The Use of Electric Pulse Training Aids (EPTAs) in Companion Animals

Companion Animal Welfare Council
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The Companion Animal Welfare Council

The Companion Animal Welfare Council (CAWC) has as its principal objectives:

(a) the provision of advice on the welfare of companion animals and the publication of its findings;

(b) the furtherance of the fuller understanding of companion animal welfare and of the role of companion animals in society;

(c) the assessment of existing legislation affecting the welfare of companion animals, and the making of recommendations regarding amendments or additions thereto

In the furtherance of these objectives, the Council will:

- undertake independent and objective studies of companion animal welfare issues and identify where further information is required;
- prepare and publish reports thereon;
- make available information and research data that it has obtained, and if appropriate, to enable Parliamentary legislation on companion animal welfare issues to be drafted and debated on an informal basis;
- be open to requests for objective views, advice and the carrying out of independent studies on issues concerned with the welfare of companion animals.

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Preface

There is currently little regulation of training and behaviour modification processes in the UK (CAWC 2008) besides measures enshrined in the Animal Welfare Act 2006 and a voluntary Code of Practice launched in 2010 (see: http://www.cawc.org.uk/080603.pdf). This Code is consistent with current UK legislation outside of Wales and emphasises the need to safeguard the welfare of all interested parties involved in the "training contract" (animals and people alike) and the importance of adopting sound scientific methods within the skills base of the practitioner. There is much debate and opinion over whether the use of certain training techniques and devices meet these requirements, especially the use of electric pulse training aids (EPTAs). An EPTA is defined for the purposes of this report as a device designed for use in the training of dogs, cats and other companion animal species, which involves the application of an electric current to the skin to aid the training process. In Wales the use of all electronic collars has been banned ostensibly on animal welfare grounds, including those related to boundary fencing (The Animal Welfare (Electronic Collars) (Wales) Regulations 2010). It has been suggested that there are currently around 350000 EPTAs in the UK, although the number in active use is unknown. Nonetheless they clearly represent a significant practice within the sphere of animal training and it is appropriate that careful consideration be given to their use, especially when there appears to be so much contradictory information available and such passionately held convictions (often linked to ethical and animal welfare concerns) by those expressing an opinion. This report critically reviews current evidence and arguments used both for and against the use of such devices and the conclusions drawn. It highlights gaps in our knowledge and awareness of both theory and practice. Recommendations are drawn on this basis.

Executive Summary

A wide-ranging review of the use of electric pulse training aids (EPTAs), (commonly referred to as “shock collars”) in companion animals was undertaken in order to form objective views on the welfare aspects of the issue and make recommendations to help tackle current concerns and dilemmas.

A systematic review of peer-reviewed scientific publications revealed ten publications of direct relevance to the specific use of EPTAs in dogs and none in other companion animal species. There were significant limitations in the quality of reporting and conclusions that could be drawn. However, overall the scientific data suggest that the application of an electrical aversive can suppress predatory-type behaviour and that these effects might be quite enduring. In addition, these reports suggest that EPTAs may reduce barking in response to an arousing stimulus, although the long term efficacy of this intervention remains unknown. Finally, it is clear that poor contingency between the application of an electrical stimulus and the behaviour to be modified can give rise to both behaviour and welfare problems.

Arguments for and against the use of EPTAs often focus on a concern for the welfare of the animal subject to training with such a device, but opponents and proponents take ethically different approaches to resolving the dilemmas associated with their use.

A call for evidence relating to the use of EPTAs suggested that practical problems relating to their use in practice are not widely reported although occasional significant problems do arise.

It is concluded that the widespread free use of EPTAs as manual training aids does not appear to be compatible with the moral climate underpinning the spirit of animal welfare legislation. Regulated use of manual devices may be acceptable if sufficient safeguards can be put in place to prevent deliberate or unintentional harm or misuse. There is inconsistency in the prevailing moral attitude towards boundary fencing involving the use of electric currents: electric fencing is widely accepted for use with horses and livestock including smaller species, but fencing systems that involve the wearing of a collar, even if they have the additional welfare safeguard of an audible warning of impending stimulation, are often rejected, and in the case of Wales, illegal.

Conclusions and Recommendations

1. The moral complexity of the problem and resulting ethical dilemmas associated with the use of EPTAs should be acknowledged by all who share a concern for animal welfare.

2. Currently there are sound animal welfare-based arguments both for and against the use of EPTAs in theory, but there is also a substantial lack of relevant research to inform the conclusions of those from either side of the debate.

3. The authors are aware of ongoing research which aims to fill this gap. This should allow more extensive, clearer and more specific recommendations to follow on the basis of the principles and guidelines issued in this report. We therefore suggest that this report be read in conjunction with future research results as they become available.

4. There is currently a moral inconsistency in attitudes towards the use of electric current for the containment of animals; for example the general acceptance of electric fences to contain livestock. This inconsistency appears to be partly speciesist and/or partly based on an arbitrary aversion to the presence of an electronic device capable of delivering an aversive stimulus to the neck of another animal.

5. Although it is for Government to decide on the legality of the various forms of these devices, the lack of conclusive scientific research, concerning the welfare implications of the use of EPTAs in all the possible contexts described, mean that at present, decisions on whether or not to legally permit the use of EPTAs need to be informed by broader ethical analyses than those based exclusively on animal welfare. In consideration of this matter, we recommend that the following points be acknowledged:

- While there are some features common to all EPTAs, meaningful distinctions with regards to the risks to animal welfare can be made between:
    - Those devices which are activated by the animal's behaviour and those which depend on some other party for the discharge of the stimulus;
    - Devices with a maximum potential to be used as a disrupter, negative reinforcer or punisher;
    - Their use by a highly skilled and knowledgeable professional and their use by those with either less knowledge or skill.
- It is not possible to formulate an evidence-based argument using utilitarian principles for or against the use of EPTAs in training.

    - An alternative ethical argument may be proposed against their use on the basis of the importance of telos and the dubious morality of compulsion in how we bring about change in others. In this case, certain practices, such as the use of EPTAs within a punishment-based training programme, aimed at creating an aversion to a problematic behaviour without encouraging a specific alternative, may be considered morally unacceptable for many reasons.
    - Any argument in favour of their use in a given context would be strengthened if it could be demonstrated that their use in this context was at least as effective as the alternatives available and that this was achieved without necessarily causing significantly more harm than these alternatives. To date neither of these requirements has been demonstrated for any common indication of use for an EPTA. The precautionary principle might suggest that the onus should be upon proponents of the use of EPTAs to provide this evidence, especially where there appear to be viable lower risk alternatives.
- It is clear that at least some EPTAs can be used in a way which causes harm and the risk of this is greater with devices lacking specific safety features (see Recommendation 8) and in the hands of less competent trainers. There is therefore an unnecessary risk to animal welfare in the unregulated availability of the current range of devices.

6. There is undoubtedly a need for further research into the use of EPTAs if we wish to generate good scientific evidence about their effects on companion animals. In particular, there is a lack of information concerning the following key points:

- The long term efficacy and impact of alternative non-electrically based (i.e. those which raise less moral concern) training methods (as opposed to restrictive practices such as leash walking) in contexts for which EPTAs are often advocated (e.g. chasing livestock).
- How different forms of electrical stimulus are perceived by different individuals (within and between species) in different circumstances.
- Whether it is possible to use these devices in a way which is effective without causing an unacceptable level of suffering in either the short or long term.
- Epidemiological and field data regarding the prevalence of use of EPTAs as a form of punishment, negative reinforcement or disruptive stimulus which can usefully establish how these devices are being used in practice.
- The impact, in both the short and longer term, on the welfare of individual species in which they are used, from the use of these

devices in the field by members of the public, unqualified trainers and those more specialised in the use of these devices.

- The welfare of animals subject to the use of these devices in non-manually controlled contexts, such as within the context of containment systems. This should include research on the ability of animals to delineate boundaries in the absence of clearly defined geographic features.

Should Government support the legality of EPTAs, then the following two recommendations are made in the interests of animal protection:

7. In order to evaluate the intrinsic risks to animal welfare of any EPTA, data relating to the following characteristics of the device should be readily available:

- Reliability
- Electrical discharge features
- Current and voltage over a range of resistances

8. In order to limit the extrinsic risks to animal welfare associated with the use of any EPTA, the following recommendations are made as a minimum requirement:

- All EPTAs should have a mandatory safety key to limit voltage. In the absence of relevant direct evidence, it may be possible for manufacturers to agree initial standards with relevant animal welfare bodies and the academic community in the interim.
- Any available EPTA with the capacity to deliver an aversive stimulus should feature a non-aversive conditional stimulus which can be used to predict the potential delivery of the aversive stimulus.
- Any available EPTA with the capacity to deliver an aversive stimulus should also have the capacity to easily cancel the delivery of the aversive stimulus after delivery of the conditional stimulus.
- An EPTA should never be used alone within a training programme, but rather it should form part of a programme including the provision of identifiable rewards.
- In the case of boundary systems, the boundary should be associated with identifiable landmarks that animals can readily associate with the limitations of a territory.
- Some form of registration / licensing of practitioners (including those involved in installing permanent structures making use of EPTAs) and devices should be developed with statutory support possibly financed by interested bodies. Licensed practitioners would operate under a clear code of conduct which recognises the knowledge and skill required for the humane use of the diversity of any devices deemed

legal, the importance of safeguarding the welfare of animals undergoing training with an EPTA, the need for informed consent from the owner concerning the process, contra-indications and potential risks.

- Consideration should be given to the standard documentation of the use of EPTAs as part of the professionalisation of their use. This would provide greater reassurance to the public and those unfamiliar with their application.

9. In the event that Government supports the legality of EPTAs, it should be noted that their use should not be considered necessarily an act of last resort. Especially when being used at a level of stimulation which results in disruption of ongoing behaviour, the use of an EPTA should be considered part of the most appropriate training package for a given animal in the current circumstances.

Aims

The aims of this report were to conduct a wide-ranging review of the subject in order to:

- Form objective views on the welfare aspects of the issue
- Identify areas in which further research is needed
- Make recommendations about tackling current concerns and problems

Objectives

The objectives of this report are:

- To scientifically evaluate published research that directly impinges on our understanding of the potential effect of EPTAs on domestic dogs.
- To evaluate arguments for and against the use of EPTAs, including those based on ethical concerns and those based primarily on interpretation of available scientific data.
- Draw conclusions and make recommendations for/against the use of EPTAs in companion animals.

Methods

With the support of the UK government's Department for Environment, Food and Rural Affairs (DEFRA), a review of the current situation within the European Union (EU) concerning the availability and use of EPTAs was undertaken.

A review of the literature providing underpinning scientific concepts used within the debate was then undertaken, to clarify their implications for animal welfare in response to the application of an electrical stimulus. A systematic review of peer-reviewed published studies examining the effects of EPTAs in relation to the management of companion animals was then undertaken.

Scientific literature, popular reports and data from 161 respondents to a call for evidence by The Scottish Parliament concerning the use of EPTAs were reviewed to identify arguments for and against their use. These arguments were then critically appraised in light of the preceding information.

A call for evidence from users of EPTAs within the UK was undertaken to establish qualitative data concerning points of interest within this population, for comparison against the theoretical points raised previously.

Preamble

Any inquiry into the use of electric pulse training aids (EPTAs) must be informed of two related aspects:

1. The welfare of the particular animal experiencing training, in terms of both the potential harms and benefits and the short and long term effects,
2. The wider societal ethical milieu, including perceptions of the compatibility of these instruments with general ethical beliefs regarding the training of companion animals see Lamb, 2011, (Ethics report on EPTAS), for an ethical opinion on this matter:.

Although discussions of harm are of ethical interest, assessments of the degree of harms and benefits regarding EPTAs are potentially quantifiable and empirical, falling within the sphere of the welfare sciences. However, within the wider community of animal owners and the public, the ethical status of EPTAs is not determined exclusively by an assessment of their harms and benefits. This, however, is often assumed in the debates aired over the employment of EPTAs, i.e. that the assessment of suffering is the only thing that matters morally, and that the issues are to be determined exclusively by scientific investigation. This utilitarian view assumes that all other concerns about animals are subjective; matters of personal taste, but not matters of moral concern. Although this may be the norm governing the debate on EPTAs, it is not necessarily acceptable. Even when suffering in the short-term is justified on the basis of long term benefits, it is fundamentally a subjective opinion to propose that suffering is wrong. In which case the grounds for saying that inflicting suffering is bad, are not necessarily different from those that justify the opinion that simply questions *the use* of certain technologies per se because they represent a morally unacceptable form of relationship between humans and their companion animals. These are ethical issues.

Nonetheless, it is important to identify and remove personal opinion that can lead to bias in the presentation of an argument, and it is for this reason that this report avoids the term “shock” or “shock collar” in the discussion of the use of these devices. As Lindsay (2005) points out, this implies that the stimulus produced by an EPTA has a certain quality and magnitude which is not necessarily the case (the nature of the stimulus and its application is explored later in this report). Secondly the term “shock” has a certain emotional connotation, which has the potential to bias objective thinking of the subject.

Another important caveat in the evaluation of evidence is an acknowledgement that EPTAs come in a wide range of forms with over 150 different devices identifiable within the UK. These do not all have the same properties and the nature of these devices has changed quite considerably over the approximately three decades since their first commercial use. This complicates and potentially restricts the external validity of specific studies, since the results may be limited to a particular device used in a particular way. It is outside the scope of this report to comment on specific devices, but rather it can only seek to identify important principles to be followed in the final analysis and synthesise available evidence to make an informed opinion.

It is also worth stating at the outset, that both proponents and opponents to the use of EPTAs appear to come to opposite conclusions based on a concern for animal welfare and care. While some may argue that manufacturers have a vested interest in the preservation and promotion of these devices, such interest does not invalidate their welfare arguments.

Some opponents of EPTAs appeal to what are described as 'positive' training methods, which is taken to mean that the training method focuses primarily on rewarding desirable behaviour. This is not necessarily incompatible with the use of an EPTA but from this standpoint, training methods which inflict pain as a form of correction or punishment are often seen to be morally problematic. Supporters of positive training methods should recognise that withholding a reward is also an aversive experience and is correctly described as "negative punishment". Thus these techniques are not exclusively reward-based. If a role for punishment is therefore acknowledged in all training approaches, it might be argued that trainers adopting 'positive' methods have no reason to oppose other forms of punishment. However, not all forms of punishment are equivalent. Although withholding a reward can be experienced as a punishment, it is not the same as the infliction of physical pain. Negative punishment (e.g. withholding a reward) generates different physiological and neurochemical responses compared to positive punishment (e.g. administering a painful electric pulse) and so is qualitatively different.

In order to determine, from a welfare standpoint, recommendations with regard to EPTAs it is considered necessary – even obligatory - to perform a cost-benefit assessment. This should not consider ethical argument, recourse to ethical principles, or methods employed in ethical inquiry.

A cost-benefit assessment would consist of a list of costs associated with the employment of EPTAs in a training context (taken to include training to recognise boundaries in the case of electronic containment systems). These would include any negative welfare impact the use of these devices will have on the animals undergoing a training programme. Presumably this could be inferred in terms of short and long term adverse welfare impacts; the extent and intensity of painful stimuli and their duration. The assessment of costs, in this respect, would then be quantified on the basis of these inferences. Against the costs, a list of predicted benefits could be outlined. These would broadly consider the predicted benefits to companion animals undergoing training, comparisons with various other training methods, benefits to companion animal owners, other people, other animals, and general benefits which may accrue to the environment. The assessment of benefits, in this respect, can again be quantifiable. However, the problem we currently face is that the necessary information for undertaking such an assessment is unavailable.

The simple determination of whether benefits outweigh costs or the costs outweigh benefits therefore raises several problems, even if no moral convictions have been incorporated into the exercise.

At the outset, it is useful to put this work in a broader contextual background.

Background

Products available

An electric pulse training aid (EPTA) is defined for the purposes of this report as a device designed for use in the training of dogs, cats and other companion animal species which involves the application of an electric current to the skin to aid the training process. Accordingly, EPTAs can be broadly divided into three functional groups:

- Handler-operated devices that deliver an electrical discharge to facilitate training (remote trainers)
- Containment systems which delineate the boundaries of an area (outdoors or indoors) – these are typically combined with some form of audible or vibrational stimulus emitted by the collar which warns the approaching animal that if it does not retreat, then an electrical stimulus will be applied automatically (underground fence systems).
- Noise-activated systems which emit an electrical stimulus in response to vocalisation by the wearer (anti-barking collars)

In theory these could be used on any companion animal species, but in the UK they are primarily targeted towards the management of the dog, although containment systems are also specifically available for cats (e.g. Invisible Fencing ® Invisible Fence Co, Inc) and at least one remote training system promoted for behavioural problems in horses (Vicebreaker, Tritronics Inc).

It is worth emphasising at this point that there appears to be an enormous variety of products available, especially in relation to remote trainers, with a variety of features, including safety cut-outs, warning signals and stimulus intensity control. Thus not all EPTAs within the same category are identical and so generalisations may be limited and comments should be related to specific EPTAs where relevant.

There appears to be a wealth of testimonials supporting their use, but peer reviewed scientific work on their use in companion animals is much more limited and appears to be restricted to the use of EPTAs in dogs. This will be reviewed later in the report, but the lack of research in other species needs to be acknowledged.

The Current Position within the EU regarding the use of EPTAs

In response to a request in 2007 from the Chief Veterinary Officer at the time, Dr Debby Reynolds, to colleagues across Europe, it was reported (Defra personal communication) from 14 respondents that their use was:

- Illegal in 4 countries:
    - Austria
    - Denmark

    - Finland
    - Germany

- Legal with some restrictions beyond general animal welfare legislation in 3 countries:
    - Czech Republic
    - Hungary
    - Italy

- Available with no legal restriction beyond general animal welfare legislation in 7 countries:
    - Belgium
    - Ireland
    - Luxembourg
    - Netherlands
    - Spain
    - Sweden
    - United Kingdom
        - Since the time of this call, Wales has banned the use of all electronic collars (The Animal Welfare (Electronic Collars) (Wales) Regulations 2010) and successfully defended this ban under their devolved powers.

Thus opinion is divided on the need for national regulation beyond existing animal protection/welfare legislation. It is perhaps worth noting that in a number of countries where there is regulation concerning their use, there may be no regulation concerning their sale and this may reflect the difficulty associated with such regulation when these devices are widely available through the internet. In the case of Wales, it is illegal for an animal to wear one of these devices or for someone to be in possession of an animal wearing such a device.

Among these responses, it was apparent that several Governments had consulted external experts on the matter, and the primary concerns of these experts appeared to relate to:

- The inappropriate use of the devices and the ease with which this can be done.
- The lack of knowledge concerning their impact on the welfare of dogs, especially in the longer term.

In response to a direct enquiry by the authors of this report, the Royal Society for the Prevention of Cruelty to Animals (RSPCA) in the UK confirmed they have never undertaken a prosecution for cruelty on the basis of the use of an EPTA.

Industry organisation

EPTAs have been commercially available for use for training since the 1980's, although they have been in use since at least the 1950's. It is widely reported that the original devices were relatively primitive, delivering quite a substantial current (hence the coining of the term "shock") and had problems of reliability – such as being affected by extraneous signals and potentially not discharging a pulse when the handler pressed the button. Technology has moved on considerably since this time and this is reflected in the range of products available and wider acceptance of these devices. These are able to deliver a pulse in a variety of ways, at a range of intensities (many devices have a variable setting) and over a range of distances (in excess of 2 kilometres in some instances e.g. SPT-2430- D.T. Systems). Some devices emit a warning signal which can cause the electric pulse to be aborted if the desired behaviour follows. The technological advancements associated with some of the currently available devices, appear to have convinced some in the animal welfare movement that these devices may have an important role to play in helping animals. For example, Randall Lockwood, formerly of The Humane Society of the United States, is reported to have said *"New technology employed by responsible manufacturers has led to products that can be and are being used safely and effectively to preserve the safety and well-being of many dogs and strengthen the bond with their human companions."* (Radio Systems Corporation, 2004 document available from http://caninetraining.com.au/PDF/e-collars.pdf.)

There is however no mandatory regulation of standards or product information available. In the UK some, but not all, manufacturers are members of the Electronic Collar Manufacturers Association (ECMA, http://www.ecma.eu.com) which sets certain standards for its members' products. These include:

- Technical requirements for reporting physical characteristics and performance of the products
- Output limits
- Safety requirements
- User information requirements
- Limitations on recommendations for use

There appear to be significant manufacturers who are not members of ECMA in the UK.

It is estimated that there are currently around 350,000 devices in use in the UK (ECMA personal communication), however, it seems reasonable to suppose that many owners borrow a device and it has been suggested that perhaps 10% of the UK population of dogs might have been exposed to training with these devices. Regardless of the exact figures, the use and regulation of these devices is therefore a significant issue to many dog owners.

Animal Welfare Considerations

1. Principles underpinning the use of electricity in training

Electricity is often associated with powerful harmful imagery by humans, for example the signs near any electricity substation or pylon. However, the danger is also commonly misunderstood, with high voltage or current often being equated with harmfulness. This misunderstanding is evident within some of the literature criticising the use of EPTAs and so it is useful to clarify this at the outset to prevent later misunderstanding. The reader may also wish to refer to basic electrical textbooks for further information on the physics of electricity or Lindsay (2005) for a useful interpretation for the animal carer.

