POSITION PAPER ◆ PRACTITIONER EDITION

The Scientific Case Against

Aversive Dog Training Equipment & Methods

Convergent Welfare Evidence and Policy Recommendations for the United States

WELFARE · NEUROSCIENCE · AGGRESSION RISK · PROFESSIONAL STANDARDS

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This document is a position paper. It synthesizes peer-reviewed welfare science, neuroscience, professional consensus statements, and comparative jurisdictional analysis to support a policy recommendation for the United States.

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Foreword

I have spent years working as a dog trainer and behavior consultant, and the longer I spend in this field, the clearer one observation becomes. The science is not the problem. The peer-reviewed welfare research on aversive dog training equipment and aversive handling techniques has been consistent for a long time, and the international veterinary profession has reached a formal consensus position. The problem is that the people who need to use the science, the practitioners, the guardians, the legislators, often do not have it pulled together in one place where they can see how thoroughly the evidence converges.

That is the gap this paper exists to close.

The peer-reviewed welfare research does not point in different directions depending on who reads it. Independent research groups, working in different countries, using different populations, different methodologies, and different outcome measures, have repeatedly found the same pattern. Aversive control is not necessary. It does not produce training outcomes superior to reward-based methods. It comes with welfare costs that reward-based methods do not. Some of those costs are behavioral. Some are physiological. Some, in the specific case of neck-pressure equipment, are mechanical, and they have been documented in peer-reviewed veterinary research. The welfare costs are real, the lack of necessity is established, and the international veterinary profession has reached a formal consensus that aversive equipment should not be used.

What I have rarely seen, and what I set out to provide here, is a single document that pulls all of that evidence together in one place. Behavior analysis, canine training outcome research, stress physiology, affective state assessment, clinical behavior medicine, nociception science, threat circuit neuroscience, peer-reviewed veterinary research on the physical effects of neck-pressure equipment, real-world survey data, and regulatory precedent from the dozens of jurisdictions that have already acted: each of these literatures, on its own, points the same direction. The agreement across them is what scientists call convergent evidence. It is the strongest kind of evidence a body of research can produce, and it is the kind of evidence we have on this question.

The reason there is still a public debate about aversive training equipment in 2026 is not that the evidence is in dispute. The evidence is settled. The debate persists because the evidence has not been consolidated, communicated, and operationalized at the level where guardians and policy makers actually encounter it. That is a problem the practitioner community can solve. It is a problem the practitioner community is best positioned to solve. Trainers, behavior consultants, certified applied animal behaviorists, and veterinary behaviorists are the bridge between the peer-reviewed welfare science and the pet guardians in the public. If that bridge is not built and walked across, the science stays in the journals, and the marketplace stays the way it is.

The kind of change I would like to see in the United States, the kind that is already in place in Wales, Switzerland, Germany, France, Australia, and a growing list of other jurisdictions, does not start in a legislative chamber. It starts with one person, in one location, talking to the guardians in their world. Each conversation moves the field a little. Enough conversations, multiplied across a country, change what the field looks like. That is how a public welfare consensus becomes a policy consensus, and that is how a policy consensus becomes law. The legislators who eventually carry these reforms forward will be responding to a constituency that already exists. Building that constituency is practitioner work.

This paper is written first for the practitioners who are doing that work. The science, the citations, the institutional consensus, the comparative jurisdictional record, and the policy logic are consolidated here in a form that is meant to be used. Read it. Cite it. Share it. Use the deployment toolkit in Section 7.6 for conversational versions of the core arguments. Use the proponent objections catalogued in Section 9 when you encounter them in real time. Use the comparative jurisdictional table in Section 7.4 when you talk with legislators or with other policy advocates. Use Section 10 when you are asked to recommend policy.

The paper can also serve as a reference for future legislative work, and I expect it will. That use is welcome. But the first step is education and organization. Anyone who is committed to force-free training and to ending the use of fear, pain, intimidation, and aversive equipment in dog training has a role to play. Get educated. Get organized. Get involved. Speak up. Advocate for change in the laws of your state. Silence is the only way the current consumer marketplace continues to operate. The convergent welfare science is on the side of the dogs. What the dogs need now is a practitioner community willing to carry that science out of the journals and into client conversations, into professional standards bodies, and into the legislative chambers where policy is actually written.

It is 2026. The peer-reviewed welfare science has been consistent for years. The international veterinary consensus has been formal since 2024. Multiple jurisdictions have operated under bans for more than a decade without producing any published evidence of harm from prohibition. The case for change is not novel, and it is not radical. It is the case the evidence has been making for a long time. What this paper offers is the synthesis, the language, and the references the practitioner community needs to make that case, in our own voices, to the people in our own communities. The dogs in those communities cannot speak for themselves. We can. We should.

That is why I wrote this paper.

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How to Use This Paper

This is a long paper, and most readers will not need every section of it on a first read. The guide that follows points each kind of reader to the parts most likely to be useful for what they are trying to do. The paper works two ways at once. It can be read straight through as a sustained argument, and it can be returned to as a reference document. Table 1 (the quick-reference welfare evidence summary), Table 2 (nociception and pain neuroscience), Table 3 (mechanical injury and neck-pressure equipment), Table 4 (threat circuitry under controllability and predictability), Table 5 (the comparative jurisdictional summary), the proponent objections in Section 9, and the terminology decoder in Section 9.13, and the defensive-justifications catalog in Section 9.15 are written for repeat reference, not single-pass reading.

Reading Paths by Audience

Pet guardians and clients new to this material. Start with the Executive Summary for the plain-language case, then read Section 2 (the functional definition of aversive control) for the operant conditioning vocabulary used throughout. Section 3.6 consolidates the welfare studies into one readable page, and Sections 10 and 11 state what the paper is asking for and why. The neuroscience in Section 4, the proponent objections in Section 9, and the device variability data in Section 8 are reference material best left for a second pass.

Trainers and behavior consultants newer to the underlying science. The working core is Sections 2 (the functional definition of aversive control), 3 (the convergent welfare evidence base), 3.6 (the quick-reference summary of those studies), and 9 (the anticipated proponent objections). Section 4 (nociception and mechanical injury) is study material for a second-pass read, once the operant framework in Section 2 is internalized. Section 9.13 (common terminology misuses and their behavior-science translation) and Section 9.15 (common defensive justifications and the evidence response) are high-value preparation for client conversations and online engagement.

Experienced trainers, behavior consultants, and veterinary behaviorists. A full read is recommended, with particular attention to Section 4 (the nociception and mechanical-injury literature on neck-pressure equipment, including Carter et al. 2020, Pauli et al. 2006, Hunter et al. 2019, and the Grohmann et al. 2013 case report), Section 5 (the necessity claim and how it has been empirically tested), Section 7 (institutional consensus across veterinary, welfare, and professional bodies, including the comparative jurisdictional data in Table 5), and Section 8 (real-world use, device variability under Lines 2013, and the regulatory vacuum). The Pessoa and Knight personal communications in Sections 4.3 and 9.4 are particularly valuable for rebutting controllability and predictability arguments, and they are not available in any other current publication.

Policy advocates and legislative readers. The policy-focused materials are the Executive Summary, Section 7.4 (which presents Table 5, the comparative jurisdictional summary covering twenty-seven enacted jurisdictions across Europe, Australia, Quebec, Latin America, and US states, alongside a survey of pending United States state-level legislative proposals in New York, New Jersey, Massachusetts, and Rhode Island), Section 10 (Recommended United States Policy, with five subsections covering equipment scope, standards of practice, confrontational handling, rationale, and supporting infrastructure), and Section 11 (Conclusion). The full evidence base supporting these recommendations is detailed in Sections 2 through 8 and is available for legislative referral, citation, and reference.

Using This Paper for Specific Practitioner Activities

Client conversations. Sections 2 (the functional definition of aversive control), 3.6 (the quick-reference summary of welfare studies), 4.1 (the distinction between nociception and tissue damage), and 9.13 (the terminology decoder), and 9.15 (the defensive-justifications catalog) provide ready language and concise study summaries that translate the science into client-accessible explanations. The general principle to communicate to clients is in Section 2.1: aversive control is defined by what the procedure does to the dog's behavior, not by the label or vocabulary the trainer or manufacturer uses to describe it.

Online debate and social media engagement. Section 9 anticipates twelve specific arguments that balanced trainers commonly deploy and provides a direct rebuttal to each. Section 9.13 catalogs fourteen rhetorical and terminological moves grouped into four thematic categories, gives the accurate behavior-science translation for each, and provides response phrasing usable directly in conversation for the high-frequency items. Section 9.15 catalogs the ten most common defensive justifications a proponent uses to make aversive use sound cautious, necessary, compassionate, or moderate, and provides the evidence response to each. The Pessoa and Knight personal communications, referenced throughout but particularly in Sections 4.3 and 9.4, are especially valuable for rebutting controllability and predictability claims, because they come directly from the senior authors of the neuroscience studies those proponent claims rely on.

Continuing education and professional speaking. Sections 3 (welfare evidence), 4 (nociception and mechanical injury), 5 (necessity claim), and 7 (institutional consensus) provide a structured argument suitable for course development, conference presentation, or professional webinar. Tables 1 and 5 are presentation-ready visual aids. Section 8 (real-world use) provides the consumer-protection framing that connects the welfare argument to public policy and is particularly useful for cross-disciplinary audiences in veterinary medicine, animal welfare advocacy, and consumer protection. The complete reference list at the end of the paper provides DOIs or URL hyperlinks for citation and verification in derived materials.

This is a position paper, not a neutral literature review. It makes a case. It is written first for the practitioners who actually have to deploy the science: trainers, behavior consultants, certified applied animal behaviorists, and veterinary behaviorists who need a comprehensive reference they can learn, internalize, and use in client conversations, online debate, continuing education, and professional advocacy. Practitioners are welcome to read, cite, share, and build on the material in their own work.

Executive Summary

The United States should adopt animal welfare policy banning the sale and use of aversive training equipment for dogs. The equipment in question is electronic collars (remote, bark-activated, and containment variants), prong or pinch collars, choke collars (also called choke chains or slip collars), and citronella and scentless-air spray collars (ultrasonic and audible-tone variants are addressed under professional standards of practice rather than under the equipment-prohibition framework, as detailed in Section 10). Alongside that prohibition, the United States should adopt a substantive force-free model state standard of practice for commercial dog training and behavior modification, drawing on Linda Michaels' Hierarchy of Dog Needs® and Best Force-Free Practices (Michaels, 2022) as a leading reference framework. The recommended state standard is aligned with the position statements of the international veterinary profession, the largest national veterinary associations in the English-speaking world, the major animal welfare organizations, and the leading professional training and behavior bodies. The case for both is built on multiple independent lines of scientific evidence that all point in the same direction: behavior analysis, canine training outcome research, stress physiology, affective state assessment, clinical behavior medicine, the science of nociception (electrical and mechanical), threat circuit neuroscience, peer-reviewed veterinary research on the physical effects of neck-pressure equipment, survey data on real-world use, and regulatory precedent from multiple jurisdictions.

The core of the argument is a definition. When an aversive piece of equipment or an aversive handling technique reduces a behavior, it is functioning as positive punishment. When a behavior increases because performing it terminates, avoids, or prevents an unpleasant event, it is functioning as negative reinforcement. Both mechanisms require the stimulus to function as an aversive event for the dog. That requirement is the same whether the aversive is electrical stimulation from an electronic collar, mechanical nociceptive input from a prong collar, compressive airway and vascular restriction from a choke collar, or direct physical confrontation such as an alpha roll, scruff shake, leash jerk, or helicoptering. Aversive control comes with welfare costs. Those costs include stress-related behavior, conflict behaviors, suppressed body language, conditioned emotional responses to cues and context, negative affective bias, and, in some studies, elevated cortisol. For the equipment that applies physical force to the neck, the costs additionally include measurable mechanical effects documented in peer-reviewed research: elevated intraocular pressure during ordinary pulling, neck pressures in injury-relevant ranges, and, in at least one peer-reviewed case report, severe ischemic brain damage leading to euthanasia following a punitive choke-chain hanging technique. Those mechanical-injury findings apply specifically to prong and choke collars, not to electronic collars. The welfare case against electronic collars does not rest on mechanical injury, because electronic collars do not

operate by mechanical force. The case against electronic collars rests on the functional properties of aversive control itself: nociceptive engagement, threat-system activation, stress physiology, and conditioned emotional response. None of these welfare costs, across any of these tool categories, are erased by lower stimulation settings, by a trainer self-testing the device on their own arm, by skilled application, by a fifteen-second video of an engaged dog, or by adding food rewards on top of the aversive contingency.

Proponents of aversive equipment have not demonstrated necessity. Cooper and colleagues (2014) and China, Mills, and Cooper (2020) both ran controlled studies showing that dogs trained without electronic collars achieve outcomes equal to or better than dogs trained with them. Head-to-head comparative studies pitting prong and choke collars against reward-based methods in everyday pet training contexts have likewise failed to produce evidence of necessity, and the international professional consensus treats all three categories as equally inappropriate. The one contemporary study frequently cited in favor of electronic collars for predatory chasing, Johnson and Wynne (2024), establishes narrow efficacy under specific experimental conditions, not necessity. Its protocol design has been challenged in the peer-reviewed literature (Bastos et al., 2025) and in the present author's separately published methodological critique (Bangura, 2025, SSRN). Herron, Shofer, and Reisner (2009) add a more specific finding about confrontational handling: alpha rolls, dominance downs, scruff shakes, and hit or kick corrections produced aggressive responses in a substantial fraction of the dogs on whom they were attempted. These methods are not recommended practice for any dog, and they are particularly contraindicated for dogs already presenting with aggression. The convergence covers populations as well as outcome measures: pet-dog populations through controlled experimental and observational studies, working-dog populations through standardized observational evaluation of handler-team welfare and operational performance (Haverbeke, Laporte, Depiereux, Giffroy, and Diederich, 2008), and population-level survey evidence covering both human-directed aggression (Casey, Loftus, Bolster, Richards, and Blackwell, 2014) and dog-directed aggression (Casey, Loftus, Bolster, Richards, and Blackwell, 2013) in the same general guardian population.

Two leading fear-conditioning researchers whose published work is frequently cited to justify electronic collar use, Dr. Luiz Pessoa (corresponding author of Limbachia et al., 2021) and Dr. David Knight (corresponding author of Wood et al., 2014), have each independently confirmed in written correspondence that their research does not support treating predictable, controllable aversive stimulation as neurologically neutral or benign. Both researchers clarify that controllability attenuates threat-related neural responses without eliminating them, and that a reduced response is not the absence of fear or stress (L. Pessoa, personal communication, April 10, 2026; D. C. Knight, personal communication, April 17, 2026). That clarification reinforces what

the dog welfare research already shows: aversive-based training, whether delivered through electronic, mechanical, or confrontational means, comes with welfare costs that do not disappear with skilled application.

Professional consensus is explicit and international. In June 2024, four major international veterinary organizations, the Federation of Veterinarians of Europe, the Federation of European Companion Animal Veterinary Associations, the Federation of European Equine Veterinary Associations, and the World Small Animal Veterinary Association, unanimously adopted a joint position paper formally calling for a complete ban on the sale and use of electric pulse training devices including electric shock collars for dogs, and broadly stating that equipment and devices that cause pain or discomfort to modify behaviors should not be used and should be strongly discouraged by veterinarians and other allied professionals (Federation of Veterinarians of Europe et al., 2024). The American Veterinary Society of Animal Behavior explicitly names electronic collars, prong collars, choke chains, leash corrections, and other forms of physical or psychological punishment as aversive methods that should not be used under any circumstances (AVSAB, 2021). The American Animal Hospital Association Behavior Management Guidelines name electronic shock collars, prong or pinch collars, choke chains, alpha rolls, and physical punishment as techniques associated with detrimental effects on the human-animal bond, problem-solving ability, and the physical and behavioral health of the patient, concluding that the only acceptable training techniques are non-aversive, positive techniques (AAHA, 2015). The American College of Veterinary Behaviorists, the American Society for the Prevention of Cruelty to Animals, the British Veterinary Association, the British Small Animal Veterinary Association, the Australian Veterinary Association, the Canadian Veterinary Medical Association, the New Zealand Veterinary Association, the European Society of Veterinary Clinical Ethology, the Royal Society for the Prevention of Cruelty to Animals, Humane World for Animals (formerly the Humane Society of the United States), Dogs Trust, the UK Kennel Club, Battersea, Blue Cross, Best Friends Animal Society, and a growing list of professional dog training and behavior organizations all independently recommend reward-based methods and oppose the use of aversive tools and aversive methods for training and behavior modification.

Jurisdictions around the world have already acted. Wales banned electronic collars under a Welsh Statutory Instrument made under the Animal Welfare Act 2006. Switzerland's Animal Protection Ordinance prohibits spiked, pinch, and electronic collars. Germany (under case-law interpretation of its Animal Welfare Act), Austria, France (in professional contexts), Spain, Sweden, Finland, Norway, Denmark, the Netherlands, Slovenia, and Colombia have all enacted bans on various combinations of these devices. Belgium-Flanders has enacted a future electric-collar prohibition taking effect in 2027, while Belgium-Wallonia has prohibited the use of electric, choke, and prong or spiked collars under a regional order in force since April 1, 2023. Quebec's Animal Welfare and Safety Regulation prohibits collars that interfere with breathing or cause pain or injury, language the Ministry of Agriculture has applied specifically to electronic and prong

collars. In Australia, Victoria, Tasmania, and Queensland have banned pronged collars through their respective state legislation, and electronic collars are prohibited in the Australian Capital Territory, New South Wales, and South Australia. The Australian federal government additionally bans the import of pronged collars. The United States is now out of step with international veterinary consensus and with international regulatory practice.

The empirical record on how aversive training equipment is actually used in the real world compounds the welfare and necessity arguments. Masson, Nigron, and Gaultier (2018b) surveyed 1,251 respondents in France about electronic collar use. They found that 71.8 percent of users operated the equipment without professional advice, that 75 percent had tried two or fewer alternative methods before reaching for the collar, and that 7 percent of dogs on which collars had been used presented with physical wounds (Masson et al., 2018b). Lines, van Driel, and Cooper (2013) examined the electrical characteristics of thirteen commercially available electronic training collar models and documented an eighty-seven-fold range in stimulus energy at maximum settings across products marketed for the same use category, ranging from 3.3 millijoules to 287 millijoules. None of those products is required to disclose voltage, current, pulse width, or waveform at the point of sale (Lines, van Driel, and Cooper, 2013). The United States has no Food and Drug Administration regulation, no Consumer Product Safety Commission standard, and no state-level technical standard for these devices. That regulatory vacuum stands in stark contrast to the medical-device framework applied to therapeutic transcutaneous electrical nerve stimulation units for human use. United States public attitude data conducted by Edelman Intelligence and reported by Petco in October 2020 found that 70 percent of dog guardians believe shock collars negatively impact their pet's emotional or mental wellbeing, that 69 percent consider shock collars a cruel training method, and that 59 percent of pet guardians would prefer to shock themselves than their dog (Petco, 2020). On the available evidence, the substantial majority of United States guardians already perceive these devices as harmful and would not lose access to a product they value if aversive electronic training equipment were removed from the consumer marketplace. A prohibition is, in this framing, a consumer protection measure as much as an animal welfare measure. It removes from the marketplace a class of product whose advertised claims are not supported by peer-reviewed evidence, whose adverse effects are documented but not disclosed, and whose appropriate use requires professional gatekeeping that does not currently exist in the United States.

The paper also anticipates and answers the principal proponent counter-moves. Section 9.12 addresses the contemporary neuroscientific argument that successful electronic-collar training transitions dogs to a welfare-neutral goal-directed anxiety state, and shows that the same neuroscience the argument invokes (Cain, 2019; Sears et al., 2026; Gillan et al., 2014; Gordon et al., 2020) locates the dog's calm under aversive contingency in an anxiety state mediated by an effective avoidance response, not in the absence of threat representation. Section 9.13 catalogs the most common terminology and rhetorical moves used to make aversive procedures sound

benign, with the accurate behavior-science translation for each. Section 9.15 catalogs the ten most common defensive justifications a proponent uses to make aversive use sound cautious, necessary, compassionate, or moderate, with the evidence response to each.

The recommended policy has two complementary components. The first is a prohibition on aversive training equipment, removing electronic, prong, choke, and spray collars from the consumer marketplace through legislation that regulates sale, import, and use. The second is the adoption of a substantive force-free model state standard of practice for commercial dog training and behavior modification, drawing on Linda Michaels' Hierarchy of Dog Needs® and Best Force-Free Practices (Michaels, 2022) as a leading reference framework, enforced through state licensure of trainers and behavior consultants. The first component is delivered through legislative architecture already established in Wales, Switzerland, Germany, France, and other jurisdictions that have enacted similar bans. The second is delivered through the same scope-of-practice mechanism by which welfare-affecting professions, including veterinary medicine, mental health counseling, and social work, are already regulated in the United States. Equipment prohibition without standards of practice leaves confrontational handling techniques (alpha rolls, dominance downs, scruff shakes, hanging or helicoptering) unaddressed. Standards of practice without equipment prohibition leaves the equipment available on the consumer market. Both components are necessary. Active legislative interest in the licensing component is already in motion at the United States state level, with pending proposals in New York (Assembly Bill A 6985 and Senate Bill S 7723) and New Jersey (Assembly Bills A 4206 and A 4207) that would establish dog-trainer licensing tied to non-aversive standards, and pending Massachusetts legislation (House Bill H 2342 and Senate Bill S 1459) that would exclude electric, prong, and choke collars from court-ordered dangerous-dog behavior modification plans, as documented in Section 7.4. Together, they accomplish what the international veterinary, professional, and welfare consensus has called for: the comprehensive removal of aversive control as the basis of canine training and behavior modification in the United States. A United States policy of this kind is not a radical proposal. It is a measured, conservative response to convergent scientific evidence, international veterinary consensus, and the welfare risks documented in the peer-reviewed literature.

SECTION 1

Introduction: The Wrong Question and the Right One

Debates about aversive training equipment and aversive training methods almost always get trapped inside the wrong question. The wrong question is whether these tools and methods work. The right question is how they work, what welfare costs come with that mechanism, whether those costs are necessary, and whether broad public access to such devices and methods is justified when safer alternatives exist.

Electrical stimulation delivered contingently can decrease unwanted behavior. So can mechanical nociceptive stimulation. So can physical confrontation. Any sufficiently unpleasant consequence delivered contingently can decrease unwanted behavior. None of that is in dispute within learning theory. But efficacy alone does not establish welfare neutrality, necessity, or ethical justification. Many interventions can suppress behavior. The capacity to suppress behavior is not, on its own, a sufficient reason to leave an intervention on the consumer market or in the professional standards of practice.

A dog may stop chasing, lunging, barking, or failing to recall for several different reasons. The underlying emotional motivation may have changed. Another behavior may have become more reinforcing in that context. Or the original behavior may now predict an unpleasant consequence that the dog is working to avoid. Those are not equivalent outcomes. One reflects changed motivation or learned alternatives. The other reflects suppression, escape, avoidance, or threat prediction. Policy that treats suppression as equivalent to resolution is not evidence-based policy.

The argument that follows applies to all aversive training equipment and all aversive handling techniques as a single, unified category. That is not a stylistic shortcut. It is the way the international veterinary and welfare consensus already treats these tools and methods. The American Veterinary Society of Animal Behavior, the American Animal Hospital Association, the Australian Veterinary Association, the British Small Animal Veterinary Association, and the joint international veterinary position paper adopted by the Federation of Veterinarians of Europe and the World Small Animal Veterinary Association in 2024 all treat them this way. The reason is scientific, not rhetorical. The mechanism of action across electronic, mechanical, and confrontational modalities is the same: positive punishment or negative reinforcement via an aversive event. The welfare concerns that follow from that mechanism are the same. The convergent research documenting those welfare concerns spans all three modalities. Treating

these tools and methods as separate debates has served mainly to let proponents pivot from one to the next when any one of them comes under scrutiny. A unified policy approach closes that escape route.

SECTION 2

The Mechanism Is Aversive Control

2.1 Functional Definition, Not Descriptive Language

In behavior analysis, an aversive stimulus is not defined by what it looks like, what it is called, or what intensity it is set to. It is defined by its function. A stimulus is aversive when its presentation decreases the future probability of the behavior it follows (positive punishment) or when its removal, avoidance, or prevention increases the future probability of the behavior that produces that outcome (negative reinforcement). This is a functional definition, not a descriptive one. It applies identically to electrical stimulation, mechanical pinch, neck constriction, verbal threat, physical correction, or handling confrontation.

When an electronic collar reduces barking, the stimulation is functioning as a positive punisher. When a prong collar reduces lead pulling, the prong pressure is functioning as a positive punisher. When a choke chain correction decreases lunging, the neck compression is functioning as a positive punisher. When a dog stops jumping up because an alpha roll has been performed in that context, the alpha roll is functioning as a positive punisher. When a dog walks in heel position next to the handler to avoid a leash-jerk correction, the threat of the correction is functioning as a negative reinforcer. In every one of these cases, the behavior change mechanism requires the stimulus to function as an aversive event for the dog. No vocabulary choice eliminates that functional requirement. Calling the electronic pulse a "tap" or a "signal," calling the prong collar a "communication tool," calling the choke chain a "training collar," or calling the alpha roll a "boundary setting" does not change what the dog's nervous system is experiencing.

2.2 The Intensity or Force Dial Proves the Point

Every aversive training tool involves a dial, explicit or implicit. Electronic collars have stimulation intensity settings. Prong collars have prong sharpness, collar tightness, and the handler's choice of correction force. Choke chains have the handler's choice of jerk force, the dog's neck diameter, and the speed of the pop correction. Confrontational handling techniques vary in force of application, duration of hold, and degree of positional compromise. In every case, the handler is adjusting the magnitude of an aversive event.

The existence of that dial, and the clinical necessity of turning it up when the dog does not respond, is itself the evidence that the mechanism is aversive. If the stimulus were not functioning as an aversive event, turning the dial up would have no effect. The fact that behavior change depends on finding a threshold intensity or force that the dog works to avoid is

definitional proof that the threshold is an aversive threshold. Proponents of these tools who argue that the tools operate below the threshold of aversiveness are making a claim that is logically inconsistent with the operation of the tools.

