

The welfare impact and efficacy of canine training methods



Summary of findings

What is an electric collar?

- Electric shock collars, or 'e-collars', are training devices that deliver a static pulse (electric shock) to the dog via metal protrusions from the collar making contact with the neck. They are used to reduce the display of unwanted behaviours, such as livestock chasing, poor recall or crossing property boundaries.
- Collars can be activated by the owner by remote control, or automatically through vibrations caused by barking or via transmitter on approach to a buried "invisible" fence.
- Other types of electric collar can emit squirts of citronella liquid or air puffs when automatically activated.
- These collars work on the principle of positive punishment (applying something unpleasant to the dog to reduce an unwanted behaviour) or in some cases negative reinforcement (removing something unpleasant to increase a desired behaviour).
- Vibration collars are remotely controlled collars which vibrate when activated, these are marketed as a distraction technique, or to replace a verbal cue when training a behaviour such as recall.

Why we advise against their use

- Research has shown that shocks from e-collars during training cause distress-related behavioural reactions and are physically stressful for dogs.
- Training recall using reward based methods is more successful than using an e-collar.
- Bark activated shock and spray collars are ineffective in some dogs; a transitory reduction in barking may occur when the collar is initially worn but this effect does not remain.
- Research demonstrates consistent links between positive punishment or negative reinforcement methods and problematic behaviours such as aggression, excitability and poor learning ability.
- E-collars do not deal with the root cause of barking or other undesirable behaviours.
- Reward based methods are reported to be more effective and welfare compatible and therefore should be preferentially used.

Political context

- The use of electric shock collars has been banned in Wales since 2010. This ban has since been upheld following judicial review.
- Scotland will soon be banning the use of static pulse, sonic and spray collars. There will be a tightly controlled exemption for the use of vibration collars in training deaf dogs, which Dogs Trust supports.
- Only Westminster is able to ban the sale of these devices across the UK.
- We urge the Government to implement a ban on the use and sale of static pulse, sonic and spray collars, including boundary fence systems for dogs.



1 Introduction

The UK pet dog population of 2017 was estimated at 8.5 million¹ and in 2011 was estimated to be between 4.7 to 16.4 million². Since many dogs are trained to some degree by their owners, the type of training and its impact on welfare on such large numbers of dogs is a highly relevant issue.

The Animal Welfare Act (UK, 2006) states that an animal in the care of humans needs to be protected from pain, suffering, injury and disease. The dog welfare code of practice advocates only positive reward based training, and avoiding harsh, painful or frightening (aversive) training methods. Scientific assessment of dog training methods identifies any which may cause suffering, or poor welfare.

Ethical debate over aversive training techniques has resulted in bans of electric shock collars in eight European countries and several states in Australia. Many qualified animal behaviourists advocate avoiding aversive methods^{3,4} to promote good dog welfare, to reduce the likelihood of dog relinquishment⁵ and strengthen the dog-owner bond⁶. This report, summarises the available scientific evidence on the effectiveness of different training methods and their impact on dog welfare. Recommendations for training methods supporting optimum dog welfare have been made to help inform legislation in England and Scotland.

1.1 Summary of training methods and training devices

Training methods are used by dog trainers and owners to increase desirable behaviours and reduce undesirable behaviours.

Reinforcement methods increase desirable behaviours whereas **punishment** methods are used to reduce unwanted behaviour. Common reinforcers used in dog training include food, toys or play. Punishers include 'time out', verbal reprimands, physical corrections such as hitting, shaking, or smacking⁷ and applying aversive devices such as prong collars, bark activated collars (citronella and electric shock) and manual electric shock collars.

Electric shock collars, or 'e-collars', are devices used to remotely deliver a static shock to the wearer via metal contacts with the neck. They are used to suppress behaviour such as livestock chasing or poor recall. **Electric and spray 'bark collars'** are activated by vibrations caused by barking, which release either an electric shock via metal contacts on the collar, or a squirt of citronella liquid (or scentless / lemon liquid) towards the mouth and nose of the dog to suppress barking. **Prong collars** or **choke chains** apply pressure to the neck via tightening of a chain or metal prongs. The principle of both prong collars and choke chains are to apply discomfort or pain when the dog is showing undesirable behaviour, and to release discomfort when the dog performs desirable behaviour.