Potential difference (voltage) and current (Amperes) do not alone indicate either the harmfulness or perceptual quality of an electrical stimulus. Factors such as the relationship between the two, their duration and localisation are important, since this relates to the amount and pattern of energy being discharged. But this in itself is also incomplete, since the cellular response, which is the antecedent of perception, will depend on the amount of current reaching the cell, which depends on the level of resistance between the electrode and the cell. Resistance may be affected by factors like the density of hair overlying the skin (contact with skin is generally recommended by manufacturers of EPTAs) and the hydration level of the skin (wet versus dry coat). This latter point raises the question of the consistency of the electrical discharge reaching the underlying cells in the region of the electrodes within a given subject. To date, data do not appear to be generally available, and this is perhaps a significant gap in our knowledge. There is also a lack of information on the variability of skin resistance between subjects, which will be affected by factors related to the properties of skin structure, e.g. coat type which can vary greatly between breeds. Such information is of particular relevance to those using these devices to train animals in the field, when they may be expected to get wet and perhaps work in close cover which may displace the collar.

All living cells are electrically active, and the application of an electric current may, at its mildest, simply stimulate normal activity within the cell. However, excessive stimulation can result in cellular damage and an associated inflammatory response which will include pain. Excessive stimulation of a receptor cell (not just a pain receptor) may result in the perception of pain. It should also be noted that cells are not inanimate physical substances, and that they may change their response to electrical stimulation according to the pattern of stimulation. It is therefore reasonable to conclude that the application of an electrical stimulus may be perceived in a variety of ways according to the magnitude and nature of the energy transmitted to relevant structures. It is often suggested that EPTAs with varied settings may be capable of producing sensations ranging from a mild tingling or tickling sensation, to a tap, to a more significant startling muscle contraction and potentially an unpleasant pain response. Thus it cannot be said that these devices necessarily inflict pain. Low levels may disrupt ongoing behaviour and allow the use of rewards for correct behaviour.

In practice it is worth considering how a desirable setting is chosen. In the absence of conduction being very consistent in different situations, which seems unlikely given the various influencing factors, a level is going to need to be chosen which has at least the necessary effect on a consistent basis. This is likely to result in a bias towards higher level of stimulation, even when routine use focuses on the value of a lower level of stimulation, If the setting were to be fixed at a maximum that never caused pain when the electrical conduction is high, the level of stimulation is likely to be too low to be effective when there is poor contact with the skin.

Within the psychology literature, the use of electricity in training is most widely associated with the delivery of an aversive to effect either positive punishment (a decrement in response) or negative reinforcement (the relative rewarding of a response through the relief of an aversive). An important principle to take from this work is the refinement of the principles associated with learning illustrated by the experiments rather than the specifics and their similarity or not with a real life situation. The study of the use of aversives in learning is a challenging area for scientists, especially as many have valid ethical concerns over the harm they may cause if they use powerful stimuli. As a result there is a long history of misunderstanding or lack of understanding of their potential effect. Indeed, even Skinner (1938) the most eminent of academics in the field of operant conditioning, initially believed that the effects of punishment were temporary (a claim sometimes made by opponents of the use of aversives in companion animal training). This was based on his work, which had used relatively mild aversives in rats. However, Boe and Church (1967) established that the intensity of the aversive was important in determining the magnitude and duration of its effect, i.e. that short exposure to an intense punisher could have a lasting effect on behaviour. Another important finding of relevance, in this regard, is the effect of incremental increases in intensity (a strategy sometimes advocated to find the right level of stimulation to suppress a behaviour). Azrin and colleagues (1963) found that, in pigeons, pecking for food could be suppressed by a standardised electrical stimulus of 80V, but if the initial stimulus was set at 60V and then gradually increased, pigeons would still be pecking when the potential difference had risen to 300V. Thus incremental increases in intensity may result in the application of potentially much more harmful stimuli, even if they are not immediately perceived as such.

Another series of important findings from the general psychology literature is based substantially on the use of aversive electrical stimuli on dogs to condition an avoidance response, and this too is sometimes misrepresented in the debate over the use of EPTAs, and so deserves some clarification here. Dogs can be trained to avoid an electrical stimulus by jumping over a barrier in response to a predictive (conditioned) stimulus. Initially the dogs show sign of fear, such as elimination when the predictive stimulus is presented, but once the response is established, these signs apparently disappear (Solomon and Wynne, 1953). This would suggest that the anxiogenic effects of predictors of aversives are short-lived if a reliable response leading to avoidance can be established, i.e. the response is not maintained by an anxiety or fear of punishment. If fear/anxiety were the motivation for the behaviour, then it would be expected that both the behavioural signs of anxiety would persist and the response would extinguish with time as the aversive stimulus is no longer being delivered in association with the conditioned stimulus. This is not the case (Solomon et al 1953). These results are now more widely interpreted as avoidance being motivated by an *expectation* that the aversive will be avoided rather than fear of the aversive (Seligman and Johnston, 1973). Lindsay (2005) refers to this as *"Escape to safety"* rather than *"Escape from danger".* Thus, so long as animals exposed to EPTAs have a predictable way of avoiding the aversive stimulus, these devices would not be expected *necessarily* to produce long term anxiogenic effects associated with trying to avoid the stimulus.

Other results using the preceding experimental arrangement provide insight into another phenomenon - *"learned helplessness"* - observed in this experimental setup, which is related to uncontrollable exposure to electrical aversives. Seligman and Maier (1967) found that if dogs were initially exposed to an inescapable electrical stimulus, they would not try to learn an avoidance strategy later, even when one was available, i.e. exposure to an *inescapable* aversive can inhibit later avoidance learning. They suggested that the animal had learned that it was helpless in its ability to avoid the aversive. This was subsequently used as a model of depression, but is of questionable validity. Maier et al (1969) found that pre-training of avoidance with an electrical aversive increased resistance to the development of learned helplessness, perhaps increasing psychological resilience in the face of inescapable aversion. Early experience and other factors contributing to individual differences may also affect the tendency to develop learned helplessness in the response to non-contingent aversives (Seligman and Groves 1970). It is worth noting that the psychology literature also suggests that if learned helplessness is established during development the effects are long lasting and potentially permanent. Maier and Seligman (1976) suggest that the uncontrollability associated with learned helplessness results in a suppression of motivation to escape, a failure to perceive contingent relationships between one's own behaviour and its consequences and emotional disruption. In a practical context, learned helplessness might manifest by the animal failing to respond to training with an EPTA. Failure to recognise this might result in an increase in the application of an aversive, even if it is eventually abandoned. Even then it seems reasonable to suggest that the animal's welfare will have been compromised in the long term. Experimental work to support this supposition is currently lacking, but this seems to be the most reasonable position to assume in the absence of good evidence to the contrary, i.e. even though individual differences may exist, there is a genuine risk of serious welfare compromise associated with the unpredictable use of high intensity electrical aversives.

The results of Maier et al (1969) described above, have more recently been re-evaluated along with other experimental studies in rats (such as Volpicelli et al., 1983) by psychologists with an interest in the development of positive psychology. In this context, exposure to aversives that can be controlled by the animal's behaviour, help to build increased resilience, not only to the aversive in question, but more broadly to stressors (Gillham 2000). Thus theoretically at least, controlled exposure to aversives could somewhat paradoxically improve the long-term well-being of animals in captivity.

A final important consideration underpinning the use of aversives in training, relates to the concept of biological preparedness. There is a substantial literature which challenges the equability associated with general process theory and which suggests that certain associations are more easily learned than others (Seligman 1970). This has several important implications:

- Firstly, the effectiveness and value of an aversive can be expected to vary with the motivation of the desired behaviour. For example, it may be relatively easy and efficient to condition responses associated with vigilance or avoidance of harm (including some forms of et-epimeletic (care soliciting) behaviour) by including the use of an aversive in the training. However it might be expected to be more difficult to control the underlying *emotion* associated with problem barking when distressed using an aversive, even though the behaviour itself may be suppressed; i.e. an aversive may suppress the barking but not improve the underlying distress. This is an important area for consideration especially in relation to the generality of the use of remote electronic trainers and the use of anti-bark collars in owner-absent problems, which may be motivated by some form of social distress.
- By the same argument, it also follows that the inclusion of an aversive in some training programmes may make them more efficient, as has been suggested by Marschark and Baenninger (2002). However, it has not been established that electrical stimuli are necessary or superior to any other form of aversive in this context. Indeed, there appears to be an absence of experimental studies to inform which programmes may be most efficient and conducive to good welfare in both the short and long term. In the next section the peer reviewed scientific evidence concerning the use of EPTAs is assessed.

2. An assessment of peer reviewed publications concerning the use of EPTAs in the training of companion animals

A systematic review of peer-reviewed published studies examining the effects of EPTAs was undertaken. To be included in the study, the publication needed to have been presented in a peer reviewed journal, accessible in English and be either case study or experimentally based using a companion animal species as subjects. Reviews which did not include new data were excluded, as were retrospective correlational studies, since these do not explore causality adequately; nonetheless such papers and scientific abstracts can provide some evidence and have been used to inform or reinforce the conclusions from other publications.

Ten reports dealing with the specific use of EPTAs in dogs were identified:

1. Beerda, B., Schilder, M.B.H., van Hooff, J.A.R.A.M., de Vries , H.W. & Mol, J.A.(1998) Behavioural, saliva cortisol and heart rate responses to different types of stimuli in dogs. *Applied Animal Behaviour Science,* 58: 365-381
2. Christiansen, F.O., Bakken, M. & Braastad, B.O. (2001a). Behavioural differences between three breed groups of hunting dogs confronted with domestic sheep. *Applied Animal Behaviour Science*, 72: 115–129.
3. Christiansen, F.O., Bakken, M. & Braastad, B.O. (2001b). Behavioural changes and aversive conditioning in hunting dogs by the second-year confrontation with domestic sheep. *Applied Animal Behaviour Science*, 72: 131–143.
4. Ekstein, R.A. and Hart, B.L. (1996) Treatment of Acral Lick Dermatitis by behaviour modification using electronic stimulation. *Journal of the American Animal Hospital Association*, 32: 225-229.
5. Juarbe-Diaz, S.V. & Houpt, K.A. (1996) Comparison of Two Antibarking Collars for Treatment of Nuisance Barking. *Journal of the American Animal Hospital Association*, 32: 231-235.
6. Polsky, R.H. (2000) Can Aggression in Dogs be Elicited Through the Use of Electronic Pet Containment Systems? *Journal of Applied Animal Welfare Science,* 3: 345-357.
7. Schalke, E., Stichnoth, J., Ott, S. & Jones-Baade, R., (2007) Clinical signs caused by the use of electric training collars on dogs in everyday life situations. *Applied Animal Behaviour Science*, 105, 369–380.
8. Schilder, M.B.H. & van der Borg, J.A.M. (2004) Training dogs with help of the shock collar: short and long term behavioural effects. *Applied Animal Behaviour Science*, 85: 319-334.

9. Steiss, J.E., Ahmad, H.A. and Voith, V.L. (2007) Evaluation of plasma cortisol levels and behavior in dogs wearing bark control collars. *Applied Animal Behaviour Science*, 106, 96-106.
10. Tortora, D.F. (1983) Safety training: the elimination of avoidance-motivated aggression in dogs. *Journal of Experimental Psychology*, 112, 176-214.

No reports relating to the use of EPTAs in cats or horses were identified, nor were any reports specifically identified relating to the use of EPTAs as containment devices in companion animal species. Tabulated summary reports relating to each of the above are given in the following pages, although some general comments are warranted to put these in perspective.

It is worth stating at this point that EPTAs can be used in training in 3 ways, and that these uses are not necessarily independent of each other

- They can be used to deliver positive punishment with the aim of stopping ongoing behaviour. This should generally be combined with some form of reward to reinforce an appropriate behaviour response.
- They can be used to deliver negative reinforcement, whereby the correct behaviour is rewarded through the termination of discomfort.
- They may be used as a disruptive stimulus to interrupt ongoing behaviour and gain attention before rewarding correct behaviour.

The level of stimulation required to achieve each of these goals will vary within a given subject, with the intensity being greatest for punishment and least for disruption. The current scientific literature appears to focus on the first two contexts described above, with no reports apparent on the use of EPTAs as a disruptive stimulus.

Before considering the specific scientific reports, it is worth emphasising that there is no perfect experiment and any piece of work may be criticised or a different perspective taken on the priorities for analysis. Thus the critique is not a personal critique of the authors, but rather a critique in relation to the goals of the current report. It is acknowledged that it is not scientifically acceptable to simply assess all possible relationships since this leads to false conclusions concerning the confidence of statistically significant findings (Type I error) and so researchers have to prioritise their interests. The commentary that follows each summary report aims to acknowledge the weaknesses or limitations of the work as far as its value in assessing the effect of EPTAs on the behaviour and welfare of dogs is concerned. In this way, the work can be put in to a reasonable perspective, rather than lauded or vilified by those wishing to present a particular case (as appears to have been the case in some instances). An over-riding consideration is whether the conclusions are reasonable given the data.

For those unfamiliar with the scientific process, it is perhaps worth emphasising that science cannot prove something with certainty; rather it is built on a philosophy of falsification of ideas and statistical confidence. This means hypotheses can be posed and evaluated, given the available data. No single study is sufficient to answer the focus of this report, and the very limited number of studies identified means that it is difficult to draw general scientific conclusions given the number of variables of concern. Nonetheless these reports carry considerable weight in the totality of the assessment being made, so long as that assessment appreciates the limits that may apply. Other forms of evidence may be used to reinforce or falsify the conclusions and so help to reduce uncertainty in a scientific way.

Tortora presented the first report of the use of EPTAs in a dog training situation in 1983; there was then a considerable gap before a series of publications over the last decade. It is perhaps regrettable that more trainers did not build on the reporting of case histories pioneered by Tortora to allow a more objective evaluation of the pros and cons of these devices both in general and specifically in relation to particular products with certain characteristics and particular training contexts. A large data base of cases would allow a useful meta-analysis of the diverse variables of interest.

Scientific work in this field is not easy and the reports cover the use of EPTAs in dogs to control

- Aggression
- Barking
- Predatory behaviour
- Acral Lick Dermatitis (a skin condition arising from repetitive licking of the limb)
- Responses of dogs during training
- Wandering from a given area

The work has been summarised into standardised tabulated summary reports for ease of reference.

2.1 Tabulated Summary Reports

Name of researchers & institution:	B. Beerda, M.B.H. Schilder, J.A.R.A.M. van Hooff, H.W. de Vries & J.A. Mol (Utrecht University, The Netherlands)			
Product investigated:	TT 100 A (Tri-Tronics, Tuscon, Arizona, USA)			
Sponsorship of project:	Ministry of Agriculture Nature and Fishery (The Netherlands), the Sophia Vereeniging ter Bescherming van Dieren and the Bond tot Bescherming van Honden.			
Title of the study:	Behavioural, saliva cortisol and heart rate responses to different types of stimuli in dogs.			
Publication reference:	*Applied Animal Behaviour Science*	1998	58	365-381
Objectives:	To: "investigate the acute stress behaviour and physiology of dogs" Authors wanted "to establish how and to what degree dogs respond to aversive stimuli and to resolve to what degree stress responses in behaviour, saliva cortisol and heart rate are correlated". Speed of recovery was also of interest.			

<table>
<tr><td>Methodology:</td><td colspan="3">Dogs housed individually.

Two-day period of acclimatisation to the experimental room.

Over two days dogs were exposed to short lasting stimuli for a period of 1 min.

One stimulus per session, three sessions per day @ 1100, 1300 and 1500.

Electric current administered as the final stimulus because it would interfere with equipment used to measure heart rate. Other stimuli administered in random order.

Stimulus 1: “press” – dog forced to floor and held there for 20 s; repeated after 20 s interval

Stimulus 2: “pull” – rope attached to collar and passing under bar 10 cm from floor pulled for 20 s. Head forced down. Pause of 20 s before repeat.

Stimulus 3: “umbrella” – dog had umbrella pointed at it before the umbrella was opened. Performed three times with 30 s intervals.

Stimulus 4: “bag” – garbage bag with 600 g of paper dropped into kennel- lifted and then released again after 30 s and then again at 60 s.

Stimulus 5: “noise” – sound blast of intensity of 110–120 dB for 1–2 s administered three times at intervals of 30 s.

Stimulus 6: “shock” – dog subjected to three electric stimuli each lasting 1–2 s.

All tests approved by local ethical committee.</td></tr>
<tr><td>Number of subjects:</td><td colspan="3">Ten adult dogs of mixed breeds and ages (5.2–13.8 years + one unknown) with equal sex ratio</td></tr>
<tr><td>Presenting complaint / criteria for inclusion:</td><td colspan="3">Chosen on the basis that they had not been exposed to any physiological experiments in the previous year.</td></tr>
<tr><td>Test procedure / methods:</td><td colspan="3"></td></tr>
<tr><td rowspan="2"></td><td>Group</td><td>Number of dogs</td><td>Treatment</td></tr>
<tr><td>“shock”</td><td>10</td><td>1–2 s electrical current applied set at level 8 of possible 15; repeated three times. No other details of voltage/amps reported.</td></tr>
<tr><td>Duration of treatment:</td><td colspan="3">One exposure to “shock” on second day of testing</td></tr>
</table>

Parameters assessed	Behaviours scored in terms of the frequency of occurrence
	• Autogrooming – behaviours directed towards the subject's own body, like scratching, licking and biting-self • Body shaking • Changes of the posture • Changes of the state of locomotion • Circling – continuous walking in short circles • Crouching – a rapid and pronounced lowering of the posture, sometimes in combination with movements that enlarge the distance to the eliciting stimulus • Defecating • Digging – scratching the floor with the forepaws in a way that is similar to when dogs are digging holes • Drinking • Floor licking – the floor is licked with the tongue • Intentions to change the state of locomotion – initial fragments of the behaviour that dogs perform in full when they actually change from one state of locomotion to another • Manipulations of the environment – playful or stereotyped interactions with elements from the environment • Open mouth – the opening of the mouth • Oral behaviours – includes tongue out: the tip of the tongue is briefly extended; snout licking: part of the tongue is shown and moved along the upper lip; swallowing; smacking • Paw lifting – a fore paw is lifted into a position of approximately 45º • Sector crossings – marks on the floor subdivided the experimental kennel into six sectors that each measured 0.88 m^2; when a dog moved from one sector to another this was scored as one crossing • Sighing – isolated intense expiration • Stretching – stretching of the body and limbs • Urinating • Vocalizing – barking; growling: low frequency vocalizations; whining: soft, high pitched vocalizations; yelping: loud relative to whining., high pitched vocalizations • Yawning **Behaviours scored as state and event** • Nosing – the nose is moved along objects and/or

	Saliva samples Taken 30 and 15 min before (considered as basal levels) and at 10, 15, 20, 30 and 60 min after onset of stimulus and assayed for cortisol. Citric acid used to stimulate saliva flow. **Heart rate** Before 0900 on each experimental day dogs were equipped with heart rate registration apparatus – five electrodes attached to animals and data stored in unit mounted on jacket worn by subjects. Heart rate not recorded during "shock" due to the effects of current on monitoring equipment. "Shock" administered late to minimise effects of repeated fitting of heart rate monitoring equipment. **Data processing** Duration of some behaviour expressed as percentage of observation time. Frequency scores of other behaviours recorded. Effects of stimulus on behaviour compared with behaviour in 10 min prior to stimulus being applied; responses expressed and reported as differences. Cortisol peak value recorded together with area under response curve. Heart rate recorded over 12 seconds and then multiplied up to be beats per minute. HR peak value recorded together with area under response curve. Normalised value of mean undisturbed HR (established before "bag" or "noise" – could not be anticipated by dog) plus standard deviation of this value. HR recovery when below this level for 1 min.
Statistical methods:	Log transformation of behavioural data. Analyses of variance for repeated measures were used to investigate if stimuli induced behavioural responses, or if response depended on type of stimulus. Significance by chance was controlled for by Bonferonni corrections. Spearman rank correlations to identify linear relationships between behavioural responses, cortisol and heart rate.

Results:	For “shock”, those behaviours recorded as a frequency of events exhibited small changes between the 10 min before the stimulus and the 10 min during which the current was applied. For those behaviours recorded as percentages there was a large decrease in lying with head rested for dogs receiving the current and an increase in standing. Effect on walking was minimal. Application of current saw a change in posture in the dogs from neutral to low or very low. Whether these observed changes were statistically significant was not examined. Compared to other stimuli application of electric current elicited different responses. Typically these differences were quantitative, rather than qualitative and larger in response to electric current Some aversive stimuli, including “shock”, caused a transient increase in salivary cortisol but “press” and “umbrella” did not elicit a response. Only “noise” caused a significant increase in cortisol levels post-stimulus. Effect of “shock” approached significance (P = 0.06). Heart rate data not applicable to “shock” stimulus. No correlations were found between behaviours, cortisol levels or heart rate parameters.

Conclusions:

“The study suggests that increased performances of body shaking, crouching, oral behaviours, yawning, restlessness and a low posture constitute behavioural indications of acute stress in dogs.”

With regard to the effect of predictability of a stimulus the effect of “shock” was singled out for discussion. There was a suggestion that the effect of “shock” on cortisol levels was perhaps associated with a degree of predictability by the dogs.

“The assumed aversive character of some stimuli (a falling bag, sound blasts and electric shocks) was confirmed by their capacity to induce saliva cortisol responses and a very low posture.”

“… it cannot be totally excluded that the reported responses to electric shocks are influenced by the experimental design.”