2.3 The "Barely Perceptible" or "Gentle Correction" Contradiction

A common proponent argument is that modern electronic collars, modern prong collars, or skilled use of choke chains operate at levels so low that they are effectively imperceptible, or are at worst a mild attention-getter, not a painful or frightening event. This argument runs into a logical contradiction. If the stimulus is behaviorally meaningful enough to change behavior through escape, avoidance, or suppression, it is by functional definition aversive. If it is not behaviorally meaningful, it is not doing the training work. There is no intermediate category where the stimulus is both strong enough to reliably shape behavior and mild enough to have no motivational salience.

The same contradiction applies to the argument that prong collars merely "self-correct" and do not cause pain, and to the argument that a properly fitted choke chain only "communicates" without discomfort. A prong collar that produces no unpleasant consequence when the dog pulls will not train the dog to stop pulling. A choke chain correction that produces no unpleasant consequence when performed will not train the dog to stop the behavior it follows. The behavior change mechanism is the aversive event. Denying the aversive event while claiming the behavior change requires a form of learning that does not exist.

2.4 Human Self-Testing and Trainer Demonstrations Are Not Welfare Assessments

Proponents of electronic collars sometimes demonstrate the tool on their own forearm to argue that it produces only a mild sensation. Proponents of prong collars sometimes show that the prongs do not puncture human skin when pressed lightly against a hand. Proponents of choke chains sometimes demonstrate that a skilled correction on another person's wrist feels like a minor tug rather than strangulation. Every one of these demonstrations shares the same category error. Human sensory, anatomical, and affective responses to aversive stimulation are not equivalent to canine responses. Human pain thresholds, skin thickness, neck anatomy, nociceptor density, and threat circuitry differ from the canine equivalents. Canine haired-skin epidermis is approximately three to five cell layers thick, considerably thinner than human epidermis (Affolter and Moore, 1994). Human cognition and context knowledge also differ in important ways from canine cognition and context knowledge. A demonstration that an electronic pulse, a prong pinch, or a chain correction feels tolerable on a human adult tells us essentially nothing about what the same stimulus does to a dog's nervous system.

2.5 Videos of Engaged Dogs Do Not Disprove the Contingency

Video demonstrations of dogs who appear engaged, happy, or relaxed while wearing aversive training equipment are routinely offered as evidence that the equipment does not harm welfare. The argument fails for several reasons. Visible engagement is not a physiological or affective readout. Threat and stress circuitry do not announce themselves through tail posture or eye expression alone. Once avoidance learning is well established, a dog may perform fluently and quickly precisely because the behavior prevents the aversive event. Fluency in the instrumental response is compatible with ongoing threat prediction. A dog who has learned to walk in heel to avoid a prong correction, or to come when called to avoid a shock, may perform the behavior smoothly and without visible distress while still maintaining the underlying threat association. Welfare is not reducible to what a dog looks like in a fifteen-second clip. Welfare is what is happening in the dog's nervous system, across time, in response to the entire training contingency.

SECTION 3

The Welfare Evidence Is Convergent

3.1 Controlled Studies of Electronic Collar Use

Cooper, Cracknell, Hardiman, Wright, and Mills (2014) conducted the methodologically strongest controlled comparison of electronic collar training to reward-based training for pet dogs showing recall problems. Dogs trained with electronic collars showed more behavioral stress indicators than dogs trained without. Reward-based training achieved outcomes equal to or better than electronic collar training on the training objectives. The electronic collar conferred no necessity advantage. China, Mills, and Cooper (2020) re-analyzed the same dataset and reported on training efficacy in greater detail. The reward-based training group achieved superior outcomes on multiple measures, including faster latency to sit, fewer hand and lead signals, and faster general obedience progress. The electronic collar group did not show better learning outcomes than the matched non-e-collar control group operated by the same trainers, which means that whatever benefit professional skill brought to the training was not coming from the collar. The trainers in these studies were nominated by the Electronic Collar Manufacturers Association as representing best practice. They did not produce better outcomes with the tools than without them. The argument that e-collars work in expert hands has been tested directly using the experts the industry itself put forward, and it failed.

Schilder and van der Borg (2004) studied protection-trained working dogs in guard-dog training programs (the published abstract describes the sample as German Shepherd dogs) and found that dogs receiving shock collar applications displayed lower body postures, high-pitched yelps, avoidance behaviors, and other behavioral signs of fear and stress on shock application, and that dogs that had received shocks showed more behavioral signs of fear and stress in the training context relative to matched dogs trained without shock. Casey, Naj-Oleari, Campbell, Mendl, and Blackwell (2021) found that dogs whose guardians used two or more aversive methods were significantly more pessimistic on a judgment bias task than dogs trained only with reward-based methods, a direct measurement of negative affective state outside the training context itself.

Haverbeke, Laporte, Depiereux, Giffroy, and Diederich (2008) extended the working-dog observational evidence base from the protection-training sample studied by Schilder and van der Borg (2004) into routine military operational training. The study followed thirty-three Belgian Defence military working dog and handler teams, predominantly Belgian Shepherds and German Shepherds, across two standardized evaluations conducted on separate occasions. Higher rates of handler aversive cues during routine training correlated with lower team performance scores, and acute canine stress signals, including lowered body posture, high-pitched yelps, and body shaking, increased following aversive cues. The lowered-posture response was again observed in

the second evaluation, indicating that the stress association persisted across separate observation sessions rather than habituating with continued exposure. The authors concluded that welfare was at minimum under threat in this population and that the inverse relationship between aversive-cue rate and team performance argued for a shift toward more reward-based methods in working-dog training. The relevance for the welfare argument is direct. The population most frequently invoked to defend aversive methods, the protection-trained and operational military working dog, is the same population in which standardized observational evaluation found aversive-cue use associated with both welfare cost and reduced operational performance. The proponent claim that pet-dog welfare findings do not transfer to working-dog populations is not supported by the only large-sample, standardized, working-dog observational evidence currently in the literature.

Deldalle and Gaunet (2014) provided a direct observational comparison of two French training schools, one using primarily negative reinforcement and one using primarily positive reinforcement, with behavioral coding of dogs during training sessions. Dogs in the negative-reinforcement school showed significantly more stress-related behaviors during training and significantly less owner-directed gaze than dogs in the positive-reinforcement school. The reduction in owner-directed gaze is welfare-relevant in its own right because owner-directed gaze is one of the canonical behavioral indicators of secure attachment and comfortable engagement with the handler. The findings establish that within-session welfare differences track training method even when the comparison is between intact, ongoing programs rather than between experimentally manipulated conditions. The Deldalle and Gaunet finding directly counters the proponent claim that dogs in aversive-method programs look engaged and content during training.

3.2 Broader Research on Aversive Training and Canine Welfare

The welfare research on aversive training extends well beyond electronic collars specifically to cover aversive methods in general. Vieira de Castro and colleagues (2020) videotaped training sessions at seven schools and categorized them as reward-only, mixed, or aversive-based. Dogs in aversive-based schools showed significantly more stress-related behaviors during training, spent more time in tense and low behavioral states, panted more, and had higher post-training cortisol increases than dogs in reward-only schools. Dogs in mixed-method schools showed significantly more stress-related behaviors, were more frequently in tense behavioral states, and panted more than dogs in reward-only schools, although the cortisol difference reached significance only for the aversive-based group. Dogs in aversive-based schools also performed more pessimistically on a cognitive bias task, indicating a more negative affective state extending beyond the training context. Vieira de Castro and colleagues (2019) separately showed that secure attachment patterns toward guardians were more consistently observed in dogs trained at reward-based schools than in dogs trained at aversive-based schools, when assessed through

a Strange Situation Procedure. The Strange Situation Procedure is a standardized behavioral assessment, originally developed by Mary Ainsworth in the 1960s and 1970s for the study of human infant attachment to caregivers and subsequently validated for use with dogs, in which the subject is observed across a series of brief scripted episodes that systematically vary the presence of the guardian and a stranger in an unfamiliar room. Behaviors such as proximity-seeking, exploration, distress at separation, and quality of greeting on reunion are coded by trained observers and used to classify the subject's attachment pattern as secure or as one of several insecure patterns. Because the procedure relies on coded observable behavior under standardized conditions, it is methodologically more rigorous than guardian self-report and is now a standard tool in canine attachment research.

Blackwell, Twells, Seawright, and Casey (2008) found that guardians who used positive-punishment-based methods reported more undesirable behaviors in their dogs than guardians who used reward-based methods, with the highest aggression scores reported in dogs whose guardians combined positive reinforcement with positive punishment. Hiby, Rooney, and Bradshaw (2004) similarly found that the number of problem behaviors reported by guardians correlated with the number of training tasks taught using punishment, while obedience ratings correlated only with the number of tasks taught using rewards. Rooney and Cowan (2011), in a home-based observational study, found that dogs of guardians who reported using more physical punishment were less playful with their guardian and interacted less with the experimenter, while dogs of guardians who reported using more rewards performed better on a novel training task. Arhant, Bubna-Littitz, Bartels, Futschik, and Troxler (2010) found that high-frequency aversive training correlated with increased aggression and excitability in dogs, while reward-based training correlated with higher obedience without those side effects.

Herron, Shofer, and Reisner (2009) surveyed one hundred forty pet guardians presenting to the University of Pennsylvania veterinary behavior service. They found that confrontational training techniques produced aggressive responses in a substantial percentage of the dogs on whom they were attempted: hitting or kicking, forty-three percent; growling at the dog, forty-one percent; forcing the release of an item, thirty-nine percent; the alpha roll, thirty-one percent; staring the dog down, thirty percent; the dominance down, twenty-nine percent; grabbing the dog by the jowls or scruff and shaking, twenty-six percent; and choke or pinch collar use, eleven percent. Shock collars were used infrequently in this clinical sample, with seven percent of those dogs showing an aggressive response. Dogs presenting for aggression to familiar people were significantly more likely to respond aggressively to the alpha roll and to yelling "no" than dogs presenting for other behavior problems. The Herron study is a direct clinical demonstration that confrontational handling is not a benign or low-risk intervention. It is a clinically identified risk factor for guardian-directed aggression, with subsequent population-level multivariable analysis (Casey, Loftus, Bolster, Richards, and Blackwell, 2014) finding adjusted increased odds of family-member aggression in dogs whose guardians used aversive methods.

Casey, Loftus, Bolster, Richards, and Blackwell (2013), an earlier survey from the same research group, extended the population-level aggression-risk finding from human-directed to dog-directed contexts. In a cross-sectional United Kingdom guardian survey, twenty-two percent of guardians reported aggression toward unfamiliar dogs and eight percent reported aggression toward dogs in the household, with concordance between dog-directed and human-directed aggression sufficiently low that the authors treated the two as largely separable behavioral phenotypes. Multivariable analysis identified guardian-reported use of positive punishment as a factor associated with increased odds of dog-directed aggression. The pairing of Casey et al. (2013) with Casey et al. (2014) closes a specific proponent counterargument: that the aversive-method aggression risk identified in the population-level literature is specific to human-directed contexts or family-aggression dynamics. The risk pattern is observable in both behavioral classes at the population level, in the same general guardian population, on independent sets of guardian-reported outcome measures. The implication is also a public-safety implication. Dog-directed aggression in shared public spaces, sidewalks, parks, and trails, is a welfare and safety concern distinct from family-directed aggression, and the population-level association with aversive-method use applies to both classes of behavior rather than to family dynamics alone.

3.3 The Dissociation Between Behavioral and Physiological Stress Markers

An important methodological point cuts across the welfare literature. Behavioral stress markers (lip licking, yawning, low body posture, displacement behaviors, conflict behaviors, reduced approach, increased vigilance) and physiological stress markers (cortisol, heart rate, heart rate variability) often converge, but not always. Cooper et al. (2014) found significant behavioral stress markers in the electronic collar group, while the larger controlled study showed no significant cortisol difference between the e-collar group and either control group. The preliminary nine-dog phase did show elevated cortisol post-stimulation, but the larger controlled phase did not replicate this clearly. The behavioral findings have sometimes been dismissed by proponents on the basis of the unreplicated cortisol result. That dismissal is selective reading. Cortisol is one measure, and a blunt one. It can be suppressed, lagged, or buffered by context. Validated behavioral markers of stress in canine research are robust and meaningful on their own. A study that finds significant behavioral stress indicators in the electronic collar group has found welfare harm, regardless of whether a single hormone assay reached statistical significance.

This dissociation also applies across aversive modalities. A prong-collared dog may not show elevated cortisol during a short walk, but may show avoidance of the collar being put on, tension during leash handling, conflict behaviors around the handler, and reduced engagement in exploratory behavior. A choke-chained dog may not show elevated cortisol during a single correction, but may show whale eye, lip lick, yawn, and shoulder tension during the correction itself and in anticipation of subsequent corrections. Welfare is assessed through convergence of indicators, not through any single measure.

3.4 Conditioned Emotional Responses and Transfer of Aversiveness

Whenever an aversive event is paired with contextual stimuli, Pavlovian conditioning can produce a conditioned emotional response to those stimuli. A dog repeatedly corrected with a prong collar in the presence of other dogs can develop a conditioned negative association with other dogs. A dog repeatedly shocked in the presence of children can develop a conditioned negative association with children. A dog repeatedly alpha-rolled by the guardian can develop a conditioned negative association with the guardian. None of this is theoretical. Schilder and van der Borg (2004) identified exactly this kind of transfer in their shock collar work, noting that the dogs in their study appeared to associate the aversive event not only with their own behavior but also with the handler, with commands, or with the training context.

This mechanism is particularly dangerous when aversive equipment or aversive methods are used to address reactivity or aggression, because the triggers in those cases are, by definition, stimuli the dog already perceives as threatening. Adding aversive stimulation in the presence of such triggers can deepen the threat association rather than weaken it. That is the most foreseeable failure mode of aversive-based approaches to reactivity and aggression, and it is the failure mode that reward-based counter-conditioning and desensitization protocols are specifically designed to avoid.

3.5 Cumulative Exposure and Welfare Risk

Most aversive training equipment is not worn for a single correction and removed. A prong collar is often worn for every walk, for months or years. A choke chain is often worn continuously during handling. An electronic collar is often worn during daily exercise and off-leash time. Even if individual corrections produced only modest stress responses, the cumulative exposure over months and years is not welfare-neutral. Chronic stress exposure produces documented effects on the hypothalamic-pituitary-adrenal axis, the amygdala, and the prefrontal cortex in mammalian research (McEwen, 2012; Rosenkranz, Venheim, and Padival, 2010; Vyas, Mitra, Shankaranarayana Rao, and Chattarji, 2002; Arnsten, 2009). It produces documented changes in cognitive performance, stress reactivity, and affective state. A policy framework that assesses aversive training equipment only on the basis of a single-session stress response is assessing the wrong exposure window.

3.6 Quick Reference: Convergent Welfare and Training Outcome Evidence

The table below consolidates the principal peer-reviewed studies that anchor the welfare and training-outcome evidence base. It is meant to be used: in client conversations, in professional debate, on social media, in continuing education. Each row identifies the study, summarizes its design and sample, states the key finding, and notes the specific proponent argument the study addresses. The strength of the case lies in the agreement across these methods. Controlled

experiments, direct observational studies, population-level surveys, affective state and cognitive bias measures, clinical referral data, and real-world containment data all point in the same direction. No single study has to carry the case alone. The agreement across methodologies, populations, countries, and outcome measures is what carries it.

Table 1. *Quick-Reference Summary of the Convergent Welfare and Training-Outcome Evidence Base.*

STUDY	DESIGN AND SAMPLE	KEY FINDING	PROPONENT ARGUMENT IT COUNTERS
A. Controlled Experimental Studies of Electronic Collar Use			
Cooper, Cracknell, Hardiman, Wright, and Mills (2014)	Randomized controlled study; 63 pet dogs with recall problems; three groups (industry-nominated trainers using e-collars; same trainers without e-collars; APDT-affiliated reward-based trainers)	Dogs trained without e-collars achieved equivalent or better training outcomes. E-collar group showed significantly elevated stress-related behaviors during training. No welfare advantage to e-collar use under industry-nominated best-practice conditions.	Counters: "E-collars are necessary for difficult cases" and "skilled professional trainers can use e-collars without welfare cost."
China, Mills, and Cooper (2020); re-analysis of Cooper et al. (2014) dataset	Controlled comparative study; 63 pet dogs in three groups for recall training (industry-approved e-collar trainers; same trainers without e-collar; reward-based positive reinforcement trainers)	Reward-based trainers achieved equivalent training outcomes more efficiently than e-collar trainers. Positive reinforcement was the most efficient method tested. No necessity advantage for e-collar use.	Counters: "E-collars are faster or more reliable than reward-based methods."
B. Direct Observational Studies			
Schilder and van der Borg (2004)	Behavioral observation study; working dogs (German Shepherds in guard-dog protection training); during and after shock collar training	Shock-collar-trained dogs showed significantly more stress-related behaviors during training. Stress responses persisted in non-training contexts, including in the presence of the trainer or training environment, indicating conditioned emotional response.	Counters: "The dog is fine when the collar is off" and "professional working-dog use is welfare-neutral."

STUDY	DESIGN AND SAMPLE	KEY FINDING	PROPONENT ARGUMENT IT COUNTERS
Haverbeke, Laporte, Depiereux, Giffroy, and Diederich (2008)	Standardized observational evaluation of thirty-three Belgian Defence military working dog and handler teams across two evaluations conducted on separate occasions.	Higher rates of handler aversive cues during routine training correlated with lower team performance scores; acute canine stress signals (lowered body posture, high-pitched yelps, body shaking) increased following aversive cues; the lowered-posture response replicated in the second evaluation, indicating persistence of the stress association across separate observation sessions.	Counters: "Pet-dog welfare findings do not transfer to working-dog populations" and "Aversive methods are operationally necessary in protection and military working dogs."
Deldalle and Gaunet (2014)	Direct observational study; two French training schools (one using negative reinforcement, one using positive reinforcement); behavioral coding of dogs during training sessions	Dogs in the negative-reinforcement school showed significantly more stress-related behaviors and significantly less gaze toward the owner during training compared to dogs in the positive-reinforcement school.	Counters: "The dog looks happy and engaged during aversive training."
Rooney and Cowan (2011)	Observational study in home setting; 53 dog-owner pairs; assessment of training methods, dog learning ability, and behavior problems	Punishment-based training methods predicted lower learning ability and more behavior problems. Reward-based training methods predicted better learning outcomes and fewer behavior problems.	Counters: "Punishment teaches the dog faster."
C. Population-Level Survey Studies			
Hiby, Rooney, and Bradshaw (2004)	Survey of 364 UK dog owners; assessment of training methods, obedience, and behavior problems	Reward-based training methods were associated with higher reported obedience scores. Punishment-based methods were associated with significantly more behavior problems.	Counters: "Punishment is effective for behavior problems." Foundational early population-level study.

STUDY	DESIGN AND SAMPLE	KEY FINDING	PROPONENT ARGUMENT IT COUNTERS
Blackwell, Twells, Seawright, and Casey (2008)	Survey of 192 UK dog owners; assessment of training methods and behavior problem occurrence	Owners using punishment-based training reported significantly higher rates of behavior problems including aggression. No association was found between training method and trainability.	Counters: "Punishment is necessary for serious behavior problems."
Arhant, Bubna-Littitz, Bartels, Futschik, and Troxler (2010)	Survey of 1,276 Austrian dog owners; analysis of smaller and larger dogs separately	Frequency of punishment-based training was associated with higher levels of aggression, excitability, and anxiety. Pattern held for both smaller and larger dogs.	Counters: "This only applies to small dogs" or "this only applies to large dogs."
Blackwell, Bolster, Richards, Loftus, and Casey (2012)	Survey of 3,897 UK dog owners (focused on electronic collar use)	Electronic collar users reported lower training success than reward-based trainers for comparable problems. Owner attendance at training classes and owner gender were the strongest predictors of e-collar use, not dog characteristics.	Counters: "I only use e-collars on dogs that need them." User characteristics drive use, not dog characteristics.
Masson, Nigron, and Gaultier (2018b)	Survey of 1,251 French dog owners; e-collar use and acquisition patterns	Among e-collar users, 71.8% used the device without professional advice, 75% had tried two or fewer alternative methods first, and 7% of dogs presented with physical wounds.	Counters: "Professionals use these tools properly." Most use is by lay guardians without guidance.
Casey, Loftus, Bolster, Richards, and Blackwell (2013)	Cross-sectional United Kingdom guardian-survey study of pet dogs; multivariable analysis.	Twenty-two percent of guardians reported aggression toward unfamiliar dogs and eight percent reported aggression toward dogs in the household; aversive-method use was associated with increased odds of dog-directed aggression; concordance between dog-directed and human-directed aggression was low, indicating largely separable behavioral phenotypes.	Counters: "The aversive-method aggression risk identified in the population-level literature is specific to human-directed contexts or family-aggression dynamics."

STUDY	DESIGN AND SAMPLE	KEY FINDING	PROPONENT ARGUMENT IT COUNTERS
Casey, Loftus, Bolster, Richards, and Blackwell (2014)	Cross-sectional United Kingdom guardian-survey study of pet dogs; multivariable analysis.	Aversive-method use was associated with adjusted increased odds of family-directed aggression in pet dogs; the finding provides population-level corroboration of the clinical-referral findings reported by Herron, Shofer, and Reisner (2009).	Counters: "Confrontational handling works for aggression cases" and "The aggression-risk finding is a clinical-referral artifact rather than a population-level pattern."
D. Affective State, Cognitive Bias, and Relationship Studies			
Vieira de Castro, Barrett, de Sousa, and Olsson (2019)	Survey and observational study; assessment of training methods and dog-owner attachment	Aversive-based training was associated with significantly weaker dog-owner attachment compared to reward-based training.	Counters: "Aversive training builds respect or stronger relationship."
Vieira de Castro, Fuchs, Morello, Pastur, de Sousa, and Olsson (2020)	Multi-measure welfare study; 92 pet dogs from 7 Portuguese training schools (3 reward-based, 4 aversive-based of which 2 mixed and 2 high-aversive)	Dogs in aversive-trained schools showed significantly more stress behaviors during training, significantly higher post-training cortisol, and significantly more pessimistic cognitive bias compared to reward-based-trained dogs. Convergent multi-measure welfare findings.	Counters: "The welfare data are inconclusive" or "there is no clear evidence of harm."
Casey, Naj-Oleari, Campbell, Mendl, and Blackwell (2021)	Cognitive bias test (judgment-bias paradigm); 100 dogs in matched-pair design (50 trained with two or more aversive methods, 50 trained with reward-based methods only)	Dogs trained with two or more aversive methods showed significantly more pessimistic cognitive bias than dogs trained with reward-based methods, with the latency difference reaching statistical significance at the middle and near-positive ambiguous bowl locations. Cognitive bias is a validated indicator of persistent affective state.	Counters: "The welfare effect is short-term" or "the dog gets over it."

STUDY	DESIGN AND SAMPLE	KEY FINDING	PROPONENT ARGUMENT IT COUNTERS
E. Confrontational Handling and Real-World Use Data			
Herron, Shofer, and Reisner (2009)	Clinical referral survey; 140 dog cases at University of Pennsylvania Veterinary Behavior Clinic; assessment of training techniques previously used by guardians	Confrontational handling techniques elicited aggressive responses at rates including: hit or kick the dog (43%), growl at the dog (41%), alpha roll (31%), forced down or dominance down (29%), grab dog by jowls and shake (26%), stare down (30%). Choke or pinch collar use elicited aggressive responses in 11% of cases.	Counters: "Confrontational handling and physical corrections work for aggression." Clinical data show they elicit aggression at high rates.
Starinsky, Lord, and Herron (2017)	Survey of 974 US dog owners; comparison of containment methods and outcomes	Escape rates by containment method: electronic fence 44%, physical fence 23%, tethered 27%. Electronic fences did not produce a clear protective effect on bite or escape outcomes compared to physical fencing.	Counters: "Electronic containment improves safety." Physical fencing outperforms electronic on the available data.

Several conclusions follow from this evidence base in aggregate. First, the welfare signal appears across every methodological approach (experimental, observational, survey, cognitive bias, clinical referral, and real-world containment), which is the structural feature that makes the case convergent rather than cherry-picked. Second, the population studied varies substantially across these works (pet dogs, working dogs, US samples, UK samples, French samples, Austrian samples, Portuguese samples), and the pattern persists across these populations. Third, the design diversity matters because no single methodology is decisive on its own, but the convergence across methodologies eliminates the possibility that the welfare signal is a methodological artifact. A practitioner facing a balanced trainer's dismissal of any single study can point to the convergence pattern documented in this table. The argument does not depend on Cooper alone, or on Vieira de Castro alone, or on Casey alone. It depends on agreement across all of them.

SECTION 4

Nociception, Mechanical Injury, Aversion, and the Real Welfare Standard

4.1 What Aversive Equipment Actually Engages: Nociception and Threat Circuitry

The welfare case against aversive training equipment does not rest on a claim that the tools cause tissue injury. Modern electronic collar proponents commonly frame their defense around sensation severity rather than tissue damage. The argument runs roughly like this: modern e-collars operate at very low stimulation levels; the sensation is mild, imperceptible, or comparable to a transcutaneous electrical nerve stimulation unit; skilled trainers use the minimum effective setting; what the dog feels is no worse than a tap on the shoulder or a static-electricity shock. Those are claims about sensation severity, not about tissue damage. The counterargument has to meet them on their own terms.

The counterargument is nociception science. Nociceptors are specialized primary afferent neurons (sensory neurons that carry signals from the periphery into the central nervous system) that respond to stimuli capable of signalling actual or potential harm (Dubin and Patapoutian, 2010). They transduce mechanical, thermal, chemical, and electrical stimuli into neural signals that the central nervous system interprets as pain or as a noxious warning event. Critically, nociceptors fire at intensities well below the threshold of actual tissue injury. The system exists to warn the organism away from potentially damaging stimuli before the damage occurs. The International Association for the Study of Pain formally defines pain as an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage (Raja et al., 2020; IASP, n.d.). The phrase "potential tissue damage" appears in the definition precisely because pain is a warning signal, not an injury report.

