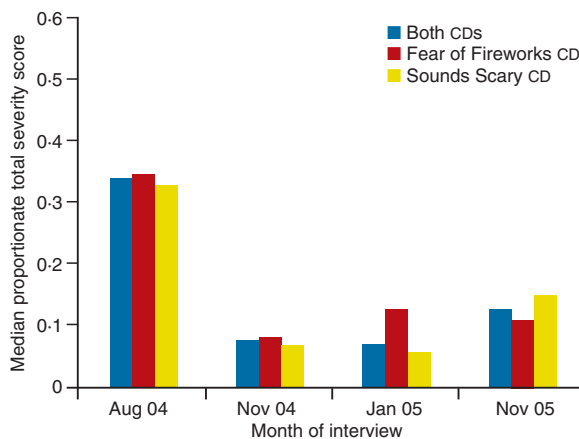


FIG 1: Standardised total severity scores reflecting response to noises by dogs at baseline (August 2004) and at each follow-up interview following treatment with Dog Appeasing Syndrome and CD-based sound desensitisation therapy. All values in November 2004, January 2005 and November 2005 are significantly different ($P \leq 0.05$) from baseline

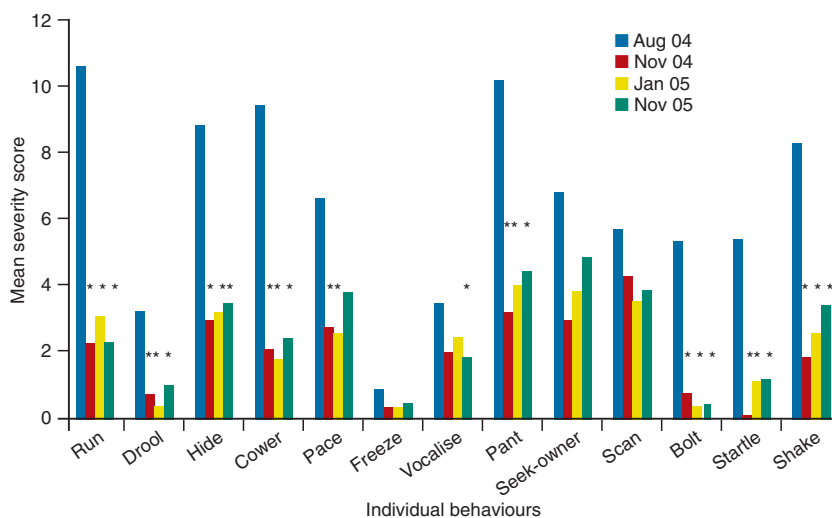


FIG 2: Mean severity scores for individual responses of 23 dogs to noise at baseline (August 2004) and at each follow-up interview following treatment with Dog Appeasing Pheromone and CD-based sound desensitisation therapy. *Significant difference compared to baseline value, $P \leq 0.05$