“In conclusion, behavioural parameters may help to identify acute stress in the dog, but they may be misinterpreted.”

Study critique:

This study did not directly set out to investigate the effects of electric current applied via a collar but rather this stimulus was part of a suite of stimuli. As a result the experiment was complicated with regard to a systematic assessment of the behavioural and physiological effects of the application of current. The data recorded could have been confounded by other parts of the study.

The statistical analysis is questionable – behavioural data is either derived from counts, or given a sample size of 10 dogs, the effect of the stimuli should perhaps have been assessed using a non-parametric analysis.

There are no assessments of the effects of individual stimuli on behaviour – it would have been useful to know if any of the stimuli significantly alter patterns of behaviour irrespective of their relation to other stimuli. Since all dogs had experienced the other five stimuli in the previous hours, it would have been possible to statistically test (with Wilcoxon signed-rank tests) whether differences in behaviours were significantly different from zero.

Since electric current was always applied last, responses of dogs may be confounded by the fact that they had previously experienced a series of other stimuli within the preceding period. The effects of the other stimuli could therefore have impacted on the response of the dogs to an electrical stimulus.

Of the behaviours considered as indicating acute stress, only dogs adopting a low posture showed a large difference before and after electrical current was applied. Elevated cortisol and changes in posture were singled out as being responses to acute stress, however other behaviours were affected by most other stimuli but not by application of electric current. This requires careful interpretation.

The suggestion that changes in behaviour due to acute stimuli can be misinterpreted is reasonable.

Name of researchers & institution:	F.O. Christiansen, M. Bakken & B.O. Braastad. (North Trondelag Research Institute, Norway / Agricultural University of Norway, Norway)
Product investigated:	Dog Radartron (D.T. Systems Inc., Dallas, TX)
Sponsorship of project:	Private means and Norwegian Research Council
Title of the study:	Behavioural differences between three breed groups of hunting dogs confronted with domestic sheep.
Publication reference:	*Applied Animal Behaviour Science* | 2001 | 72 | 115–129.
Objectives:	To investigate the inclination of three breeds of hunting dog to chase sheep, and to ascertain variation associated with individuals, sex and age.
Methodology:	Test area – 2 ha fenced enclosure of open, flat pasture containing a flock of 5 Dala (~90 kg ewe weight) sheep. **Test 1:** Path test – dogs walked on 5m leash along 100m path were exposed sequentially to four novel stimuli (rag pulled over track in front of dog, unfamiliar human, bundle of tin cans thrown on stone path, and encounter with lone, tethered sheep). Goal to define and describe basic skills needed by dogs in "everyday life". **Test 2:** Sheep test – Each dog fitted with electronic collar prior to release into test area (a 15m leash was fitted to the collar to help prevent sheep attack should electric current prove ineffective in preventing attack). Each dog was in the test area for a maximum of 5 minutes. **Questionnaire:** owners asked about previous experience of the interaction between dogs and sheep.
Number of subjects:	41 Elkhounds, 29 Hare hunting dogs, 68 English setters
Presenting complaint / criteria for inclusion:	Breeds included in study given hypothesis that hunting dogs are more likely to be sheep hunters
Test procedure / methods:	

Group	Number of dogs	Treatment
Test 1	All	None
Test 2	All	Electric current for 1 s @ 3,000 V and 0.4 A. Only administered when dog within 1-2 m of sheep. Repeated if dog did not withdraw or re-entered 1-2 m zone.

Duration of treatment:	Test 2 was for a maximum of 5 min
Parameters assessed	**Test 1:** For rag, human and sheep, time was recorded from detection of stimulus to the dog's presence close to it or avoidance of it.

	Exposure to a lone sheep, behaviour was ranked according to a withdrawal–approach scale: 1 = withdrawal from sheep to 6 = fast approach towards sheep. **Test 2:** Immediate behaviour towards sheep (considered to reflect hunting motivation) was recorded according to ordinal scale: 1 – withdrawal from sheep; 2 – intermediate towards sheep; 3 – uninterested in sheep; 4 – observes sheep; 5 – interested in sheep; 6 – chase attempt; 7 – attacks sheep. Latency time recorded between dog being placed in fenced area and start of first attack. Attack severity ranked: 1 – slow approach; 2 – moderate approach usually with an attack; 3 – severe attack. Use of electronic collars in this context was focused on their value as a deterrent to prevent dogs from harming sheep. Questionnaires: record of owners' experiences of dog's behaviour.
Statistical methods:	Kruskal Wallis, two-tailed t-tests, Mann-Whitney, Chi-squared and Pearson correlations. Also maximum-likelihood factor analysis with varimax rotation performed to determine the degree to which variability in behavioural test results could be explained by common underlying factors.
Results:	**Test 1:** Breed and age of dog had significant effects on the response towards sheep in the second test scenario. Sex had no effect on the response. 61% of Elkhounds attacked the sheep; 44.5% of hare hounds and 30% of Setters (χ^2, $P < 0.01$). **Test 2:** The three breeds required administration of an electric current to differing extents. 87.7% of all dogs did not require an electric current. 31.7% of Elkhounds were given an average of 2.9 ± 0.6 currents. 6.9% of Hare hounds were given an average of 1.5 ± 0.5 currents. Only 2.9% of Setters were given an average of 1.5 ± 0.5 currents. Effect of currents differed between dogs (not quantified) but involved differing grades of jumping, head-shaking, vocalisations, or speed of withdrawal from the sheep. There were no effects of age of the dog (<3 years or >3 years) on the numbers of currents administered. Dogs that showed a long recovery time after noise and a long reaction latency towards sheep exhibited a significant negative correlation with the number of electronic currents administered.

Conclusions:

Discussion mainly focused on the response of different breeds towards sheep. Differences in the number of currents administered were considered to reflect a degree of fearfulness of individual dogs towards sheep. Both sexes and the two age groups were equally likely to receive an electric current and were equally likely to withdraw after the current.

With regard to specific conclusions about electric currents – low administration of currents was due to 1) timing of currents and 2) spontaneously interrupted attacks, particularly in young dogs.

Considered that administration of an electric current earlier in the hunting sequence would have deleterious consequences on conditioned fear against other non-sheep stimuli in the environment. Authors specifically warn against unskilled application of electric current and recommended that use of electronic collars is avoided other than for the purposes of training dogs to avoid chasing sheep.

"Dogs' experience with sheep in other situations appeared to be of importance for their later behaviour towards sheep, despite their lack of previous test experience towards sheep. We also found that dogs with general low fearfulness were potential sheep chasers. The elkhounds showed a greater potential for chasing sheep than the setters, with hare hunting dogs being intermediate. The major factors predicting a high hunting motivation and attack severity towards sheep were lack of previous opportunity to chase sheep, low fear of unfamiliar noise and people, and general interest in sheep."

Study critique:

It would have been useful to have some quantitative record of the effect of the application of an electric current on the behaviour of the dogs.

The use of an electronic collar was incidental to the primary aim of this study but there was some insight into the effectiveness of electrical current as a treatment. The collars were there to deter direct attack upon sheep that the dogs were being exposed to. Application of the electric current caused a dog to break off from a sheep attack but there was an effect of breed. It is unclear why Elkhounds are more prone to attack sheep but it does seem that they are less fearful (which may reflect their size or general demeanour) and they require greater disincentive (i.e. more applications of current) to break off an attack than smaller breeds of hunting dogs. The secondary use of electronic collars in this study provides some insight into their use in dog training in general and the conclusion of the authors that use should be limited to training dogs not to attack sheep tends to imply that this is their favoured opinion of the technique rather than an opinion based on scientific evidence.

<table>
<tr><td>Name of researchers & institution:</td><td colspan="4">F.O. Christiansen, M. Bakken & B.O. Braastad.
(North Trondelag Research Institute, Norway / Agricultural University of Norway, Norway)</td></tr>
<tr><td>Product investigated:</td><td colspan="4">Dog Radartron (D.T. Systems Inc., Dallas, TX)</td></tr>
<tr><td>Sponsorship of project:</td><td colspan="4">Private means and Norwegian Research Council</td></tr>
<tr><td>Title of the study:</td><td colspan="4">Behavioural changes and aversive conditioning in hunting dogs by the second-year confrontation with domestic sheep.</td></tr>
<tr><td>Publication reference:</td><td>Applied Animal Behaviour Science</td><td>2001</td><td>72</td><td>131–143.</td></tr>
<tr><td>Objectives:</td><td colspan="4">To investigate whether the use of an electronic dog collar has learning effects lasting for at least one year, and to uncover secondary negative effects on the dogs’ behaviour.</td></tr>
<tr><td>Methodology:</td><td colspan="4">(as per Christiansen et al., 2001a)
Test area – 2 ha fenced enclosure of open, flat pasture containing a flock of 5 Dala (~90 kg ewe weight) sheep.
Test 1: Path test – dog walked on 5m leash along 100 path where exposed sequentially to four novel stimuli (rag pulled over track in front of dog, unfamiliar human, bundle of tin cans thrown on stone path, and encounter with lone, tethered sheep). Goal to define and describe basic skills needed by dogs in “everyday life”.
Test 2: Sheep test – Each dog fitted with electronic collar prior to release into test area (a 15m leash was fitted to the collar to help prevent sheep attack should electric current prove ineffective in preventing attack). Each dog was in the test area for a maximum of 5 minutes.
Questionnaire: owners asked about previous experience of the interaction between dogs and sheep.
In this study there were dogs that received electric currents the previous year and dogs that did not.</td></tr>
<tr><td>Number of subjects:</td><td colspan="4">35 Elkhounds, 23 Hare hunting dogs, 56 English setters</td></tr>
<tr><td>Presenting complaint / criteria for inclusion:</td><td colspan="4">Breeds included in study given hypothesis that hunting dogs are more likely to be sheep hunters</td></tr>
<tr><td>Test procedure / methods:</td><td colspan="4"></td></tr>
</table>

Group	Number of dogs	Treatment
Test 1	All	None
Test 2	All	Electric current for 1s @ 3,000 V and 0.4 A. Only administered when dog within 1-2 m of sheep. Repeated if dog did not withdraw or re-entered 1-2 m zone.

Duration of treatment:	Test 2 was for a maximum of 5 min
Parameters assessed	**Test 1:** For rag, human and sheep, time was recorded from detection of stimulus to the dog's presence close to it or avoidance of it. Exposure to a lone sheep, behaviour was ranked according to a withdrawal–approach scale: 1 = withdrawal from sheep to 6 = fast approach towards sheep. **Test 2:** Immediate behaviour towards sheep (considered to reflect hunting motivation) was recorded according to ordinal scale: 1 – withdrawal from sheep; 2 – intermediate towards sheep; 3 – uninterested in sheep; 4 – observes sheep; 5 – interested in sheep; 6 – chase attempt; 7 – attacks sheep. Latency time recorded between dog being placed in fenced area and start of first attack. Attack severity ranked: 1 – slow approach; 2 – moderate approach usually with an attack; 3 – severe attack. Use of electronic collars in this context was as a deterrent to prevent dogs from harming sheep. Questionnaires: record of owners' experiences of dog's behaviour.
Statistical methods:	Kruskal Wallis, two-tailed t-tests, Mann-Whitney, Wilcoxon paired tests, Chi-squared and Pearson correlations. Also maximum-likelihood factor analysis with varimax rotation performed to determine the degree to which variability in behavioural test results could be explained by common underlying factors.
Results:	**Test 1:** In previous study (Christiansen *et al.*, 2001a) dogs performing the path test had no prior exposure to electric currents but in this study those dogs that had received an electric current the previous year exhibited significant differences in behaviour to dogs that had not received a current. In particular, object discovery distance was increased and human contact latency was decreased in dogs that had previously received a current. Number of dogs attacking a lone sheep was reduced to one individual. **Test 2:** Responses of dogs to electric current was again not quantified but were described in the same terms as previous study. The percentage of dogs receiving an electric current was reduced from the previous year with elkhounds and hare hunting dogs exhibiting a reduction in currents applied to zero, but there was a significant increase in the number of setters receiving a current. Only one dog that received a current in the first year required a current in the second year. The number of currents administered per dog was also reduced for all dogs and for each breed. The factor analysis suggested that testing a dog's hunting response in one year could predict the tendency of that dog to attack sheep the next year. **Questionnaire:** 24 dogs exhibited changes in behaviour with 18 individuals losing interest in sheep. Only one dog in this group had received a current in the previous year. 88 dogs exhibited no change in behaviour from one year to the next and receiving an electric current

	had no significant effect on the dogs' general behaviour. Results indicate that the dogs exhibited significant changes in their behaviours from one year to the next with a significant reduction in the number of attacks on sheep. Barking was more prevalent in the second year when encountering lone sheep. Five of the barking dogs had attacked sheep in the previous year.

Conclusions:

Concluded that behavioural responses towards sheep were weaker or delayed one year after the initial tests. It is stated that no dogs attacked the lone sheep (despite the results stating that one dog did attack a lone sheep) compared with two-thirds of the dogs the year before and in the sheep confrontation test no dogs attacked sheep as their first response. Number of electric stimuli administered was reduced. Concluded that the dogs had a weaker motivation for chasing and attacking the sheep the second year, both in a test situation and in daily activity.

Suggested that receivers of electric stimuli exhibited particularly evident changes in behaviour and that this effect was seen after one year. Those dogs that needed electric stimuli in the second year but not the first were young animals – in the second year they were older and more experienced and so less fearful of sheep.

Owners reported no negative effects of current treatment in the first year. Such a result is seen as adding to debate surrounding the ethics of using an electronic collar. Authors recommend that electronic dog collars are restricted to specific training sessions where use is limited to aversive training in close proximity to sheep.

"Our study indicates that aversive conditioning with the use of electronic dog collars is an efficient method for reducing the probability of a dog chasing or attacking sheep on pasture. Reduction in the chasing motivation was found 1 year after the first test, particularly, in those which received el.[ectric] shocks the first year. The possibility remains that the learning is partly associated with the particular site of training, and that chasing is more likely on other sites. Further research is needed to test the generality of the el. shock training, as well as refining the methods in order to avoid the need for re-testing young dogs."

Study critique:

Presumed but not stated that all of the dogs tested in this study had been tested previously by Christiansen *et al.* (2001a). The numbers of dogs in the two studies are different. This is a potential problem of some significance with this report. The previous study used 41 Elkhounds of which 13 required electrical currents – this study used 35 Elkhounds only 6 of which needed currents, although only one dog received currents in both years.

The statistical analysis is by Wilcoxon paired-tests but nowhere is it clearly stated that the data were paired. It would be useful to compare the two years for only those dogs tested in both years.

The study appears to compare percentages derived from different numbers of dogs, which potentially undermines the validity of the conclusions.

It is unclear exactly how, what appears to be a transient experience, i.e. the exposure of a dog to a 100m walk and 5 minutes in a sheep field (with or without application of an electrical stimulus) is meant to be related to a change in behaviour a year later. Especially given that the majority of the dogs had no experience of electric currents and received no discipline or praise following the initial exposure.

<table>
<tr><td>Name of researchers & institution:</td><td colspan="4">R.A. Ekstein & B.L.Hart (University of California, Davis, USA)</td></tr>
<tr><td>Product investigated:</td><td colspan="4">Tri-Tronics model 300</td></tr>
<tr><td>Sponsorship of project:</td><td colspan="4">Grant from Center for Companion Animals Health, University of California, Davis, CA 95616</td></tr>
<tr><td>Title of the study:</td><td colspan="4">Treatment of Acral Lick Dermatitis by behaviour modification using electronic stimulation.</td></tr>
<tr><td>Publication reference:</td><td colspan="2">Journal of the American Animal Hospital Association</td><td>1996</td><td>32</td></tr>
<tr><td></td><td colspan="4">225-230.</td></tr>
<tr><td>Objectives:</td><td colspan="4">To: “explore the effectiveness of treating canine ALD [Acral Lick Dermatitis] by means of remote punishment utilising an exacting programme for application of electronic shock.”</td></tr>
<tr><td>Methodology:</td><td colspan="4">Dogs were identified by veterinary practitioners. Trials were carried out by owners in their “home” environment.

Dogs wore Elizabethan collars at all times except when wearing the electronic collars. Dogs were allowed to become accustomed to the weight of electronic collars in advance. Electronic collars were fitted for one hour during which current could be applied remotely and out of sight of the dog. After three sessions of no licking of the lesion, owners were asked to conduct longer training sessions in sight of dog but not to react when current was applied. When licking was absent or rare for a period of six hours, the owner was advised to remove the Elizabethan collar and to stop training with the electronic collar.

Telephone contact with owners allowed guidance and progress reports. There was long-term follow-up by telephone.</td></tr>
<tr><td>Number of subjects:</td><td colspan="4">Five mixed breed dogs, two males and three spayed females. Another five dogs identified as exhibiting Acral Lick Dermatitis were excluded from the study because of unwillingness of owners to follow procedures, but all owners were willing to use electronic collars.</td></tr>
<tr><td>Presenting complaint / criteria for inclusion:</td><td colspan="4">Exhibiting persistent Acral Lick Dermatitis for greater than 2 months and were accustomed to, and tolerated, an Elizabethan collar (or other lick restraints)</td></tr>
<tr><td>Test procedure / methods:</td><td colspan="4"></td></tr>
<tr><td></td><td>Group</td><td>Number of dogs</td><td colspan="2">Treatment</td></tr>
<tr><td></td><td></td><td>5</td><td colspan="2">Elizabethan collar removed for a period of 1h during which electronic collar was worn. 13.2 ms of current remotely delivered by owner watching from a hidden position every time the dog licked the lesion.</td></tr>
<tr><td>Duration of treatment:</td><td colspan="4">One-hour training sessions were conducted in a variety of locations until</td></tr>
</table>

	three consecutive sessions were free of lesion licking. Owner then advised to conduct longer training sessions (up to 6 h) and deliver current in sight of dog but show no reaction. When licking of lesion was rare in a period of more than 6h then the electronic collar was removed and not replaced by the Elizabethan collar.
Parameters assessed	Data on time to first lick of lesion, number of electric currents applied before dog did not lick the lesion in an hour, number of days of training and total number of electric currents applied. Resolution was defined as one month in which no current was applied, no Elizabethan collar was worn and no licking had occurred to recreate a gross lesion.
Statistical methods:	None
Results:	80% (4/5) resolution of the ALD problem.

Case	Training time until first lick / current	Number of currents applied before first lick free hour	Number of days and current (Amps) applied to resolution	Long-term follow-up and comments
1	5 min	1	36 d; 7	Relapse after 9 months; resolved with single, 1 h retraining session (one current applied)
2	15 min	5	12 d; 21	No relapse after 12 months
3	1 min	5	31 d; 9	Relapse after 12 months; resolved with one week of licking restraint (no current applied); no additional relapse after 6 months
4	2 min	3	50 d; 10	No relapse after 7 months
5	20 h	0	No resolution	Developed bilateral front paw infections; diagnosed as hypothyroid

No other stereotypical behaviour patterns emerged in any of the four dogs after resolution of ALD.

Conclusions:

Most important aspect in successful treatment of ALD with remote, electronic treatment was considered to be owner compliance with instructions.

“This project, although small in terms of subject number, reveals a promising therapeutic solution to ALD.”

“These results are encouraging and indicate the need for a larger scale evaluation of this approach.”

Study critique:

This study has a small sample, which is recognised by the authors as being an issue for the external validity of the results. The data are suggestive of the application of electric current as an effective treatment but many more dogs would be required to have good confidence in the effectiveness of the treatment.

Whilst the application of electric current did lead to resolution in four of five cases, there was a reliance on the owners to administer the treatment away from the investigators and to honestly report their own behaviour to the researchers. There was no direct or independent confirmation that the owners actually complied with the treatment protocol. The dogs did not undergo veterinary or behavioural examination after resolution and so secondary effects of electric current were not recorded. Such an examination may have revealed physical side-effects of the treatment.

<table>
<tr><td>Name of researchers & institution:</td><td colspan="4">S.V. Juarbe-Diaz & K.A. Houpt (College of Veterinary Medicine, Cornell University, Ithaca, New York, USA)</td></tr>
<tr><td>Product investigated:</td><td colspan="4">The Bark Diminisher, model BD11 (TriTronics, Tucson, AZ, USA)</td></tr>
<tr><td>Sponsorship of project:</td><td colspan="4">N/A</td></tr>
<tr><td>Title of the study:</td><td colspan="4">Comparison of Two Antibarking Collars for Treatment of Nuisance Barking</td></tr>
<tr><td>Publication reference:</td><td>Journal of the American Animal Hospital Association</td><td>1996</td><td>32</td><td>231-235</td></tr>
<tr><td>Objectives:</td><td colspan="4">To “compare the efficacies of the citronella spray collar and the electronic shock collar as barking deterrents, and to obtain information about owners regarding the usage of these devices.”</td></tr>
<tr><td>Methodology:</td><td colspan="4">Owners of dogs that barked excessively contacted the authors’ institution for advice following press releases. A questionnaire was used to ascertain whether the dog was suitable for the trial.

Two types of collars were investigated: citronella spray and electric pulse training aid

Each dog was randomly assigned to wear one of the two collars for two weeks, followed by seven days when no antibarking collar was used and finally two weeks wearing the other collar. Owners were instructed on use of the collars but no other behaviour modification advice was given to the owners. Those owners who were wary to leave the collar on 24-hours a day were advised to put it on whenever the problem was likely to occur.