Electrical stimulation from a training collar does not have to cause tissue damage to activate nociceptors and pain pathways. It simply has to be delivered at an intensity that the peripheral nervous system encodes as noxious. C-fiber and A-delta fiber nociceptors respond to electrical stimulation at intensities well below any injury threshold. Pressure applied to the dog's neck by a prong collar does not have to puncture skin or bruise deep tissue to engage mechanonociceptors. It simply has to exceed the threshold of noxious mechanical input. Compression applied by a choke chain does not have to cause vascular damage or tracheal rupture to engage mechanonociceptors and threat circuitry. It simply has to be delivered with enough force and duration to be noxious. In every case, the biological question is whether the stimulus crosses the nociceptive threshold, not whether it crosses the injury threshold.

The intensity dial on an electronic collar, the sharpness of the prong points, and the degree of neck compression produced by a choke chain are all functionally calibrated to deliver a stimulus the dog experiences as unpleasant enough to change its behavior. Unpleasant enough to change behavior through avoidance, escape, or suppression is, by definition, noxious. A stimulus that is not noxious will not drive avoidance learning. A stimulus that does drive avoidance learning is, by functional and by neurobiological definition, crossing the nociceptive threshold. The argument that aversive equipment operates in a zone above behavioral effectiveness but below nociceptive engagement is not consistent with how peripheral sensory neurons function.

This is why the welfare case does not require a showing of tissue damage. A dog's capacity to experience a stimulus as aversive, to undergo threat conditioning, to develop conditioned emotional responses, to experience stress, and to be worse off for the exposure does not begin at the threshold of visible injury. It begins at the threshold of nociceptive activation and threat-system engagement, which is a much lower threshold and the threshold the tools are built to cross.

Two further considerations strengthen the nociception argument and answer the proponent appeal to low-level or skilled application. The canine sensory anatomy that encounters these stimuli is not equivalent to the human anatomy proponents use in self-test demonstrations. As discussed in Section 2.4, Affolter and Moore (1994) document that canine haired-skin epidermis is approximately three to five cell layers thick, considerably thinner than human epidermis. A delivered electrical or mechanical stimulus that crosses the human nociceptive threshold at one intensity will reach deeper canine tissue at the same delivered energy. Self-testing on human skin systematically underestimates what the canine nervous system receives.

The equipment itself is also not standardized in ways that justify the proponent appeal to a low intensity setting. Lines, van Driel, and Cooper (2013) examined the electrical characteristics of thirteen commercially available electronic training collar models and reported an eighty-seven-fold range in stimulus energy at maximum settings, from 3.3 millijoules to 287 millijoules at a 50 kilohm resistive load representative of canine neck impedance. Within a single collar, the median ratio of maximum to minimum delivered energy across the available strength settings was 81, with individual collars ranging from 8 to 1,114. The authors reported that user-disclosed comparison data such as voltage, pulse parameters, and waveform are not available at the point of sale. Two of the thirteen new collars examined contained manufacturing faults, in one case capable of delivering a maximum-strength impulse regardless of the level chosen via the user dial. The authors concluded that a given strength setting cannot be assumed to deliver a similar stimulus across collar models or brands. From the canine nervous system perspective, what determines whether the nociceptive threshold is crossed is the actual electrical signal at the skin, not the user's intensity setting. The proponent appeal to a low intensity setting, even granting good faith user technique, is not informative about the welfare-relevant question of whether the stimulus is noxious to the dog.

Table 2. *Nociception, Pain Neuroscience, and Sensory Engagement of Aversive Training Equipment.*

STUDY	DESIGN AND SAMPLE	KEY FINDING	PROPONENT ARGUMENT IT COUNTERS
A. Foundational Pain Neuroscience and Definitional Standards			
Dubin and Patapoutian (2010)	Peer-reviewed review of nociceptor neurobiology in the Journal of Clinical Investigation	Nociceptors are specialized peripheral sensory neurons that detect potentially damaging stimuli at the skin, including extremes of temperature, pressure, chemical, and electrical signals, and transduce these stimuli into neural signals carried to higher brain centers. The system fires below the threshold of actual tissue injury; its biological function is to warn the organism away from potentially harmful events before damage occurs.	Counters: "Modern electronic collars operate at low stimulation levels and do not cause tissue damage; therefore they are welfare-neutral." Nociceptors do not require tissue damage to fire.
Raja, Carr, Cohen, Finnerup, Flor, Gibson, Keefe, Mogil, Ringkamp, Sluka, Song, Stevens, Sullivan, Tutelman, Ushida, and Vader (2020)	Revised International Association for the Study of Pain definition; published in Pain (the leading journal in the field), authored by the multidisciplinary IASP Task Force	Pain is defined as an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage. The phrase "potential tissue damage" is intentional and core to the definition. The IASP also affirms that the definition applies to both human and nonhuman animals.	Counters: "Pain requires tissue damage; absence of damage means absence of pain or welfare cost." The international scientific definition explicitly includes potential damage.

STUDY	DESIGN AND SAMPLE	KEY FINDING	PROPONENT ARGUMENT IT COUNTERS
B. Comparative Canine Sensory Anatomy			
Affolter and Moore (1994)	Peer-reviewed review of histologic features of canine and feline skin in Clinics in Dermatology, organized by anatomic region	Canine haired-skin epidermis is approximately three to five cell layers thick, considerably thinner than human epidermis. The cutaneous structures that mediate nociception in dogs are anatomically distinct from human cutaneous anatomy.	Counters: "Self-test demonstrations on human skin (forearm, palm, wrist) accurately represent what the dog feels." Human and canine cutaneous anatomy are not equivalent; the same delivered energy reaches deeper structures more readily in canine skin.
C. Engineering Characteristics of Aversive Training Equipment			
Lines, van Driel, and Cooper (2013)	Engineering measurement study of electrical characteristics of thirteen commercially available electronic training collar models in the United Kingdom; impedance measurements on twenty-seven dogs; published in the Veterinary Record	Stimulus energy at maximum settings ranged from 3.3 millijoules to 287 millijoules at a 50 kilohm load representative of canine neck impedance, an eighty-seven-fold range across products. Within a single collar, the median maximum-to-minimum energy ratio was 81 (range 8 to 1,114). Two of thirteen new collars contained manufacturing faults; one could deliver a maximum-strength impulse regardless of user setting. Authors concluded that a given strength setting cannot be assumed to deliver a similar stimulus across collar models or brands.	Counters: "A low setting on the user dial corresponds to a mild, predictable, and welfare-neutral stimulus." The relationship between user setting and delivered stimulus is heterogeneous across products and within products, and is not disclosed at the point of sale.

4.2 Documented Physical Effects of Neck-Pressure Equipment (Prong and Choke Collars)

The nociception argument above applies equally to electronic, prong, and choke collars, because all three cross the nociceptive threshold by design. There is, however, a separate evidentiary question that arises specifically for equipment that applies mechanical force to the canine neck.

Peer-reviewed veterinary research on prong collars and choke chains documents measurable physical effects on live anatomy during ordinary use, and, in one peer-reviewed case report, catastrophic injury during punitive use. This mechanical-injury evidence is distinct from the nociception argument and applies only to neck-pressure tools. Electronic collars, operated in their standard training modes, do not cause this kind of mechanical injury, and this paper does not claim otherwise. The mechanical-injury argument is a prong-and-choke-collar argument.

Carter, McNally, and Roshier (2020) tested seven collar types and a slip lead on a simulated canine neck model with a pressure sensor beneath the collar. Under force levels representing a firm pull (40 N), a strong pull (70 N), and a jerk (141 N average), collars produced pressures between 83 and 832 kilopascals on the model neck. Collar type and applied force each had significant effects on the pressure delivered to the neck. The authors concluded that no collar tested produced a pressure low enough to mitigate the risk of injury when the dog pulls on the lead (Carter, McNally, and Roshier, 2020). Hunter, Blake, and De Godoy (2019) measured force and pressure on the canine neck during ordinary on-leash walking and found peak contact pressure values reaching 44.61 newtons per square centimeter, with significant differences in how different collar constructions transmit force to the neck. Both studies establish that ordinary collar use transmits substantial pressure to the canine neck. The pressures produced by prong collars, which concentrate force at the prong points, and by choke chains, which apply force to a progressively narrowing circumference, are higher than what flat collars produce under identical pull conditions. This is an engineering reality of how those collars are designed to operate.

Pauli, Bentley, Diehl, and Miller (2006) measured intraocular pressure in fifty-one eyes of twenty-six dogs while the dogs pulled against a collar or a harness. Intraocular pressure rose significantly from baseline when pressure was applied via a collar, but not when equivalent pressure was applied via a harness. The authors concluded that dogs with weak or thin corneas, glaucoma, or any condition where elevated intraocular pressure could be harmful should wear a harness rather than a collar (Pauli et al., 2006). The proposed physiological mechanism is ventral neck pressure compressing the jugular veins and obstructing ocular aqueous outflow. Elevation produced by a flat collar under pull is a published and reproducible finding. Prong and choke collars concentrate or constrict force delivery in ways that flat collars do not, which on the underlying mechanism would be expected to produce equal or greater intraocular pressure elevation. The peer-reviewed literature has not yet directly tested prong or choke collars against the same protocol, and the burden of demonstrating that these tools are mechanically safer than the flat collars Pauli measured lies with the manufacturers and proponents who market them, not with the welfare science community.

Grohmann, Dickomeit, Schmidt, and Kramer (2013) published a detailed peer-reviewed case report in the Journal of Veterinary Behavior describing severe ischemic brain damage in a one-year-old German Shepherd Dog subjected to a punitive training technique in which the guardian lifted the dog off the ground by the choke chain collar. The dog initially appeared normal, then

became progressively ataxic (uncoordinated and unable to walk normally), began circling to the left, and showed reduced consciousness. Magnetic resonance imaging showed multifocal T2 and diffusion-weighted changes consistent with severe cerebral edema from ischemia. The injury mechanism was carotid artery compression producing cerebral hypoxia. Because of the severity of the neurological findings, the dog was euthanized. The authors attribute the injury to the punitive hanging technique commonly referred to in the training community as helicoptering or hanging. This is a documented peer-reviewed case of fatal ischemic brain injury directly caused by a choke chain training technique (Grohmann et al., 2013).

The clinical veterinary literature additionally recognizes that repeated collar pressure is a clinical concern for tracheal collapse, and harnesses are commonly recommended in place of collars for dogs diagnosed with tracheal collapse (Rozanski, 2022). Cough induced by collar pressure is a recognized diagnostic feature of the condition in veterinary medicine.

Taken together, the peer-reviewed literature on neck-pressure equipment establishes that prong and choke collars, by their mechanical design, transmit pressure to the canine neck in ranges capable of producing measurable physical consequences, including elevated intraocular pressure under ordinary pull conditions and, under punitive use, documented fatal cerebral ischemia. None of this evidence applies to electronic collars, which operate by a different mechanism. The mechanical-injury case applies specifically to neck-pressure equipment and adds a further layer of evidence, beyond the nociception argument, that prong and choke collars should not remain on the consumer market.

Table 3. *Mechanical Injury and Physiological Effects of Neck-Pressure Equipment.*

STUDY	DESIGN AND SAMPLE	KEY FINDING	PROPONENT ARGUMENT IT COUNTERS
A. Engineering and Pressure Measurement Studies			
Carter, McNally, and Roshier (2020)	Engineering study; seven collar types and one slip lead tested on a simulated canine neck model with embedded pressure sensor; force levels of 40 N (firm pull), 70 N (strong pull), and 141 N (jerk)	Pressures between 83 and 832 kilopascals were produced across collar types. Collar type and applied force each had significant effects on pressure delivered. Authors concluded no collar tested produced a pressure low enough to mitigate the risk of injury when the dog pulls on the lead.	Counters: "Collars only cause harm when used improperly" or "properly fitted collars are mechanically safe."

STUDY	DESIGN AND SAMPLE	KEY FINDING	PROPONENT ARGUMENT IT COUNTERS
Hunter, Blake, and De Godoy (2019)	Force and pressure measurement study on canine neck during ordinary on-leash walking; multiple collar constructions compared	Peak contact pressure values reached 44.61 newtons per square centimeter during ordinary walking. Significant differences across collar constructions in how force is transmitted to the neck.	Counters: "Pressure on the neck only matters under abusive use" and "ordinary walking with a collar transmits negligible force."
B. Physiological Effect Studies			
Pauli, Bentley, Diehl, and Miller (2006)	Intraocular pressure measurement; 51 eyes of 26 dogs; pull against collar versus pull against harness with equivalent force	Intraocular pressure rose significantly from baseline when pressure was applied via a collar but not when equivalent pressure was applied via a harness. Authors recommended that dogs with weak or thin corneas, glaucoma, or any condition where elevated intraocular pressure could be harmful should wear a harness rather than a collar.	Counters: "Collars are physiologically benign at typical leash forces." Establishes a clinically significant ocular effect from collar pressure on the neck.
Rozanski (2022) and broader veterinary clinical literature	Clinical veterinary recognition of repeated collar pressure as a contributor to tracheal collapse; harnesses commonly recommended as alternatives for dogs with diagnosed tracheal collapse	Repeated collar pressure is recognized in clinical veterinary practice as a contributor to tracheal compromise. Cough induced by collar pressure is a recognized clinical sign.	Counters: "There is no clinical evidence that collar pressure causes tracheal problems in dogs."

STUDY	DESIGN AND SAMPLE	KEY FINDING	PROPONENT ARGUMENT IT COUNTERS
C. Documented Case Report of Catastrophic Injury			
Grohmann, Dickomeit, Schmidt, and Kramer (2013)	Peer-reviewed case report; one-year-old German Shepherd Dog subjected to a punitive training technique in which the guardian lifted the dog off the ground by the choke chain collar (the helicoptering or hanging technique)	Severe ischemic brain damage from carotid artery compression and cerebral hypoxia; dog showed progressive ataxia, circling, and reduced consciousness. MRI showed multifocal T2 and diffusion-weighted changes consistent with severe cerebral edema from ischemia. The dog was euthanized due to severity of neurological findings.	Counters: "Choke chain training techniques in common use among balanced trainers do not cause serious physical harm." A documented, peer-reviewed fatal injury directly attributable to a choke chain technique.

The mechanical evidence base summarized in Table 3 is independent of the nociception argument set out earlier in this section. Even if a reader sets aside the question of whether prong and choke collars engage nociceptors during ordinary use, the engineering, physiological, and clinical evidence establishes documented physical effects on the canine neck under conditions that fall within the operating range of these tools as marketed and used. The case for prohibition of neck-pressure equipment does not depend on the nociception argument alone.

4.3 Threat Circuitry, Controllability, and Avoidance Learning

The neuroscience evidence summarized in this section draws from rodent, human, and broader mammalian research. This cross-species foundation should be understood carefully. A rodent shuttlebox study or human neuroimaging study is not being presented as a dog-training trial. Rather, these studies inform the welfare analysis because the basic biological systems at issue, including amygdala-centered threat detection, hypothalamic-pituitary-adrenal stress activation, defensive responding, serotonergic modulation of controllability, and operant escape-avoidance learning, are conserved across mammals, including domestic dogs. The dog-specific welfare and training studies reviewed in Sections 3 and 5 provide the direct canine evidence. The mechanism literature summarized here explains why aversive control can produce predictable stress, fear, avoidance, and welfare risks across mammalian learners. The policy argument therefore rests on convergence, not on any single species, model, or study.

The neuroscience of fear and threat conditioning provides further evidence that aversive-based training engages welfare-relevant neural processes regardless of how skillfully the tool is applied. The amygdala and its connected circuits respond to predicted aversive events, encoding threat associations and driving avoidance learning (LeDoux, 2014). Limbachia et al. (2021) showed that

when human participants had control over aversive stimulation, the magnitude of threat-related neural responding was attenuated compared to uncontrollable aversive conditions, but not eliminated. The senior author of that study, Dr. Luiz Pessoa, confirmed in written correspondence that the attenuation should not be interpreted as rendering controllable aversive stimulation neurologically neutral or welfare-benign. Wood et al. (2014) documented that the amygdala mediates the emotional modulation of threat-elicited responses, situating the amygdala as the key node through which aversive stimulation produces emotional response. Dr. David Knight, the senior author of that study and a fear-conditioning researcher whose broader research program (including work on the conditioned diminution of unconditioned responses) is sometimes cited as showing that predictable aversive stimulation is neurologically neutral, confirmed in written correspondence that his research cannot be used to support the proposition that predictable aversive stimulation is neutral or benign (L. Pessoa, personal communication, April 10, 2026; D. C. Knight, personal communication, April 17, 2026).

Methodological note on these personal communications. The two personal communications cited above (L. Pessoa, personal communication, April 10, 2026; D. C. Knight, personal communication, April 17, 2026) consist of written email correspondence between the present author and the named senior researchers, in which each researcher independently confirmed the substantive interpretation of their published work as represented in this paper. Both exchanges are documented and are held on file by the present author. Excerpts of the correspondence are available, on written request and subject to the correspondents' permission, to qualifying parties including academic peer reviewers, legislative drafting staff, professional credentialing bodies, and accredited journalists. This disclosure framework follows standard academic practice for citing personal communications in policy contexts where the communications support a substantive interpretive position rather than introducing novel empirical findings.

This neuroscience has direct implications for aversive-based training. A dog trained with an electronic collar to avoid predatory chasing has learned to avoid an aversive event, not to become neutral to one. The same is true of a dog trained with a prong collar to avoid lead pulling, or a dog trained with a choke chain to avoid forging. In every case, the learned behavior is avoidance driven by negative reinforcement of an aversive event that the dog's brain continues to represent as aversive. Controllability and predictability do not dissolve the aversive. They modulate the intensity of the neural response to it.

The fear-and-avoidance literature has moved beyond the older framing of avoidance as a reflexive, negatively reinforced, fear-driven response. Cain (2019), in a review of contemporary active avoidance research, describes avoidance as a goal-directed instrumental behavior that the brain mounts in contexts where harm is anticipated and a behavioral solution is available. Importantly, the shift from a fear state to an anxiety state during effective avoidance does not eliminate the underlying threat representation. The warning stimulus retains its conditioned threat value; what changes is that the dog has acquired a behavioral option that controls

exposure to the aversive event. When the avoidance response is blocked or fails, the fear state returns along with the inflexible defensive reactions characteristic of fear. This framing is directly relevant to the welfare evaluation of aversive-based training, because it locates the welfare cost not in observable freezing or panic during training, but in the underlying threat representation that the warning stimulus retains throughout.

The neurobiological literature on stressor controllability underscores the same point. Maier and Watkins (2005), in a review covering decades of stressor controllability research, set out the dorsal raphe nucleus, serotonergic, and corticotropin-releasing factor pathways through which controllability modulates the consequences of an aversive stressor. The work establishes a robust modulation finding: controllable aversive events produce a different downstream profile than uncontrollable aversive events. The work does not establish that controllable aversive events are stress-free or welfare-neutral. The aversive remains aversive. The animal still recruits stress-system machinery in response to it. What controllability does is attenuate certain downstream sequelae, including the spread of activation into prefrontal regions that produces the broader behavioral signature of learned helplessness. This is the same point Pessoa made in written correspondence about the Limbachia data, expressed at the level of system neurobiology rather than human imaging.

The empirical literature on canine remote shock collar use under conditions designed to maximize controllability and predictability is consistent with this picture. Christiansen, Bakken, and Braastad (2001) studied 114 hunting dogs (Norwegian elkhounds, English setters, and hare hunting dogs) across two consecutive years of pasture confrontation testing with sheep. Remote shock collar use was deployed under conditions where the dog could control the aversive event through behavioral compliance and where the aversive was predictable and contingent on a defined behavior. The authors' own welfare measures were limited, relying largely on owner report and temperament tests, and the study did not detect a significant fear or anxiety effect using those measures. The methodological thinness of the welfare assessment, rather than a clean positive welfare conclusion, is what prevents the data set from supporting a welfare-benign reading. The Christiansen study is sometimes invoked by proponents to argue that controllable, predictable shock-collar use in field conditions is welfare-benign. The data set itself does not support that reading.

The most recent neurobiological work on active avoidance reinforces this convergence. Sears, Andrade, Samels, Laughlin, Moloney, Wilson, Alwood, Moscarello, and Cain (2026), in a study using a shuttlebox active avoidance paradigm with rats, demonstrated that response-produced feedback cues are transformed during training into safety signals that positively reinforce avoidance. Moderately trained avoidance was goal-directed and depended on the posterior dorsomedial striatum. Overtrained avoidance became habitual, depended on the dorsolateral striatum, and was insensitive to devaluation of the safety signal. The Sears and colleagues finding has three implications relevant to the present argument. First, the safety signals they identify

acquire their value entirely from their inverse relationship with the aversive contingency. Without the aversive event, no warning stimulus acquires threat value, no feedback cue acquires safety value, and the avoidance response is not reinforced. To describe avoidance as positively reinforced by safety, in the technical sense Sears and colleagues use, is not to claim that the underlying training regime was not aversive. The aversive contingency is the precondition for the entire learning architecture. Second, the authors describe the shift from fear to anxiety that accompanies effective avoidance, in which the dog (or rat) is in an anxiety state where action is possible because safety is attainable, and they explicitly note that when the avoidance response is impaired, the fear state returns along with inflexible reactions like freezing. This is the mechanism behind the proponent observation that a successfully shock-collar-trained dog looks engaged and content during work. The dog is in an anxiety state mediated by an effective avoidance response, not in the absence of threat representation. Third, the same dorsolateral striatum-mediated habitual circuit that the Sears study isolates is the circuit Gillan, Morein-Zamir, Urcelay, Sule, Voon, Apergis-Schoute, Fineberg, Sahakian, and Robbins (2014) implicate in obsessive-compulsive disorder, and is consistent with the stronger habitual avoidance Gordon, Patterson, and Knowlton (2020) document in survivors of early life stress. The argument is not that aversive training causes obsessive-compulsive disorder in dogs. The argument is that the learning architecture aversive-based training depends on, particularly under prolonged or overtrained conditions, is the same architecture implicated in clinical populations as the substrate for persistent maladaptive avoidance.

Taken together, the neuroscience literature on threat circuitry, controllability, predictability, and active avoidance does not exempt aversive-based training from welfare scrutiny. It does the opposite. The modulating factors that proponents invoke (skilled application, predictable timing, controllable contingencies, low intensity) operate on top of an aversive contingency that the dog's nervous system continues to represent as such throughout. Table 4 summarizes the convergence.

Table 4. *Threat Circuitry Research Under Controllability and Predictability Conditions.*

STUDY	DESIGN AND SAMPLE	KEY FINDING	PROPONENT ARGUMENT IT COUNTERS
A. Foundational Fear and Threat Circuitry Reviews			
LeDoux (2014)	Theoretical and review paper integrating decades of fear-circuit research	The amygdala and its connected circuits respond to predicted aversive events, encode threat associations, and drive avoidance learning. Fear and anxiety reflect distinct defensive brain states with distinct circuitry, but both are engaged by aversive contingencies.	Counters: "Predictable aversive stimulation is processed by a different, welfare-benign circuit."
Cain (2019)	Review of contemporary active avoidance research	Active avoidance is goal-directed instrumental behavior under threat. The shift from a fear state to an anxiety state during effective avoidance does not eliminate the underlying threat representation. When the avoidance response is blocked, the fear state returns along with inflexible defensive reactions.	Counters: "A dog that performs trained behaviors calmly under aversive equipment is in a welfare-neutral state."
B. Controllability Research			
Maier and Watkins (2005)	Review of stressor controllability research integrating dorsal raphe, serotonergic, and corticotropin-releasing factor system findings	Controllability modulates downstream consequences of aversive stressors but does not render the stressor benign or stress-free. The animal recruits stress-system machinery in response to controllable aversive events. Controllability attenuates particular sequelae including the spread of activation that produces learned helplessness.	Counters: "If the dog can control the aversive by behavioral compliance, the aversive is no longer welfare-relevant."

STUDY	DESIGN AND SAMPLE	KEY FINDING	PROPONENT ARGUMENT IT COUNTERS
Limbachia, Morrow, Khibovska, Meyer, Padmala, and Pessoa (2021); plus L. Pessoa (personal communication, April 10, 2026)	Human functional neuroimaging study; participants experienced controllable versus uncontrollable aversive stimulation; with senior author clarification of interpretation	Threat-related neural responding was attenuated under controllable conditions but was not eliminated. The senior author confirmed in writing that the attenuation should not be interpreted as rendering controllable aversive stimulation neurologically neutral or welfare-benign.	Counters: "Controllability eliminates the neural threat response, so controllable aversive training is welfare-neutral."
C. Predictability Research			
Wood, Ver Hoef, and Knight (2014); plus D. C. Knight (personal communication, April 17, 2026)	Human fMRI study of amygdala response to a threat stimulus (loud aversive noise) under varying emotional context, with the threat-elicited response indexed by skin conductance; with senior author clarification of interpretation	The amygdala mediates the emotional modulation of threat-elicited responses, situating the amygdala as the key node through which aversive stimulation produces emotional response. The senior author confirmed in writing that his research, including work on the conditioned diminution of unconditioned responses, cannot be used to support the proposition that predictable aversive stimulation is neurologically neutral or benign.	Counters: "Predictability eliminates the aversive character of the stimulus."

STUDY	DESIGN AND SAMPLE	KEY FINDING	PROPONENT ARGUMENT IT COUNTERS
D. Active Avoidance Mechanism Studies			
Christiansen, Bakken, and Braastad (2001)	Field study of remote shock collar use in 114 hunting dogs (Norwegian elkhounds, English setters, hare hunting dogs) across two consecutive years of sheep pasture confrontation testing under controllable, predictable shock-collar contingencies	The authors' welfare assessment relied largely on owner report and temperament tests, and did not detect a significant fear or anxiety effect using those measures. The methodological thinness of the welfare assessment, rather than a clean positive welfare conclusion, is what prevents the data set from supporting a welfare-benign reading of controllable, predictable shock-collar use under field conditions.	Counters: "Controllable, predictable shock-collar use under field conditions is welfare-benign."
Sears, Andrade, Samels, Laughlin, Moloney, Wilson, Alwood, Moscarello, and Cain (2026)	Shuttlebox active avoidance with rats; novel safety-signal devaluation procedure; chemogenetic suppression of dorsomedial and dorsolateral striatum; both sexes tested, with the devaluation effect reported in males	Active avoidance is positively reinforced by response-produced feedback cues that the brain transforms into safety signals through their inverse relationship with the aversive event. Moderately trained avoidance is goal-directed and depends on posterior dorsomedial striatum; overtrained avoidance becomes habitual, depends on dorsolateral striatum, and is insensitive to safety-signal devaluation. The same overtrained-habit circuit is implicated in obsessive-compulsive disorder and in survivors of early life stress.	Counters: "Avoidance is positively reinforced by safety, therefore aversive-based training is not actually aversive once the dog has learned." The safety signal has no value without the aversive contingency that defines it; the overtrained-habit circuit is the substrate of clinically maladaptive avoidance.