1.2 Measuring dog welfare and assessing efficacy of training

'Welfare measures', for example, heart rate, and stress hormone readings gained from dog urine and saliva samples, are used to analyse the stress response system^{8,9}. These measures may be used to assess the impact of training methods on dog welfare. Dog behaviour responses are also important indicators of stress. Negative (poor welfare) behaviour responses include; yelping, trembling, whining, barking, panting, urinating or defecating¹⁰, low 'crouched' posture¹¹, and more subtle signs such as; ears held back, moving away and lip licking¹¹⁻¹³. Research studies assessing the impact of training methods or devices on dogs collect a combination of the physical and behavioural welfare measures.

The efficacy of training methods describes how well they work to reduce or eliminate unwanted behaviour, or increase desirable behaviours. This is assessed either by owner or researcher report of change, or by testing the dog in the situation where the behaviour would usually be displayed to rate change. Studies reporting efficacy of training methods, and the welfare implications of each method, are summarised below.

2 The impact of manual electric shock collars on dog welfare

Four studies reported significant behavioural reactions to the e-collar shock which indicate anxiety or fear^{8,14-16}. Evidence linking changes in stress hormones (cortisol) with e-collar shocks were inconsistent. This may be because stress hormones are released in both positive and negative situations. In the studies where stress hormones were measured, all found an increase after the e-collar had been used^{8,14,15,17}, and one study¹⁷ found very high levels of stress hormones as a result of the shock being given in an unpredictable way. Behavioural and physiological responses to static shock undoubtedly show a negative impact on dog welfare.

The most recent study¹⁴ showed that nine dogs being trained with an e-collar displayed behaviours including yelping and running back to the owner, they also showed elevated stress hormone levels after being trained with the e-collar. The study then compared 63 dogs completing recall training with a dog trainer either with an e-collar, without an e-collar, or using only reward based methods. Whilst dogs in the group using the e-collar showed signs of anxiety or fear (tense behaviour, increased panting, yelping) stress hormone levels did not differ between dogs trained with different methods. An associated report to DEFRA¹⁸ on e-collars found that owners were unclear about how to use the e-collars correctly, so these experimental findings involving dog trainers are likely to underestimate real world adverse impact of e-collars on dog welfare.

Another study observed the behaviour of 32 dogs being shocked with an e-collar, and then compared 16 dogs trained with an e-collar to 15 dogs trained without an e-collar during police dog training sessions¹⁶. Behaviour responses to the static shock included; lowered ear position, high pitched yelping, lip licking, lowered tail, squealing, avoidance, and crouching. In training, e-collar trained dogs showed more signs of anxiety, including lowered ear position, increased lip licking and paw lifting, compared to non-shocked dogs. E-collar trained dogs also showed increased anxious behaviours when they were not being trained, indicating that being shocked affected dog behaviour in unrelated situations.

The third study¹⁹ experimentally exposed 10 dogs to shocks from an e-collar. Stress hormones were monitored for intervals before and after the e-collar use. Sharp increases in stress hormones were recorded as a result of being shocked and dogs showed low posture.

A fourth study experimentally exposed 14 beagles to shock from e-collars whilst they were chasing a dummy prey¹⁷. Dogs which were shocked in an unpredictable way showed large increases in stress hormones (327% increase), dogs which were shocked only when they touched the dummy prey also showed increases in stress hormones (31% increase) as were dogs which were shocked for not returning to the researcher when recalled (160% increase).

The final study observed 42 police dogs undergoing training with an e-collar¹⁵. Both stress hormone levels and behaviour responses to training with the e-collar were measured. Shocked dogs showed increased vocalisations and behavioural reactions of anxiety (ears back and crouching) which demonstrates a negative impact on their welfare. However, stress hormone levels were lower during e-collar training when compared to a period where dogs were not restrained from reacting to a 'distractor' person.