At the end of each two-week period an evaluation form was given to the owners to fill out regarding the efficacy of each collar as well as any changes in their dogs’ behaviour or the owners’ general feelings.</td></tr>
<tr><td>Number of subjects:</td><td colspan="4">Nine cases started the study, eight completed it (ninth dog considered unsuitable for EPTA). Dogs were of mixed breeds, gender and ages (1.5–13 years)</td></tr>
<tr><td>Presenting complaint / criteria for inclusion:</td><td colspan="4">Dogs exhibited excessive barking but NOT accompanied by aggression toward owners or strangers or multiple (i.e. three or more) behaviour problems.</td></tr>
<tr><td>Test procedure / methods:</td><td colspan="4"></td></tr>
<tr><td></td><td colspan="4"><table><tr><th>Group</th><th>Number of dogs</th><th>Treatment</th></tr><tr><td>EPTA</td><td>Nine</td><td>Details of current applied when collar activated not provided.

Model of collar chosen because it shut off the delivery of current if the dog ignored the correction</td></tr></table></td></tr>
</table>

			and continued to bark. The collar rested on ventral cervical area and was activated by a vibration-sensitive diaphragm.
Duration of treatment:	EPTA worn for a period of two weeks.		
Parameters assessed	Owners to report: changes in frequency (episodes/day), intensity (loudness) and duration (barks/episode) on ordinal scale: much greater, greater, about the same, less and much less than before the use of the collar. Response of dog to correction by the collar and other changes in behaviour. General comments by the owners. Overall efficacy for either collar was deemed satisfactory if the owner reported frequency of barking as being less or much less then before collar use.		
Statistical methods:	None		
Results:	For the citronella collar, 8 out of 9 owners reported a decrease (less or much less than before using the collar) in barking frequency, intensity and duration. “All but one owner expressed a preference for the spray collar over the electronic collar, even if both were effective in curtailing barking, mainly because the owners disliked the idea of using electronic shock for punishment and felt the citronella spray did not hurt their dogs.” The owners could also see when the collar was working but there would be spraying in response to other noises in the environment. For the electronic collar, only two owners reported a decrease in all three indices measured and four owners reported no change in barking behaviour. Failure cases commented that their dogs let out a painful cry or that the dogs appeared to put up with the shock and bark anyway.		

Conclusions:

“In many cases of nuisance barking, the owners either are absent or unable to punish their dogs properly. Mechanical devices which facilitate appropriate correction can be helpful in overcoming this problem.”

It is suggested that an EPTA may not be adequate to deter some dogs from barking because “their pain threshold may be such that the discomfort of a shock correction is ignored.”

Citronella collars may be less tolerable given a dog’s sense of smell, but the citronella collar was perceived by the owners as a more humane and acceptable way of stopping their dogs’ barking.

Study critique:

This was a study mainly to ascertain the effectiveness of the citronella collar relative to the collar that delivered an electric current. The number of subjects was too small given the nature of the experimental design for statistical assessment. It is unclear how the period of 7 days between collars, may have affected the owners' evaluation. Owners may have been comparing the barking behaviour against the time before the trial or during the intervening week, in the case of the second assessment. This is unclear and so confidence in the results is limited.

The physical characteristics and method of use of the collars are largely unknown.

A Wilcoxon one-sample test can be performed on the ordinal scale used for measuring changes in behaviour. By comparing against a median of 3 (about the same) the frequency of barking for the dogs that wore the citronella collars first shows no significant departure from the null hypothesis. Hence, from a subjective perspective the citronella collars worked well but statistically both collars could be interpreted as having no significant effect. Even in the case when the citronella collar was used second there was no significant departure from the null hypothesis ($P>0.05$ in all cases) :

The conclusion that "electronic shock" collars appeared ineffective in this study is mainly a subjective assessment by the authors.

Name of researchers & institution:	R. Polsky (Animal Behaviour Counseling Services, Inc., Los Angeles, USA)			
Product investigated:	Electronic containment system			
Sponsorship of project:	N/A			
Title of the study:	Can aggression in dogs be elicited through the use of electronic pet containment systems?			
Publication reference:	*Journal of Applied Animal Welfare Science*	2000	3	345-357
Objectives:	To examine the relationship between receiving an electric "shock" and the elicitation of aggression by giving descriptive accounts of five case histories			
Methodology	Collation of descriptive information from deposition transcripts and other legal documents made available by attorneys representing people who filed lawsuits for personal injury because they were attacked by a dog.			
Number of subjects:	Five male adult dogs of varying breeds			
Presenting complaint / criteria for inclusion:	Each animal had been under a boundary-training regimen using an electronic collar, and had attacked a human being.			
Test procedure / methods:	Not applicable			
Duration of treatment:	Not applicable			
Parameters assessed	Victim's age and familiarity with dog Did the victim engage the dog in a manner capable of eliciting an aggressive response diagnostically different from either 1) pain-elicited aggression, or 2) avoidance-motivated aggression? Breed, age and sex of the dog Was there a history of aggression towards humans? Nature and location of attack (in relation to boundary) Was the containment field operating at the time of the attack and did the dog receive a "shock"			
Statistical methods:	None – recognition that the results lacked the scientific vigour of an experienced ethological observer.			

Results:	**Case 1** “Sawyer” – 2-year-old golden retriever reproductively intact male that had shown no previous aggression towards people. Attacked male owner in driveway after being observed as having “convulsions” when it approached a friend’s car. No formal obedience training and had been using the boundary equipment and had received electric stimuli several times in the past. **Case 2** “Moses” – 3-year-old golden retriever reproductively intact male that had shown no previous aggression towards people. Attacked male owner when the dog received its first “shock” from boundary equipment. No formal obedience training. **Case 3** “Mac” – 3-year-old golden retriever reproductively intact male that had shown one previous instance of aggression towards the female owner and several times towards her neighbour’s dog. No formal obedience training. Attacked female owner when the dog close to or within the boundary signal field. **Case 4** “Obie” – 2-year-old Akita reproductively intact male with no previous instances of aggression save for alarm-bark in response to strangers passing the property. No formal obedience training. Had been using boundary system but had escaped several times after battery failure or break in transmitter wire. Attacked 5-year-old boy, a stranger to the dog, apparently unprovoked. Dog was proximate or within transmitter field. **Case 5** “Rocky” – 3-year-old Rottweiler reproductively intact male that, according to the owner had shown no previous aggression towards people. Neighbour stated that the dog had shown aggression to him on several occasions. Boundary training started when a puppy and had contained the dog except for some isolated incidences. No formal obedience training. Attacked three unfamiliar male children that encountered the dog within its boundary after initially being friendly but changed when boys began to run away. Crossed boundary to pursue and attack the boys.

Conclusions:

Conclusion stated that dogs were responding to an electric current elicited in the presence of a human being. It is suggested that there were no behavioural cues that indicated that the dog was about to attack but these may have been present without being recognised by observers. The author states: “In the absence of more thorough and accurate behavioural histories on each dog, the small sample size, and the specifics of the dog’s behaviour at the time of the attack, the implication that shock was associated with, or the cause of, the dog’s attack remains tenuous.”

Attacks were all at the boundary of the property and dogs were of a similar age and the same sex. None had been neutered.

“Manufacturers stress that their systems are safe, ethically acceptable, and that they work successfully for the vast majority of dogs. Despite these claims, manufacturers need to acknowledge the risks involved and make consumers aware that the systems are not foolproof and that some dogs could attack a person as a result of having received electric shock.”

Study critique:

It is unclear what evidence there is that the electronic boundary system was operating in each case and whether the dogs actually received an electric stimulus prior to, or during, any attack.

Each of the case histories is based on legal documentation in cases where the plaintiff is seeking some financial redress. Presumably the first three cases are by the owners against the manufacturers or insurance companies. The other two cases are attacks against children – apparently "unprovoked" attacks against children are not rare and the fact that these cases involved electronic boundary systems may be coincidental. The rationale behind each legal case would have been of value in the analysis.

A major limitation with this report is that it lacks any attempt at comparison with other examples of apparently unprovoked attack by dogs that do not involve electronic boundary systems. Comparison of behaviours observed in other cases of dog attack would allow comparison with the behaviour of the people involved and that of the dogs. The author highlights the point that the dogs in his cases exhibited repeated biting of victims – although this does occur in some attacks, it is not a typical characteristic of non-predatory attacks by dogs on children.

In Table 1, the author seems unsure whether the dogs in cases 1 and 2 had been neutered but it is clearly stated in the text that they had not been.

In the journal the paper is described as a commentary – this implies that the editor and/or author considered the manuscript as an attempt to pass opinion on a particular topic rather than a scientific study. The author admits that the source of information leaves a lot to be desired and its reliability is questionable. For instance, in case 5 the dog is considered by the owner to be docile, but this is disputed by a neighbour. It may be that the owner is trying to shift the blame from himself to perhaps the manufacturer of the boundary system. The implication is that the electric collar / boundary system made the dogs aggressive, yet the animals were all male, un-neutered, had no formal obedience training and were at an age at which behavioural problems begin to be expressed (as suggested by the author on p. 355).

The author admits that his conclusions are tenuous.

<table>
<tr><td>Name of researchers & institution:</td><td colspan="4">E. Schalke, J. Stichnoth, S. Ott & R. Jones-Baade.
(Dept of Animal Welfare and Behaviour, University of Hannover, Germany)</td></tr>
<tr><td>Product investigated:</td><td colspan="4">Teletakt micro 3000 (Schecker GmbH & Co)</td></tr>
<tr><td>Sponsorship of project:</td><td colspan="4">Hans & Helga Maus Foundation</td></tr>
<tr><td>Title of the study:</td><td colspan="4">Clinical signs caused by the use of electric training collars on dogs in everyday life situations.</td></tr>
<tr><td>Publication reference:</td><td>Applied Animal Behaviour Science</td><td>2007</td><td>105</td><td>369–380.</td></tr>
<tr><td>Objectives:</td><td colspan="4">To investigate the intensity of stress signs, i.e. salivary cortisol and heart rate, from the use of electronic training collars during dog training.</td></tr>
<tr><td>Methodology:</td><td colspan="4">Training simulations were undertaken indoors whilst the dog was wearing a belt to measure heart rate and an electronic collar.
Heart rate (HR) measured using a Polar Horse Trainer Transmitter and Vantage NVTM heart rate measuring instrument – Averaged heart rate over 5 s.
Saliva sampled after buccal stimulation by a small amount of citric acid and swab taken. Samples were taken blind to the treatment dogs received. Samples were then analysed for cortisol levels.
There was a three-month adaption phase to allow the dogs to be accustomed to the routine required for the tests to run. Every dog was trained to hunt a dummy rabbit. Dogs in the “H” group were additionally trained to respond to a verbal “Here” as a recall signal.
Base levels for HR and salivary cortisol (SC) established for each dog after it had spent 50 minutes in the test room alone.</td></tr>
<tr><td>Number of subjects:</td><td colspan="4">Fourteen laboratory bred beagles (five females and nine males) aged 1.5–2 years</td></tr>
<tr><td>Presenting complaint / criteria for inclusion:</td><td colspan="4">Use of dog collars during training</td></tr>
<tr><td>Test procedure / methods:</td><td colspan="4">Preliminary test No. 1: period of 5 days when each dog was allowed to hunt unimpeded for 1-2 min and the dog was allowed to catch and take prey. After 10 min 5 saliva samples were taken at 5 min intervals HR measured throughout.
Preliminary test No. 2: period of 5 days when the dog was allowed to hunt for 2 min but impeded by a 1.5 m leash. SC and HR sampling was repeated as per preliminary test 1.
Main test: Electric pulses were administered to each dog in accordance to its group (see below) to a maximum of one pulse per dog per day. Main test was terminated for a dog if it showed no interest in hunting on three successive days, displayed distinct signs of stress in the experimental environment (not defined) or after the third application of an electronic pulse. Salivary swabs were taken 10 min after the electric pulse and five swabs were taken in total (as above). HR was</td></tr>
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<table>
<tr><td></td><td colspan="3">measured continuously.

Post test: After the main test the dogs had no contact with experimenters or the environment for 4 weeks. They were then taken to the experimental environment and SC and HR values determined as before.</td></tr>
<tr><td rowspan="4"></td><td>**Group**</td><td>**Number of dogs**</td><td>**Treatment**</td></tr>
<tr><td>A “Aversion”</td><td>Three males and two females</td><td>Received electrical stimulus only when touched prey (dummy rabbit fixed to motion device)</td></tr>
<tr><td>H “Here”</td><td>Two males and two females</td><td>Received electrical stimulus if they did not obey previously established command whilst hunting</td></tr>
<tr><td>R “Random”</td><td>Four males and one female</td><td>Received electrical stimulus arbitrarily – unpredictably and out of context – decision of when electrical stimulus administered was decided by drawing lots.</td></tr>
<tr><td>**Duration of treatment:**</td><td colspan="3">Unit operated at maximum settings. Voltage received depended on skin resistance: los resistance 500 Ω: peak voltage of 700 V @ 1.25 A or 2200 Ω: peak voltage of 1,760 V @ 0.82 A. Manufacturer stated impulse duration of < 1 ms but not measured in study.</td></tr>
<tr><td>**Parameters assessed**</td><td colspan="3">Cortisol levels – values were transformed relative to values recorded during the preliminary test No. 1 period.

HR: curves were smoothed by averaging HR over 3 min sections or the period tests. These curves were used to determine recovery times for HR.

“Max” HR at the time of the shock was recorded

For a 15 min period that started 15 min after the shock the HR was averaged – “Mw15” value.

“Max”/”Mw15” ratio was calculated.

Time between “Max” and “Mw15” was determined.

Response of dog to pulse: 1) stopped hunting and would not do so thereafter; 2) stopped hunting after two pulses and would not do so thereafter; and 3) stopped hunting after third pulse and could not be stimulated to hunt thereafter

Dogs were assigned groups according to their behavioural responses to electrical stimuli.</td></tr>
<tr><td>**Statistical methods:**</td><td colspan="3">Statistical analysis was by independent t-tests or one-way ANOVA or Mann-Whitney and Kruskal-Wallis test. Values per dog compared over two days used paired t-tests or Wilcoxon-Rank tests. If over more than two days then ANOVA and Friedman tests were used.</td></tr>
<tr><td>**Results:**</td><td colspan="3">Baseline cortisol levels were higher than those during preliminary test No. 1, so average values were used. Baseline HR values were taken as</td></tr>
</table>

	the average Mw15 values. **Preliminary test No. 2:** impeded hunting significantly increases SC levels. Comparison of the three groups of dogs showed that absolute SC levels were significantly lower in the "H" group than the "A" or "R" groups. Relative SC values for the "R" group were significantly lower than the other two groups. No effect on HR. **Main test:** Differences in SC were recorded and analysed according to the responses of the dogs to electrical stimuli. SC levels were higher for the group "R" dogs than the dogs in groups "A". For the "R" dogs absolute SC values increased with subsequent shocks and decreased the day after no shock was administered but value was higher than the value seen after the first shock. In general, "R" dogs had higher absolute SC values than dogs in the other groups. For relative SC values dogs in the "H" group had higher values than the "A" group. **Post test:** "R" dogs had the highest SC values and the dogs in groups "A" were the lowest. No effect of group was recorded for HR. Comparing the SC values between the different test periods showed that for the "A" group, impeded hunting appeared to elevate SC values compared with the post test period. For the "H" group SC levels were lowest during preliminary test No. 1 but highest during preliminary test No. 2 – post test values were intermediate. For the "R" group SC values in the post test were higher than seen during preliminary tests.

Conclusions:

Use of laboratory based beagles seen as a method of standardising the dogs' response to the treatments and so excluding other environmental factors that could condition them during rearing.

Most of the discussion is a justification of the techniques employed.

The interpretation of the results is that dogs in group "A" were able to associate the shock with the presence of the "prey" and so they could predict the shock and control their response to it – there was lower increase in the relative SC levels. Dogs in group "H" are deemed able to predict the shock but were unable to control their response to the presence of "prey" – leads to high SC values. Dogs in group "R" exhibited the highest SC values because they could not predict the shock.

Conclusion is that poor timing of electric stimulus could lead to a high risk that dogs show severe and persistent symptoms of stress. Authors recommend that devices should be restricted to trained personnel and only under certain situations.

Study critique:

The justification for some of the calculations made in the data handling is not clearly explained in all cases.

One significant limitation with this report is the lack of descriptive statistics presented. The results of the statistical analysis are presented without the results themselves being presented. This makes independent interpretation of the results impossible. Many of the calculations made in the methods section are not described in the results section.

This independent evaluation is further compounded by a complicated grouping of the dogs for analysis. The rationale for these groups is unclear – for instance, one group of dogs experienced two shocks and then were sampled for three days thereafter whereas another group of dogs had two shocks but were only sampled for one day thereafter. It is unclear within the context of the main test being stopped why such differences are present

Analysis could have been simplified to compare dogs that received one, two or three electrical stimuli and then tested for the same period after the last treatment. This would have simplified interpretation of the results.

From a statistical perspective both parametric and non-parametric analyses are supposedly used but which test is used in each analysis is not stated.

The conclusions drawn are reliant on the interpretation of the data by the authors. It is suggested that the effects of the shock are persistent yet for group “R” dogs, which exhibited the greatest persistence of stress, three dogs had one stimulation, five dogs had 2 stimulations and two dogs had three stimulations. But, there were only five dogs in total in group “R”, which makes interpretation of the analysis even more difficult. The authors seem to be assigning individual dogs to different subsets or responses for their analysis – this is potentially problematic because if a dog has received three stimulations then there is the possibility that its response will be different to that of a dog that has received only two stimulations.

Name of researchers & institution:	M.B.H. Schilder & J.A.M. van der Borg (University of Utrecht, The Netherlands)			
Product investigated:	Radio controlled remote electronic shock collar – manufacturer not reported			
Sponsorship of project:	Bond tot Bescherming van Honden (Association for Dog Protection)			
Title of the study:	Training dogs with help of the shock collar: short and long term behavioural effects			
Publication reference:	*Applied Animal Behaviour Science*	2004	85	319-334
Objectives:	To: 1) "investigate the direct behavioural reactions of dogs upon receiving a shock during training, with the aim of finding what behavioural responses were elicited by the reception of a shock." 2) "investigate what the long-term impact of shocks could be." 3) investigate "the behaviour of shocked and non-shocked dogs before and during training and also during a walk in the park, with the aim to find out if there are indications that once shocked, dogs were indeed more fearful than non-shocked controls."			
Methodology:	Behavioural responses of dogs during normal training periods – investigators had no control over what methods and aids the trainers used. Video cameras used to record training sessions. Observed 107 applications of electrical stimulus to 32 [*sic*] dogs Samples analysed by one-zero sampling of behavioural reactions using a suite of behavioural elements and postures based on carriage of the ears, tail and body. Within training situation dogs were usually asked to perform another task immediately after the current was administered and so most reactions to the application of the current were "immeasurably short". Reliability of observation methods was checked subsequently by videoing two training sessions of the "shocked" dogs. Data analysed for "shock" and control dogs during training sessions when no electric currents were applied. Filmed three sequences: 1) 2 min "free" walk on the leash – no orders given to dog; 2) obedience work including: "sit and down in motion, heeling in slow, normal and fast walking speed with changes of direction, and recall to the handler"; 3) protection work, which included "a number of exercises (search for criminal, hold and bark at criminal, escape and defence, followed by attack by the criminal, and finally, transport back)." Also filmed dogs being walked in the park firstly as a "free" walk and then performing obedience tasks as previously required during training. Sampling of behaviours was dependent on the task being performed and the numbers of dogs performing the behaviours. It was not possible for all observations to be made on all dogs at all times.			
Number of subjects:	15 dogs undergoing training to Dutch official (IPO) certificate: 5 Malinois-x, 1 Malinois, 8 German Shepherds, 1 Rottweiler (all intact males).			

	Also 31 more dogs training to Dutch VH3 certificate, all German Shepherds. 16 dogs (2 female, 14 male) had received electric current during training and 15 dogs (3 female, 12 male) had never received electric stimulus and were controls.
Presenting complaint / criteria for inclusion:	Chosen on the basis that the dogs were undergoing standard training procedures and at least some animals were being training without electronic collars.