4.4 The Compound Schedule Problem: Why Adding Food Does Not Subtract the Aversive

There is a more sophisticated proponent argument that holds that the problem with aversive equipment is not the aversive itself but the absence of positive reinforcement, and that combining aversive stimulation with high-rate food reinforcement eliminates the welfare concern. The argument does not hold up. Adding food reinforcement to an aversive-based contingency creates a compound schedule in which positive reinforcement and positive punishment, or positive reinforcement and negative reinforcement, operate in parallel. The presence of the positive component does not erase the aversive component. The dog's nervous system continues to register and respond to the aversive event.

Empirically, the controlled electronic collar studies that produced welfare concern used trainers nominated by the industry, trainers who did in fact add food reinforcement and praise to their electronic-collar work. The welfare indicators appeared anyway. The Vieira de Castro et al. (2020) finding of elevated stress behaviors and increased panting appeared in schools that used aversive methods in combination with reward-based methods (Group Mixed), not only in schools that used aversive methods alone, although the cognitive-bias finding was specific to the high-aversive group. Compound schedules that pair food with aversive events also produce their own set of welfare concerns, including approach-avoidance conflict and conditioned ambivalence toward the handler. The argument that adding food to a shock, pinch, or correction protocol eliminates the welfare concern has not been demonstrated in any controlled study and is not supported by the studies that have examined compound schedules empirically.

SECTION 5

The Necessity Claim Fails

5.1 Cooper (2014) and China (2020): No Necessity Advantage Under Best-Practice Conditions

Cooper et al. (2014) and China et al. (2020) matter for the necessity claim because of how they were designed. The electronic collar trainers in both studies were nominated by the Electronic Collar Manufacturers Association as representing the trade's best practice. They used low-level stimulation. They followed manufacturer-recommended protocols. They were evaluated on the problem categories the industry most strongly claims as the e-collar's home territory: recall failure and chasing. Under those conditions, reward-based training produced outcomes equal to or better than electronic collar training, while the electronic collar group showed behavioral welfare indicators that the reward-based group did not.

The implication is decisive. If electronic collars are not necessary in the hands of trained, industry-nominated, best-practice trainers working on the problems that most favor the tool, then they are not necessary at all. The argument for electronic collars has already failed at the professional level. That failure cannot be rescued by pivoting to "use by professionals only" as a policy concession. The studies show that even under professional, industry-nominated, best-practice conditions, the tool produces welfare harm without an outcome benefit.

The necessity-failure finding extends to working-dog populations through observational rather than experimental evidence. Haverbeke, Laporte, Depiereux, Giffroy, and Diederich (2008), Section 3.1, found that higher rates of handler aversive cues during routine military working-dog training correlated with lower, not higher, team performance scores, with acute canine stress signals increasing in association with aversive cues across two evaluations. The population most often invoked to argue that aversive equipment is operationally necessary, the protection-trained and military working dog, is the same population in which standardized observational evaluation associated aversive-cue use with reduced operational performance. The necessity claim does not survive at the experimental level for pet dogs (Cooper et al., 2014; China et al., 2020), and the closest available observational analogue does not support it for working dogs either.

5.2 No Necessity Advantage for Prong and Choke Collars

The published comparative outcome literature for prong and choke collars against reward-based methods is thinner than the electronic collar literature, but the pattern is consistent. No peer-reviewed study has demonstrated that prong or choke collars produce long-term training outcomes superior to reward-based alternatives in everyday pet training contexts. The welfare literature, including Hiby et al. (2004), Blackwell et al. (2008), Arhant et al. (2010), Rooney and

Cowan (2011), and Casey et al. (2021), consistently associates aversive methods with worse rather than better training outcomes and with elevated risk of problem behaviors, including aggression. The absence of any controlled study demonstrating long-term superiority of prong or choke collars over reward-based methods is itself meaningful. The burden of proof for a device whose mechanism engages nociception, and whose use has been associated in the peer-reviewed veterinary literature with measurable physical consequences on the canine neck, lies on the proponent to demonstrate necessity, not on the opponent to refute a never-demonstrated claim.

The veterinary behavior literature is explicit on this point. The AAHA 2015 Canine and Feline Behavior Management Guidelines conclude that the only acceptable training techniques are non-aversive positive techniques, and specifically name electronic shock collars, prong or pinch collars, choke chains, alpha rolls, cattle prods, entrapment, and physical punishment as techniques associated with detrimental effects on the human-animal bond, problem-solving ability, and the physical and behavioral health of the patient (AAHA, 2015). The AVSAB 2021 position statement is similarly explicit that aversive methods including but not limited to electronic collars, prong collars, choke chains, leash corrections, and other forms of physical or psychological punishment should not be used under any circumstances, and that there is no evidence that aversive training is necessary for dog training or behavior modification (AVSAB, 2021). The BSAVA position statement explicitly names electric shock collars, prong collars, spray collars, choke chains, and electric containment fences as aversive devices that the BSAVA recommends against, and supports legislation banning their sale and use (BSAVA, 2024). The professional consensus has already assessed the necessity claim and rejected it.

5.3 Johnson and Wynne (2024): A Narrow Finding, Not a Necessity Proof

Johnson and Wynne (2024) is frequently cited by proponents as evidence that electronic collars are necessary for predatory chasing problems. It is neither as strong nor as generalizable as that citation suggests. The study examined a narrow problem profile under specific experimental conditions and reached a narrow efficacy conclusion, not a necessity conclusion. Its protocol design has been challenged in the peer-reviewed literature (Bastos, Warren, and Krupenye, 2025), with specific methodological concerns about the reward-based comparison condition, the duration of the training trial, and the baseline comparability of groups. Johnson and Wynne (2025) published a response to that critique, but the substantive methodological concerns about the original protocol design were not resolved by the response. The present author's separately published methodological critique (Bangura, 2025, SSRN) raises additional concerns about the study's internal validity and about the generalizability of its findings to general pet dog populations. A single contested efficacy finding under narrow experimental conditions is not a foundation for policy that grants broad consumer access to a device whose mechanism engages nociception and threat circuitry.

5.4 Practice-Based Evidence on Force-Free Alternatives

The claim that aversive equipment is necessary for difficult cases is contradicted by the clinical practice of board-certified veterinary behaviorists, who treat the most severe aggression, reactivity, anxiety, and predatory problems in canine medicine without relying on aversive equipment. The ACVB clinical standard of care is built on behavioral assessment, environmental management, and reward-based behavior modification, integrated with psychiatric medication when clinically indicated. ACVB-board-certified veterinary behaviorists treat the most severe canine aggression, reactivity, anxiety, and predatory cases using this integrated approach, without relying on aversive equipment. If aversive equipment were genuinely necessary for difficult behavior cases, the veterinary specialty that handles those cases would be using it. It is not. The specialty that sees the hardest cases has already determined that reward-based, force-free methods are the appropriate standard of care (ACVB, 2025).

SECTION 6

Reactivity, Aggression, and Confrontational Handling: Where Aversive Approaches Compound Harm

6.1 Suppression Versus Resolution

Aversive-based training, whether delivered through equipment or through confrontational handling, is especially concerning when it is used with reactivity and aggression, because reactivity and aggression usually occur in the presence of stimuli the dog already perceives as threatening, frustrating, overwhelming, or unsafe. A reactive dog barking and lunging at another dog, a stranger, a child, a bicycle, or an unfamiliar object is not simply disobeying. The dog is already in a state of heightened arousal, threat appraisal, and defensive preparation. Adding an aversive event in that moment, whether electrical stimulation, prong correction, choke correction, leash jerk, alpha roll, or physical correction, lands on top of an already activated emotional and physiological background. The dog can associate the aversive not only with its own behavior but also with whatever else is present, including the trigger itself. This is the conditioned emotional response mechanism described in Section 3.4, applied in the exact circumstance where aversive Pavlovian pairings are most foreseeable and most dangerous.

6.2 The Herron Finding on Confrontational Handling

Herron, Shofer, and Reisner (2009) provide direct clinical evidence on confrontational handling. In their sample of dogs presenting to a university behavior service, confrontational techniques produced aggressive responses in a substantial percentage of cases: hitting or kicking the dog, forty-three percent; the alpha roll, thirty-one percent; the dominance down, twenty-nine percent; grabbing the jowls or scruff and shaking, twenty-six percent. Dogs presenting for aggression toward familiar people were significantly more likely to respond aggressively to the alpha roll and to yelling "no" than dogs presenting for other complaints (Herron, Shofer, and Reisner, 2009). The implication is direct. Confrontational handling is not merely aesthetically uncomfortable or philosophically disfavored. It is a clinically identified independent risk factor for guardian-directed aggression. It is an unsafe intervention on grounds of human safety, not only animal welfare.

This finding directly contradicts the popular claim that confrontational methods are needed to address aggressive dogs. The evidence shows the opposite. Confrontational methods are contraindicated for aggressive dogs and for many dogs without existing aggression, because the methods themselves elicit defensive and guardian-directed aggressive responses in a substantial

minority of cases. A method that triggers aggressive responses in a quarter to a half of the dogs on whom it is attempted is not a safe, reasonable, or evidence-based intervention, regardless of how it is rationalized by dominance theory or by celebrity television demonstration.

6.3 The Mechanism of Compounded Harm

Schilder and van der Borg (2004) identified the compound harm mechanism directly in the electronic collar context, noting that dogs in their study appeared to associate shocks not only with their own behavior but also with the handler, commands, or training context. The same mechanism applies to prong collars in the presence of triggers, to choke chains in the presence of triggers, and to confrontational handling performed in the presence of triggers. Under these conditions, the visible reactive or aggressive behavior may decrease while the underlying emotional problem worsens. The dog may bark less, lunge less, or appear more controlled, but the trigger may now become even more predictive of discomfort, conflict, pressure, or threat. Suppression of visible behavior is not the same as resolution of fear, anxiety, frustration, or defensive motivation. A dog that looks more controlled on the outside while carrying a heavier emotional load on the inside can escalate or redirect when the suppression fails, and the failure often occurs at the worst possible moment.

SECTION 7

Professional and Regulatory Consensus

7.1 Veterinary Behavior Specialists and Veterinary Organizations

On June 14, 2024, the Federation of Veterinarians of Europe, in conjunction with the Federation of European Companion Animal Veterinary Associations, the Federation of European Equine Veterinary Associations, and the World Small Animal Veterinary Association, unanimously adopted a joint position paper on animal behavior, training methods, and the welfare implications of equipment used to modify behavior. The paper's seventh formal recommendation is a direct and unambiguous call for a complete prohibition on the sale and use of electric pulse training devices, specifically including electric shock collars for dogs (FVE, FECAVA, FEEVA, and WSAVA, 2024). The paper states broadly that equipment and devices that cause pain or discomfort to modify behaviors, such as electric shock collars for dogs and cats, should not be used and should be strongly discouraged by veterinarians and other allied professionals. The signatories represent the veterinary profession across the European Union, across the European companion animal and equine sectors, and globally through WSAVA. This is as unambiguous an international veterinary consensus as exists in this literature. Four major veterinary organizations, representing tens of thousands of veterinarians across multiple continents, formally and unanimously recommend a ban.

The American Veterinary Society of Animal Behavior, in its 2021 position statement reaffirmed in 2025, states explicitly that aversive methods including but not limited to electronic collars, prong collars, choke chains, leash corrections, and other forms of physical or psychological punishment should not be used under any circumstances. AVSAB also states that there is no evidence that aversive training is necessary for dog training or behavior modification (AVSAB, 2021). The AVSAB position matters for policy because proponents often shift, under pressure, from "it works" to "it is necessary." Necessity is a stronger claim than efficacy. A procedure can be effective and still unnecessary. A procedure can suppress behavior and still be inappropriate if less intrusive methods can accomplish the same goal with lower welfare risk.

The American College of Veterinary Behaviorists, the AVMA-recognized specialty organization for board-certified veterinary behaviorists, took its position further in a formal letter to the American Veterinary Medical Association in December 2025. ACVB addressed a public statement by AVMA leadership that seemed to leave room for shock collars as a last-resort alternative to euthanasia. The ACVB response was explicit and emphatic. Electronic collars carry significant risks of fear, aggression, physical pain, and long-term welfare harm. There is no evidence that electronic collars reduce euthanasia risk. Shock collars are not medically necessary, are not evidence-based for preventing euthanasia, and are not aligned with the standard of care for

behavior treatment. ACVB urged that cases involving serious or complex behavior concerns be referred to a board-certified veterinary behaviorist rather than escalated to shock, and aligned its position with AVMA's own published JAVMA guidance on humane training (ACVB, 2025).

The American Animal Hospital Association, representing the certifying and accreditation body for companion animal veterinary practices in the United States, opposes aversive training techniques. The AAHA 2015 Canine and Feline Behavior Management Guidelines, updated in subsequent editions, identify electronic shock collars, prong or pinch collars, choke chains, alpha rolls, dominance downs, cattle prods, lunge whips, starving or withholding food, entrapment, beating, and other forms of physical punishment as training techniques associated with detrimental effects on the human-animal bond, problem-solving ability, and the physical and behavioral health of the patient. The AAHA Guidelines conclude that the only acceptable training techniques are non-aversive, positive techniques that identify and reward desired behaviors (AAHA, 2015).

The European Society of Veterinary Clinical Ethology has similarly argued against the use of electronic collars, concluding after review that there is no evidence of superior efficacy compared to reward-based training and that risks associated with timing errors, lay use, and welfare harm are substantial (Masson et al., 2018a). The British Veterinary Association calls publicly and repeatedly for a complete ban on the sale and use of electronic shock collars for dogs and cats in the United Kingdom, describing electronic shock collars applied even at low intensity as causing physiological and behavioural responses associated with stress, pain, and fear (BVA, 2024). The British Small Animal Veterinary Association opposes aversive training methods broadly, stating explicitly that aversive methods and devices, including electric shock collars, prong collars, spray collars, choke chains, and electric containment fences, have the potential to cause physiological and psychological suffering and that the BSAVA supports legislation banning the sale and use of devices that enable aversive training (BSAVA, 2024). The Australian Veterinary Association holds that collars designed to inflict pain, discomfort, or fear to achieve behavioural change should not be used on dogs, naming electronic and prong collars specifically in that prohibition and adding that prong collars should be illegal in all Australian jurisdictions (AVA, 2022). The Canadian Veterinary Medical Association strongly discourages aversive training techniques and asserts that remote-controlled shock collars are not a necessary method of training or behaviour modification (CVMA, 2021). The New Zealand Veterinary Association's current position states that NZVA does not support the use of electronic behaviour-modifying collars that deliver aversive stimuli for the training or containment of dogs, and recommends that guardians use positive reinforcement methods instead (NZVA, n.d.).

The convergence across veterinary behavior medicine, small animal veterinary practice, international veterinary federations, and national veterinary associations on multiple continents is not selective or niche. It is the established professional consensus.

7.2 Animal Welfare and Humane Organizations

Animal welfare and humane organizations have aligned with the veterinary behavior consensus. In the United States, the American Society for the Prevention of Cruelty to Animals (ASPCA) states explicitly that it is opposed to any training equipment that causes a pet to experience physical discomfort or undue anxiety, and supports training methods that incorporate kindness and respect for both the pet and the guardian, making primary use of lures and rewards such as food, praise, petting, and play (ASPCA, n.d.). Humane World for Animals (formerly the Humane Society of the United States), Best Friends Animal Society, the San Francisco SPCA, and Michigan Humane have each publicly opposed the use of electronic shock collars, prong collars, choke chains, and aversive training methods, and have endorsed reward-based training as the appropriate standard (Humane World for Animals, n.d.). Best Friends Animal Society has stated publicly that it does not use aversive tools such as pinch collars or electronic collars, and does not endorse their general use, citing the potential for harm when such tools are used by the public (Best Friends Animal Society, 2025). In October 2020, Petco, one of the two largest pet specialty retailers in the United States with more than fifteen hundred locations, ended the retail sale of human- and bark-activated electronic shock collars, citing evidence that shock collars increase fear, anxiety, and stress in dogs, and announced an industry-wide #StopTheShock campaign calling on other retailers, manufacturers, and pet guardians to discontinue the sale and use of these devices (Petco, 2020).

Internationally, the same alignment is even more comprehensive. The Royal Society for the Prevention of Cruelty to Animals, RSPCA Australia, Dogs Trust, the UK Kennel Club, Battersea Dogs and Cats Home, Blue Cross, the People's Dispensary for Sick Animals, the British Columbia Society for the Prevention of Cruelty to Animals, the Scottish Society for the Prevention of Cruelty to Animals, and Cats Protection have each publicly opposed the use of electronic shock collars, prong collars, choke chains, and aversive methods, and have called for legislative bans or for exclusive use of reward-based methods. RSPCA Australia has explicitly stated that it is opposed to the import, sale, or use of equipment used to modify the behaviour of a companion animal that is inhumane, causes injury, pain, suffering, or distress, or can be used to abuse animals, including pronged or pinch collars (RSPCA Australia, n.d.). The British Columbia Society for the Prevention of Cruelty to Animals has stated that it does not support the use of devices and techniques that cause anxiety, fear, distress, pain, or injury, including choke chains, prong collars, and shock collars (BC SPCA, n.d.). In the United Kingdom, the British Veterinary Association, the Kennel Club, Dogs Trust, RSPCA, Battersea, and Blue Cross have acted jointly as a coalition advocating for a complete ban on the sale and use of these devices in England (Dogs Trust, 2024; BVA, 2024).

This is not a fringe coalition. These are the largest and most widely recognized animal welfare organizations in the United States, United Kingdom, Canada, and Australia, joined by a major US pet specialty retailer that decided to remove shock collars from its shelves. When the largest

veterinary, welfare, shelter, and retail organizations in the anglophone world each independently reach the same conclusion about aversive training equipment and aversive methods, policy makers should take that convergence as what it is. A field consensus that these tools and methods should be off the market.

7.3 Professional Training and Behavior Organizations

The leading professional training and behavior organizations have adopted the most explicit positions of all. Their standards directly prohibit member use of electronic, prong, and choke collars and of other aversive equipment and methods. The Joint Standards of Practice, as updated in November 2025, are endorsed by the International Association of Animal Behavior Consultants, APDT International, the Karen Pryor Academy, Assistance Dogs International, the Grisha Stewart Academy, Science Matters, Understand Horses, the Victoria Stilwell Academy, and the IAABC Foundation (IAABC, 2025). These standards commit signatory organizations to reward-based methods and explicitly reject the deliberate use of pain, fear, or intimidation in training.

In February 2025, the International Association of Animal Behavior Consultants sunset its previous shock collar addendum and adopted a clarified position explicitly opposing the intentional use of aversive stimuli and specifically requiring members to refrain from using shock in any training or behavior modification context. Members with existing clients using shock devices are expected to help transition those clients away from shock. This is a substantive strengthening of the professional consensus, not a cosmetic update.

The direction of professional trajectory is also telling. Multiple leading education and certification organizations in the dog training field have actively disassociated themselves from broader industry frameworks that continued to permit aversive tools. In particular, the International Association of Animal Behavior Consultants, the Karen Pryor Academy, the Victoria Stilwell Academy for Dog Training and Behavior, the Academy for Dog Trainers (Jean Donaldson), the Pet Professional Guild, and APDT International have each formally distanced themselves from a broader certification framework that continues to permit the use of electronic, prong, and choke collars. Each organization cited alignment with contemporary welfare science and ethical standards as the basis for that departure. The professional consensus is not merely stable. It is tightening. Organizations that permit aversive tools are becoming smaller and more isolated within their own field.

Additional professional organizations that explicitly prohibit aversive equipment or that require reward-based practice of their members include the Pet Professional Guild, Pet Professional Guild Australia, AnimalKind, the Association of Professional Dog Trainers United Kingdom, the Association of Professional Dog Trainers New Zealand, the Canadian Association of Professional Dog Trainers, and the Animal Behaviour and Training Council in the United Kingdom. The Association of Pet Dog Trainers New Zealand has issued a position statement stating that the use

of electronic training collars in the context of training is not only unnecessary but a form of cruelty toward dogs, and that shock collars should no longer be an accepted practice in dog training (APDTNZ, 2022). That kind of direct language is now the professional norm among organizations setting standards for modern reward-based training.

7.4 Jurisdictions That Have Enacted Prohibitions on Aversive Training Equipment

Multiple jurisdictions have enacted binding legal restrictions on aversive training equipment, providing regulatory precedent and evidence that bans can be implemented without producing peer-reviewed evidence of increased public safety risk. The pattern across the verified record is consistent. The earliest national prohibitions in this area are now between fifteen and twenty years old, the most recent are continuing to be enacted, and several of the jurisdictions that adopted bans well over a decade ago, including Wales, Switzerland, Austria, and Germany under the case-law interpretation of its Animal Welfare Act, have continued to operate under those prohibitions without any peer-reviewed evidence of harm from prohibition.

In Europe, Wales prohibited the use of electronic collars on dogs and cats under the Animal Welfare (Electronic Collars) (Wales) Regulations 2010 (S.I. 2010/943, W. 97), which came into force on 24 March 2010 under section 12 of the Animal Welfare Act 2006. Gibraltar, a British Overseas Territory, prohibited the attachment of electronic, choke, or pronged collars to cats or dogs under the Animals (Amendment) Act 2025 (enacted as No. 5 of 2026), which inserts section 5C into the Animals Act and was gazetted on 23 March 2026. Under section 5C, it is a summary offence to attach such a collar to a cat or dog in Gibraltar, to cause one to be attached, or to possess in Gibraltar a remote-control device designed or adapted to activate an electronic collar while a cat or dog is wearing such a collar; the offence is punishable by a fine not exceeding level 5 on the standard scale (Gibraltar, 2026). The Act defines “collar” to include a collar, harness, or any item that may be worn by a cat or dog. Switzerland's Animal Protection Ordinance (Tierschutzverordnung) of 23 April 2008, in force 1 September 2008, prohibits training devices delivering electric shocks at Article 76 under the Animal Protection Act of 16 December 2005 (Swiss Federal Council, 2008). Austria's Federal Animal Protection Act of 28 September 2004, in force 1 January 2005, prohibits at §5(2)(3)(a) spike collars, prong collars, and animal training devices using electricity or chemical substances. Germany operates a case-law prohibition: §3 No. 11 of the Animal Welfare Act (Tierschutzgesetz), originally 1972 and consolidated on 18 May 2006, was interpreted by the Federal Administrative Court (Bundesverwaltungsgericht) on 23 February 2006, in case BVerwG 3 C 14.05, to cover electronic training devices on the basis of their design and function, regardless of how an individual user might attempt to apply them.

Denmark's Bekendtgørelse nr. 607 of 25 June 2009 prohibits remote-controlled and automatically operating electric devices, sharp or pointed prong collars, and the advertising and sale of prohibited equipment, under the Animal Welfare Act of 6 June 1991. The Netherlands prohibited

equipment delivering electric shocks to dogs through the Besluit of 26 April 2018 amending the Besluit houders van dieren, with the professional exception closed by Staatsblad 2021, 361, and a separate pinch collar ban in force from 1 July 2018. Norway's Animal Welfare Act of 19 June 2009, in force 1 January 2010, supports an implementing regulation prohibiting electric training devices, anti-bark electric collars, invisible electric fences, and prong collars; the predecessor 1974 Act also restricted training collars. Sweden's Animal Welfare Act 2018:1192, in force 1 April 2019, supplemented by the Animal Welfare Ordinance 2019 and Jordbruksverket regulations, prohibits equipment delivering electric shocks. Finland's Animal Welfare Act 693/2023, in force 1 January 2024, was the first Finnish statute to contain an explicit prohibition on electric and spike collars.

France adopted the Arrêté of 19 June 2025, which at Article 14 prohibits electric, prong, and strangling collars (without stopping buckle) in professional contexts; the prohibition applies to educators, breeders, kennels, refuges, and presenters but does not yet cover private use, with the broader Assembly proposition de loi (passed 16 January 2023) still pending in the Senate. Slovenia's Animal Protection Act (Zakon o zaščiti živali, ZZZiv) of 18 November 1999, with most recent amendment ZZZiv-G in force 1 August 2025, restricts electronic training collars under its general Animal Protection Act framework. Spain's Ley 7/2023, in force 29 September 2023, prohibits at Article 27(ñ) the use of electric, impulse, punishment, and choke collars, with hunting, herding, and guard dogs exempt and serious-infraction penalties of €10,001 to €50,000 under Article 76. The Flemish region of Belgium adopted a decree on 13 July 2018 establishing a principle prohibition under the federal Animal Welfare Act of 14 August 1986; a phase-out scenario set in 2021 brings the electric-collar prohibition into force on 1 January 2027, with no exception for military, police, or behaviour therapists, although invisible-fence collars remain permitted. The Walloon region of Belgium has acted separately and earlier under its own Animal Welfare Code: the Arrêté du Gouvernement wallon du 15 décembre 2022 (Moniteur belge, 22 February 2023, Numac 2023040666) prohibits the use of electric collars and other electric-shock accessories on dogs and cats, accessories emitting unpleasant sound signals or acting through chemical substances, and choke collars and prong or spiked collars on dogs, with a one-year transition for certain contexts (canine clubs, dog handlers, buried-fence electric collars) that expired on 1 April 2024 and limited derogations for specified official utility dogs and (for choke collars) for adult dogs under veterinary certification. The Walloon order regulates use, not commercialization, because commercial regulation belongs to Belgian federal authority. The Belgian record therefore has to be read regionally rather than nationally: Flanders has enacted a future electric-collar prohibition, while Wallonia has prohibited the use of a broader range of equipment under a regional order already in force.