2.1 The efficacy of electric shock collars

Efficacy is measured by assessing the degree to which dogs avoid stimuli after they have been shocked, or by owner report of success. Four studies have considered efficacy of e-collars. The majority of owners (63%) report livestock chasing or recall problems as their primary reason for using e-collars²⁰. Three studies where an e-collar had been used to shock dogs for approaching either sheep²¹ or Kiwi birds^{22,23} reported that e-collar shocks reduced dogs' interest in both sheep and Kiwi. However, none of these studies compared e-collar use to positive training methods. An owner survey contrasted efficacy of positive methods against e-collars. Owners reported less success when using e-collars compared to those using reward based methods. In terms of training recall behaviour, this suggests that reward based methods were more successful than e-collar use²⁰.

3 The impact of bark activated shock or spray collars on dog welfare

Three studies explored the effect of bark activated spray or shock collars on dog welfare. Two suggested that bark activated collars have a negative impact on dog welfare and the third study suggested that anxiety levels were unchanged by the collar.

The first study measured stress hormones in 21 dogs who each wore a bark activated collar and an inactive dummy collar (at separate time points) to stop their barking behaviour. There was an 169% increase in stress hormone levels when the dogs wore the bark activated collars, whereas no increase was observed when the dogs wore the inactive collar²⁴.

The second study scored 41 dogs' levels of anxiety whilst they wore a bark activated collar. The study found that, even though barking was reduced by wearing the collar, the dogs' anxiety levels remained the same²⁵, which suggests that the collar does not treat the root cause of barking. The final study²⁶ of 10 dogs wearing a citronella collar reported behaviour responses including freezing, jumping backwards, and one dog showed hiding and trembling for the training period.

3.1 The efficacy of bark activated shock or spray collars

Four studies explored the efficacy of bark activated collars (spray and shock types). Of these, three demonstrated a tendency for barking to be reduced by initial application of the collar, but evidence regarding the longevity of effect was lacking as the two studies where barking was assessed over time showed increases in barking over a period of weeks.

A study which investigated using a citronella spray bark collar on 10 dogs reported that barking was eliminated in only two cases and reduced in one, seven of the cases either had no change or increased in barking²⁶. The second study investigated both citronella spray collars and bark activated e-collars on nine dogs, seven owners reported reduced barking with the citronella collar whereas two owners reported little change. When dogs wore the bark activated e-collar, only 2 reported a reduction in barking²⁷. The third study reported the effectiveness of citronella spray collars in 30 dogs over a three-week period. All dogs showed reduced barking initially, but over the 3-week period barking increased again²⁸. The final study measured the effect of scentless and citronella bark activated collars on 41 hospitalised dogs. Almost 50% of dogs continued barking after wearing one of the collars, 76% showed a reduction in barking by wearing the citronella collar and 58% with the scentless bark collar²⁵.



4 The impact of choke chains or prong collars on dog welfare

There is little evidence regarding the welfare implications and efficacy of prong collars or choke chains. Three studies show that both prong collars and choke chains have the potential to negatively impact on welfare with little evidence regarding how effective they are as a training device.

One study reported dogs' responses to prong collars and found that dogs showed low body position (crouching) and 'ears back' in response to the prong collar being used¹⁵ thereby suggesting a negative impact on welfare.

Two studies report adverse effects of choke chain use which include infections and lacerations as a result of tight choke chains²⁹, and an extreme case where a dog was put to sleep as a result of injuries sustained during training with the choke chain³⁰.



5 Direct observation of the impact of training methods on dog welfare

Two studies directly assessed dogs' responses to training and show positive behaviours to rewards (food, praise) and negative responses to punishers (scolding, hanging by collar or hitting), implying that immediate welfare is influenced by the chosen training method.

The observational studies observed 33 military working dogs³¹ and 50 pet dogs³² being trained using both positive and negative methods. In the first study, working dogs showed low posture after punishment when compared to after a reward³¹. The second study compared training classes which used positive or negative training methods, dogs showed behavioural signs of anxiety, such as low posture and lip licking, when owners used negative training methods³³.