Group	Number of dogs	Treatment
IPO certificate	15	Given electric current of unknown voltage or amperes or duration ("immeasurably short") during normal training
"shock"	16	Given electric current of unknown voltage or amperes or duration ("immeasurably short") during normal training
control	15	Control group not given shocks at any time

Duration of treatment:	One training session per dog.
Parameters assessed	Indicated in two tables reproduced below:-

Table 1 Ear, tail & body positions	
	Description
Ear positions	
Pinnae maximally backwards	
Pinnae backwards	The pinnae are backwards for more than half, are upright or buckled, they are in one line with the stop of the nose and are not flat in the neck
Pinnae partly backwards	The pinnae are turned backwards halfway and upwards: opening is completely visible from the side
Neutral ears	Pinnae partly sideways and completely upwards, ear openings are partly visible from the side
Pinnae partly high	Position between neutral and high
Pinnae maximally forwards	Pinnae maximally forwards and turned towards another and forwards. Inside of pinnae not visible from the side
Tail positions	
Tail very low	Tail tucked between hind legs
Tail low	Upper side of tail against back, tail forms an S
Tail half low	Tail lower than neutral
Tail is neutral	Tail follows line of lower back of dog and appears not above the line of the back
Tail half high	Tail is held above the contour of the back
Tail high	Tail in a maximally high position
Body positions while walking and standing	
Normal sit	Sit in a normal position: legs stretched and head held

Shoulders	While sitting the shoulders are withdrawn
Walk normal	Walks with straight legs, not flexed
Bent legs	Walks with flexed hid legs
Completely flexed	Walks with flexed fore and back legs
Crouch stalk	Walks with strongly flexed fore and hind legs

Table 2
Behaviours, scored in four different contexts

Behaviour	Description	Scored during			
		Free walk	Obedience	Manwork	Shock
Panting	Only start scored	X			
Tongue out	Tip of tongue is briefly extended	X	X	X	X
Lick lips	Part of tongue is shown and moved along the upper lip	X	X	X	X
Yawn	Includes intention movement	X	X	X	X
Replaceme nt-sniffing	Sudden, short sniffing of ground, included its intention movement	X	X	X	X
Squeal	Short, repeated high pitched vocalisation	X	X	X	X
Shake	Shake body or head	X	X	X	X
Jump	Jumps against owner	X	X	X	X
Bite Leash		X	X		
Urinate	Urinate in sitting or standing position	X	X		
High sounding yelp	Stronger or higher pitched yelping	X	X	X	X
High sounding bark	Single high pitched bark	X	X	X	X
Fast open and close	Mouth opens just about 1 cm and almost closes in fast alternation	X	X	X	X
Bark	Normal barking	X	X		
Turn head away	Head is turned away from owner or criminal		X	X	X
Lift front paw			X	X	X
Look at owner				X	
Bark at criminal	High voiced repeated barking at criminal			X	X
Screaming bark	Low pitched, loud bark				X
Growl-bark	Bark and simultaneous growling at criminal			X	
Soundless bark	Soundless barking movements			X	
Jaws	Jaws shut audibly			X	

Ears back	Ears back after shock		X
Tail lowered	Tail lowered after shock		X
Crouch	Dog ducks with legs flexed and head towards ground	X	X
Back lowered	Only backside of body lowered		X
Head movement	Characteristic movement sideways and downwards after being shocked	X	X
Snap	Snapping at owner	X	X
Avoid	Moving away from criminal with high speed	X	X
Circle	Turn 180°-360°	X	X
Fast head movements	Dog looks from owner to criminal in fast alternation	X	

An X denotes that the behaviour has been scored in a particular context

Statistical methods:

Comparisons were made between

1) control and “shock” dogs during training;

2) control and “shock” dogs during time in the park;

3) control dogs during training and in the park; and

4) “shock” dogs during training and in the park.

Also compared behaviours and posture of dogs being trained versus being walked for the control and “shock” groups.

Data from the two groups were compared using one-tailed Mann-Whitney U test, within the same group of dogs using the Wilcoxon matched pairs test. Nominal P-values were also calculated using an improved Bonferroni method.

Reliability of results was tested using Spearman’s rank correlation for “shocked” dogs that walked freely and did obedience exercises on the training grounds – scores for ear and tail positions.

Fisher exact probability tests were also used to test for the occurrence of specific behaviours.

Results:

Reliability of results: all very high for the “two data sets” for a range of ear positions and behaviours.

Dogs receiving electric current during training: Electric current was applied in ten contexts: “dog does not obey “let go” command: 34×; dog heels ahead of the handler:

33×; dogs bites the criminal at wrong moment 12×; dog reacts too late on command “heel”: 8×. In six more contexts the dogs received four or fewer shocks.”

Frequency of behavioural responses reported for the number of dogs exhibiting that response. Total frequency shown was 267 responses.

Behaviour on training grounds – control versus “shocked”: Ear position

	significantly lower in three scenarios but tail position did not. Increased tongue flicking and front paw lifting in "shocked" dogs. **Behaviour in park – control versus "shocked"**: Ear position significantly lower in two scenarios but tail position did not differ. Increased tongue flicking and front paw lifting in "shocked" dogs. **Behaviour on the training grounds and in park for controls**: No significant differences in ear or tail position. Increased tongue flicking on the training ground. **Behaviour on the training grounds and in park for "shocked" group**: Ear position unaffected by location but tail position was significantly lower at the training grounds. Tongue flicking not significantly different but lick lips and front paw lifting significantly higher at training grounds. **Comparison of walking and training:** ear and tail positions varied between walking and training situations – ear positions were higher for dogs being walked, irrespective of whether dogs were in the "shock" or control groups

Conclusions:

There are discussions on the methods employed; "is being shocked painful or just annoying?; "is the welfare of shocked dogs impaired?; and "why is there so much and such heavy punishment during police and guard dog training?"

"We concluded that shocks received during training are not only unpleasant but also painful and frightening. Furthermore, we found that shocked dogs are more stressful on the training grounds than controls, but also in a park. This implies, that whenever the handler is around, the dog seems to expect an aversive event to occur. A second unwanted association might be that the dogs have learned to associate a specific command with getting a shock.

Apart from the acute pain and fear, these expectations may influence the dog's well being in the long term in a negative way. To counter misuse of the shock collar, it is proposed to ban its use for "sports", but save it for therapeutic applications, such as for suppressing hunting and killing sheep. The effects we found occurred in spite of the fact that control dogs also underwent fairly harsh training regimes.

Trainers and handlers should study learning theory far better and review the structure of the training in order to teach the let go command in an earlier phase and to reduce the number of mistakes. They should incorporate more rewards during exercises. Also, less temperamental and less forceful dogs should be bred. This also would decrease the chance that dogs make mistakes for which they could receive punishment."

Study critique:

A major concern with this study is the style of the report published. This does not in itself invalidate the findings, but makes further independent evaluation difficult.

The methods employed are not all clearly described and so repetition of the study would be difficult on the basis of the information provided. It is not entirely clear what was observed for each group of dogs. It would appear that those dogs that received electric current during training were observed for their reactions to the current, but there appear to be a total of 31 dogs in these groups, yet observations were reported of current being applied to 32 dogs.

A wide range of data was supposedly collected but in reality practical difficulties in data collection from video tapes appear to mean that the range of behaviours that could be analysed was quite limited. The authors appear to be selective in the data analysed and admit this in the discussion.

There is no indication of what current was applied, nor is there any indication that all of the collars used were of the same design.

Results: Reliability of data – correlations were perform on “two data sets” but it is not indicated which two data sets these were. Presumably it was for control and “shock” dogs but this is not stated

Direct behavioural response of dogs to electric current: There were ten contexts when current was applied to a dog – four are described but the other six contexts are unclear, as is the frequency. Tabulation of these data would have been very useful in the interpretation of the results regarding the effects of electric current on behaviour.

Behavioural responses to current were a key feature of the study, but the results described are limited. Data were reported as a total frequency in a number of dogs, but it is impossible to determine the nature of the distribution of the data. For instance, “lowering of ear position” occurred 46 times in 22 dogs. This could be because it occurred twice in 20 dogs and three times in two dogs OR once in 21 dogs and 25 times in one dog. Similarly it would be useful to know the median number of electric currents applied per dog – it would be inappropriate to assume that the 32 dogs each had 3.3 currents applied (107/32). It is possible that there were dogs that received many more currents than others. The absence of these descriptive statistics limits the understanding of the behavioural responses of dogs to application of electric current. Moreover, there were 267 responses reported – presumably more than one behavioural response occurred when electric current was applied. It is possible that the electric current elicited a particular suite of behaviours but this does not appear to have been investigated and is perhaps a missed opportunity to present valuable data.

Are there long-term effects? “Average” values presented with SEMs in figures 2–5 – median values may have been more valuable, depending on the distribution of the data.

The presentation of data in tables that indicated average values within the different contexts would have allowed direct comparison rather than a reliance on the selectivity used by the authors.

The text appears to present pre-conceived interpretations which are in danger of biasing the reader and limiting alternative interpretation – e.g. the heading for section 3.1 is “Are control dogs more frightened on the training ground than in the park?” This is an interpretation of the data which would be better placed if reserved for the discussion.

There was a large array of behaviour and posture parameters that were considered but actual collection of data implied that very few of these were observed in sufficient numbers to allow statistical analysis.

Discussion: The point about using a Bonferroni correction is that it accounts for potentially false positive results – yet the authors claim that its role in the analysis was such that potentially significant results disappear. In which case a clear argument needs to be presented for the most appropriate analysis and interpretation.

In the section on whether being “shocked” is painful or just annoying – the lack of a full description of the results means that further independent evaluation based on their results is not possible.

The authors appear to hold a certain view of the issue and significant parts of the discussion appear to focus on reinforcing this opinion with extrapolation from what appears more limited information.

Name of researchers & institution:	J. Steiss, C. Schaffer, H. A. Ahmad & V L. Voith. (Universities of Tuskegee (Alabama) and Pomona (California), USA)			
Product investigated:	Deluxe Bark Collar Model DBC100 (Radio Systems Corp., Knoxville, TN, USA)			
Sponsorship of project:	Radio Systems Corp., Knoxville, TN, USA & Dept of Health & Human Services' Health and Servies Administration, Bureau of Health Professions			
Title of the study:	Evaluation of plasma cortisol levels and behavior in dogs wearing bark control collars.			
Publication reference:	*Applied Animal Behaviour Science*	2007	106	96-106
Objectives:	To 1) measure plasma cortisol and ACTH levels as indicators of physiological stress in healthy adult dogs wearing electronic and lemon spray bark control collars; 2) determine the effectiveness of the two collar types for control of barking.			
Methodology:	Dogs were housed individually in an indoor kennel with two sections – recording sessions were made in a section with windows overlooking a yard. **Week –1:** Dogs were screened by physical examination and blood collection (complete blood count, serum biochemistry and plasma cortisol) and then presented with a bark stimulus (unfamiliar dog on leash). Dogs then randomly assigned to one of three groups by picking card from a hat. Three groups: control, electronic collar, lemon spray collar. **Week 0:** Dogs wore inactive collars for 30 min/day for 3 consecutive days – data recorded on day 3. **Weeks 1 & 2:** Dogs wore activated collar for 30 min/day for 3 consecutive days – data recorded on three consecutive days each week. **Bark stimulus:** Unfamiliar dog (that did not bark at unfamiliar dogs) presented at 5, 15 and 25 min during 30 min session – a different dog was presented each time. **Observations:** Two observers evaluated two dogs simultaneously with dogs 14m apart. Observer was positioned 1.2 m in front of run in full view of test dog. Sessions were videotaped. Timed barking and whining duration and number of collar corrections. Activity indicator **Blood sampling:** Taken within 4 min of opening door of run at end of each 30 min observation session. 6 ml sample from cephalic vein. During week –1 some dogs were walked to a treatment room for examination and placed under physical constraint – as such, week 0 samples are considered better baseline values than week –1 samples.			
Number of subjects:	Twenty-one (11 males and 10 females) dogs considered healthy on the basis of physical examination, serum biochemistry and total blood count. Mean weights 22.5 kg and mean age = 20 months. Mixed breed – held in no-kill shelter for a mean of 5 months before trial.			

<table>
<tr><td>Presenting complaint / criteria for inclusion:</td><td>No dogs were presenting any problem and were included in the trial because they were available and they barked at a strange dog (three dogs were excluded because they did not bark at an unfamiliar dog)</td></tr>
<tr><td>Test procedure / methods:</td><td></td></tr>
<tr><td></td><td>
<table>
<tr><th>Group</th><th>Number of dogs</th><th>Treatment</th></tr>
<tr><td>Control</td><td>7</td><td>Wore inactivated collar (half were inactivated electronic collars, the other half wore inactivated lemon spray collars)</td></tr>
<tr><td>Electronic bark collar</td><td>6</td><td>Positioned high on neck immediately below the jaw and set to “low” intensity during weeks 1 & 2. Current delivered was not reported. Device activated when both sound and vibration of a bark were detected simultaneously. Detection time was 152 ms.</td></tr>
<tr><td>Lemon spray bark collar</td><td>8</td><td>Lemon-scented spray (not citronella) activated by vibration. Detection time was 67 ms.</td></tr>
</table>
</td></tr>
<tr><td>Duration of treatment:</td><td>30 min/day for 3 consecutive days for two weeks</td></tr>
<tr><td>Parameters assessed</td><td>Plasma cortisol measured for dogs on weeks –1, 0, 1 (days 1 & 3), 2 (day 3)

ACTH measured for dogs on week 0 (day 3) and week 1 (day 1)

Barking duration measured each session

Activity of dog measured by counting the number of times the left paw was moved across a grid line painted on the floor of the run.</td></tr>
<tr><td>Statistical methods:</td><td>Evaluated as a repeated measures over time for the two treatments (electronic and lemon spray) and control using general linear model (GLM) on SAS ® Statistical Analysis Software with treatment and time as main factors. Significant different effects classified using Tukey-Kramer test or Scheffe’s test.</td></tr>
<tr><td>Results:</td><td>Compared with week 0, both collar types reduced barking duration on day 1 of week 1 and by the second day of week 1bark duration was less than 2 s per 30 min.

Number of corrections administered was higher on week 1, day 1, for the electronic collar (4 versus 2 for the spray collar). Dogs wearing electronic collars had no corrections on days 2 and 3. For the dogs wearing spray collars, one correction was the average correction on day 2 and no corrections were required on day 3. No results for corrections were reported for week 2 – presumably no corrections were required.

Activity patterns were not affected by collar type although the dogs wearing spray collars were significantly less active than the controls.</td></tr>
</table>

	Dogs wearing electronic collars showed no difference in activity compared to the controls. Cortisol levels were increased (P > 0.05) on day 1 of week 1 for dogs wearing both collar types but values decreased to a level comparable to those seen in week 0 by day 3 of week 1. There were no effect effects of the collar type but time did have a significant effect ACTH levels were unaffected by the treatment and were within standard reference ranges.

Conclusions:

Both types of collars are reported to be effective against barking.

"with dogs wearing bark control collars intermittently over a 2 week period, the collars effectively deterred barking without statistically significant elevations in plasma cortisol, compared with controls, at any of the time points measured."

Study critique:

The report is clear and the results appear unambiguous. The study seeks to ascertain the short term effects of the two treatments. The authors however acknowledge that the long term effects remain unknown since habituation to the collars may occur in the longer term. One earlier report concerning the use of citronella collar (Wells 2001) suggests this may indeed happen.

The authors do not themselves express any opinion regarding the values of electronic bark collars but limit themselves to providing data that will contribute to that debate.

Name of researchers & institution:	D.F. Tortora, (RemBehCon., Inc., New Jersey, USA)			
Product investigated:	A1-90 Remote-controlled electronic collar (Tritronics, Inc., Tuscon, Arizona, USA)			
Sponsorship of project:	None stated			
Title of the study:	Safety training: the elimination of avoidance-motivated aggression in dogs.			
Publication reference:	*Journal of Experimental Psychology*	1983	112	176-214
Objectives:	To: "identify the behavioural characteristics and appropriate treatment of a form of instrumental aggression in companion dogs, herein recognised as avoidance-motivated aggression."			
Methodology:	**Experiment 1 [*sic*]** – review of case histories between 1978-1981. **Experiment 2:** An A1-90 remote-controlled electronic collar used – this could produce two auditory stimuli and deliver electric current at variable resistances 1–730 kΩ. Activation of the collar led to 0.5 s buzz followed by a 10 ms electric current. The second tone could be delivered after the electrical stimulus. Study covered a period in excess of 2½ years – groups of 3-4 dogs were trained at one time with a comparable number of subjects in a waiting list control. Initial consultation – owners were advised on how to manage aggression and to keep a diary concerning the dog's behaviour. Treatment – training to perform 15 operands (responses to verbal and/or hand signal) over nine stages of "safety" training: 5–20 twice-daily sessions of 90 min. Inter-trial interval of ~5 min. Operands got progressively higher in the performance criterion and were based on American Kennel Club stands for CDX obedience. Also considered useful in controlling dogs in a home environment. Trained and tested in a) 125-acre grass field; b) on the sidewalk in the street; c) busy shopping malls; d) in and around local dog shelter with resident dogs barking incessantly; e) normal household situations; f) in a college environment including classrooms with 20-60 students. There were nine stages of training and each dog had to pass each stage before progressing. Stages 1–3 Pretesting and pre-training (wearing dummy collar); Stages 4–6 Conditioning (wearing activated collar); and stages 7–9 Normalisation (with collar but eventually leading			

	to collar being removed). Conditioning: stage 4 – perform operands to escape progressively increasing electrical stimulation. Operator activated collar simultaneously with giving command. Stage 5 – To perform operands to avoid electric current. Stage 6 – to perform operands to attain the conditioned safety tone. Normalisation – Stage 7 electric current to punish every incorrect response to a command. Tape recording was made by the trainer as a record of the training session. Follow-up – data collected by survey and video-tape analysis.
	Experiment 3: Comparison of safety training (as described for Experiment 2) and two control groups; 1) play-training – essentially followed safety training schedule up to and including stage 2 and then dogs were kept on this schedule thereafter; and 2) play-training/aversion-relief – Replicated play-training training with the addition of signalled electrical stimulus as punishment for aggression. Once the safety-trained dogs had reached stage 8 then the control groups were placed on the safety-training regimen. **Experiment 4:** Investigation of the use of the safety tone emitted by the electronic collar on avoidance-motivated aggression, conditioned fear and performance of operands. Apparatus the same as in Experiment 2. Six groups: two derived from dogs in Experiment 2 that either matched the dogs in the other groups (M) or were randomly selected (R). In these groups the safety tone had been introduced in stage 4. Other groups replicated Experiment 2 except: D1 – safety tone was introduced during a safety-conditioning session between sessions 5 & 6 of stage 6; D2 – safety tone was introduced during a safety-conditioning session between sessions 9 & 10 of stage 6; D3 – safety tone introduced and used as a reinforcer throughout stage 6 from session 9 onwards; C – control – treated identically to those in experiment 2 except the tone was introduced in a random-conditioning session between sessions 5 & 6 of stage 6 – 60 trials where 15 were "15 forward, 15 reverse, 15 shock only and 15 tone only". Then tone was used as reinforcer from sessions 6 to 9. Then they had 60 safety-conditioning sessions between session 9 & 10 identical to the D1, D2 & D3 dogs. Safety tone was used as a reinforcer thereafter.
Number of subjects:	**Experiment 2**: 26 male and 10 female dogs ranging in age from 12-60 months. Mixed breeds **Experiment 3:** 12 male and 6 female dogs aged 15–48 months of mixed breeds. **Experiment 4:** 10 male and 6 female dogs aged 15–48 months of mixed breeds.

	Group	**Number of dogs**	**Treatment**
	Experiment 2	36	Application of unspecified electric current at varying levels of intensity
	Experiment 3	6 x 3	Application of unspecified electric current at varying levels of intensity
	Experiment 4	4 x 5	Application of unspecified electric current at varying levels of intensity
Duration of treatment:	Weeks during training sessions		
Presenting complaint / criteria for inclusion:	**Experiment 2** – Household pets referred by a veterinarian for showing signs of aggression. **Experiment 3:** Household pets referred by a veterinarian for showing signs of aggression and diagnosed as showing extreme forms of avoidance-motivated aggression. **Experiment 4:** Household pets referred by a veterinarian for showing signs of aggression and diagnosed as showing extreme forms of avoidance-motivated aggression.		
Parameters assessed	**Experiment 2:** Pre-testing – frequency of biting or biting attempts during commands and during 10 min stimulus presentations per session designed to elicit aggression. Parameters analysed: 1) The effects of safety training on avoidance-motivated aggression; 2) acquisition of operands over stages; 3) Stage 4 escape and avoidance acquisition for each operand; 4) evidence for the development of learning over stages; 5) changes in dog's emotionality over stages; 6) changes in dog's carriage over stages. **Experiment 3:** Parameters analysed: 1) The effects of safety training on avoidance-motivated aggression; 2) acquisition of operands over stages; 3) evidence for the development of learning over stages. **Experiment 4:** Parameters analysed: 1) The level of aggression; 2) acquisition of operands over stages; 3) changes in dog's emotionality over stages.		
Statistical methods:	Pearson correlations to test for reliability of observations between observer and trainer. Two-way ANOVA to test for effects of conditions (control versus trained) and stages of training. Gamma coefficients.		

Results:	**Experiment 2:** 1) Avoidance-motivated aggression – control dogs showed decline in aggression over the period of training for other dogs from mean proportion of aggression to 1.0 to 0.8. Trained dogs started at 0.9 and showed no aggression at stage 6 and from stage 8 onwards including up to 2 years after training. Statistically significant using ANOVA. 2) Acquisition of operands – The mean proportion of correct operands increased from zero at stage 1 through to almost 1.0 at stage 6 remaining above 0.9 for all stages thereafter and in the follow up period. Mean number of trials to acquire a new operand (“place”) decreased from ~27 at stage 2 to ~2 at stage 8. Mean number of “shocks” to suppress a high base-rate response declines from ~25 at stage 1 to ~2 at stage 8 and 9. 3/4) Acquisition of individual operands during stage 4 training varied according to the response required. 5) Change in emotionality – Mean proportion of pre-session muscle tremor was initially low (0.1) for stage 1-3 rose to ~0.6 for stage 4 and then declined to almost zero at stage 6. Mean proportion of yelping during “shock” was almost 1.0 at stages 1-3 but declined to 0.3 at stage 5 before rising to 0.4 at stage 7. Mean proportion of muscle post-session tremor decreased over the training sessions. The mean proportion of induced play post-shock increased from zero at stages 1-3 to ~0.8 for stages 7–9. All of these effects exhibit significant effect of training stage (ANOVA). 6) Dog’s carriage – qualitative assessment of carriage showed that on ordinal scale dogs’ mean carriage score became progressively more positive during training. **Experiment 3:** Mean proportion of aggression for safety trained dogs decreased from ~0.9 at stage 4 to almost zero at stage 6 and remained low. For control groups the level of aggression only declined to ~0.6 at stage 5 and thereafter for the play-trained with aversion relief. For the play training alone group aggression decline to ~0.7 at stage 6 but increased to levels comparable to previous levels. Once on the safety training regimen then aggression was quickly diminished by stage 5 if the dogs had been subjected to electric currents and by stage 6 if just in the play-training control. All effects were significant when tested with ANOVA.
	Acquisition of operands was comparable with experiment 2 for dogs undergoing safety-training but greatly reduced for control groups - lack of electrical stimulus led to a loss in achievement of correct operands during stages 7 and 8. Once the safety training was adopted for the control groups then acquisition of operands was increased, faster for play-training with aversion relief. All effects were significant when tested with ANOVA. Mean trials to acquire a new operand was significantly reduced between stages 2 and 6 for safety-trained dogs but not for play-trained dogs.