In Latin America, Colombia enacted Ley 2480 de 2025 (Ley Kiara), in force in 2025, which at Article 10 prohibits prong and electric collars in regulated pet care services including kennels, training centres, transport, grooming, and spas; private-use cases are addressed under the

general anti-cruelty framework of Ley 84 de 1989 as updated by Ley 2455 de 2025 (Ley Ángel) of 18 April 2025. In North America, the Canadian province of Quebec adopted the Règlement on the welfare and safety of domestic companion animals and equines (chapter B-3.1, r. 0.1), which came into force on 10 February 2024 and replaces the earlier Règlement under chapter P-42, r. 10.1; the Quebec Ministry of Agriculture, Fisheries and Food has specifically identified prong-type collars and electric shock collars as collars that violate the requirement that an animal's collar must not interfere with breathing or cause pain or injury (Government of Quebec, 2024).

Australia operates a federal prohibition on the import of pronged collars under the Customs (Prohibited Imports) Regulations 1956 (Commonwealth), with sale and use addressed at the state and territory level. The Australian Capital Territory's Animal Welfare Act 1992 prohibits administering an electric shock to an animal except by a prescribed device; the Animal Welfare Regulation 2001 lists permitted electrical devices, and electronic training collars are not on that list, with the framework further strengthened by the Animal Welfare Legislation Amendment Bill passed 26 September 2019, which also recognised animal sentience. New South Wales prohibits the use, sale, and possession of electric collars at section 16 of the Prevention of Cruelty to Animals Act 1979, with containment systems permitted only inside a fence at least 1.5 metres high. Queensland's Animal Care and Protection Amendment Act 2022, passed 2 December 2022 and in force 12 December 2022, added section 37A to the Animal Care and Protection Act 2001, prohibiting the possession and use of pronged dog collars; electronic collars in Queensland are regulated rather than banned. South Australia's Prevention of Cruelty to Animals Regulations (No. 2) 2000, regulation 8(1)(a), prohibits placing on an animal a collar designed to impart an electric shock. Tasmania's Animal Welfare Act 1993 was amended by Act No. 36 of 2022 to insert section 8(2)(ja), prohibiting pronged collars and similar pinching collars in force from 30 November 2022. Victoria's Prevention of Cruelty to Animals Regulations 2019 prohibit pronged collars at regulation 11, while electronic collars are heavily regulated under regulations 23 to 29A with technical specifications set by Ministerial Approval Notice S 56 published in the Victorian Government Gazette on 6 February 2020.

At the United States state level, several jurisdictions have enacted partial restrictions in the tethering context. Hawaii Revised Statutes §711-1109(1)(j), as amended by Act 182 of the Session Laws of 2021, makes it a criminal offence of cruelty to animals in the second degree to tether or restrain a dog by means of a choke collar, pinch collar, or prong collar unless the dog is engaged in an activity supervised by its owner or an agent of the owner. Rhode Island General Laws §4-13-42, as substantially expanded by H 8095, Chapter 079 of 2024 (in force 12 June 2024), prohibits tethering a dog with a choke-type, head, or prong-type collar, restricts permanent tether area to no less than 113 square feet (or a six-foot trolley radius at ground level), prohibits tethering for more than ten hours in any twenty-four-hour period and between 10:00 p.m. and 6:00 a.m. (with a fifteen-minute exception), and incorporates the Tufts Animal Care and Condition Weather Safety Scale to limit outdoor confinement under adverse conditions. Connecticut General

Statutes §22-350a, as amended by Public Act 10-100 with effect 1 October 2010 (and subsequently amended, current version under Public Act 22-59), prohibits tethering a dog by means of a coat hanger, choke collar, prong-type collar, head halter, or any other collar, halter, or device that is not specifically designed or properly fitted for the restraint of the dog. The Animal Legal and Historical Center records that twenty-three states and the District of Columbia have enacted laws regulating the tethering of dogs, with several states explicitly naming choke, prong, or pinch collars as prohibited tethering equipment. These statutes are partial restrictions in the tethering context rather than comprehensive prohibitions on the sale and use of aversive equipment, but they establish that United States state legislatures have already recognized the welfare concerns associated with these tools and have begun legislating accordingly (Animal Legal and Historical Center, 2022). No comprehensive sale-and-use prohibition has yet been enacted at the United States state level. Pending legislative activity in the 2024 to 2026 period, however, reflects active interest across multiple states and across multiple legislative-design models, as discussed below.

Table 5. *Comparative Summary of Jurisdictions That Have Enacted Prohibitions or Restrictions on Aversive Dog Training Equipment.*

The following table consolidates the jurisdictional record of legislative and regulatory action against aversive dog training equipment, organized by region. The table is not exhaustive but documents the principal jurisdictions cited throughout this paper. Statutory citations and effective dates are drawn from primary sources where available and from the Welsh Government's 2017 review (Welsh Government, 2017) and the FVE, FECAVA, FEEVA, and WSAVA 2024 joint position paper (Federation of Veterinarians of Europe et al., 2024) for jurisdictions where primary verification was conducted through those secondary references.

JURISDICTION	DEVICES PROHIBITED OR RESTRICTED	STATUTORY AUTHORITY OR CITATION
Europe		
Wales (United Kingdom), 2010	Electronic collars on dogs and cats	Animal Welfare (Electronic Collars) (Wales) Regulations 2010 (S.I. 2010/943, W. 97), made under section 12 of the Animal Welfare Act 2006; in force 24 March 2010.

JURISDICTION	DEVICES PROHIBITED OR RESTRICTED	STATUTORY AUTHORITY OR CITATION
Gibraltar (British Overseas Territory), 2026	Electronic, choke, and pronged collars on cats and dogs (also offence to possess a remote-control device while a cat or dog is wearing an electronic collar). “Collar” defined to include a collar, harness, or any item that may be worn by a cat or dog.	Animals (Amendment) Act 2025, enacted as No. 5 of 2026; gazetted 23 March 2026 (First Supplement to the Gibraltar Gazette); inserts section 5C into the Animals Act; summary offence; fine not exceeding level 5 on the standard scale.
Switzerland, 2008	Spike, pinch, and electronic collars; equipment causing pain, fear, or major injury	Animal Protection Ordinance (Tierschutzverordnung, TSchV), Article 76, of 23 April 2008, in force 1 September 2008. Underlying Animal Protection Act (Tierschutzgesetz, TSchG) of 16 December 2005.
Austria, 2004	Spike collars, prong collars, electric and chemical training devices	Federal Animal Protection Act (Tierschutzgesetz), §5(2)(3)(a), BGBl. I 2004/118, of 28 September 2004, in force 1 January 2005.
Germany (case-law)	Electronic and pain-inflicting training devices	Animal Welfare Act (Tierschutzgesetz, TierSchG) §3 No. 11, originally 1972 and consolidated 18 May 2006; interpreted to cover electronic training devices by Federal Administrative Court (Bundesverwaltungsgericht) judgment of 23 February 2006, BVerwG 3 C 14.05.
Denmark, 2009	Remote-controlled or automatically operating electric devices; sharp/pointed prong collars; advertising and sale of prohibited equipment	Bekendtgørelse nr. 607 af 25. juni 2009 om forbud mod brug af visse aggregater, hals¸bånd mv. til dyr, under the Animal Welfare Act (Dyreværnsloven), lov nr. 386 af 6. juni 1991.
Netherlands, 2018	Equipment delivering electric shocks to dogs (initial 2018 ban; professional exception closed 2021); pinch collars (in force 1 July 2018)	Besluit van 26 april 2018 amending Besluit houders van dieren, Article 1.3(h), under the Wet dieren, Article 2.1; further strengthened by Staatsblad 2021, 361.
Norway, 2009	Electric training devices; anti-bark electric collars; invisible electric fences; prong collars	Animal Welfare Act (Lov om dyrevelferd), LOV-2009-06-19-97, of 19 June 2009, in force 1 January 2010, with implementing regulation. Predecessor 1974 Animal Welfare Act also restricted training collars.

JURISDICTION	DEVICES PROHIBITED OR RESTRICTED	STATUTORY AUTHORITY OR CITATION
Sweden, 2018	Equipment delivering electric shocks; spike collars	Animal Welfare Act (Djurskyddslagen) 2018:1192, in force 1 April 2019, supplemented by the Animal Welfare Ordinance 2019 and Jordbruksverket regulations.
Finland, 2023	Electric and spike collars (use and sale)	Animal Welfare Act 693/2023, in force 1 January 2024 (1996 Act did not contain explicit prohibition).
France, 2025 (professionals)	Electric, prong, and strangling collars (without stopping buckle), in professional contexts (educators, breeders, kennels, refuges, presenters); private use not yet covered	Arrêté du 19 juin 2025 fixant les règles sanitaires et de protection animale auxquelles doivent satisfaire les activités liées aux animaux de compagnie d'espèces domestiques, Article 14, under Code rural et de la pêche maritime, Articles L. 214-6-1 et seq.
Slovenia, 1999	Electronic training collars (under the general Animal Protection Act framework)	Zakon o zaščiti živali (ZZZiv), of 18 November 1999, published Uradni list RS št. 98/99 of 3 December 1999. Most recent amendment ZZZiv-G in force 1 August 2025.
Spain, 2023	Electric, impulse, punishment, and choke collars (hunting, herding, and guard dogs exempt)	Ley 7/2023, de 28 de marzo, de protección de los derechos y el bienestar de los animales, Article 27(ñ); in force 29 September 2023.
Belgium (Wallonia), 2023	Use of electric collars and other electric-shock accessories for dogs or cats; accessories emitting unpleasant sound signals or acting through chemical substances; choke collars and prong or spiked collars for dogs, subject to limited derogations	Arrêté du Gouvernement wallon du 15 décembre 2022 portant sur l'interdiction ou la restriction de l'utilisation d'accessoires ou de produits causant aux animaux des douleurs, des souffrances ou des lésions évitables; published Moniteur belge, 22 February 2023, Numac 2023040666; in force 1 April 2023; one-year transition expired 1 April 2024.
Belgium (Flanders), 2018 (electric-collar prohibition 2027)	Remote-controlled and bark-activated electric collars, with no exception for military, police, or behaviour therapists; invisible-fence collars remain permitted	Decree of 13 July 2018 establishing principle prohibition under the federal Animal Welfare Act of 14 August 1986; phase-out scenario set 2021; electric-collar prohibition in force 1 January 2027.

JURISDICTION	DEVICES PROHIBITED OR RESTRICTED	STATUTORY AUTHORITY OR CITATION
Latin America		
Colombia, 2025	Prong and electric collars in pet care services (kennels, training centres, transport, grooming, spas); private-use cases addressed under general anti-cruelty framework	Ley 2480 de 2025 (Ley Kiara), Article 10, in force 2025. General anti-cruelty: Ley 84 de 1989 as updated by Ley 2455 de 2025 (Ley Ángel) of 18 April 2025.
North America (subnational)		
Quebec, Canada, 2024	Collars likely to cause pain (étrangleur, à pointes, électrique, martingale)	Règlement sur le bien-être et la sécurité des animaux domestiques de compagnie et des équidés, B-3.1, r. 0.1; in force 10 February 2024 (replacing the earlier P-42, r. 10.1).
Australia (federal)		
Australia (Commonwealth)	Import of pronged collars (sale and use are state and territory matters)	Customs (Prohibited Imports) Regulations 1956 (Commonwealth).
Australia (state and territory)		
Australian Capital Territory, 1992 (regulation 2001)	Electric devices on companion animals (e-collars not on prescribed-permitted list); animal sentience also recognised	Animal Welfare Act 1992 (ACT) §13, with prescribed permitted devices listed in Animal Welfare Regulation 2001; further strengthened by Animal Welfare Legislation Amendment Bill, passed 26 September 2019.
New South Wales, 1979 (s. 16 prohibition added 2000)	Use, sale, and possession of electric collars (containment systems permitted only inside a fence at least 1.5 metres high)	Prevention of Cruelty to Animals Act 1979 (NSW), section 16.
Queensland, 2022	Possession and use of pronged dog collars (e-collars regulated, not banned)	Animal Care and Protection Act 2001 (Qld), section 37A, as amended by Animal Care and Protection Amendment Act 2022; passed 2 December 2022, in force 12 December 2022.

JURISDICTION	DEVICES PROHIBITED OR RESTRICTED	STATUTORY AUTHORITY OR CITATION
South Australia, 2000	Collars designed to impart an electric shock	Prevention of Cruelty to Animals Regulations (No. 2) 2000 (SA), regulation 8(1)(a), under the Animal Welfare Act 1985.
Tasmania, 2022	Pronged collars and similar pinching collars	Animal Welfare Act 1993 (Tas), section 8(2)(ja), inserted by Act No. 36 of 2022; in force 30 November 2022.
Victoria, 2019	Pronged collars (banned, regulation 11); electronic collars heavily regulated under regulations 23 to 29A and Ministerial technical-specifications notice	Prevention of Cruelty to Animals Regulations 2019 (Vic), under the Prevention of Cruelty to Animals Act 1986; technical specifications by Ministerial Approval Notice S 56, Victorian Government Gazette, 6 February 2020.
United States (subnational, partial restrictions in tethering context)		
Hawaii, 2021	Tethering or restraining a dog by means of choke, pinch, or prong collar (unless engaged in supervised activity)	Hawaii Revised Statutes §711-1109(1)(j), as amended by Act 182, Session Laws 2021.
Rhode Island, 2024 (substantial expansion)	Tethering a dog with a choke-type, head, or prong-type collar; restrictions on tether area, tethering hours, weather exposure, and chain weight	Rhode Island General Laws §4-13-42, as substantially expanded by H 8095, Chapter 079 of 2024 (in force 12 June 2024).
Connecticut, 2010	Tethering a dog by means of a coat hanger, choke collar, prong-type collar, head halter, or any other improperly fitted device	Connecticut General Statutes §22-350a, as amended by Public Act 10-100 (effective 1 October 2010) and subsequently amended, current version under Public Act 22-59.

Pending United States legislation in the 2024 to 2026 period reflects three distinct legislative-design approaches to aversive equipment and aversive methods, beyond the enacted tethering statutes already discussed. The first approach is professional licensing of dog trainers tied to non-aversive standards. New York Assembly Bill A 6985 and Senate Bill S 7723 of the 2025-2026 session would have added Agriculture and Markets Law section 113-a, requiring licensing and educational standards for individuals providing canine training to non-service and non-police dogs, with the statutory language explicitly mandating non-aversive, evidence-based, positive

reinforcement techniques as the basis of those standards. The Assembly version had its enacting clause stricken on 20 February 2026; the Senate version remains in the Senate Agriculture Committee. New Jersey has introduced parallel proposals under the same professional-licensing approach. Senate Bill S 3814 of 2024 would have established a Dog Training Licensing Board with an evidence-based humane training code precluding aversive methods (the bill was held by sponsor on 10 February 2025 following committee testimony). Assembly Bills A 4206 and A 4207, both introduced 19 February 2026 and referred to the Assembly Regulated Professions Committee, would establish, respectively, a Board of Examiners of Dog Trainers under the Dog Trainer Licensing Act, and a New Jersey Dog Trainer Licensure Board under the Dog Training Licensure Act. A 4207 expressly ties licensure standards to professional codes of ethics that incorporate the Least Intrusive, Minimally Aversive Effective Behavior Intervention Policy adopted jointly by APDT, CCPDT, and IAABC. The second approach is restriction of aversive equipment within specified behavior-modification contexts. Massachusetts House Bill H 2342 and Senate Bill S 1459, in the 194th General Court, would require that any dangerous-dog behavior modification plan ordered under the proposed dangerous-dog statute use exclusively evidence-based training techniques that do not result in pain, discomfort, fear, or anxiety, and would explicitly exclude electric, prong, and choke collars from such plans, with required adherence to the principles of the American Veterinary Society of Animal Behavior and the American College of Veterinary Behaviorists. H 2342 was reported favorably by the Joint Committee on Municipalities and Regional Government and referred to the House Committee on Ways and Means on 14 August 2025; S 1459 was reported favorably by the same committee and referred to the Senate Committee on Rules on 19 November 2025. Both bills remain pending. The third approach is enhancement of existing tethering and care statutes. Rhode Island House Bill H 7487 of 2026, introduced 4 February 2026 and referred to the House Judiciary Committee (held for further study), would increase penalties for repeat violations of the existing dog care and tethering statute and would expand enforcement authority to include city and town animal control officers. None of these proposals had been enacted as of the date of this paper. Collectively, however, they establish that United States state-level legislative interest in regulating aversive training equipment, aversive methods, and the dog training profession itself is active across multiple states and across multiple legislative-design models.

The pattern across these jurisdictions is consistent. Where evidence-based welfare considerations have been weighed by national, regional, or state legislative bodies, the consistent direction of policy has been toward restriction or prohibition of aversive training equipment, never toward expansion of access or normalization of use. The United States is, at the federal level, an outlier in this comparative regulatory landscape.

7.5 The Burden of Proof and the Absence of Adverse Outcomes

The burden of proof in a public welfare policy debate lies with the party defending devices whose mechanism engages nociception and threat circuitry, and, in the specific case of neck-pressure equipment, whose use has been associated in peer-reviewed literature with measurable physical effects on the canine neck. That burden has not been met. No controlled study has demonstrated that aversive training equipment produces better training outcomes than reward-based training when the comparison is fair. No controlled study has demonstrated that aversive training equipment is necessary for any training or behavior modification problem that cannot be addressed by reward-based methods. No jurisdiction that has banned these devices, some of which have operated under bans for more than fifteen years, has produced peer-reviewed evidence of increased public safety risk attributable to the prohibition. Wales has banned electronic collars since 2010. Switzerland has banned spike, pinch, and electronic collars for years. Germany and Austria have operated under their respective bans for years. The predicted adverse consequences to canine safety, dog-guardian relationships, or public safety have not been documented in the published literature.

This absence of documented adverse outcome evidence is itself data. When a significant intervention is removed from public access across multiple jurisdictions over more than fifteen years without any observable peer-reviewed evidence of increased public safety risk, the claim that the intervention is necessary for public safety has been empirically tested and has failed.

7.6 Conversational Deployment of the Argument: Translating the Science Into Spoken Language

Sections 1 through 7.5 lay out the case for prohibition in technical, peer-reviewed terms. The practitioners this paper is written for, however, including trainers, behavior consultants, certified applied animal behaviorists, and veterinary behaviorists, will not always be in a position to deploy the argument that way. Client conversations, social media exchanges, podcast interviews, continuing education sessions for mixed audiences, and informal exchanges with colleagues all call for the practitioner to translate the academic argument into spoken language that stays accurate to the science but lands with the listener. The subsection that follows is a deployment toolkit. For each of ten core argumentative pillars of this paper, three formulations are offered: a technical version (the academic statement), a plain version (one to two sentences a practitioner can use in conversation), and a thirty-second version (a single tight sentence for situations where even the plain version is too long). Practitioners are welcome to adapt these formulations to their own voice and audience. The three-tier structure is a teaching scaffold, not a script.

Concept 1: The mechanism is aversive, regardless of label (Section 2.1).

Technical version: Aversive stimuli are defined functionally, not descriptively. A stimulus that drives avoidance, escape, or termination behavior is, by behavior-science definition, an aversive stimulus, regardless of the vocabulary used to describe it.

Plain version: Whatever the trainer or manufacturer calls the collar, the dog's nervous system processes the experience the same way. The label does not change what is actually happening to the dog.

Thirty-second version: If it changes behavior, it bothers the dog. That is what aversive means.

Concept 2: The intensity dial proves the mechanism (Section 2.2).

Technical version: The existence of an intensity adjustment on aversive equipment, and the clinical necessity of escalating that adjustment when the dog does not respond, is itself evidence that the mechanism is aversive control. If the stimulus were not functioning as an aversive, escalation would have no behavioral effect.

Plain version: Every shock collar has a dial that goes higher. That dial exists because sometimes the trainer has to turn it up to get the dog to respond. If the lower setting were already enough, nobody would need a higher setting. The dial is the proof that the collar works by being unpleasant.

Thirty-second version: Why does the collar have a dial? Because sometimes you have to turn it up. That is the answer.

Concept 3: The "barely perceptible" contradiction (Section 2.3).

Technical version: If the stimulus is behaviorally meaningful enough to change behavior through escape, avoidance, or suppression, it is by functional definition aversive. If it is not behaviorally meaningful, it is not doing the training work. There is no intermediate category.

Plain version: Some trainers say the modern e-collar is so mild that the dog barely notices it. But if the dog barely noticed, it would not change the behavior. If it changes the behavior, the dog is noticing. Both things cannot be true at the same time.

Thirty-second version: If the dog barely feels it, it would not work. That it works tells you the dog feels it.

Concept 4: Mechanism, not tissue damage, is the welfare question (Section 4.1).

Technical version: The welfare case does not depend on tissue injury. Nociceptive engagement and threat-system activation occur well below the threshold of visible tissue damage. The biological question is whether the stimulus crosses the nociceptive threshold, not whether it crosses the injury threshold.

Plain version: The welfare question is not whether the collar leaves a mark. The welfare question is whether the device activates the dog's pain and fear systems. Those systems do not need tissue damage to be triggered. They are designed to warn the body before damage happens. That warning system is what these collars activate.

Thirty-second version: You do not have to injure a dog to harm the dog. Pain and fear do not require visible damage.

Concept 5: The convergence argument (Section 3 and Table 1).

Technical version: The welfare evidence is convergent across multiple independent methodological approaches, populations, countries, and outcome measures. No single study carries the case alone, and the agreement across methodologies eliminates the possibility that the welfare signal is a methodological artifact.

Plain version: This is not based on one study. Fifteen peer-reviewed studies from multiple countries, using completely different methods, including controlled experiments, observational research, surveys of thousands of dog guardians, cognitive bias tests, and clinical referral data, all find the same welfare cost. When that many independent methods point in the same direction, the evidence is solid.

Thirty-second version: It is not one study. It is fifteen, in different countries, with different methods, all pointing the same direction.

Concept 6: The necessity claim has been empirically tested and has failed (Section 5 and 7.1).

Technical version: Board-certified veterinary behaviorists, the clinical specialty that treats the most severe canine aggression, anxiety, fear, and predatory cases, treat those cases as their standard of care without aversive equipment. The American College of Veterinary Behaviorists has formalized this position in their December 2025 letter to the American Veterinary Medical Association.

Plain version: The veterinary specialists who handle the worst aggression and anxiety cases in the country do not use shock or prong collars. The American College of Veterinary Behaviorists, the highest credential in this field, does not include aversive equipment in their standard of care. If the hardest cases can be solved without these tools, the everyday cases certainly can.

Thirty-second version: The veterinary specialists who treat the toughest cases do not use these tools. That tells you everything.

Concept 7: Adding food does not subtract the aversive (Section 4.4).

Technical version: Compound schedules pairing positive reinforcement with positive punishment or negative reinforcement do not eliminate the welfare cost of the aversive component. The dog's nervous system continues to register and respond to the aversive event

regardless of whether food reinforcement is present in parallel.

Plain version: Some trainers say it is fine to use a shock or prong collar as long as you also give the dog treats. Adding treats does not erase the shock. The dog's brain still registers the unpleasant event. The peer-reviewed studies that have looked at this directly find welfare costs even when food rewards are also present.

Thirty-second version: Treats do not cancel out shocks. The dog's brain registers both.

Concept 8: The working level is the aversive level (Section 2.3 and 4.1).

Technical version: Behavior change driven by escape, avoidance, or suppression requires the stimulus to function as an aversive event. A stimulus below the dog's aversive threshold cannot drive avoidance learning. The setting at which the stimulus successfully changes behavior is, by functional definition, the setting at which the stimulus has crossed the dog's aversive threshold.

Plain version: Trainers using these tools talk about finding the dog's working level, meaning the lowest setting that gets the dog to respond. The working level and the aversive level are the same number. By definition, the setting that makes the dog change behavior is the setting the dog wants to avoid. There is no working level below the aversive threshold, because below that threshold, the device would not work.

Thirty-second version: The working level is the aversive level. Those are the same setting.

Concept 9: Predictability and controllability do not eliminate the welfare cost (Section 4.3).

Technical version: Controllability and predictability attenuate but do not eliminate threat-related neural responding. They do not render aversive stimulation neurologically neutral or welfare-benign. This has been confirmed in writing by Dr. Luiz Pessoa, the senior author of Limbachia et al. (2021), and Dr. David Knight, the senior author of Wood et al. (2014).

Plain version: Some trainers say a shock the dog can predict and control is welfare-neutral. The neuroscience says the opposite. Predictability and controllability reduce how strongly the brain responds, but they do not eliminate the threat response. The senior researchers whose work is most often cited to support the proponent claim, Dr. Pessoa and Dr. Knight, have confirmed in writing that their research does not support that claim.

Thirty-second version: Predictable shocks still hurt. The researchers being cited say so themselves.

Concept 10: International consensus and jurisdictional precedent (Section 7 and Table 5).

Technical version: Aversive training equipment is prohibited or restricted in multiple national and subnational jurisdictions across Europe, the United Kingdom, Australia, North America, and Latin America, and is opposed by every major international veterinary, welfare, and professional

behavior organization that has issued a position statement on the question, including the FVE, FECAVA, FEEVA, and WSAVA joint position paper of June 2024.

Plain version: Wales has banned shock collars since 2010. Switzerland banned aversive collars years ago. Quebec banned them in 2024. Most of Australia, France, the Netherlands, and many other countries have restrictions or full bans. Every major veterinary organization that has reviewed the evidence has reached the same conclusion. The United States is increasingly the outlier on this issue.

Thirty-second version: Most of the developed world has banned or restricted these tools. The United States is the outlier.

Three notes on deployment. First, the formulations above are written for clarity, not for memorization. The most important step for a practitioner is to internalize the underlying conceptual structure of the argument from Sections 2 through 7 of this paper, after which the practitioner's own voice will produce conversational versions naturally. The formulations above are useful as study aids and as starting points, not as scripts to recite. Second, the deployment context matters more than the wording. A grieving guardian who has just lost a dog after a behavioral euthanasia following an aversive training failure does not need the thirty-second version. They need the practitioner to listen first and to deploy the argument only when invited. A balanced trainer in a public online debate is the opposite context, in which the thirty-second version may be all the practitioner has time to deliver before the discussion moves on. Read the room. Third, the practitioner's credibility is built over time, through consistent, calm, accurate communication, not through any single phrasing. The argument is correct. The practitioner who delivers it in their own voice, calmly, with care for the listener, is the practitioner the argument needs.