6 Survey studies investigating the efficacy of different training methods and their impact on dog welfare

Six survey studies demonstrate consistent links between punishment or negative reinforcement methods and problematic behaviours such as aggression, excitability and poor learning ability. Reward based methods were reported to be more effective and welfare compatible. Furthermore, they highlight the danger of punishment based methods in their potential to elicit aggression, which is detrimental to dog welfare, is a human safety concern and is likely to have a negative impact on the relationship between dog and owner. Aggression is often a result of anxiety or fear and therefore is a welfare concern.

The first study³⁴ found that punishment was associated with higher reported aggression and excitability, and in smaller dogs, a positive correlation was found between frequency of punishment and anxious or fearful behaviour scores. The second study compared questionnaire results to dogs responses to training with a researcher and found that owner reported punishment was associated with less dog to researcher interaction, and reduced dog ability in a training task³⁵.

The third survey study looked at both problematic behaviours displayed by dogs and success of different training methods. Obedience was greater in dogs whose owners had used positive methods. Punishment was associated with more problematic behaviours whereas fewer problematic behaviours were displayed from dogs whose owners only used rewards or other non-punishment methods³⁶.

The fourth study asked owners about training methods they had used and which methods resulted in aggressive behaviour responses from their dog³⁷. Physical manipulation was reported to elicit an aggressive response in approximately a quarter of dogs on which they were attempted. An 'alpha' roll (forcing the dog onto its back) elicited aggression in 31% of dogs, forced release of an item in 38%, hit or kicking in 43%, and leash correction in 6%. Indirect confrontation also elicited aggression in 15% that yelled 'no', in 30% that stared down, and 20% that used a spray bottle. Whereas, positive training methods elicited aggression from between 0-4% of dogs.

The fifth and sixth studies also reported links between aggression and training methods. Owners using only positive reinforcement methods reported less aggression or fear from their dogs whereas owners who used punishment reported having dogs who avoided or used aggression⁷. Training methods which used punishment or negative reinforcement were associated with increased risk of aggression towards familiar and unfamiliar people³⁸.



7 Summary of training methods efficacy and impact on dog welfare

Training techniques which use punishment such as shock collars and spray collars were clearly associated with behavioural signs of general anxiety including tense behaviour¹⁴ and immediate behavioural responses indicative of a negative state including lowered ear position¹⁵, lip licking¹⁶, yelping^{8,14}, crouching and low posture^{15,31}. These dog behaviours have been consistently associated with other aversive or painful events according to previous studies^{10,39} and currently are used to interpret negative emotions by owners, veterinarians, behaviourists and researchers^{13,40-42}.

When considering physiological measures of stress, punishment training techniques were associated with increased cortisol, a hormone of the stress response system^{8,15,17,24}. However, three studies found conflicting results^{8,14,15}. Stress hormones are known to increase in response to both positive and negative events which may explain why not all results were consistent across the studies.

The studies which measured efficacy of training methods found that e-collars were effective initially^{22,23} and bark activated collars were partially effective²⁵⁻²⁸ but the longevity of the learning did not remain for bark activated collars²⁸, nor for a proportion of e-collar users²³. Furthermore, these studies did not compare aversive methods to reward based methods, and survey studies which did found that reward based methods were reported to be more effective^{20,36}.

Other authors⁴³ suggest that dog handlers should be assessed and regulated, however the process of assessing handlers and making aversive devices only available for these individuals is likely to be difficult to regulate, and still allows for misuse. Furthermore, scientific evidence indicates that reward based methods are more effective than aversive methods, and pose a lesser risk to the welfare of dogs. Aversive devices are often seen as a quick fix to a problematic behaviour without consideration for the threat to the short or long-term welfare of dogs.

Given the available scientific evidence, we suggest that reward based methods should be promoted in line with providing dogs with a life free from pain, suffering and distress. Training devices which have the potential for physical and psychological damage are recommended be banned to meet the terms of the Animal Welfare Act (UK, 2006). Banning aversive devices and encouraging reward based training methods will improve the lives of dogs and their owners.

Please note the collars shown in the pictures within this document are intentionally loose so as not to hurt the dogs.

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