	Experiment 4: Level of aggression in all groups up to stage 6 was the same (all zero) – proportion of aggression increased at stage 7 in all groups with biggest effect in groups C and D3. Proportion of aggression decline to below 0.05 by stage 8. Acquisition of operands increased during sessions in stage 6 but at a lower rate than the controls. Group D1 showed the most rapid improvement. The other changes in acquisition depended on the particular training schedule. The C group, which had random conditioning, exhibited no improvement in acquisition of operands during this phase but increased thereafter. Emotional differences: For the proportion of yelping during shock there was little effect of the different groups but for tremor pre-session M&R dogs exhibited less than dogs in the other groups. Similarly, tremor post-shock was lowest in M&R dogs whilst play post-shock was highest in these groups. "In summary, the safety tone used as a conditioned reinforcer appears to decrease fear both before a training session and after a traumatic shock. Similarly, the use of a conditioned safety tone increases the likelihood that the dog interacts playfully with the trainer after a traumatic shock (relaxes)."

Conclusions:

"The findings of the present study seem to indicate that safety training

a) permanently eliminates avoidance-motivated aggression,

b) produces a high probability of extinction-resistant prosocial responding,

c) establishes a prosocial avoidance response set,

d) reduces fear and other reactions to stress, and

e) is correlated with positive changes in the dogs' carriage."

"Safety training was conceptualised as a multidimensional training program. It embodies response competition by safety training a wide range of behaviourally balanced prosocial avoidance operands, emotional competition via the extinction of fear, and motivational or incentive competition via safety acquisition."

"It appears that safety training with electrical stimulation is the only treatment that has potential for success"

Study critique:

The training programme outlined, which involved electrical stimulation via a collar, appears to have positive effects on the behaviour of the dog in the long term. However, the controls in experiment 2 were dogs that were not undergoing the intensive training sessions; a potentially more useful control would have been dogs that were undergoing the training sessions but without the use of electrical stimulation. Thus it is unclear whether it is the intensive training or the use of electrical stimulation within the training session that is the critical component in improving the behaviour of the dogs concerned. It would be useful to examine whether the intensive training regimen is as effective if the electrical stimulation is removed.

The actual level of electric current applied at the various operating levels for the collar are not quantified or not reported. This makes replication of the study very difficult.

2.2 General Conclusions on Published Studies

Overall, the studies indicate that the behaviour of dogs can be affected by electrical stimulation, but there are frequently important limitations:

- A lack of detail on the necessary physics of the devices used. This includes:
    - The amount of electrical energy being delivered
    - The magnitude of the skin contacts which affects the dissipation of energy
- Complicated experimental designs which are often very ambitious but with inadequate controls for the experimental situations – often because the primary research questions are complicated. There is perhaps an understandable desire to get as much information as possible from as small a sample as possible, given the concerns of some relating to the use of these devices.
- Selective or unjustified data analysis, when a different analysis may have provided more useful information.
- A tendency for authors to appear to over-extrapolate the results (especially to all EPTAs) or consider results from a particular perspective. In some cases the discussions tend to go well beyond the data, into the more general applied and political considerations which are more matters of opinion.
- Insufficient or confusing reporting of information, making replication or an understanding of what was done difficult.

Despite this it is possible to draw a number of more specific conclusions from an overall assessment of this body of work, which are supported by the broader scientific literature. Namely:

- That the application of an electrical aversive can suppress predatory type behaviour and that these effects might be quite enduring.
- EPTAs may reduce barking in response to an arousing stimulus, although the long term efficacy of this intervention remains unknown. There does not appear to be any evidence of long-term deleterious effects on the dogs when certain devices are used in this context.
- That poor contingency between the application of an electrical stimulus and behaviour can give rise to both behavioural and welfare problems.

However, these studies do not allow general conclusions to be drawn on the impact of these devices on the long-term welfare of animals exposed to them in what might be considered an "appropriate" manner – i.e. whether or not they be used effectively without causing significant welfare concern. Nor do the studies address whether alternative methods of behaviour modification and training are as effective or any less stressful for dogs in the field. There is therefore undoubtedly a need for further research into the use of EPTAs if we wish to generate good scientific evidence on their effects in companion animals. Good epidemiological and field data regarding the use of EPTAs as a form of punishment, negative reinforcement or disruptive stimulus would also be very useful in order to establish how these devices are being used in practice. Data verification in any such study is critical since the actual context of use may differ from that which the trainer believes is being applied. There is currently a lack of information concerning the level of knowledge and understanding about the science of animal training amongst trainers. There is a need for further, specific hypothesis-driven scientific investigations.

In addition to the studies presented here, the review revealed a number of studies investigating the use of EPTAs in other species of canid (coyotes and wolves). These suggest that EPTAs, especially when combined with an audible stimulus, can produce long term reduction in predation (Andelt et al., 1999, Linhart et al. 1976, Schultz et al., 2005, Shivak et al., 2002, 2003). Although the individual sample sizes were small, the results are consistent with the scientific reports in dogs and so add weight to the conclusion that EPTAs may be used to reduce the risk of predatory behaviour around livestock.

Further studies in other species (cattle and goats) have investigated experimentally the use of EPTAs for containment. These contrast with the one case series review reported in the dog and deserve consideration, given the lack of data available on companion animal species in this context. One study in cattle (Lee et al., 2007) found that the use of an EPTA could successfully deter cattle from an attractant and a second study that the effect of transient exposure to a device was no more stressful than a period of head restraint (Lee et al 2008). Training appears to be a necessary requirement for these systems to be most effective (Tiedemann et al., 1999), but even then there may be significant difficulties for some individuals to learn the necessary association to be contained by the device when there is no warning signal (Fay et al., 1989) or clear geographic features to associate. Specific work on companion animals in this context is necessary, but it seems reasonable to suggest that if these devices are to be used on pets in this context, then training and clear predictive stimuli and geographic markers should be minimum requirements to maximise effectiveness and minimise the risks.

3. Putative welfare arguments for and against the use of EPTAs in dogs

In this section, arguments for and against the use of EPTAs are reviewed, which purport to be concerned with the welfare implications of these devices. The arguments have been extracted from a review of the scientific and popular press, including review articles and commentaries, as well as a review of the evidence presented to the Scottish Parliament following its call for evidence in relation to proposed legislation aimed at regulating the use of EPTAs and a call undertaken by CAWC in 2008/9.

3.1 General criticisms

It should be noted that some of the arguments posed here are context specific and make certain assumptions about the training context, e.g. the EPTA is to be used as a source of punishment, or perhaps that reward is not included in the training programme. These assumptions may not be appropriate and so some the context specificity of some points needs to be recognised where appropriate.

3.1.1. Lack of evidence of efficacy

There are data to indicate that these devices may be effective in certain circumstances and this is supported by a sound scientific rationale. However, there is a lack of data concerning the specifics for their effective use and how this relates to the welfare of animals being trained, e.g. intensity of stimulation required or protocols to be adopted. An absence of evidence for a given effect should not be interpreted or presented as evidence of an absence of effect, but in the interests of protecting animal welfare, greater research into their effective use (most experimental studies to date seem to focus on their potential misuse) would help to inform this debate.

3.1.2. Potential for misuse / abuse

A number of studies have indicated that at least some of these devices are capable of causing considerable distress if used inappropriately, e.g. through the random or inappropriate application of current.

In some countries there have been successful cruelty prosecutions relating to the misuse of these devices on children (e.g. C and J Crawford, Chesterfield SC USA 2010), but no reports of cruelty prosecutions relating to their use in animals have been found. It seems reasonable to assume, therefore, that detected use to cause intentional harm is exceptional.

There is a notable lack of scientific evidence concerning problems with their more general use by the public or by specialist pet trainers. Nonetheless, even in the absence of evidence, it seems reasonable to suggest that it should be accepted that a risk remains. There is some evidence to suggest that inappropriate use does occur in some groups such as certain populations within the military (e.g. Haverbeke et al., 2008) and police (Schilder and van Den Borg, 2004). Members of the public may use these devices to deliver painful stimulation because they simply believe it is necessary for effect, especially given their colloquial title of "shock collars". Use in this context is perhaps one of the greatest concerns regarding the risk of harm from these devices.

However, it should be recognised that where their use is currently legally permissible, there are current legislative safeguards in place (e.g. Animal Welfare Act 2006) to protect against cruelty arising from the use of these devices whether intentional or not. To date no cruelty prosecutions have been taken to date under any UK legislation concerning the normal use of the devices; the reasons for this remain a matter for debate.

3.1.3. Unreliable contact makes them unreliable

Poor contact will undoubtedly lead to reduced efficacy, but conductivity may also be altered (positively or negatively) in certain situations by changes in the local environment. There is a lack of information concerning the electrical conduction properties of companion animal skin and hair in the range of circumstances likely to be encountered or the significance of this on the efficacy or experience of a given electrical discharge. The size and other properties of the contact electrodes also require careful consideration in this regard. Instructions provided with most devices reviewed appear adequate if followed correctly.

3.1.4. Risk of injury from the devices

It is sometimes claimed that EPTAs can cause electrical burns or seizures, but evidence of this is lacking and indeed such suggestions have led to legal proceedings (e.g. Orion Pet products Pty v RSPCA (Vic) in Australia) which did not find in favour of such claims. The physical characteristics of these devices are such that accidental harm in the way that is often suggested by any proprietary device is extremely unlikely, if not impossible. Sores occasionally arise from fitting a collar too tightly and it is perhaps these pressure sores arising from inappropriate fitting that have led some to believe that a collar may burn the skin at the point of contact. One owner in the call for evidence ascribed the death of her dog to "over-shock", but the exact circumstances were unclear.

3.1.5. Non-contingent aversives result in detrimental emotional changes

The random application of aversives is undoubtedly stressful, and this is supported by experimental evidence using one form of EPTA in dogs (Schalke et al 2007). However, it might be reasonably argued that the use of an EPTA in this way represents an inappropriate use in terms of both the schedule of punishment and intensity of the aversive stimulus used. Counter to this is the argument that there are currently insufficient restrictions on the use or output of EPTAs which increase the risk of such inappropriate use.

3.1.6. Risk of malfunction results in loss of function or prolonged discomfort

It is accepted that early devices often lacked the desired reliability but this no longer appears to be the case. In the case of anti-bark collars it is often claimed that a dog other than the one barking might activate the device, but there is a lack of evidence to support this claim in relation to modern devices. Many (but not all) devices have a safety cut-out in the event of failure, so in a worst case scenario, the animal will not receive the training pulse anticipated. Given that these devices are advocated for training (rather than maintenance of the learned response, although occasional reinforcement might be required), the risk posed by such a malfunction should be considered minimal. However, it would be useful for devices to have a declared reliability from bench testing that was readily available to those considering purchasing an EPTA.

3.1.7. Their need / demand arises from a lack of regulation of training and behaviour services to produce competent alternative practitioners

There are currently no studies available comparing the use of EPTAs as part of the management of any behaviour problem with a programme not using an electrical stimulus. This is a significant gap in our knowledge. This argument is based on unfounded assumptions and a perhaps questionable scientific basis, since responses learnt through avoidance of aversion are different to those learned through the acquisition of a positive reward. The latter are typically more variable and so there are sound scientific reasons to question the integrity of this claim in the face of a lack of evidence one way or the other. It has also not been established how the use of an electrical stimulus as an aversive or disruptive stimulus compares to any other used to achieve the same effect. Indeed it might be argued that the strong odours used in some deterrents (e.g. citronella collars) are more likely to be perceived with greater aversion by a macro-osmic species (i.e. species with a highly developed sense of smell, such as the dog or cat); a similar argument might just as reasonably be applied to the use of loud audible disruptive stimuli. There is perhaps a tendency to anthropomorphise the relative unpleasantness of different stimuli, when scientific data could valuably inform the animal welfare debate.

3.1.8. The use of aversives can disrupt the dog-owner bond

If paired with the presence of the owner/ handler, it seems reasonable to suggest that the use of an aversive will increase the risk of avoidance and potentially create further problems, and there is some evidence to support this in dogs (e.g. Schilder and Van Den Borg 2004). However, in counter to this, it might be argued that this again reflects a misuse of the EPTA. Animals should typically be habituated to the collar in advance, and any electrical stimulus delivered in association with the animal's behaviour rather than any specific individual.

3.1.9. The use of aversives is less efficient than the use of rewards in training

As already noted, there is a lack of studies comparing the efficiency and effectiveness of any training regime using an EPTA with one that does not. Training involves effective communication and application of learning theory to reinforce appropriate behaviour; different forms of learning have evolved to cope efficiently with different circumstances, and therefore any generalisation on the efficiency of one process over another is unsound. There are many instances where the use of aversives can result in effective learning following a single exposure, and in general a blended approach, encouraging appropriate behaviour and discouraging inappropriate responses, will offer the best opportunity for communication and reinforcement to achieve the desired outcomes.

3.1.10. Seen as a "quick fix" when more humane alternatives are available

This argument also lacks supporting evidence. It might be argued from a theoretical perspective that in terms of animal welfare, a relatively short exposure to an aversive stimulus may be preferable to the stress associated with a more prolonged training experience, even if the longer period of training primarily uses positive reinforcement, to reward correct behaviour, as it may require greater effort to sustain attention and deal with conflicting motivations when an animal is tempted by alternatives and this is not supported by a disincentive. However in the absence of comparative studies it is not possible to substantiate this one way or the other.

3.2 Criticisms directed at the use of EPTAs as either punishment or negative reinforcement devices

It should be recognised that not all training involving an EPTA necessarily requires the stimulus to be sufficiently aversive to be either a source of punishment or negative reinforcement and so these concerns would not arise with devices incapable of delivering a stimulus that is perceived aversively.

3.2.1. Effective punishment and negative reinforcement is relatively permanent in its effects and so it is difficult to correct errors

The use of aversives can result in a more rigid and permanent response, since harm avoidance is generally a higher priority than resource acquisition. In some situations it might be argued that this is desirable since it means that once an appropriate response has been established, aversives do not need to be applied to maintain the response, and that this may reduce dependence on the training skills of owners. However, in contrast the accidental misapplication of aversives might result in a response that is more difficult to reverse. This risk might be minimised through the use of the technique only by appropriately qualified and trained individuals.

The difficulties that the use of such training techniques poses in practice are unclear. Concerns have recently been raised about the use of negative reinforcement in equitation, but these tend to focus on the problems arising from the timing of negative reinforcement rather than the risk of inflexible responses arising through its inappropriate use.

3.2.2. Use of aversives in training is incompatible with certain behavioural goals

The limitations of the generality of the laws of learning have already been discussed, and it should be accepted that the use of EPTAs is not appropriate for all behaviours. By the same argument, this would suggest that an entirely reward-based programme may not be appropriate in all circumstances. It is therefore reasonable to consider which behaviours might be best suited to training with an EPTA and restrictions on their use in training in this regard could then be proposed on a more logical basis. Further research is required on this matter, although reasoned argument could begin, focused on the establishment of conditioned avoidance responses.

3.2.3. Better for a dog to be euthanized if its behaviour is such as to require these devices

This is a matter of opinion rather than a clear welfare argument given our current lack of knowledge of the impact of EPTAs on animal welfare. It is therefore not considered further.

3.3. Criticism directed at their use relating to punishment

It should be recognised that not all training involving an EPTA necessarily requires the stimulus to be sufficiently aversive to be a form of punishment and so these concerns would not arise with devices incapable of delivering a stimulus that is perceived sufficiently aversive to inhibit a recurrence of behaviour in the long term.

3.3.1. Inappropriate contingencies of punishment prevent learning of appropriate responses

Inappropriate contingencies prevent appropriate learning regardless of whether the behaviour is contingent upon reward or punishment and so this criticism is more a general critique of poor training practice and not specific to the use of EPTAs.

3.3.2. Difficult to get the right level for effective punishment, versus risk of habituation

As already discussed, if a device is to be used as a punisher, it is important that an appropriate intensity is established as soon as possible to prevent habituation to the stimulus and the need for a more intensive stimulus. There are currently no published scientific guidelines on how this might be achieved in a training context and so the appropriate threshold is currently part of the art of training with a punisher. Both excessive and insufficient punishment can have serious detrimental consequences for the animal’s welfare and this is a serious cause for concern. It might be argued that in skilled hands this risk can be minimised, but at present there is no formal way of establishing who has the necessary skill.

3.3.3. Punishment induces emotional changes that interfere with learning

This argument is related to point 2 above and in the previous section, since the emotion induced is appropriate to the adaptive context of the type of learning that is established from avoidance. Thus it is unlikely that if used appropriately that learning to avoid would be inhibited. However, the use of EPTAs to deliver punishment to teach responses that are not associated with avoidance may be harder to justify in the absence of appropriate reinforcement. The risks associated with this problem might be mitigated by ensuring that operatives are appropriately skilled and knowledgeable in animal training science.

3.3.4. Punishment can elicit inappropriate behaviours e.g. avoidance associated with fear or aggression

Aggression may arise as a result of either frustration or a perceived threat, and the risk is increased if the animal is more highly aroused and in a negative affective state. It therefore seems reasonable to assume that these risks are greater if an EPTA is used to deliver punishment and especially if this repeated with some frequency. It could be argued that such responses are a reflection of misuse (see points 2 and 3 above); nonetheless it is reasonable to suggest there is an increased risk.

3.3.5. Ethics of devising training based on punishment

Detailed ethical considerations concerning the use of EPTAs or different aversive methods for training are outside the scope of this report and have been discussed elsewhere (e.g. Lamb 2011) and so will not be addressed further here. However, it is worth highlighting that arguments surrounding the animal welfare impacts of EPTAs should be distinguished from ethical arguments. .

3.4 Criticisms directed at their use relating to negative reinforcement

3.4.1 Inappropriate associations learned through other contingencies as a result of negative reinforcement

This criticism reflects the risks of poor training practice by inadequately qualified or skilled personnel. It is not a specific criticism of the use of EPTAs.

3.5. Specific criticism directed at particular EPTAs

In this section, criticisms that relate to particular types of product are briefly considered.

3.5.1. Boundary fence systems

Specific concerns expressed relating to these systems focus on three areas:

- The ability of the animal to identify the relevant association in the absence of a visible or audible sign

In some cases a visible barrier may not be permissible and this might be the reason why such a device is chosen. While animals may be able to learn geocentric boundaries without an obvious physical barrier, this process will inevitably be assisted by the inclusion of either a visual, olfactory and/or audible warning signal. This is a relatively straightforward refinement to include in any EPTA used for this purpose.

- Lack of physical barrier does not prevent entry by others and so may coincidentally increase risk of harm to occupants

This assumes that the installation of a physical barrier is a viable alternative, but this may not always be the case. Clearly if there is a risk from other animals then these need to be identified before any installation and appropriate measures taken before the decision taken to install a boundary fence-related EPTA. The use of an EPTA should not be seen as an alternative to the use of appropriate training for the given circumstances. This problem may also be largely theoretical as it was not encountered directly in the call for evidence from users (see later). The risk needs to be recognised but cannot be quantified in the absence of evidence. The use of trained personnel and informed consent by the owner may help to mitigate against this risk.

- If the animal breaks through the barrier it is locked out

This problem is essentially similar to the one above and the risks must be assessed in a given circumstance. The risk is perhaps higher and owners need to be aware of their responsibility in such circumstances. Whilst it seems reasonable to suggest that dogs and horses should not be left unattended in an area limited by an EPTA- related boundary system, this might be harder to accept in the case of cats.

3.5.2. Anti-barking collars

Barking problems still represent a substantial cause of noise complaints to Local Authorities. Uncontrolled barking is also a frequently cited reason for relinquishment of dogs. This can be in response to multiple complaints from local authorities, deteriorating neighbour relations, threats of eviction from landlords and where the courts have ordered the owners to comply with a restriction. Several court decisions concerning the nuisance associated with dog barking have stipulated a limit of four minutes of sustained barking per day. In such cases the owner may have little alternative but to seek a speedy resolution to a problem, such as the use of an anti-barking collar, since alternatives might take considerably more time. However, it may be that an appeal to the authorities, drawing attention to the fact that expert professional advice is being taken, would have a good chance of acceptance, and negate the use of such a device. There are also specific concerns relating to the use of these devices which tend to focus on two areas:

- The product controls the sign not the cause

Many dogs vocalise as a sign of distress and the use of an EPTA device to inhibit the behaviour in these circumstances depends on their efficacy in providing either negative reinforcement of quiet behaviour and/or punishment of vocalisation. In such instances their use is inappropriate. If they are to be considered for use, it is imperative that it is established that the behaviour is not associated with distress and that the stimulus is of an appropriate intensity. This requires considerable skill and so it is difficult to see a justification for such devices being freely available.