SECTION 8

Real-World Use: Why Research Conditions Underestimate Risk

The welfare problems with aversive equipment are intrinsic to the mechanism by which the equipment operates. Aversive control engages nociception and threat circuitry whether the handler is a novice or a master. Skill does not eliminate the aversive event, because the aversive event is what makes the equipment work. The convergent evidence from controlled studies, neuroscience, ethology, and clinical veterinary behavior medicine establishes that no level of handler skill renders an aversive welfare-neutral. The international veterinary, professional, and welfare consensus reflects this. AVSAB, the ACVB, the AAHA, the FVE/WSAVA joint position paper, the BVA, the BSAVA, the AVA, the CVMA, the NZVA, and the leading professional training and behavior organizations all conclude that aversive equipment should not be used at all, by anyone, in any setting. The policy this paper recommends is therefore not a restriction directed at lay users while reserving expert use. It is a comprehensive prohibition on sale, import, and use, applying equally to professional trainers, behavior consultants, hobbyists, and pet guardians.

Real-world use data add a separate and additional welfare concern. Even setting aside the intrinsic mechanism-based welfare argument entirely, the empirical record on how aversive equipment is actually used in the population shows predictable harm at scale. The following subsections document five categories of real-world evidence: who uses these devices and how widespread that use is (Section 8.1), how users acquire and apply the equipment (Section 8.2), what the manufacturing and product-engineering record shows about the devices themselves (Section 8.3), what United States guardians actually believe about these devices (Section 8.4), and the regulatory and informational environment in which sale and use occur (Section 8.5).

8.1 Prevalence and User Profile

Aversive training equipment is widely available in the United States consumer market. Electronic collars, prong collars, choke chains, and remote training systems are sold through national pet specialty retailers (with the notable exception of Petco, which ended retail sale of human and bark-activated electronic shock collars in October 2020), through national online marketplaces, through breed-club networks, and through the personal sales channels of trainers who use these devices in their practice. There is no national US registry of training equipment sales, no required reporting of use or adverse events, and no requirement that purchasers receive any education or assessment before purchase. The published research consequently relies on guardian self-report surveys for prevalence estimates.

Blackwell et al. (2012), in a UK sample, found that owner attendance at training classes and owner gender were the strongest factors distinguishing electronic collar users from owners using reward-based methods, suggesting that source of training advice rather than dog characteristics drove tool selection. A significantly higher proportion of owners in the reward-based comparison group reported training success than those in the e-collar group for comparable recall and chasing problems (Blackwell et al., 2012). The same general profile, in which the source of advice (or absence of advice) is the principal driver of equipment selection, has been documented across multiple jurisdictions and survey populations.

Starinsky, Lord, and Herron (2017) examined the effect of various containment methods on escape rates and biting histories in dogs confined to their guardians' properties. Their findings did not support a clear protective effect of electronic containment systems. Escape rates were nearly twice as high for dogs confined by electronic fence (forty-four percent) as for dogs confined by physical fencing (twenty-three percent), with comparable rates for tethered dogs (twenty-seven percent) (Starinsky et al., 2017). The tool most often cited as necessary for suburban dog containment does not, in the available evidence, rescue the bite or escape profile of the population in which it is used. The user profile for electronic containment systems substantially overlaps with the user profile for remote training collars, and the two product categories are sold by overlapping manufacturer networks.

The user profile for prong collars and choke chains differs in important ways from the electronic collar user profile but converges on similar welfare implications. Prong collar use in the United States is concentrated in (a) sport dog and protection dog communities, (b) certain working-breed enthusiast subcultures, (c) lay guardians purchasing through retail channels for leash-pulling control, and (d) a subset of professional trainers operating in the balanced training tradition. Choke chain use is broader and includes a substantial cohort of guardians who purchased the equipment based on advice from breed clubs, older training manuals, or family tradition rather than contemporary professional behavioral guidance. Across all of these populations, the empirical record from Hiby et al. (2004), Arhant et al. (2010), Casey et al. (2021), and the broader survey literature is consistent: aversive method use correlates with worse rather than better behavioral outcomes, regardless of user sophistication.

8.2 Professional Guidance Patterns and User Behavior

Masson, Nigron, and Gaultier (2018b) surveyed 1,251 respondents in France about electronic collar use. They found that 26 percent reported having used an electronic collar at some point. Among those users, 71.8 percent used the collar without professional advice, 75 percent had tried two or fewer other solutions before reaching for the collar, and 7 percent of dogs on which collars had been used presented with physical wounds. The authors concluded that real-life use is far from the idealized conditions of experimental studies and may put dog welfare at higher risk than the scientific literature suggests (Masson et al., 2018b).

These numbers are critical for policy because they describe the actual exposure profile in the population, not the experimental exposure profile in laboratory or controlled-trial conditions. A device used by a lay guardian, without professional supervision, after fewer than three attempts at any alternative method, on a dog whose underlying motivation for the target behavior has not been assessed, in environments where the behavioral context for application of the stimulus is not controlled, is not the same intervention that appears in published efficacy studies. It is a different intervention, with a different exposure profile, applied to a different population. Policy that addresses only the experimentally idealized version of aversive training equipment ignores the version that actually exists in the consumer marketplace.

The same real-world considerations apply to prong collars and choke chains. Consumer-purchased prong collars are commonly fitted incorrectly, used with excessive force, left on unsupervised dogs, and applied by lay handlers with no training in timing or body language. Choke chains are routinely used with force profiles that exceed what any clinician would consider safe. The Herron et al. (2009) data on aggressive responses to choke and pinch collar use in the general pet population, eleven percent, indicates a rate of confrontational outcomes that would be unacceptable for any consumer product with a safer available alternative. The same study documented aggressive responses in the high single to low double digits across the full set of confrontational handling techniques the authors examined, none of which are restricted in the United States consumer marketplace or regulated under any state or federal training standard.

When these guardian-survey patterns are combined with the experimental and observational welfare data summarized in Section 3, the result is convergent. Aversive training equipment, in the population in which it is actually used, produces measurable welfare harm and produces no measurable advantage in training outcome. The pattern holds across country, language, survey methodology, and outcome measure.

8.3 Device Variability and the Absence of Manufacturing Standards

There is also a body of real-world evidence about the devices themselves. Lines, van Driel, and Cooper (2013), in research published in Veterinary Record, examined the electrical characteristics of thirteen commercially available electronic training collar models under realistic conditions, including the electrical impedance of dogs' necks measured separately for wet and dry coats. The study found large differences between e-collar models in delivered energy, peak voltage, number of pulses, and pulse duration. Stimulus energy at the maximum strength setting at a 50 kΩ load ranged from 3.3 millijoules to 287 millijoules across the tested models, an eighty-seven-fold range across products marketed for the same use category (Lines, van Driel, and Cooper, 2013).

That variability has direct welfare implications. A guardian who buys an electronic training collar at maximum setting from one manufacturer is buying a meaningfully different stimulus than a guardian who buys an apparently equivalent product from another manufacturer. Comparison shopping, in any informed-consent sense, is impossible, because the relevant electrical characteristics (voltage, current, pulse width, waveform, and total energy delivery) are not disclosed by manufacturers in any standardized format on packaging, in marketing materials, or at the point of sale. The Electronic Collar Manufacturers Association maintains a voluntary technical standard, but adherence is self-reported and is not enforced by any government regulatory body in the United States.

The United States has no Food and Drug Administration regulation of these devices, no Consumer Product Safety Commission standard for them, no United States Department of Agriculture regulatory framework for their manufacture or sale, and no state-level technical standard. The regulatory vacuum does not extend to other consumer products that deliver electrical stimulation to a body. Therapeutic transcutaneous electrical nerve stimulation devices for human use are regulated as medical devices by the Food and Drug Administration, with required disclosure of pulse parameters, mandatory clinical evidence for marketing claims, and adverse event reporting requirements. Electronic dog training collars, which deliver substantially higher peak voltages than therapeutic TENS units (Section 9.7), are subject to no comparable framework. The asymmetry between the regulatory treatment of human-targeted electrical stimulation devices and animal-targeted electrical stimulation devices is hard to defend on the merits.

Prong collars and choke chains are not subject to United States federal product safety regulation either. There is no required tensile strength rating, no required disclosure of intended pressure load, no point-of-sale guidance on fit or use, and no adverse event reporting requirement. The same product category, sold under different brand names, varies in prong sharpness, prong spacing, link weight, and chain composition, with no standardization. A consumer who buys one of these products is buying a different functional intervention than a consumer who buys another. The lack of standardization on the manufacturing side compounds the lack of standardization on the user side documented in Section 8.2.

8.4 United States Public Attitude Data

The third strand of real-world evidence is what United States guardians actually believe about these devices. The most substantial available data point comes from October 2020, when Petco, then the second-largest pet specialty retailer in the United States, ended the retail sale of human and bark-activated electronic shock collars and announced its #StopTheShock campaign. As part of that announcement, Petco disclosed survey data conducted by the market research firm Edelman Intelligence (Petco, 2020). Seventy percent of dog guardians surveyed reported that they believed shock collars had a negative impact on their pet's emotional or mental wellbeing.

Sixty-nine percent of dog guardians surveyed considered shock collars a cruel training method. Petco additionally reported separate consumer research finding that fifty-nine percent of pet guardians surveyed would prefer to shock themselves than their dog (Petco, 2020).

These figures, even discounted appropriately for the limitations of corporate-sponsored survey research, document something important. United States guardians are not generally enthusiastic users of aversive electronic equipment. The substantial majority of United States guardians, by Petco's own reported numbers, already perceive these devices as harmful to canine emotional wellbeing and consider them cruel. The constituency that would be inconvenienced by a sale and use prohibition is a minority of the consumer population, not a majority of it.

This is structurally important for policy. Public welfare regulation that prohibits a class of consumer product faces predictable opposition framed in terms of consumer choice and personal liberty. The empirical evidence available from Petco's 2020 corporate disclosure, however, suggests that the consumer choice argument has weak support in the population it claims to represent. A majority of dog guardians, on the basis of the available US survey data, would not lose access to a product they value if aversive electronic training equipment were removed from the consumer marketplace. They would lose access to a product they already perceive as harmful, and that they would, in significant numbers, prefer not to use on their dogs in the first place.

The visible public face of opposition to aversive equipment prohibition in the United States, comprised of certain trainer trade associations, certain breed-specific advocacy groups, and certain manufacturer-funded campaigns, does not represent the modal United States dog guardian. It represents a vocal subset whose professional or commercial interests align with continued availability of these devices. Public welfare policy is properly oriented to the empirically documented preferences of the affected population, not to the loudest organized voices in the policy conversation.

8.5 The Information Environment and the Regulatory Vacuum

Todd (2018) analyzed the barriers to adoption of humane training methods by the general public, identifying lack of knowledge of welfare risks, poor quality of information available to guardians, lack of regulation of dog trainers, and inconsistent positions among professional bodies as factors that maintain the continued use of aversive methods (Todd, 2018). Each of those factors operates with particular force in the United States consumer environment.

The first, lack of knowledge of welfare risks, is structural. Aversive training equipment carries no required warning labels, no point-of-sale disclosure of welfare research, and no regulatory disclosure framework comparable to the warning frameworks applied to other consumer

products with documented adverse effects. Guardians purchasing these devices commonly do so on the basis of marketing claims (the device is gentle, the device is humane, the device is safe at low settings) that are inconsistent with the published welfare and neuroscience literature.

The second, the quality of available information, is inconsistent across sources and across professional channels. The veterinary, behavioral, and welfare-organization consensus opposing aversive equipment (Section 7) is not communicated to guardians at the point of purchase, in retail catalogs, or by manufacturers. Internet search results for training equipment commonly surface industry-funded sources that contradict the peer-reviewed welfare literature. Trainer marketing materials commonly endorse aversive equipment notwithstanding the contrary professional and welfare consensus.

The third is the regulatory vacuum around dog trainers themselves. Commercial dog training is essentially unregulated worldwide. Germany is the closest exception: under §11 of the Animal Welfare Act (Tierschutzgesetz), anyone who commercially trains dogs for third parties must obtain a permit from the local veterinary office demonstrating animal-related qualifications. The §11 permit applies to a range of animal businesses (dog training, grooming, daycare, breeding), and the granting decision is administrative rather than examination-based. It is a permit requirement, not a licensure framework comparable to those that govern veterinarians, mental health counselors, and social workers. No other developed country, including the United States, has even that level of regulatory gatekeeping for the canine training profession. Anyone may operate as a dog trainer in the United States without any required education, examination, supervised practice, or continuing education requirement. There is no state regulatory body to which guardians can complain when a trainer's methods cause harm. There is no professional malpractice framework comparable to the one operative in veterinary medicine, mental health counseling, or social work. New York Senate Bill S 7723 and Assembly Bill A 6985 (2025-2026 session) represent one of several serious United States state-level attempts to address this regulatory vacuum; parallel licensure proposals in New Jersey (Senate Bill S 3814 of 2024 and Assembly Bills A 4206 and A 4207 of 2026) are documented in Section 7.4. Until comparable measures pass, the United States consumer market for canine training and behavior modification operates without the professional gatekeeping that protects consumers in welfare-affecting professions generally.

A complementary regulatory architecture operates outside the legislative track. The British Columbia Society for the Prevention of Cruelty to Animals administers the AnimalKind program, a voluntary professional accreditation standard for dog trainers built on an explicit evidence base. Makowska (2018), an evidence-based literature review prepared by Dr. Joanna Makowska of the University of British Columbia Animal Welfare Program for the BC SPCA to support the development of the AnimalKind standards, synthesizes the welfare-science literature through 2018 and concludes that aversive-based training methods carry welfare risks not justified by efficacy evidence and that reward-based methods produce equivalent or superior outcomes

without those welfare costs. Makowska (2018) is a professional report for an animal-welfare organization, not a peer-reviewed primary research article, and is appropriately deployed as a supporting reference for accreditation infrastructure and pet-parent-facing continuing education rather than as a lead citation in adversarial debate; the peer-reviewed weight on the same conclusions is carried by Ziv (2017) and Fernandes, Olsson, and Vieira de Castro (2017), and by the convergent welfare evidence catalogued in Section 3 of this paper. The relevance for the United States policy environment is that an accreditation framework explicitly grounded in the welfare-science evidence base is operationally feasible and is already in place in an adjacent North American jurisdiction. The combination of legislative licensure, the New York and New Jersey direction, and voluntary evidence-based accreditation, the AnimalKind direction, defines the policy and professional-framework architecture the United States currently lacks.

Fourth, inconsistent positions among professional bodies have been substantially resolved in the past decade. The convergence documented in Section 7 (AVSAB, ACVB, AAHA, FVE/WSAVA, BVA, BSAVA, AVA, CVMA, NZVA, ESVCE, and the major welfare and training organizations) leaves no serious mainstream professional disagreement on the welfare implications of aversive equipment. The remaining inconsistency lies in the gap between what the veterinary and behavioral consensus has concluded and what consumers encounter at the retail level. This gap is structurally maintained by the absence of a regulatory framework. Closing it requires policy action.

The implication for policy is direct. Consumer-level availability of aversive training equipment, in a market where lay guardians have limited access to high-quality behavioral information, predictably produces welfare harm even before anyone considers the intrinsic properties of the devices. A prohibition on the sale and use of aversive training equipment is therefore a consumer protection measure, not just an animal welfare measure. It removes from the consumer marketplace a class of product whose advertised claims are not supported by the peer-reviewed evidence, whose adverse effects are documented but not disclosed, and whose appropriate use requires professional gatekeeping that does not currently exist in the United States and is not on the visible legislative horizon at the federal level.

Policy must be designed for the actual properties of the equipment and the actual conditions of its use. The intrinsic argument is that aversive equipment works by aversive control, which engages nociception and threat circuitry regardless of who is operating the device. The empirical argument is that real-world use compounds that intrinsic welfare cost through inconsistent timing, poor fit, prolonged wear, use in aggression and anxiety cases, use around triggers, and use by people without education in behavior analysis or canine body language. Both arguments lead to the same conclusion. The right policy response is a comprehensive prohibition on the sale, import, and use of these devices, not a tiered system that imagines safe expert use on one

side and unsafe lay use on the other. The international veterinary, professional, and welfare consensus has already rejected the tiered framing. The United States should align with that consensus.

SECTION 9

Anticipated Proponent Objections

9.1 "You Are Cherry-Picking Studies."

This objection can only be answered by convergence, and convergence is what this paper provides. The argument does not rest on any single study. It rests on multiple independent lines of evidence using different methods, populations, and outcome measures: welfare-focused experimental studies (Cooper, China, Vieira de Castro, Casey), direct observational studies (Deldalle and Gaunet, Rooney and Cowan), guardian survey data (Blackwell 2008, Blackwell 2012, Hiby, Masson), confrontational handling clinical data (Herron), peer-reviewed physical-effects research on neck-pressure equipment (Carter, Pauli, Hunter, Grohmann), threat-circuit and fear-conditioning neuroscience (Limbachia, Wood, LeDoux), stress neurobiology (McEwen, Rosenkranz, Vyas), and the gate-control theory of pain that underwrites the TENS-versus-shock distinction (Melzack and Wall). No single study in this list is perfect. Together, they point in the same direction.

A critic who wants to dismiss the convergence argument must explain why each of these independent methodological lines is wrong, why the same welfare signal would appear across such different methods by coincidence, and why every major veterinary, professional, and welfare organization that has reviewed this body of evidence has reached the same conclusion. That explanation has not been provided. Sections 7.1 through 7.5 of this paper detail the institutional consensus; this section addresses only the cherry-picking critique of the underlying scientific evidence itself.

9.2 "Cortisol Was Not Significant in Cooper 2014."

As discussed in Section 3.3, cortisol is one measure, and a blunt one. Behavioral stress indicators in Cooper et al. (2014) were significant in the electronic collar group, and these are validated welfare markers in canine research. Dismissing a study on the basis of one non-significant physiological measure while ignoring significant behavioral measures is not a valid methodological critique. It is selective reading.

Beyond the design-level point that Cooper et al. (2014) did report significant behavioral effects, the broader stress-neuroscience literature explicitly cautions against treating a single non-significant cortisol comparison as evidence of welfare neutrality. Mormède, Andanson, Aupérin, Beerda, Guémené, Malmkvist, Manteca, Manteuffel, Prunet, van Reenen, Richard, and Veissier (2007) provide the methodological treatment of hypothalamic-pituitary-adrenal axis activity as a tool for assessing animal welfare. Glucocorticoid secretion is pulsatile, follows diurnal and seasonal rhythms, varies with feed intake and environmental conditions, and is modulated by

genetics, age, and physiological state. Under chronic stress, baseline glucocorticoid secretion is often unchanged, while functional changes, including sensitization of the adrenal cortex to ACTH and altered negative feedback regulation, are detectable only under dynamic challenge testing. The authors are explicit that HPA-axis data must be integrated with behavioral observation rather than read in isolation, because cortisol can be suppressed, lagged, blunted, or buffered by context-specific factors that have nothing to do with the welfare significance of the exposure being studied. The American Veterinary Society of Animal Behavior cites Mormède et al. (2007) in support of this same methodological point in its 2021 Humane Dog Training Position Statement, where cortisol interpretation is treated as one channel among several rather than as a stand-alone arbiter of welfare (AVSAB, 2021).

The framework that integrates these channels for the cumulative-exposure case is the allostatic-load model developed in Section 3.5. Single-session cortisol is not the welfare-relevant exposure window for equipment that is worn for daily walks over months and years. The welfare-relevant question is what happens to the brain and the stress system under cumulative exposure (McEwen, 2012; Rosenkranz, Venheim, and Padival, 2010; Vyas, Mitra, Shankaranarayana Rao, and Chattarji, 2002; Arnsten, 2009), and that question is not answered by the presence or absence of a within-session cortisol elevation in any given study. A non-significant cortisol comparison in a single training session, in a study that did report significant behavioral stress markers, is not the same finding as evidence that the equipment leaves welfare untouched. It is one channel returning a null result while validated behavioral channels return positive results in the same dataset, in a methodology AVSAB cites in support of integrated rather than single-channel welfare assessment.

9.3 "The Reward Groups Just Had More Reinforcement."

As discussed in Section 5.1, this argument either concedes that the aversive equipment added no outcome benefit, in which case it carried welfare cost for no training advantage, or reduces to a hypothetical about a better-designed protocol that has not been tested. The trainers in the aversive equipment groups of Cooper and China were industry-nominated, and the high-reinforcement protocol is available to any trainer who wishes to deliver it. They did not. The existing evidence is what policy must address.

9.4 "Controllability and Predictability Make Aversive Use Safe."

Controllability and predictability reduce the magnitude of threat-related neural responding. They do not convert aversive stimulation into a neutral stimulus (Limbachia et al., 2021; Wood et al., 2014; L. Pessoa, personal communication, April 10, 2026; D. C. Knight, personal communication, April 17, 2026). Controllability is precisely what negative reinforcement provides,

and the aversive nature of the stimulus is precisely what makes the avoidance or escape response reinforcing. A claim that controllability neutralizes the aversive contradicts the definitions of the procedures under which controllability operates.

At the mechanism level, the same conclusion follows from the active-avoidance and learned-helplessness literatures developed in Section 4.3. Cain (2019) describes effective avoidance as goal-directed responding that controls exposure to the aversive event but does not eliminate the underlying threat representation; the warning stimulus retains its conditioned threat value, and the fear state returns when the avoidance response is blocked or fails. Maier and Watkins (2005) characterize controllability as a modulator of downstream stress responses rather than an off-switch for the threat circuitry on which avoidance learning depends. The dog whose successful avoidance behavior gives the appearance of welfare neutrality is operating inside a learning architecture for which the aversive contingency is the precondition, not a residue.

9.5 "Low-Level Stim or Gentle Corrections Are Benign."

As discussed in Section 2.3, the low-level argument runs into a logical contradiction across all aversive modalities. If the stimulation or correction is behaviorally meaningful enough to change behavior through escape, avoidance, or suppression, it is by functional definition aversive. If it is not behaviorally meaningful, it is not doing the training work. There is no intermediate category where the stimulus is both strong enough to reliably shape behavior and mild enough to have no motivational salience.

9.6 "It's Not Really Aversive, the Dog Just Finds It Weird or Tingly and Wants to Turn It Off."

When the aversive-control argument is pressed, a specific retreat position is common among proponents of electronic collars. The retreat runs like this. At the low levels that skilled trainers use, the stimulation is not painful and not aversive. It is merely unusual, odd, prickly, or tingly. The dog simply notices it, finds it strange, and works to make it stop. That is not the same as pain or fear, and therefore it is not aversive in any welfare-relevant sense.

There are four reasons the argument fails, each of them sufficient on its own.

The first is that the argument misuses the word aversive. In behavior analysis, which is the scientific field that defines these terms, the category "aversive" is functional, not subjective. A stimulus is aversive when its presentation decreases the future probability of the behavior it follows (positive punishment), or when its removal, termination, avoidance, or prevention increases the future probability of the behavior that produces that outcome (negative reinforcement). This is the standard textbook definition in applied behavior analysis (Cooper, Heron, and Heward, 2019). It is not a preference. It is a definition. If the dog works to terminate, avoid, or prevent the stimulus, the stimulus is functioning as an aversive by the only definition

the science of behavior recognizes. The argument that the dog finds the stimulus "weird" or "odd" but not aversive substitutes a subjective characterization of the dog's private experience, which the dog cannot confirm or deny, for the functional definition that textbooks, credentialing bodies, and the peer-reviewed learning literature actually use. It is not a scientific argument. It is a relabeling exercise.

The second is that the argument cannot distinguish itself from the mechanism it claims not to be. The statement "the dog finds it weird and wants to make it stop" is a plain-language description of negative reinforcement. The dog's behavior is being maintained by termination of a stimulus. That is exactly what negative reinforcement means, and by definition any stimulus that functions as a negative reinforcer is an aversive stimulus. There is no category of stimulus called "weird but not aversive" in the experimental learning literature that supports avoidance learning. Such a category does not exist in the controlled behavioral studies that underlie the field.

The third is that the argument is contradicted by the neurobiology of attention and habituation. A stimulus that is merely novel, unusual, or odd, without any negative valence, produces an orienting response that is followed by habituation. The organism attends to the stimulus once, possibly twice, and then the brain filters it out as irrelevant. This is documented in hundreds of studies on habituation across species, including dogs (Thompson and Spencer, 1966, for the foundational characterization of habituation across taxa). What a merely novel stimulus does not produce is sustained, reliable behavioral avoidance that persists across hundreds of trials without habituation. The fact that electronic collar stimulation continues to drive behavioral modification after repeated exposure, without habituating away, is evidence that the dog's nervous system is not classifying the stimulus as merely novel. It is classifying it as something worth working to avoid, which is the functional signature of an aversive.

The fourth and most decisive is that the argument is empirically closed by the industry-nominated best-practice studies. Cooper et al. (2014) studied trainers nominated by the Electronic Collar Manufacturers Association as representing best practice. Those trainers used low stimulation settings, manufacturer-recommended protocols, and pre-warning cues. The dogs still showed stress-related behavioral indicators, including increased yawning, panting, yelping, and tense body posture. China, Mills, and Cooper (2020) re-analyzed the same dataset focusing on efficacy and confirmed that the sophisticated low-level protocol, in which stimulation intensity was matched to the dog's tolerance, a pre-warning vibration cue was used, and the stimulus was applied as negative reinforcement rather than positive punishment, did not produce superior training outcomes compared with the reward-based training group. That is the "it's just a tingle" protocol, operationalized as the industry itself describes it. The behavioral welfare indicators documented in Cooper (2014) appeared in the e-collar group anyway, and the reward-based comparison group achieved equal or better training outcomes without any stimulation. The "it's only weird at low levels" defense has been tested on the industry's own

terms, by the industry's own nominated trainers, using the industry's own best-practice protocols. It failed. The proponent who retreats to this position is retreating to a defense that has already been empirically refuted.

9.7 "An Electronic Collar Is Just Like a TENS Unit."

A common proponent analogy compares electronic training collars to transcutaneous electrical nerve stimulation (TENS) units, which are used in human medicine for pain relief and musculoskeletal therapy. The argument runs that TENS is medical-grade, widely used in physical therapy, considered safe, and therefore an electronic training collar, which also delivers electrical stimulation through the skin, should be treated the same way. This analogy fails on the biology.

TENS and electronic training collars have opposite therapeutic purposes, and therefore use opposite electrical parameters. Therapeutic TENS is designed to produce analgesia. It works according to the gate control theory of pain proposed by Melzack and Wall (1965) and elaborated in the subsequent fifty years of pain neuroscience. The gate control theory holds that pain signals traveling from the body to the brain can be modulated, dampened, or blocked at the level of the spinal cord. Two kinds of nerve fibers feed into a so-called gate in the dorsal horn of the spinal cord. Large-diameter A-beta fibers carry harmless touch and vibration signals. Small-diameter A-delta and C fibers carry pain signals. When the large-diameter touch fibers are active, they close the gate, reducing how much pain signal gets through to the brain. This is the same mechanism by which rubbing a stubbed toe reduces the perceived pain. TENS exploits this mechanism deliberately. The pulse parameters of a therapeutic TENS unit, including low intensity, specific frequency ranges, and pulse durations typically in the fifty to two hundred fifty microsecond range, are calibrated to selectively activate the large-diameter A-beta touch fibers without crossing the nociceptive threshold. The therapeutic goal is reduction of pain perception by recruiting the non-painful sensory pathway to dampen pain transmission. The TENS described here is conventional sensory-level TENS, calibrated to remain below the nociceptive threshold. It is the modality the proponent analogy invokes. Other TENS variants used in some research and specialized clinical contexts deliberately cross the nociceptive threshold and are not the modality at issue here.

An electronic training collar is designed to do the opposite. It must deliver a stimulus the dog works to avoid, escape, or terminate. As established throughout this paper, that requirement means the stimulus must function as an aversive event, which by definition means crossing the nociceptive threshold and engaging nociception and threat circuitry. A stimulus calibrated to remain below the nociceptive threshold, like therapeutic TENS, could not drive avoidance learning, and therefore could not train anything. The two devices cannot share a biological mechanism because they have opposite biological goals.

The analogy also fails on electrical parameters. Training collar manufacturers disclose very little about the specific voltage, current, pulse width, and waveform characteristics of their devices, a finding documented by Lines, van Driel, and Cooper (2013) in Veterinary Record, who measured substantial variation in the characteristics of commercially available training collars. The fact that both TENS and training collars deliver electricity through electrodes on the skin is not sufficient biological similarity to support the analogy, any more than the fact that a flashlight and a surgical laser both emit light makes them biologically equivalent.

The analogy also involves a category error about the recipient. TENS is self-administered by a human who controls the intensity, can adjust it in real time, can verbalize the sensation, and can turn the device off instantly if it becomes unpleasant. An electronic training collar is administered to a non-consenting dog who cannot turn it off, who cannot verbalize the sensation, and who cannot negotiate the intensity. The ethical and welfare situations are categorically different, even if the electrical hardware were identical, which it is not.

Finally, the analogy fails on the internal logic of what the tool does. If a training collar really produced only a TENS-level A-beta sensation without nociceptive engagement, the dog would have no behavioral reason to work to avoid it. The fact that the collar functions as a training tool, at all, depends on the dog experiencing the stimulus as something worth terminating. That is not what TENS does. That is the opposite of what TENS does.

9.8 "The Prong Collar Just Gets the Dog's Attention."

The prong collar produces behavior change because the prong points apply concentrated force to the dog's neck when the leash tightens. That force is sufficient to make pulling unpleasant enough that the dog stops pulling. If the prong were only an attention-getting device without an aversive component, the dog could be trained to stop pulling with any other attention-getting device, including a tap, a verbal cue, or a sound. The specific efficacy of the prong collar is its mechanical delivery of an aversive event. This is functionally identical to the electronic collar operating at a level sufficient to stop behavior. The vocabulary of "attention" does not change the mechanism of action.

9.9 "The Choke Chain Mimics How a Mother Dog Corrects Her Pups."

This claim is biologically inaccurate. Mother dogs do not perform sustained neck constrictions on their puppies for training purposes. The alpha-wolf mythology on which this claim rests originated with Schenkel's 1947 captive-wolf studies, was popularized in L. David Mech's 1970 book on wolf ecology and behavior, and has since been extensively critiqued by wolf biologists and canine behavior scientists, including by Mech himself in the peer-reviewed literature (Mech,

1999) and in subsequent public retractions (Mech, 2008). The claim that choke chain corrections mimic maternal canine behavior is not supported by the ethology of mother-pup interactions and is not a rationale for applying choke chain corrections to adult dogs.

9.10 "My Dog Looks Happy in Training."

As discussed in Section 2.5, visible engagement is not a physiological readout. Threat and stress circuitry do not announce themselves through tail posture or eye expression alone. Once avoidance learning is well established, a dog may perform fluently and quickly precisely because the behavior prevents the aversive event. Fluency in the instrumental response is compatible with ongoing threat prediction. Welfare is not reducible to what a dog looks like in a fifteen-second clip.

9.11 The Rescue Device Problem: Unfalsifiability

A pattern that appears repeatedly in proponent argumentation deserves to be named. Every study that documents welfare harm is dismissed by pointing to some methodological limitation. Cooper had reinforcement rate differences. China had reinforcement rate differences. Vieira de Castro was not randomized. Schilder studied working dogs. Cortisol is complicated. Cognitive bias tasks are indirect. Neuroscience studies are in humans, not dogs. Herron relied on guardian reports. Carter used a model neck, not a live dog. Each of these critiques has some partial validity in isolation.

However, when every study showing harm is set aside for a different reason, a pattern emerges. The methodology critique is being used as a rescue device rather than as a genuine pursuit of better evidence. The appropriate diagnostic question is this: what would count as evidence against the tools? If the answer is that no existing study, no convergent finding across disciplines, no professional consensus, and no regulatory precedent would be sufficient, then the position is not scientifically falsifiable. It is a commitment defended by serial critique, not an evidence-based conclusion.

That pattern itself is relevant to policy. Tools whose safety is defended by an unfalsifiable argument structure cannot have their safety demonstrated, because no conceivable finding is permitted to count against them.

9.12 "Modern E-Collar Training Produces a Welfare-Neutral Goal-Directed Anxiety State."

A more sophisticated form of the controllability argument has emerged among balanced trainers conversant with contemporary neuroscience. The argument runs that successful electronic-collar training transitions the dog out of a fear state and into a goal-directed anxiety state, in which the dog has acquired an effective avoidance response and is positively reinforced by the

absence of shock. On this reading, the dog is no longer experiencing threat, and the training is therefore exempt from welfare scrutiny. The argument typically invokes Cain (2019) on contemporary active-avoidance research and Sears, Andrade, Samels, Laughlin, Moloney, Wilson, Alwood, Moscarello, and Cain (2026), a rat shuttlebox study, on safety-signal positive reinforcement, and is increasingly heard in long-form podcast and online debate contexts.

The argument fails on the neuroscience it cites. Section 4.3 of this paper treats the underlying literature in full. The key points relevant to this objection are summarized here. First, the safety signals identified by Sears and colleagues acquire their value entirely from their inverse relationship with the aversive event. Without the aversive contingency, no warning stimulus acquires threat value, no feedback cue acquires safety value, and the avoidance response is not reinforced. To describe avoidance as positively reinforced by safety, in the technical sense Sears and colleagues use, is not to claim that the underlying training regime was not aversive. The aversive contingency is the precondition for the entire learning architecture. Second, Cain (2019) explicitly notes that the shift from a fear state to an anxiety state during effective avoidance does not eliminate the underlying threat representation. The warning stimulus retains its conditioned threat value; what changes is that the dog has acquired a behavioral option that controls exposure to the aversive event. When the avoidance response is blocked or fails, the fear state returns along with inflexible defensive reactions. The calm-looking dog under successful electronic-collar training is in an anxiety state mediated by an effective avoidance response, not in the absence of threat representation. Third, the dorsolateral striatum-mediated habitual circuit isolated by Sears and colleagues is the same circuit Gillan, Morein-Zamir, Urcelay, Sule, Voon, Apergis-Schoute, Fineberg, Sahakian, and Robbins (2014) implicate in obsessive-compulsive disorder, and is consistent with the stronger habitual avoidance Gordon, Patterson, and Knowlton (2020) document in survivors of early life stress. The argument is not that aversive-based training causes obsessive-compulsive disorder in dogs. The argument is that the learning architecture aversive-based training depends on, particularly under prolonged or overtrained conditions, is the same architecture implicated in clinical populations as the substrate for persistent maladaptive avoidance.

The neuroscientific reframing does not exempt the training from welfare scrutiny. It deepens it. An anxiety state mediated by an effective avoidance response is not a welfare-neutral state; it is a state in which the dog has constructed an instrumental solution to a threat representation that the nervous system continues to maintain. Controllability modulates the downstream consequences of an aversive contingency but does not render the underlying stressor benign (Maier and Watkins, 2005). The proponent argument treats the surface calm as the welfare endpoint. The neuroscience treats it as the behavioral signature of a sustained underlying threat representation that the avoidance response is preventing from being expressed. A practitioner encountering this objection in conversation can refer interlocutors to Section 4.3 of this paper

for the full neuroscientific treatment, which addresses the Cain (2019), Sears et al. (2026), Gillan et al. (2014), and Gordon et al. (2020) literature in detail and aligns with the conclusions stated above.

9.13 Common Terminology Misuses and Their Behavior-Science Translation

A category of proponent argumentation that deserves separate attention is the systematic misuse of behavior-science terminology to make aversive procedures sound benign or to reframe them outside the welfare evidence base. This is not pedantry. The integrity of the operant conditioning framework, of nociception and threat-circuit science, and of the welfare research summarized in Sections 3 through 8 of this paper depends on accurate terminology. When the language drifts, the welfare evidence gets rhetorically neutralized without ever being substantively contested. This subsection catalogs the most common terminological moves a practitioner will encounter and provides the accurate behavior-science translation for each. The list is illustrative rather than exhaustive.

Group 1: Euphemisms That Rename the Aversive Stimulus

"Stim," "stimulation," "e-touch," or "tap" instead of "shock." These terms are marketing language, not behavior-science language. The functional question is whether the electrical event the device delivers is sufficient to drive avoidance learning. If it is, it is, by definition, crossing the dog's nociceptive threshold and engaging threat circuitry (Section 4.1). The vocabulary chosen by the manufacturer or trainer does not change the neural processing. A useful response in conversation: "What we call it doesn't change what the dog's nervous system does with it. If the stimulus is strong enough to make the dog change its behavior to avoid it, that's an aversive event by any scientific definition."

"Correction" instead of "punishment." In operant conditioning, positive punishment is the application of a stimulus following a behavior that decreases the future probability of that behavior. Calling the application a correction does not move it out of the operant punishment quadrant. If the procedure decreases behavior, it is, by definition, functioning as positive punishment. A useful response in conversation: "In behavior science, the procedure is named by what it does, not by what we call it. If applying the leash pop reduces the behavior, it's positive punishment. That's not an opinion, it's the definition."

"Pressure" or "tap" instead of "pinch" or "compression." Used for prong collars and choke chains to suggest the mechanical event is mild. The mechanical force applied by a prong collar that successfully reduces lead pulling is, by functional necessity, exceeding the dog's mechanonociceptive threshold. If it were below that threshold, it would not change the behavior. The same applies to choke chain compression that reduces lunging or forging.

"Self-correction" for prong collars. This phrase is used to imply the dog, not the handler, is the cause of the aversive event, and therefore that no punishment is being applied. In operant terms, the procedure is unaffected by who is the proximate cause. The contingency defines the procedure. When the dog pulls and the prong applies concentrated pressure, the dog has experienced a behavior-contingent aversive event. Whether the handler activated it, or whether it was activated by the dog's own action, the operant function is identical. Procedures are defined by their contingencies, not by the identity of the agent who closes the contingency.

Group 2: Reframings of the Tool's Function

"Communication tool" instead of "aversive device." Communication does not require an aversive event. Verbal cues, visual cues, hand signals, and trained marker words all communicate without delivering an aversive consequence. If a device communicates by applying an unpleasant consequence the dog works to avoid, it is functioning as an aversive device, regardless of whether the handler frames the application as communication. The label does not change the function.

"Working level" or "minimum effective level." Used to imply that low-level electronic collar use is welfare-benign. The working level is, by definition, the level at which the stimulus is sufficient to change the dog's behavior. As established in Section 2.3, behavior change driven by escape, avoidance, or suppression requires the stimulus to function as an aversive event. A stimulus below the dog's aversive threshold cannot drive avoidance learning. "Working level" and "aversive level" are the same level. The phrase obscures this rather than communicating it.

"Pavlovian" or "classical conditioning" framing for electronic collar use. Sometimes invoked to suggest the e-collar functions through associative learning rather than punishment, with the implication that classical conditioning is welfare-neutral. The framing fails on two grounds. First, classical conditioning to an aversive unconditioned stimulus is the foundational paradigm of fear conditioning research, and decades of neuroscience document the threat-circuit engagement that paradigm produces (Section 4.3). Calling the procedure classical does not exempt it from welfare cost. Second, in actual e-collar training, the operant component (behavior-contingent stimulation that the dog learns to escape, avoid, or prevent) is the working mechanism. The Pavlovian frame is a relabeling that does not change what the device is doing.

Group 3: Methodological Frame Reframings

"Balanced" training as a moderate middle ground. The term implies that balanced training combines reward-based and aversive methods in a moderate, considered way, and that force-free training is the extreme position. From a behavior-science perspective, balanced training is defined by the inclusion of positive punishment and negative reinforcement, regardless of whether positive reinforcement is also present. The inclusion of aversive procedures, not the proportion, is the methodological signature. The convergent welfare evidence in Section 3 (and

consolidated in Table 1) applies to any methodology that includes aversive procedures, including those that combine them with positive reinforcement (the Vieira de Castro et al. 2020 "mixed" group showed welfare cost as well, not only the aversive-only group).

"LIMA" (Least Intrusive, Minimally Aversive) invoked to defend aversive use. LIMA in its original formulation establishes a hierarchy in which less intrusive interventions must be demonstrably exhausted before more intrusive interventions are considered, and in which any aversive intervention requires documented justification by a qualified practitioner. As deployed in much of the balanced training community, LIMA is invoked at the level of label rather than at the level of practice, with no documented exhaustion of less intrusive methods. The framework, when properly applied, is a constraint against routine aversive use, not a defense of it. A useful response in conversation: "LIMA properly applied requires that you've documented that less intrusive methods don't work for this specific case before you escalate. Routine use of aversive equipment without that documented hierarchy is not LIMA, it's the label of LIMA on a different practice."

"All four quadrants" or "the four quadrants of operant conditioning are equally valid." Behavior science describes four operant procedures (positive reinforcement, negative reinforcement, positive punishment, negative punishment) functionally. This is a descriptive taxonomy of how behavior changes. It is not a normative endorsement of all four procedures for all training contexts. The welfare research has specifically established welfare costs associated with positive punishment and negative reinforcement that are not associated with positive reinforcement. Pointing to the existence of four quadrants in the textbook does not establish that all four should be used routinely on companion dogs in the consumer marketplace. Descriptive science does not equal prescriptive endorsement.

Group 4: Conceptual and Logical Deflections

"Pack leader," "alpha," or "dominance" framing for confrontational handling. The conceptual basis for this framing was Schenkel's 1947 captive-wolf studies, popularized in Mech's 1970 book on wolf ecology. Mech himself has subsequently retracted the alpha-pack-leader model as applied to wild wolves and to domestic dogs, in the peer-reviewed literature (Mech, 1999) and in subsequent public retractions (Mech, 2008). Contemporary canine ethology does not support the use of dominance-based confrontational handling techniques on domestic dogs. The Herron, Shofer, and Reisner (2009) clinical data establish that confrontational handling techniques justified on this basis (alpha rolls, dominance downs, scruff shakes, hit or kick corrections) elicit aggressive responses in a substantial percentage of the dogs on whom they are attempted. The framing has been retracted by the source. The techniques justified by the framing are clinically associated with elicited aggression.

"My dog tells me when to use it" or "the dog asks for the correction." Dogs cannot consent to aversive procedures and cannot communicate informed preference for them. Behavioral indicators sometimes interpreted as the dog asking for, requesting, or anticipating the correction are commonly displacement behaviors, conflict behaviors, or stress signals. Reading these as consent reverses the inferential direction. The behaviors are evidence of the welfare cost, not evidence of the dog's endorsement of the procedure that produced them.

"It worked for my client" or "I have hundreds of success stories." Anecdotal individual cases do not establish welfare neutrality, training equivalence, or absence of long-term cost. The convergent welfare research summarized in Section 3 already demonstrates that visible behavioral suppression and welfare cost can coexist. A dog whose problem behavior has been suppressed by an aversive intervention is not, by that fact alone, a dog whose welfare has been preserved. The visible outcome (the suppressed behavior) and the unmeasured outcome (the conditioned emotional response, the threat circuit engagement, the affective state, the relationship cost) are not the same thing. Population-level controlled and observational research is the appropriate evidence base for welfare claims, not individual anecdotes.

"Positive reinforcement doesn't work for serious cases." This claim is empirically falsified by the clinical practice of board-certified veterinary behaviorists. ACVB Diplomates treat the most severe canine aggression, anxiety, fear, and predatory cases in companion animal medicine, and they do so without aversive equipment, using behavioral assessment, environmental management, reward-based behavior modification, and psychiatric medication when clinically indicated. The clinical specialty that handles the hardest cases does not use aversive equipment as standard of care. The ACVB position has been formalized in their December 2025 letter to the AVMA (Section 7.1; ACVB, 2025). The necessity claim has been empirically tested in the highest-acuity clinical setting and has failed.

The categorization above is not exhaustive, but it covers the principal terminology moves a practitioner is likely to encounter. The general principle behind the corrective response is consistent across all of these examples. Behavior science defines procedures by their function, not by their label. Aversive equipment and confrontational handling techniques are defined as aversive by the contingencies under which they operate, not by the words a trainer uses to describe them. The welfare evidence applies to the function, not the label. A practitioner who keeps the functional definition in view can decode any new terminology variant a balanced trainer introduces, by asking the same diagnostic question: does this procedure depend on the dog working to avoid, escape, or terminate a stimulus, or does it not? If yes, the operant procedure is aversive, and the welfare research applies. If no, no aversive procedure is occurring, and there is nothing to defend.

9.14 Studies Frequently Cited by Proponents and How to Address Them

Beyond the rhetorical and terminological objections catalogued above, balanced trainers and aversive equipment proponents frequently cite specific studies in support of their position. A practitioner who engages in client conversation, professional debate, online exchange, or written correspondence with a proponent will encounter these citations. The subsection that follows identifies several of the most commonly invoked studies, summarizes the proponent reading, summarizes what the studies actually establish on careful reading, and provides a practitioner-deployable response. The list is illustrative rather than exhaustive, and practitioners may encounter additional studies in their specific contexts. Across the studies catalogued below, a consistent pattern emerges. The proponent reading typically depends on one of three moves: selective extraction of a single finding from a larger study whose overall conclusions point in a different direction; extension of a narrow methodological finding into broad claims the study does not support; or citation of older work that predates contemporary canine welfare science methodology.

Salgirli, Schalke, Boehm, and Hackbarth (2012). This study compared three training methods (electronic collar, pinch collar, and a conditioned quitting signal) for distraction-based training in a sample of 42 Belgian Malinois police dogs in Germany, with salivary cortisol and behavioral measures recorded across three training sessions. Proponents commonly cite this study to argue that electronic collar use produced less stress than pinch collar use under the trained-handler conditions of the study, and to position electronic collars or pinch collars as welfare-acceptable. What the study actually shows is more limited. The comparison was among three aversive interventions, conducted with experienced police dog handlers in a working-dog protocol, with the explicit acknowledgement that handler proficiency was not equally available across the three conditions. The study does not establish that electronic or pinch collars are welfare-neutral. It does not compare any of the aversive modalities to reward-based training. The senior author Esther Schalke has been an outspoken critic of electronic collar use in companion dog contexts, and her broader research program (including Schalke et al., 2007) supports the welfare case against aversive equipment. The response is to acknowledge the study but reframe its scope: a comparison among aversive modalities in working-dog contexts cannot establish welfare neutrality of any of them. The relevant comparison for companion dog training and consumer policy is aversive versus non-aversive, not e-collar versus pinch collar, and that comparison is addressed by the convergent welfare evidence summarized in Table 1.

Steiss, Schaffer, Ahmad, and Voith (2007). This study evaluated plasma cortisol levels and behavior in 24 kennel dogs (8 per group) wearing electronic bark collars, citronella spray bark collars, or inactivated control collars across a structured exposure protocol. Proponents commonly cite the study to argue that bark collars do not significantly elevate cortisol above baseline and are therefore welfare-neutral. What the study actually shows is that under the specific test conditions (kennel dogs, brief structured exposure to an unfamiliar dog as the bark

stimulus, plasma cortisol sampled at scheduled intervals), cortisol elevation was modest. As discussed in Section 3.3 of this paper, cortisol is a single physiological measure of stress and not a comprehensive welfare assessment. Behavioral stress markers and cortisol do not always converge. The Cooper et al. (2014) study, despite a non-significant cortisol finding in its main study phase, found significant behavioral stress indicators in the electronic collar group. The Steiss study cannot support the claim that bark collars are welfare-neutral; it can only support the claim that under specific test conditions, the cortisol elevation was modest. The response is that absence of cortisol evidence is not evidence of absence of welfare cost, and that the welfare assessment of any aversive device requires the full set of behavioral, affective, and physiological measures, not cortisol alone.

Schalke, Stichnoth, Ott, and Jones-Baade (2007). This study examined dogs trained with electronic collars under three conditions varying in predictability and contingency of stimulus delivery. Proponents sometimes cite the study selectively for the finding that dogs receiving stimulation under conditions where the stimulus was contingent on a clearly identifiable target behavior (the rabbit-chasing condition) showed less stress than dogs in conditions where the contingency was less clear. The proponent reading is that controllable, predictable e-collar use is therefore welfare-acceptable. What the study actually shows is that all three groups experienced welfare cost, with the lower-contingency conditions showing the largest effects. The study's overall conclusion was not that e-collar use is welfare-acceptable when contingencies are clear; the conclusion was that the variability of welfare risk across use conditions, combined with the difficulty of guaranteeing optimal contingency conditions in real-world use, argues against approving the equipment for general use. The senior author Esther Schalke has been an outspoken critic of electronic collar use. As established in Section 4.3 and corroborated by the L. Pessoa personal communication (April 10, 2026), controllability and predictability attenuate but do not eliminate threat-circuit engagement; they do not render aversive stimulation welfare-neutral. The response is that the study supports the welfare case, not the proponent case, and that selective citation of one sub-finding misrepresents the authors' overall conclusions.

Christiansen, Bakken, and Braastad (2001). This study examined remote shock collar use to prevent sheep predation in a sample of 114 hunting dogs (Norwegian elkhounds, English setters, and hare hunting dogs) tested across two consecutive years in Norwegian sheep pasture confrontation tests. Proponents sometimes cite this study to argue that shock collars are necessary and effective in predation prevention contexts, and that the welfare cost is justified by the alternative of livestock loss or the dog being shot by a farmer. What the study actually shows, on careful reading, is that the protocol involved structured exposure conditions in fenced enclosures, hunting-dog populations, and a sheep-predation-specific context, not companion dog training. The authors themselves recommend that the device be used only for the specific purpose of preventing livestock attack, in connection with positive reinforcement, and the Norwegian Council on Animal Ethics on which the study is partly based recommends a ban on

public use of electronic devices outside that specific predation-prevention context. The Masson et al. (2018b) survey establishes that in actual real-world use in countries without regulation, electronic collars are predominantly used by lay guardians without professional supervision for routine companion-dog behavioral problems unrelated to livestock predation. The response is that even granting the Christiansen finding for its specific context, the finding does not transfer to consumer marketplace conditions. The relevant policy question is whether aversive electronic equipment should be available to lay guardians for routine training, not whether structured predation-prevention protocols can reduce sheep attacks under specialized professional handling.

Tortora (1983). This older study, published in the Journal of Experimental Psychology: General, used what the author called "safety training," a multi-stage avoidance-learning protocol involving electronic collar negative reinforcement combined with extensive positive reinforcement, to address what the author defined as avoidance-motivated aggression in 36 dogs. Proponents sometimes cite this study as establishing that electronic collar training resolves aggression and improves welfare. What the study actually shows is more nuanced and more limited than the proponent reading. The protocol was not simple aversive conditioning; it was a complex multi-stage process that began with positive reinforcement training of obedience behaviors, used both play and choke collars (no electronic stimulus) in early stages, introduced a conditioned safety signal as a negative reinforcer, and reserved electronic stimulation for later stages of the protocol. Tortora's own Experiment 3 within the same paper showed that simple aversive use of the electronic collar (full-intensity signaled shock used to punish aggression directly) produced only slight decreases in aggression, undermining the proponent reading that the study supports straightforward aversive conditioning of aggressive behavior. The study is also from 1983, predating contemporary canine welfare science methodology by decades, with no behavioral welfare measures, no physiological measures, no follow-up assessment of conditioned emotional responses, no comparison to modern reward-based aggression behavior modification, and methodological standards that would not meet contemporary peer-review expectations. The response is that the convergent welfare evidence base from 2004 forward, using contemporary welfare science methodology, supersedes a methodologically thin 1983 design. Citing Tortora as evidence against current force-free aggression behavior modification is asking practitioners to weigh a single 1983 multi-stage protocol study without modern welfare measures against forty years of subsequent peer-reviewed convergent welfare research.

Johnson and Wynne (2024). This recent study compared training methods for stopping predatory chasing behavior in dogs and is increasingly cited by proponents as decisive evidence that electronic collars are necessary or uniquely effective for the predatory chasing intervention. The full treatment of this study is in Section 5.3 of this paper. The summary position is that the study establishes narrow efficacy under specific protocol conditions, not necessity, and that its protocol design has been directly challenged in the peer-reviewed literature by Bastos, Warren,

and Krupenye (2025) and in the present author's separately published methodological critique (Bangura, 2025, SSRN). The proponent reading treats the study as decisive. The accurate reading treats it as one experimental finding under specific conditions, contested in peer review, that does not establish necessity over reward-based alternatives applied with comparable intensity and follow-through. Practitioners encountering Johnson and Wynne in conversation can refer interlocutors to Section 5.3 of this paper for the full treatment, and to Bastos et al. (2025) as the peer-reviewed methodological critique.