- Activation by other noises / dogs

Technological developments should ensure that the device cannot be inappropriately activated by other noises but that it requires a combination of relevant noise and vibration for an electrical stimulus to be delivered. In addition it seems reasonable to suggest that the device should contain an audible warning tone which predicts delivery of current if the vocalisation does not cease.

3.6 Summary of and commentary on arguments supporting the use of EPTAs

The arguments in favour of the use of EPTAs focus on two main areas: the welfare benefits that these devices bring and the efficiency they provide for trainers. A third area concerns the consistency of standards, i.e. why should collars be unacceptable but electric fences acceptable? Such ethical arguments have been discussed elsewhere (e.g. Lamb 2011).

3.6.1 Welfare benefits

Proponents of the use of EPTAs argue that their use improves the welfare and quality of life of companion animals and their owners in the long term. This is suggested on the basis of a number of considerations.

Firstly, it is pointed out that they are not necessarily used as an aversive stimulus but as a disruptive one within a reward-based programme. In this instance, some of the criticisms which relate to the aversive nature of the stimulus may become irrelevant. Unfortunately, there are no published studies in the peer reviewed literature demonstrating efficacy or impact of devices in this context, although combined methods are described in the training literature (e.g. Deeley’s E-touch Trainer’s Workshop, course notes), and so the degree to which this theory translates into practice remains unknown. Similarly the extent to which this is normal practice also remains unknown.

Proponents also suggest that even if the training is aversive, then long term use is unusual, and so it is a relatively short inconvenience for a longer term gain. Unfortunately there are no independent data to substantiate either the tendency to use these for a short period of time or that the impact of their use is only aversive in the short term. Further research would help to address this knowledge gap.

It is further suggested that the use of an EPTA provides freedoms that would otherwise be deprived, such as: garden access, off-lead walking and exercise, and ability to socialise off-lead. It is argued that the devices ensure animals are contained within safe zones and prevented from roaming and causing associated problems, and that when used appropriately they increase the animal's control over its environment, reduce the risk of harm and reduce its stress. These latter points are theoretically sound but a lack of comparative studies mean it is not possible to determine if these goals could not be achieved as efficiently or with less stress by using alternative techniques.

Proponents also conclude that the benefits outweigh the risks. In a rebuttal of some of the criticism of opponents discussed in the previous section, it is argued that safety measures are in place for abusers through anti-cruelty legislation and that EPTAs are probably more humane than some alternatives, like citronella collars. As these points have already been addressed, they will not be discussed further.

An ethical argument in favour of their use is also often posited which suggests that the use of EPTAs saves lives and prevents more harmful outcomes for the animal, such as accidents on the road (still a significant cause of death for cats), being shot for livestock worrying, or access to countryside poisons. In addition, such training also reduces the risk to others, including livestock and horses, pets, wildlife, and the risk of problems such as road accidents by drivers trying to avoid straying animals. However, opponents would argue that these problems could be prevented by using either alternative training methods or by ensuring the animal was on-lead in risky situations. However as has been pointed out already, there is no evidence to suggest that these alternatives are as effective or that simple restraint on a lead without additional behaviour modification or being indoors does not cause substantial distress to the animal, for example through frustration.

A further benefit which it is claimed can be derived from the use of EPTAs is an increase in owner confidence in potentially problematic circumstances. While this might be the case (and there are no scientific data either way), there are also no data to suggest that confidence is greater when these devices are used compared to when they are not. It might be expected that, so long as a reliable outcome can be demonstrated, then owner confidence is likely to be improved regardless of the method employed to achieve that outcome.

3.6.2 Efficacy

As previously noted, arguments in favour of efficacy are not substantiated by scientific data in favour of any technique over another in relation to the use of EPTAs. Proponents claim that users find the method convenient, with a high compliance and high satisfaction rate, since treatment is relatively short term. It would be relatively straightforward to generate good data to substantiate or refute this claim. It is also suggested that the method results in a high level of reliability which cannot be achieved in other ways, especially in relation to distance training, and that in some cases the method may be essential, since some dogs do not appear to respond to other methods, although it is acknowledged that the use of such devices is not suitable for all dogs. In particular it is argued, with some theoretical soundness, that the use of EPTAs is particularly useful for self-rewarding behaviours, and problems in which the dog does not attend to the owner. The flexibility of discharge allows the individualisation of the stimulus required in a relatively straightforward way. Again the lack of comparative studies is a serious gap in our knowledge and ability to evaluate this claim. Other contexts in which EPTAs are particularly promoted include:

the re-establishment of control in the event of unresponsiveness to commands; the facilitation of identification of wildlife for legal control measures without hunting; and the contingent delivery of punishment upon misbehaviour, i.e. the appropriate use of punishment.

Whilst these are undoubtedly indications, it is again unclear whether the use of EPTAs in these contexts makes the process superior in any way, given the lack of available scientific data.

It is frequently argued that EPTAS are beneficial in the following contexts: when used as a last resort, as a deterrent, within a comprehensive training programme, when dealing with a very determined animal, and when other methods of training have been proven to be unsuccessful. Even organisations who are generally opposed to the use of EPTAs acknowledge that they may be indicated in some circumstances. For example a press release from the Association of Pet Behaviour Counsellors, (2004) states their opposition to EPTAS, but acknowledges that:

“Only in a handful of cases, where all else has been tried and failed, and when the condition is potentially life-threatening, can the use of such devices ever be justified, and, only then, in the hands of an experienced behavioural specialist who is capable of accurate timing.”

In response to the Welsh Assembly’s decision to impose a ban on EPTAs the Director of the British Association for Shooting and Conservation (Wales), Glynn Cook, drew the following conclusions:

Electronic training devices are very rarely, if ever, the first port of call for those training dogs…Reward based training systems are the norm in the gun dog world, with very few resorting to such devices…However, this does not mean that such devices should not be available to those who need them as a technique of last resort.

We believe that using the devices on dogs with serious behavioural problems can work if used as a last resort and could prevent dogs being put down. (Cook, 2008)

This appeal to a method of last resort may focus on the desire to avoid an alternative course where the animal is euthanized for undesirable behaviour such as worrying or killing livestock or inability to work. This form of benefit might be supported by an appeal to the lesser evil. This appeal to the use of EPTAS *as a last resort* or *lesser evil* raises ethical questions.

This suggests that whilst EPTAs are not generally morally acceptable, they should not be made illegal because in extreme circumstances, i.e. as a last resort, they are the lesser evil. This opinion appears to be shared by many opponents as well as supporters of the use of EPTAs. However, is it coherent to endorse the legality of a practice while maintaining that it is morally unacceptable?

A moral judgement about an activity and a judgement regarding its legalisation do not always concord. It may be desirable to enact laws based on moral arguments, but laws may have to be limited by prudent considerations. In this way certain practices that are morally questionable may have to be legally tolerated because a law prohibiting them cannot be enforced without infringing upon other moral considerations. Nevertheless, tolerating the immoral does not make it moral. One is choosing the lesser evil.

We can apply this reasoning to the arguments regarding the moral and legal status of EPTAs.

For example, one may believe that there is a limited use for EPTAs, but may feel that once legally endorsed they could be used with too great a frequency, so as to become an unacceptable preferred method of training animals. Conversely, one may see them as morally dubious, but have no objections to them being legally endorsed as it would provide an opportunity for them to be brought under control, for example only to be used by professionals, under strict licence and in a humane manner, as part of a comprehensive training programme and as a lesser evil.

In the case of the last resort/lesser evil argument in favour of using EPTAs, it is argued that in certain circumstances the infliction of pain on an animal may be necessary to prevent greater harms to the animal or to others. So the question is: how best can the practice be limited? One possibility would be to legally restrict use of EPTAs to those circumstances where it is necessary.

Under these circumstances moral objections to the use of EPTAs can be transformed into arguments in favour of them being legally permissible. The case for the legalisation of EPTAs as a lesser evil is to restrict and control their use.

It is one thing to argue that EPTAs should remain legal as the lesser evil, but it is an entirely different matter to argue that they are morally good.

From a purely utilitarian perspective, there is no room for the concept of a lesser evil. If, according to the consequences it is concluded that EPTAs are morally wrong - we have a duty to prohibit them; however, if it concludes they are morally right, then we have a duty to use them. In the latter case they should not be considered a lesser evil, but a positive good. If the cost-benefit calculation favours their use, one would not simply be permitted to use them; one would be morally *obliged* to use them. There is no scope for choice between lesser evils, between one’s moral judgements regarding an activity and one’s moral judgements about what to do about that activity. This perhaps highlights the limitations of a purely utilitarian approach to resolving such moral issues and the need for a wider approach to resolving such dilemmas, such as a consideration of the morality of using electric current to control the behaviour of animals, and limit their autonomy.

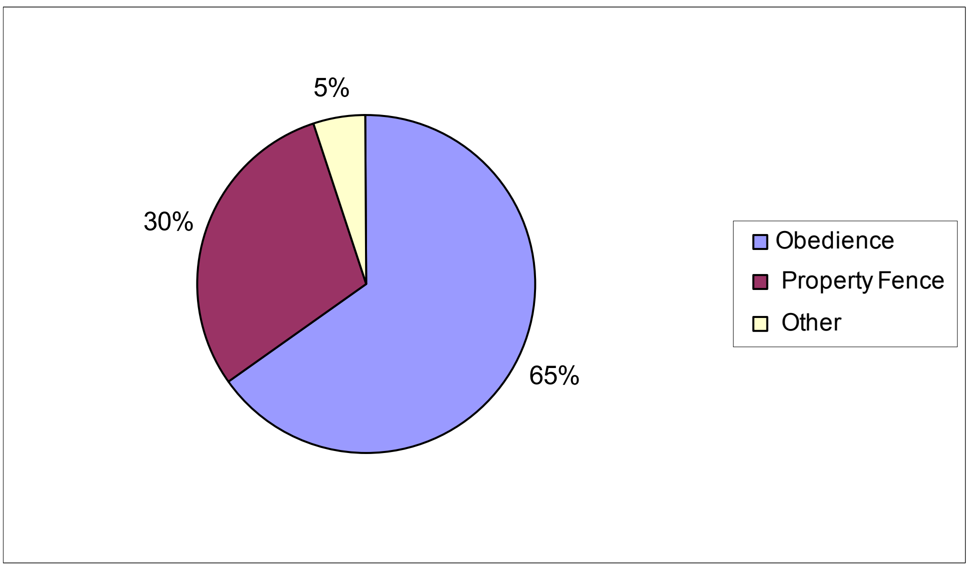
4. Results from a call for evidence relating to the use of electric pulse training aids

Given the lack of scientific data relating to the impact of the use of EPTAs on the welfare of companion animals, a call for evidence was undertaken with a view to assessing the contexts in which EPTAs were being used in the UK, including their use in relation to other potential methods, their perceived benefits and any perceived problems or difficulties encountered by users rather than those without direct experience of the devices.

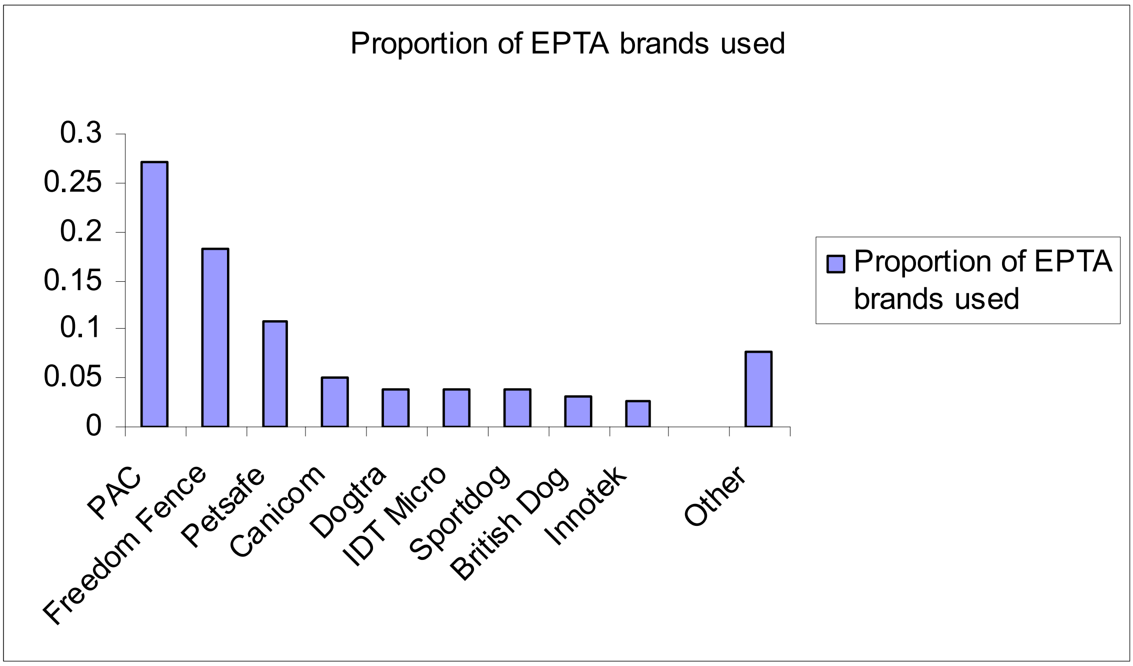
Data were gathered via the internet, such that the originating source of all submissions could be determined and multiple submissions from the same computer prevented. A copy of the questionnaire is provided in the Appendix. Summary data were extracted at frequent intervals during the Spring and Summer of 2009, with the data used here being extracted after there appeared to be no substantial shift in the running total patterns of responses being logged. At this point the survey had been completed by 188 people from the UK. 92% of respondents used the EPTAs with dogs, 8% with cats and none with horses. The small sample size in relation to cats precludes much meaningful scientific discussion of results in relation to this species. However, the results suggest they were used for containment based on a concern for the risks associated with straying outside of the owner's property, such as injury from road traffic accidents or impact on neighbours without cats and either the perceived difficulty or ineffectiveness of other containment systems, beyond household containment. These points deserve research attention.

The main reported use of EPTA collars in dogs was to improve obedience, such as more responsive recalls and stopping animals that chase/kill wildlife/livestock. They were also used to improve 'bad behaviours' such as jumping up or barking, as well as being used as invisible property barriers to stop animals from wandering.

General categories of reported use of EPTA in dogs



Breaking down the obedience category, most EPTAs were used to stop chasing behaviours (50%), followed by improving recalls (27%) and lastly to improve general obedience (23%) which includes basic obedience training and gundog training. These results are largely consistent with the reported preferential indications for the use of EPTAs.

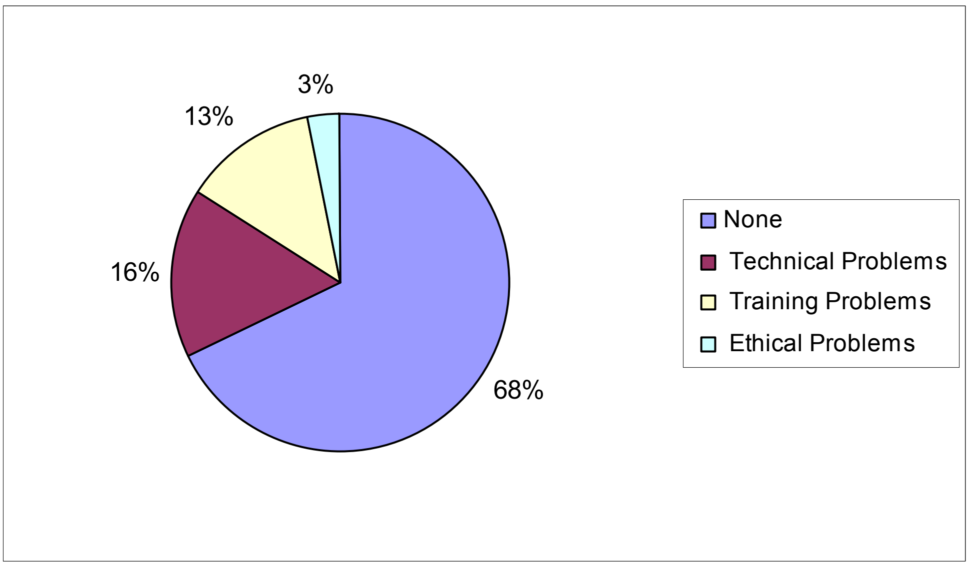


The most common brands of EPTA used by respondents were PAC, Freedom Fence and Petsafe.

All but 6 respondents rated the EPTA effectiveness at 8 or above on a score of 0-10.

The majority of EPTA users reported no difficulties with the training method – those that did could be broken down into Technical, Ethical and Training concerns.

<u>Classification of problems encountered by users, with the method of training associated with the use of EPTAs.</u>



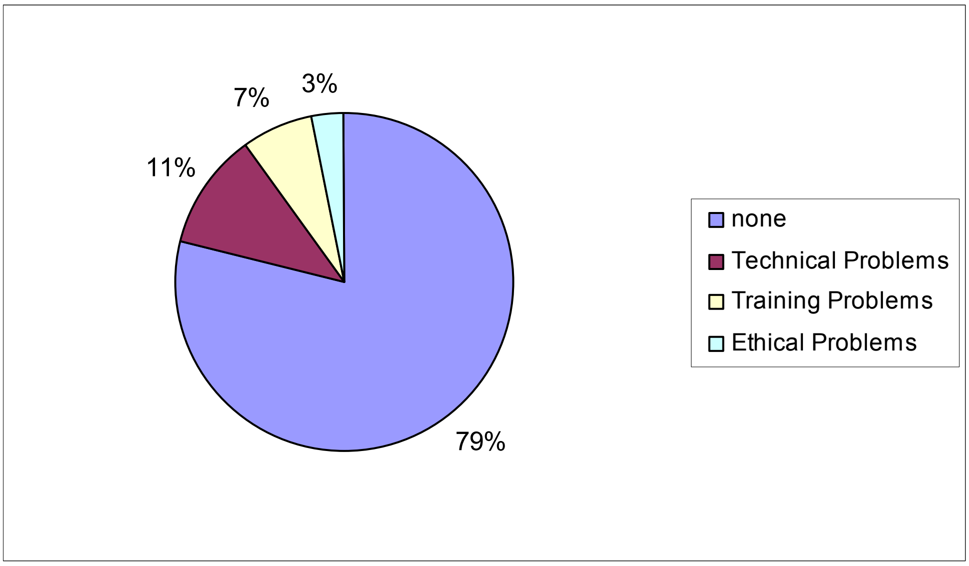
Technical concerns consisted of problems such as the batteries going dead without being noticed, the collar was too big for smaller breeds of dog, the dog would sometimes be out of range to administer a warning tone or shock, the collar was not always making proper contact with the animal's neck and property fence wires would get breaks in them.

Training concerns included the behaviour returning if the collar was removed, determining the correct signal strength to use, the initial training with the collar was slow, timing the warning signals or shocks correctly and the dog learning to ignore the warning signal and shock.

Ethical concerns consisted of people being reluctant to use the collar, being afraid of frightening or causing pain to their animal and being concerned with the negative stigma collar use has.

The complications arising from EPTA use were grouped into the same 4 categories.

<u>Classification of complications encountered by users associated with the use of EPTAs.</u>



Technical problems again included times when the batteries had died, the dog was out of range or in the woods or the property fence was broken.

Training problems also included the dog ignoring the warning signal and shock, the timing being difficult to achieve and the property fence preventing escaped dogs from returning.

Ethical concerns included animals developing ulcers or sore areas where the EPTA was applied, one owner suggesting that their dog reportedly died from 'over-shock' and in one instance the dog's separation anxiety was reported to increase after EPTA use. These latter two reports are a cause for concern. Given the technical specifications of the collars available, it is difficult to conceive how the former could be causally linked, in the case of the latter; this appears to be an instance of inappropriate use. It is suggested that if EPTA use is permitted, a body overseeing suspect adverse events be instigated to allow the further investigation of such cases.

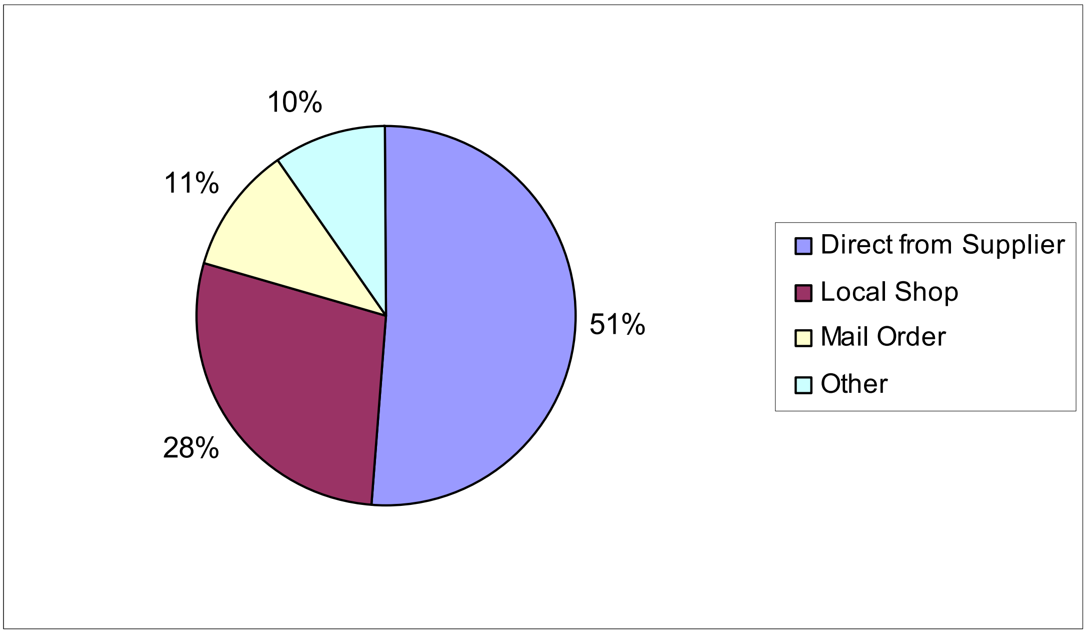
93% of respondents rated the EPTA 8 or more on reliability and 88% rated them 7 or more for ease of use. This would support the claim that they are reliable and convenient to use.

36% of respondents used the EPTA for one month or less while 16% were still using them after a year. This would suggest that the training involving the use of EPTAs is of comparable duration to other methods not using an EPTA.

74% of people reported complete satisfaction with the EPTA compared to 4% who reported complete dissatisfaction.

4% of people felt that EPTAs should only be used by qualified trainers, 6% only used an EPTA as a last resort and 2% felt they were inhumane. Most EPTAs were purchased from the suppliers, followed by local shops. This suggests that they are not being used predominantly by trained personnel.

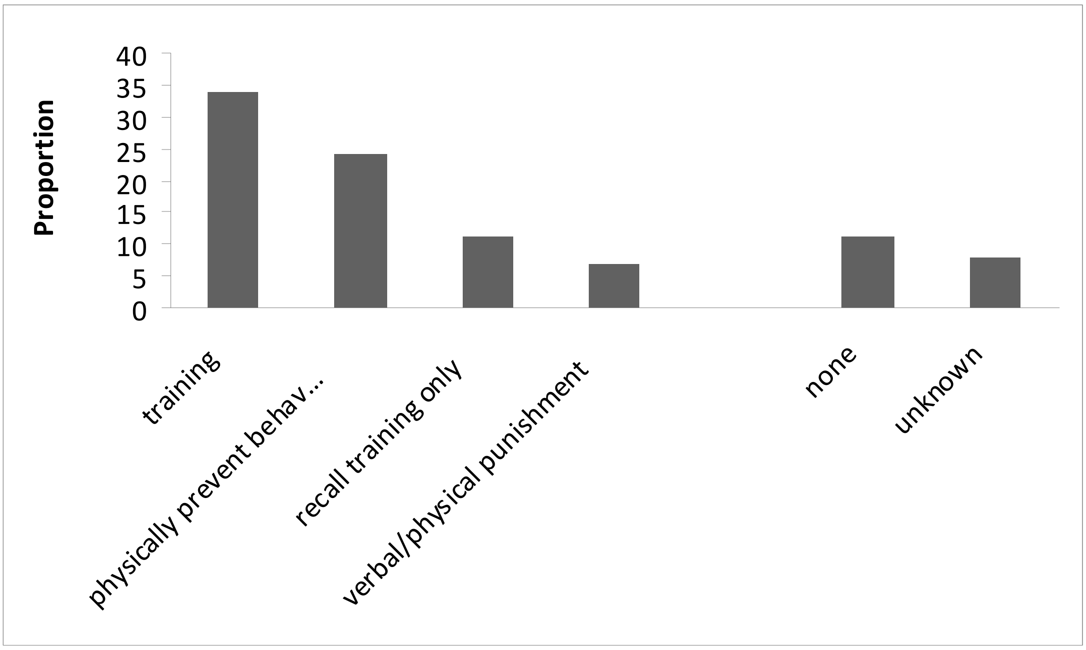
<u>Classification of source of EPTA described by users</u>



70% of respondents always use the warning signal first while 6% never do and 13% do not have warning signals.

The other methods used aside from EPTAs in behaviour management are given below:

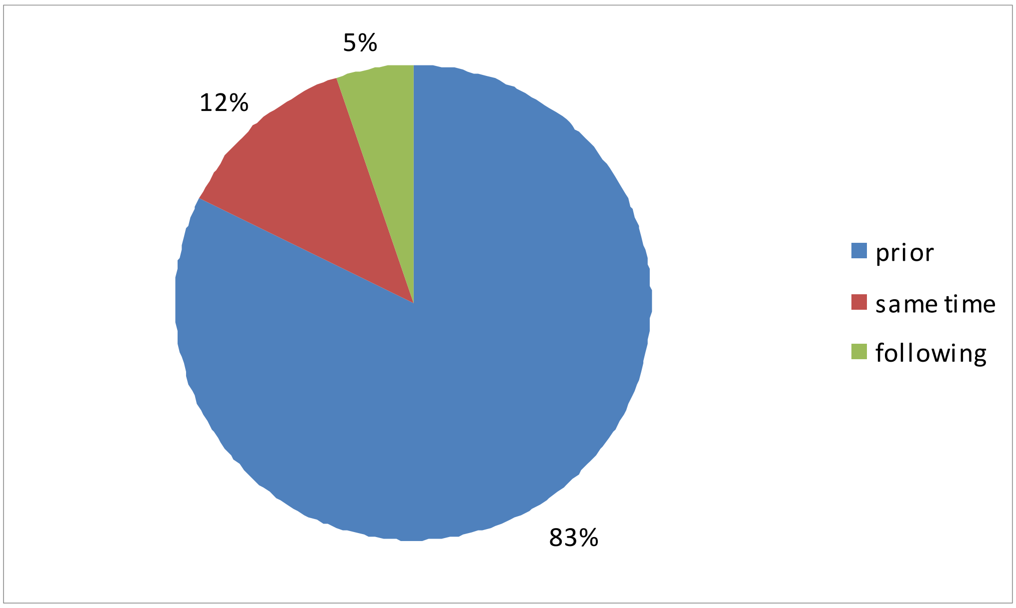
Reported use of other methods tried apart from EPTA by EPTA users



Training included traditional basic obedience classes, reward - based techniques and specific gundog training.

Physically preventing the behaviour included methods such as tying the animal in the garden, shutting them in the house and using long lines/leashes.

Time of use of other training and behaviour modification methods, relative to EPTA use by users.



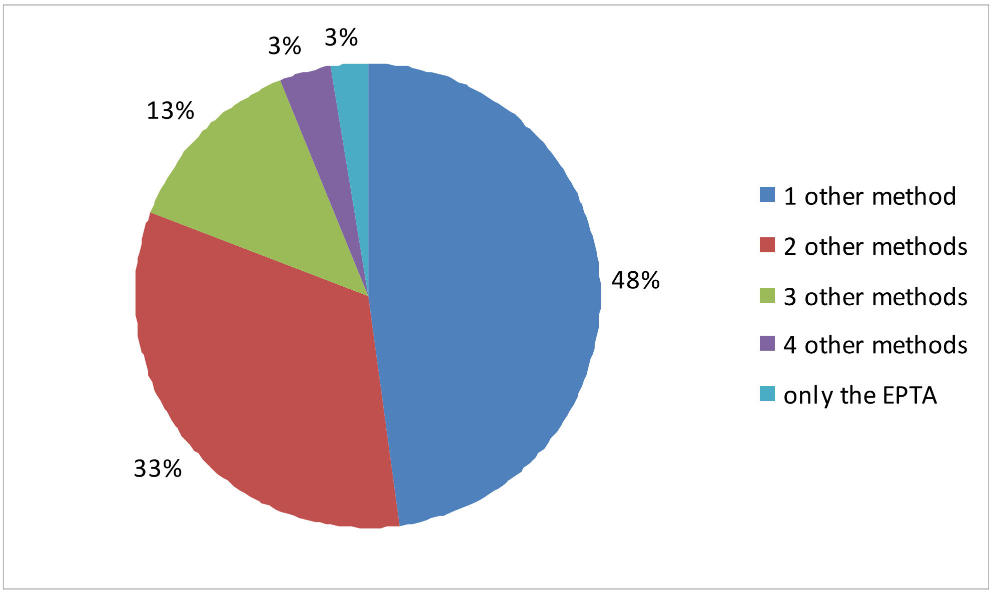
Methods used prior to the EPTA were mainly physically preventing the behaviour and traditional training of the animal without use of an EPTA.

Methods used at the same time as the EPTA were mainly training/recall training without use of an EPTA.

Methods used following the EPTA were mainly training/recall training without use of an EPTA.

However, 67% of respondents found these other training methods ineffective, 63% found them unreliable, 52% thought they were difficult to use/implement and 64% were not satisfied with the results.

<u>Reported number of other methods used in addition to EPTA by users</u>



Most respondents only tried one other method aside from the EPTA while 3% used the EPTA only.

These data provide a snapshot of the use of EPTAs in the UK and suggest that problems relating to the use of EPTAs in practice are not widespread although occasional significant problems do arise.

Conclusion and Recommendations

If the use of electric current is accepted as a morally questionable way to educate people, then it seems that the use of EPTAs in a similar way also involves a morally questionable approach to the training of companion animals, even if welfare requirements are fulfilled. Irrespective of claims and counter claims regarding suffering, the employment of EPTAs has the potential to contribute to an instrumentalisation of the relationship between humans and companion animals and so may be seen as being incompatible with ethical principles regarding education, training, and correcting behaviour. Although analogies between humans and animals are often questionable, over the past few years a shift in the moral and legal climate is suggestive of a public awareness that companion animals are not akin to machines, and deserve respect in many ways similar to humans, and that *'It is not clear that a radical distinction between human and non-human is now defensible, either biologically or ethically…'* (FAWC, 1998). They have morally relevant interests. However, the application of concern for these moral interests is somewhat inconsistent at present, as illustrated by the widespread acceptability of electric fencing for horses and livestock.

1. The moral complexity of the problem and resulting ethical dilemmas associated with the use of EPTAs should be acknowledged by all who share a concern for animal welfare.

2. Currently there are sound animal welfare-based arguments both for and against the use of EPTAs in theory, but there is also a substantial lack of relevant research to inform the conclusions of those from either side of the debate.

3. The authors are aware of ongoing research which aims to fill this gap. This should allow more extensive, clearer and more specific recommendations to follow on the basis of the principles and guidelines issued in this report. We therefore suggest that this report be read in conjunction with future research results as they become available.

4. There is currently a moral inconsistency in attitudes towards the use of electric current for the containment of animals; for example the general acceptance of electric fences to contain livestock. This inconsistency appears to be partly speciesist and/or partly based on an arbitrary aversion to the presence of an electronic device capable of delivering an aversive stimulus to the neck of another animal.

5. Although it is for Government to decide on the legality of the various forms of these devices, the lack of conclusive scientific research, concerning the welfare implications of the use of EPTAs in all the possible contexts described, mean that at present, decisions on whether or not to legally permit the use of EPTAs need to be informed by broader ethical analyses than those based exclusively on animal welfare. In consideration of this matter, we recommend that the following points be acknowledged:

- While there are some features common to all EPTAs, meaningful distinctions with regards to the risks to animal welfare can be made between:
    - Those devices which are activated by the animal's behaviour and those which depend on some other party for the discharge of the stimulus;
    - Devices with a maximum potential to be used as a disrupter, negative reinforcer or punisher;
    - Their use by a highly skilled and knowledgeable professional and their use by those with either less knowledge or skill.
- It is not possible to formulate an evidence-based argument using utilitarian principles for or against the use of EPTAs in training.
    - An alternative ethical argument may be proposed against their use on the basis of the importance of telos and the dubious morality of compulsion in how we bring about change in others. In this case, certain practices, such as the use of EPTAs within a punishment-based training programme, aimed at creating an aversion to a problematic behaviour without encouraging a specific alternative, may be considered morally unacceptable for many reasons.
    - Any argument in favour of their use in a given context would be strengthened if it could be demonstrated that their use in this context was at least as effective as the alternatives available and that this was achieved without necessarily causing significantly more harm than these alternatives. To date neither of these requirements has been demonstrated for any common indication of use for an EPTA. The precautionary principle might suggest that the onus should be upon proponents of the use of EPTAs to provide this evidence, especially where there appear to be viable lower risk alternatives.
- It is clear that at least some EPTAs can be used in a way which causes harm and the risk of this is greater with devices lacking specific safety features (see Recommendation 8) and in the hands of less competent trainers. There is therefore an unnecessary risk to animal welfare in the unregulated availability of the current range of devices.

6. There is undoubtedly a need for further research into the use of EPTAs if we wish to generate good scientific evidence about their effects on companion animals. In particular, there is a lack of information concerning the following key points:

- The long term efficacy and impact of alternative non-electrically based (i.e. those which raise less moral concern) training methods (as opposed to restrictive practices such as leash walking) in contexts for which EPTAs are often advocated (e.g. chasing livestock).

- How different forms of electrical stimulus are perceived by different individuals (within and between species) in different circumstances.
- Whether it is possible to use these devices in a way which is effective without causing an unacceptable level of suffering in either the short or long term.
- Epidemiological and field data regarding the prevalence of use of EPTAs as a form of punishment, negative reinforcement or disruptive stimulus which can usefully establish how these devices are being used in practice.
- The impact, in both the short and longer term, on the welfare of individual species in which they are used, from the use of these devices in the field by members of the public, unqualified trainers and those more specialised in the use of these devices.
- The welfare of animals subject to the use of these devices in non-manually controlled contexts, such as within the context of containment systems. This should include research on the ability of animals to delineate boundaries in the absence of clearly defined geographic features.

Should Government support the legality of EPTAs, then the following two recommendations are made in the interests of animal protection:

7. In order to evaluate the intrinsic risks to animal welfare of any EPTA, data relating to the following characteristics of the device should be readily available:

- Reliability
- Electrical discharge features
- Current and voltage over a range of resistances

8. In order to limit the extrinsic risks to animal welfare associated with the use of any EPTA, the following recommendations are made as a minimum requirement:

- All EPTAs should have a mandatory safety key to limit voltage. In the absence of relevant direct evidence, it may be possible for manufacturers to agree initial standards with relevant animal welfare bodies and the academic community in the interim.
- Any available EPTA with the capacity to deliver an aversive stimulus should feature a non-aversive conditional stimulus which can be used to predict the potential delivery of the aversive stimulus.
- Any available EPTA with the capacity to deliver an aversive stimulus should also have the capacity to easily cancel the delivery of the aversive stimulus after delivery of the conditional stimulus.

- An EPTA should never be used alone within a training programme, but rather it should form part of a programme including the provision of identifiable rewards.
- In the case of boundary systems, the boundary should be associated with identifiable landmarks that animals can readily associate with the limitations of a territory.
- Some form of registration / licensing of practitioners (including those involved in installing permanent structures making use of EPTAs) and devices should be developed with statutory support possibly financed by interested bodies. Licensed practitioners would operate under a clear code of conduct which recognises the knowledge and skill required for the humane use of the diversity of any devices deemed legal, the importance of safeguarding the welfare of animals undergoing training with an EPTA, the need for informed consent from the owner concerning the process, contra-indications and potential risks.
- Consideration should be given to the standard documentation of the use of EPTAs as part of the professionalization of their use. This would provide greater reassurance to the public and those unfamiliar with their application.

9. In the event that Government supports the legality of EPTAs, it should be noted that their use should not be considered necessarily an act of last resort. Especially when being used at a level of stimulation which results in disruption of ongoing behaviour, the use of an EPTA should be considered part of the most appropriate training package for a given animal in the current circumstances.

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Appendix 1

Survey used in call for evidence

Companion Animal Welfare Council

Call for evidence relating to the use of electric pulse training aids (EPTA or "shock collars").

The Companion Animal Welfare Council is currently aiming to produce an independent report on the implications of the use of these electronic training aids in companion animals. This review considers devices designed for use in the training of dogs, cats and horses and any other companion animal species which involve the application of an electronic current to the skin to aid the training process. We are seeking *specific verifiable* information in relation to direct experience of both the use of these devices and alternatives in relation to achieving specific training goals.

Please note that you can only submit the questionnaire once, as such you should consider that in your opinion your answers are the most important for us to hear about. A check will take place to ensure the validity of the questionnaire database. We cannot accept anonymous information but the supplied details will only be used for the purpose of data verification. By clicking on the button below to begin the questionnaire you are aware that any data collected will only be used for the purpose as described in relation to the use of EPTA training aids.

Please note this questionnaire is no longer accepting responses.

Begin Questionnaire

Call for evidence relating to the use of electric pulse training aids (EPTA or "shock collars").

Please use the format below for the submission of the information addressing each point in turn

When you have finished please use the Submit Questionnaire button at the bottom of this page

Notes

For each question answered, please comment on the following under their specific headings:
a) The efficacy (effectiveness) of the method (rank out of 10, where 10 is extremely effective)
b) Any additional benefits experienced or perceived from the method
c) Any specific difficulties / complications arising from the method
d) Your level of compliance and reliability with the method (rank out of 10, where 10 is extremely compliant, followed instructions completely)
e) The ease / convenience of the method (rank out of 10, where 10 is extremely easy)
f) Time spent using the method (if ongoing please indicate this and how long it has been used for.)
g) Your overall satisfaction ranking of the method relative to the other methods you describe (rank out of 10, where ten is extremely satisfied)
h) Any other specific comments concerning the method

Please indicate if you are from the UK by ticking this box and entering your postcode ☑

Section A

Please confirm which species you are responding to this questionnaire about:-

○ Cat ○ Dog ○ Horse ○ Other Please Specify:-

What was the training goal for which you decided to use an electric pulse training aid? Please evaluate the EPTA in this section based upon your direct experience.

Training Goal (EPTA)	EPTA Make/Type	Effectiveness (1-10)
		0

Benefits	Difficulties	Complications	Reliability (1-10)	Ease Of Use (1-10)	Length Of Use (weeks)	Ongoing Use (Yes/No)	Satisfaction	Other Comments
			1	1	1	○ Yes ○ No	1	

Please indicate where you got the device from:-

○ From Trainer ○ Mail Order ○ Direct From Supplier ○ Local Shop ○ Other Please Specify:-

Why did you decide to use the device?

○ Advice of Trainer ○ Advice of a Friend ○ Read about device in article ○ Read about device in advert ○ Other Please Specify:-

Does the device have a warning e.g beep which allows the animal to avoid the current if it does the right thing before the current is delivered? And if so how often do you use this feature? :-

○ No warning ○ Sometimes ○ Always ○ Never

Section B

Please list and tell us about your experience with all other methods you used to address THIS issue, and how long for prior to (P), at the same time (S), following (F) the use of the EPTA to achieve this goal.

Other Method Used (1)	Prior(P) Same Time(S) Following(F)	Effectiveness (1-10)
	○ P ○ S ○ F	1

Benefits	Difficulties	Complications	Reliability (1-10)	Ease Of Use (1-10)	Length Of Use (weeks)	Ongoing Use (Yes/No)	Satisfaction (1-10)	Other Comments
			1	1	0	○ Yes ○ No	1	

Other Method Used (2)	Prior(P) Same Time(S) Following(F)	Effectiveness (1-10)
	○ P ○ S ○ F	1

Benefits	Difficulties	Complications	Reliability (1-10)	Ease Of Use (1-10)	Length Of Use (weeks)	Ongoing Use (Yes/No)	Satisfaction (1-10)	Other Comments
			1	1	0	○ Yes ○ No	1	

Other Method Used (3)	Prior(P) Same Time(S) Following(F)	Effectiveness (1-10)
	○ P ○ S ○ F	1

Benefits	Difficulties	Complications	Reliability (1-10)	Ease Of Use (1-10)	Length Of Use (weeks)	Ongoing Use (Yes/No)	Satisfaction (1-10)	Other Comments
			1	1	0	○ Yes ○ No	1	

Other Method Used (4)	Prior(P) Same Time(S) Following(F)	Effectiveness (1-10)
	○ P ○ S ○ F	1

Benefits	Difficulties	Complications	Reliability (1-10)	Ease Of Use (1-10)	Length Of Use (weeks)	Ongoing Use (Yes/No)	Satisfaction (1-10)	Other Comments
			1	1	0	○ Yes ○ No	1	

Contact Details

Please provide contact details below , these must be completed in order to submit the questionnaire successfully.

If you are willing to be contacted about other research that is being undertaken in this area please tick this checkbox ☐

Name	
Address	
Email	
Telephone	

Be assured, the report will anonymise private sources and individuals who provide evidence either directly or indirectly, unless permission is gained to the contrary. Where specific examples are cited they will remain anonymous, unless otherwise agreed with the source.

Please note, if you have already submitted evidence to one of the regional Parliamentary calls for evidence, this need not be resubmitted, although specific responses in the format described above are welcomed. In addition we will be pleased to receive any specific evidence relating to:

1. The size of the market and the indications for EPTAs in the UK
2. References relating to research directly evaluating the impact of the use of these devices.

You can forward any additional evidence onto the postal address below, but please note that we will be unable to engage in any correspondence relating to this matter.

Prof Daniel Mills
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University of Lincoln
Riseholme Park,Riseholme
Lincoln LN2 2LG

Submit Questionnaire