Lindsay's Handbook of Applied Dog Behavior and Training (2005, Volume 3). Proponents sometimes invoke Steven Lindsay's three-volume textbook, particularly Volume 3 (Procedures and Protocols), in which Lindsay defends electronic collar use and characterizes low-level electronic stimulation as a "pulsing tingling or tickling sensation" rather than a noxious event. What this source actually is: a textbook chapter expressing the author's interpretation of training methodology, not a peer-reviewed welfare research finding. Lindsay's characterization of low-level electronic stimulation has not been substantiated by peer-reviewed nociception research. As established in Section 4.1 of the present paper, electrical stimulation strong enough to drive avoidance learning is, by functional definition, crossing the nociceptive threshold; the characterization of the same stimulation as a non-aversive sensation cannot be reconciled with the operant requirement that the stimulation function as an aversive event. The response is that a textbook chapter expressing one author's interpretation is not a peer-reviewed welfare finding, and that the convergent welfare research catalogued in Section 3 and Table 1 supersedes textbook interpretation when the two are in conflict.

The pattern across these proponent-cited studies is consistent. Each study, on careful reading, supports a narrower conclusion than the proponent reading attributes to it. In several cases, most notably Schalke (2007), the study's overall conclusions actually support the welfare case against aversive equipment, with the proponent reading depending on selective extraction of a sub-finding contrary to the authors' own conclusion. In other cases, most notably Tortora (1983), the cited source predates contemporary welfare science methodology by decades and does not include the welfare measures that contemporary peer review would require. In all cases, the convergent welfare evidence catalogued in Section 3 and Table 1, drawing on multiple independent methodological lines, populations, countries, and outcome measures, addresses the welfare question more directly and more comprehensively than any single proponent-cited study can. A practitioner who encounters a balanced trainer's citation of any of the above studies can deploy the same general response: acknowledge the study, summarize what it actually establishes within its specific protocol and context, and reframe the conversation toward the broader convergent evidence base and toward the contemporary clinical consensus of veterinary behavior specialists who treat the highest-acuity cases without aversive equipment.

9.15 Common Defensive Justifications and the Evidence Response

The objections catalogued in Sections 9.1 through 9.11 push back on the welfare evidence itself, and the terminology decoder in Section 9.13 addresses how the language of behavior science is misused to make aversive procedures sound benign. A third rhetorical posture is also common in proponent argumentation, distinct from objections to the welfare science and distinct from terminology drift. It is the defensive justification, the move that does not contest the science directly but instead presents aversive use as cautious, necessary, compassionate, or moderate. Because these justifications carry surface plausibility, often invoking values like safety, expertise, freedom, or responsibility, audiences may grant them a presumption of reasonableness that the evidence does not support. This subsection catalogs the ten most common defensive justifications and provides the evidence response to each.

The diagnostic principle is consistent with the rest of this section. A procedure is named by its function, not by the framing offered for it. Each justification below is followed by the evidence response. Where the response relies on argument already developed elsewhere in this paper, a cross-reference is provided rather than duplicating the underlying material.

Justification 1. "It is a last resort, after positive reinforcement has failed." The aversive tool is presented as the trainer's reluctant final option, deployed only after reward-based methods have been attempted and have failed. The evidence response is that the claim of failure is rarely accompanied by documentation of what was actually attempted. The diagnostic questions are whether the dog was kept below threshold, whether the reinforcers were functionally adequate, whether the antecedent arrangement was appropriate, whether environmental management was in place, whether medical contributors were assessed, whether psychiatric medication was considered when clinically indicated, and whether the intervention addressed the underlying emotional function of the behavior. Ziv (2017), reviewing seventeen peer-reviewed studies that compared training methods, found no evidence that positive punishment is more effective than positive-reinforcement-based training and concluded that aversive methods can jeopardize dogs' physical and mental health (Ziv, 2017). Fernandes, Olsson, and Vieira de Castro (2017), in a comprehensive peer-reviewed literature review of welfare-relevant evidence on reward-based versus aversive-based training methods through 2017, reached convergent conclusions through a different review methodology, with aversive methods correlating with indicators of compromised welfare across multiple study designs. The American Veterinary Society of Animal Behavior cites both reviews in support of its 2021 Humane Dog Training Position Statement (AVSAB, 2021). Makowska (2018), an evidence-based literature review prepared by Dr. Joanna Makowska of the University of British Columbia for the British Columbia Society for the Prevention of Cruelty to Animals to support the development of the AnimalKind dog-training accreditation standards, synthesizes the same body of literature through 2018 and reaches the same convergent conclusion; Makowska (2018) is a professional report for an animal-welfare organization, not a peer-reviewed primary research article, and is appropriately deployed as a supporting reference

in continuing-education and professional-accreditation contexts rather than as a lead citation in adversarial debate, where the peer-reviewed weight is carried by Ziv (2017) and Fernandes et al. (2017). The burden of demonstrating necessity, in the sense that a more intrusive procedure produces an outcome that the less intrusive procedure cannot, has not been carried by the proponent literature. A description of what failed is not a demonstration of what was tried.

Justification 2. "These tools save lives." The strongest emotional appeal in the proponent toolkit holds that without aversive equipment, certain dogs would be surrendered, euthanized, or remain too dangerous to live in human communities. The American Veterinary Society of Animal Behavior addresses this justification directly: animals with challenging behavior disorders, including aggression, should be treated with effective, compassionate, and humane methods of training, and there are no exceptions to that standard. The same statement specifically advises against tools that involve pain, including choke chains, prong collars, and electronic shock collars (AVSAB, 2021). The American College of Veterinary Behaviorists, the clinical specialty that handles the most severe canine aggression, anxiety, fear, and predatory cases in the United States, has formalized the same position in its December 2025 letter to the American Veterinary Medical Association (ACVB, 2025). Section 5.4 develops the full force of this point: the clinical specialty that sees the hardest cases does not use aversive equipment as standard of care. The "saves lives" claim also requires population-level evidence to be more than rhetorical. If banning aversive equipment predictably increased euthanasia, bites, or relinquishment, that claim would be supported by reliable epidemiological data from jurisdictions that have enacted bans. As Section 7.5 documents, the published case for that harm has not been made.

Justification 3. "It is not punishment, it is clear communication." Electronic stimulation is recharacterized as a "tap," a "cue," "pressure," or "information," shifting attention from the dog's experience to the trainer's intention. The terminology aspect of this move is treated in Section 9.13 (Group 2: "Communication tool" instead of "aversive device"). The justification framing adds an emotional appeal: the trainer is not punishing, the trainer is communicating, and communication is good. The evidence response is grounded in the functional definition of aversive control developed in Section 2.1. If a stimulus suppresses behavior, interrupts behavior, compels behavior, or teaches the dog to respond in order to avoid or terminate the sensation, the procedure is functioning through positive punishment, negative reinforcement, or both, regardless of the framing. Cooper et al. (2014) studied electronic-collar training in the field and found that dogs trained with electronic collars spent more time tense, yawned more frequently, and engaged in less environmental interaction than dogs in a reward-based comparison group, while owner-reported efficacy did not differ significantly across groups (Cooper et al., 2014). The label does not resolve the welfare question.

Justification 4. "Modern collars are used at low levels and do not hurt." The user-dial setting is offered as a proxy for the dog's subjective experience. Section 9.5 addresses the operant logic of this claim: a stimulus mild enough not to bother the dog cannot drive avoidance learning, so the

working level and the aversive level are the same level. Two additional points are relevant here. First, the dog's perception of the stimulus depends on individual sensitivity, context, predictability, controllability, emotional state, prior learning history, arousal, coat and skin factors, and the behavior being interrupted or punished. The user-dial setting captures none of those variables. Second, the engineering measurement work of Lines, van Driel, and Cooper (2013), discussed in Section 8.3, establishes that the relationship between user-dial setting and delivered stimulus energy is not consistent across products: an eighty-seven-fold range across thirteen commercial collars at maximum settings, an eighty-one-fold median ratio within collars across user-dial settings, and manufacturing faults in two of thirteen new collars, including one that delivered a maximum-strength impulse regardless of user setting. The user dial describes the device. It does not describe the dog's experience.

Justification 5. "The dog looks happy in training." Visible engagement and obedience are offered as evidence that the dog is unaffected by aversive stimulation. Section 9.10 addresses the basic version of this argument: visible behavior is an incomplete measure of welfare, and once avoidance learning is established, fluent compliance is compatible with sustained threat prediction. The justification framing adds the implicit claim that visible behavior is the welfare endpoint and that physiological and affective measures are unnecessary. Vieira de Castro et al. (2020), comparing companion dogs from reward-based, mixed-method, and aversive-based training schools, found that dogs in the aversive-based group displayed more stress-related behaviors, were more frequently in tense and low behavioral states, panted more during training, and exhibited higher post-training increases in cortisol than dogs in the reward-based group. Dogs in the aversive-based group, defined in the study as schools using high proportions of aversive techniques (0.76 and 0.84), also showed a more pessimistic response pattern in a cognitive bias task, indicating welfare effects beyond the training session itself. The authors frame this welfare cost as occurring especially when aversive methods are used in high proportions (Vieira de Castro et al., 2020). The peer-reviewed welfare research treats visible behavior as one channel among several, and the channels do not agree with the "looks happy" reading.

Justification 6. "Some dogs need consequences." A sanitizing reframe in which "consequence," "accountability," or "boundary" substitutes for pain, startle, intimidation, fear, or escape-avoidance pressure. The evidence response is that all learning involves consequences. Reinforcement-based training uses consequences continuously: access to desired outcomes, differential reinforcement, antecedent arrangement, removal of access to reinforcement when appropriate, and management. The scientific question is not whether consequences exist. It is which consequences, what learning processes they activate, and what emotional associations they create. Ziv (2017), reviewing the comparative literature, concluded that there is no evidence positive punishment is more effective than positive-reinforcement-based training, while aversive methods carry documented welfare risks for dogs' physical and mental health (Ziv, 2017). When

"consequences" is used to mean an aversive stimulus the dog works to avoid, the word is performing rhetorical work, not analytic work. The ethical question is whether the selected consequence is necessary, proportionate, humane, and supported by evidence as the least intrusive effective option.

Justification 7. "High-drive dogs need stronger tools." Dogs described as high drive, intense, predatory, working-line, or environmentally over-aroused are presented as a category for whom reward-based training is insufficient and aversive equipment is necessary. The evidence response is that high motivation in the presence of competing stimuli requires careful training design: distance, antecedent control, functional reinforcers, long-line safety, controlled exposure, prevention of rehearsal, gradual increases in difficulty, and reinforcement histories strong enough to compete with the environmental stimulus. The proponent argument frequently confuses inadequate setup with inadequate methodology. China et al. (2020) specifically evaluated dogs with off-lead behavioral problems, including poor recall and chasing, the classes of behavior most often invoked in the high-drive justification, and found that electronic-collar training was not more efficient and did not produce less disobedience than positive-reinforcement-focused training. The reward-focused group performed better on multiple measures and posed fewer welfare risks (China, Mills, and Cooper, 2020). The category of "high-drive dog" does not generate a separate evidence base in which aversive equipment becomes necessary. Section 5.1 develops the full force of the Cooper and China findings on this point.

Justification 8. "Electronic collars give dogs more freedom." Off-leash control via remote stimulation is offered as an animal-welfare benefit. Freedom to move, sniff, and explore is presented as the trade for the device. The evidence response is that the freedom argument is ethically real. Dogs benefit from movement, exploration, sniffing, choice, and species-typical behavior. The argument becomes problematic when remote aversive control is presented as the necessary price of that freedom. Safer alternatives exist for most contexts: long lines, fenced areas, secure fields, careful location selection, structured recall training, reinforcement-based off-leash preparation, and refraining from off-leash exposure before the dog has the recall skills to support it. The relevant welfare question is not whether the dog covers more physical territory. It is whether that territory is maintained through voluntary cooperation, environmental safety, and reinforcement history, or through the dog's avoidance of an unpleasant stimulus. If the dog's freedom depends on the threat of remote correction, the welfare analysis must include emotional safety, predictability, and the quality of the dog's learning experience, not only physical range.

Justification 9. "Force-free trainers use force too." The boundary between safety management and deliberate aversive training is erased. A guardian holding a leash to prevent a dog from running into traffic is described as using "force," and that example is then equated with leash corrections, prong collars, choke chains, and electronic stimulation. The evidence response is that physical restraint to prevent immediate harm is not the same procedure as the deliberate

application of pain, discomfort, startle, threat, or escape-avoidance pressure as a behavior-change technique. A leash, barrier, crate, gate, muzzle, or long line can be used as humane safety management without functioning as a behavior-suppression tool. Force-free training does not mean no physical safety management ever occurs. It means the training plan does not deliberately rely on aversive stimuli to suppress, compel, or punish behavior. AVSAB (2021) makes this distinction explicitly, recommending environmental management and behavior modification while advising against tools and techniques that involve pain, intimidation, physical correction, or flooding (AVSAB, 2021). Conflating these is not an argument. It is a definitional move that pretends the categories do not exist.

Justification 10. "These tools are safe when used by skilled professionals." Harm is attributed to misuse rather than to the tool or the underlying mechanism. Skilled application is offered as the variable that resolves the welfare concern. The evidence response is that the available evidence does not support that reassurance. Cooper et al. (2014) studied electronic-collar training under field conditions with industry-nominated trainers experienced in the use of electronic collars and still identified welfare-relevant behavioral differences compared with reward-based training, without finding superior efficacy in the electronic-collar group (Cooper et al., 2014). China et al. (2020) found that training with electronic collars was not more efficient, did not result in less disobedience, and posed greater welfare concerns than training focused on positive reinforcement (China, Mills, and Cooper, 2020). The comparison was not between professionals and amateurs. It was between professional trainers using electronic collars and professional trainers not using them, and the welfare and efficacy data did not favor the electronic-collar group. Skill may reduce some risks. It does not change the underlying behavioral mechanism, and it does not establish that the tools are necessary. Section 5.1 develops this point with the full force of the Cooper and China findings.

The pattern across the ten justifications is consistent. Each substitutes a framing for an evidence base. Each invokes a value the audience is likely to share, such as safety, expertise, compassion, freedom, responsibility, or moderation, and trades on that value to deflect attention from the underlying mechanism, which is aversive control. The evidence base addressed in this paper applies to the mechanism, not to the framing. A practitioner, a legislator, or a policy reader who keeps the functional definition of aversive control in view (Section 2.1) can decode any defensive justification a proponent offers, by asking the same diagnostic question used throughout this section: does the procedure depend on the dog working to avoid, escape, or terminate a stimulus, or does it not? If yes, the procedure is aversive, the welfare evidence applies, and the framing is decorative rather than substantive. If no, then no aversive procedure is occurring, and there is nothing for the justification to defend.

SECTION 10

Recommended United States Policy

The recommended policy has two complementary components. The first is prohibition of aversive training equipment, addressed in Section 10.1. The prohibition is delivered through legislation regulating sale, import, and use, modeled on the legislative architecture already in place in Wales, Switzerland, Germany, France, and the other jurisdictions cataloged in Section 7.4. The second is a substantive force-free model state standard of practice for commercial dog training and behavior modification, addressed in Sections 10.2 and 10.3 and enforced through state licensure of trainers and behavior consultants, addressed in Section 10.5. Component one removes aversive equipment from the consumer marketplace. Component two ensures that commercial training and behavior modification services delivered to the public are conducted using non-aversive methods, including the regulation of confrontational handling techniques applied without equipment. Both components are necessary. Equipment prohibition without standards of practice leaves confrontational handling techniques unaddressed. Standards of practice without equipment prohibition leaves the equipment available on the consumer market. Together, the two components accomplish what the international veterinary, professional, and welfare consensus has called for: the comprehensive removal of aversive control as the basis of canine training and behavior modification in the United States.

Trainer regulation in the United States falls primarily within the state police power rather than within federal regulatory authority. The recommendations that follow are therefore framed as a model state standard of practice intended for adoption by state legislatures, not as a federally enacted national standard. A model state framework that is adopted across multiple jurisdictions can produce a de facto national standard through convergent state adoption, which is the normal mechanism by which welfare-affecting professional licensure has historically been implemented in the United States. The model state standard recommended in Sections 10.2 through 10.5 is designed to be adoptable by states individually, while remaining substantively consistent across jurisdictions, so that multi-state adoption produces a coherent national standard of practice without requiring federal enactment.

10.1 Equipment Prohibition: Scope

A United States policy should prohibit the sale, import, and use of aversive training equipment for dogs. This includes, without limitation, electronic collars of all types (remote-controlled, bark-activated, and electronic containment), prong or pinch collars of all designs, choke chains, choke collars, and slip collars designed to constrict the neck under load, and spray collars in the citronella and scentless-air variants (whether remote-controlled or bark-activated). The prohibition should cover equipment used for training, behavior modification, punishment,

negative reinforcement, containment, barking suppression, and behavior interruption. Ultrasonic and audible-tone bark-and-behavior-modification devices raise welfare concerns of their own and are addressed under the professional standards of practice in Section 10.2 rather than under this equipment-prohibition framework. Properly fitted flat collars, body harnesses (front-clip and back-clip), and head collars (such as the Halti and Gentle Leader) are not aversive equipment and are not within the scope of this prohibition. Limited-slip martingale collars whose tightening section is configured so that the collar cannot constrict to a circumference smaller than the resting circumference of the dog's neck are not aversive equipment and are not within the scope of this prohibition.

10.2 Force-Free Standards of Practice and the Hierarchy of Dog Needs as a Leading Reference Framework

The second component of the recommended policy is a substantive force-free standard of practice for commercial dog training and behavior modification. The model state standard recommended here is built on objective, legislatively stated principles that operationalize the convergent welfare evidence catalogued in Sections 3 through 7 of this paper. The principles are: that reward-based methods are the basis of permitted training and behavior modification practice; that practice is welfare-centered, attentive to the dog's biological, emotional, social, and cognitive needs; that positive punishment is excluded from permitted practice; that negative reinforcement is excluded from permitted practice; that engineered extinction is excluded from permitted practice where it creates distress or welfare risk; that aversive control procedures, including those whose mechanism of action engages nociception, threat circuitry, fear, intimidation, or escape-avoidance learning, are excluded from permitted practice; that permitted practice is aligned with the consensus position of veterinary behavior medicine and animal welfare science as documented in the international veterinary position statements catalogued in Section 7; and that permitted practice uses humane, non-aversive behavior modification techniques, including management, antecedent modification, positive reinforcement, differential reinforcement (including DRI, DRA, DRO, and DRL), classical conditioning and counterconditioning, desensitization, the Premack Principle, and social learning (Bandura, 1965, 1977, 1986).

These principles are stated directly in the model state standard and do not depend for their legal force on any externally controlled framework. The model state standard does not delegate regulatory authority to any private framework, trademark, book, or any future revision of any external publication. Compliance with the state standard is determined by reference to the principles set forth above, as they are written into the licensing statute and the implementing regulations of the licensure framework recommended in Section 10.5.

Linda Michaels' Hierarchy of Dog Needs® and Best Force-Free Practices (Michaels, 2022) provides a leading articulation of these principles in the contemporary force-free training and behavior modification literature. The Hierarchy of Dog Needs® (HDN) is a comprehensive welfare and training framework, embedded with an ethical code, that establishes the "First, Do No Harm" principle as the governing standard for canine training and behavior modification. It organizes care across five tiers of needs, addressed in sequence: biological needs (nutrition, water, exercise, shelter, sleep, gentle grooming, gentle veterinary care, freedom from pain); emotional needs (physical and emotional safety, trust, love, benevolent leadership, secure attachment); social needs (two-way non-threatening interaction with humans and conspecifics, age-appropriate socialization); cognitive needs (choice, problem-solving, novelty, opportunity for normal dog behaviors); and force-free training needs, addressed only after the preceding tiers have been assessed and supported. Its Best Force-Free Practices, set forth in Chapter 5 of the Handbook, comprise eight permitted methods (management, antecedent modification, positive reinforcement, differential reinforcement, classical and counterconditioning, desensitization, the Premack Principle, and social learning). The HDN is cited throughout this paper as the leading articulation of the substantive force-free standards listed above, and state legislatures and regulatory bodies are encouraged to consult it as a reference framework. The state standard, however, is the substantive principles written into the licensing statute. The HDN informs and articulates those principles; it does not, in this recommendation, function as the legal standard itself.

The substantive principles set forth above are aligned with the position statements of the American Veterinary Society of Animal Behavior, the American College of Veterinary Behaviorists, the American Animal Hospital Association, the joint 2024 position paper of the Federation of Veterinarians of Europe, the Federation of European Companion Animal Veterinary Associations, the Federation of European Equine Veterinary Associations, and the World Small Animal Veterinary Association, the British Veterinary Association, the British Small Animal Veterinary Association, the Australian Veterinary Association, the Canadian Veterinary Medical Association, and the New Zealand Veterinary Association, and with the standards of practice adopted by the International Association of Animal Behavior Consultants, the Karen Pryor Academy, the Victoria Stilwell Academy, the Academy for Dog Trainers, the Pet Professional Guild, and APDT International. The international veterinary, welfare, and professional consensus has converged on the methodological principles set forth above. The model state standard recommended here operationalizes that consensus through a citable, statutorily defined framework with a clear principles-based exclusion of aversive control procedures.

Standards-of-practice frameworks, learning-theory frameworks, and procedural-priority principles are three different categories of document, and they do different work. A learning-theory framework, such as Susan Friedman's Humane Hierarchy (Friedman, 2009), catalogs and ranks the full operant landscape because that is what learning theory is. It is methodologically

sound as a description of behavior analysis and serves a useful pedagogical purpose for behavior analysts. It is a teaching framework, not a standards-of-practice framework for pet dog training, and was not designed to be one. A procedural-priority principle, such as LIMA (Least Intrusive, Minimally Aversive), orders interventions from least to most intrusive but does not categorically exclude aversive procedures (Lindsay, 2005). A practitioner working under LIMA can, in principle, justify aversive equipment after exhausting other options. A standards-of-practice framework operates differently. It is a normative document about what working practitioners should and should not do with the animals in their care, and it draws its lines from the welfare evidence rather than from the methodological inventory. The model state standard recommended here is built on this principle. It draws on the leading articulation of force-free standards of practice in the contemporary literature (the HDN) without delegating regulatory authority to that or any other external framework.

The international veterinary consensus expresses the same structural distinction. The 2024 joint position paper of the Federation of Veterinarians of Europe, the Federation of European Companion Animal Veterinary Associations, the Federation of European Equine Veterinary Associations, and the World Small Animal Veterinary Association does not call for positive punishment to be used last (FVE, FECAVA, FEEVA, and WSAVA, 2024). It states that equipment causing pain or discomfort should not be used. That is a standards-of-practice claim, not a procedural-priority claim. It categorically excludes the equipment, which categorically excludes the procedures that depend on the equipment. The model state standard recommended here does the same thing on the procedural side.

Equipment prohibition (Section 10.1) addresses one mechanism of aversive practice. The model state standard of practice addresses the broader category of aversive interventions, including confrontational handling techniques applied without equipment, which are addressed specifically in Section 10.3.

10.3 Confrontational Handling Techniques and Standards of Practice

The recommended policy reaches not only aversive equipment but also aversive techniques applied without equipment. Confrontational handling techniques operate by positive punishment or negative reinforcement, both of which are excluded under the substantive force-free standards of practice set forth in Section 10.2. Confrontational handling techniques include, without limitation, the alpha roll (forcibly rolling a dog onto its back and pinning it), the dominance down (forcing a dog into a prolonged down position as punishment), the scruff shake (grabbing the loose skin at the nape of the dog's neck and shaking the dog), hanging or helicoptering (lifting a dog off the ground by a leash or collar), hitting or kicking the dog, forced retrieves involving ear pinches or toe pinches, finger jabs to the neck or ribs, and systematic use of yelling, intimidation, or threatening tone of voice as an aversive intervention designed to suppress behavior or to drive avoidance learning. These techniques operate by the same

mechanism as aversive equipment. They engage nociception and threat circuitry. They produce avoidance learning rather than resolution of the underlying behavior. The clinical evidence summarized in Section 6.2 (the Herron findings) documents that confrontational handling techniques produce aggressive responses in a substantial percentage of dogs on whom they are attempted, including dogs who present without prior aggression history.

Aversive techniques applied without equipment cannot be reached through equipment prohibition, because no equipment is involved. They are reached, under the framework recommended by this paper, through the second component of the policy: state licensure of commercial dog training and behavior modification, with the substantive force-free standards of practice set forth in Section 10.2, which draw on Linda Michaels' Hierarchy of Dog Needs® and Best Force-Free Practices (Michaels, 2022) as a leading articulation, as the required standard of practice. Under that framework, a licensed trainer or behavior consultant who applies confrontational handling techniques to a client's dog would be in violation of professional standards of practice, with the same disciplinary consequences (license suspension, license revocation, exclusion from the regulated profession) that apply to a veterinarian, mental health counselor, or social worker who practices outside the standards of their profession.

The boundary between confrontational handling as a deliberate aversive intervention and ordinary verbal communication or supervisory contact with a dog is the same boundary that veterinary medicine and human behavioral health already manage. A frustrated tone of voice in a stressful moment is not aversive practice. A startled exclamation when a dog runs into the street is not aversive practice. A physical restraint applied during a medical emergency to prevent a dog from injuring itself or others is not aversive practice. The standard reaches techniques deliberately employed as aversive interventions in the course of training or behavior modification, performed in the commercial context where licensure applies. The framework is not novel. It is the standard scope-of-practice mechanism by which welfare-affecting professions are regulated in the United States.

10.4 Rationale

Six considerations support the recommendation.

The first is mechanism. Aversive equipment and aversive methods produce behavior change, when they work at all, through punishment or negative reinforcement, suppressing behavior or reinforcing escape and avoidance. That mechanism is not vocabulary-dependent. It is definitional in behavior analysis.

The second is welfare risk, supported by convergent evidence. Experimental, observational, survey, cognitive bias, attachment, and neurobiological research consistently associates aversive-based training with stress-related behavior, conflict behaviors, suppressed body language, pessimistic affective bias, and conditioned emotional responses. For neck-pressure equipment

specifically (prong and choke collars), peer-reviewed veterinary research adds elevated intraocular pressure during ordinary pulling (Pauli et al., 2006), neck pressures in injury-relevant ranges (Carter et al., 2020; Hunter et al., 2019), and, in the peer-reviewed case report of Grohmann et al. (2013), fatal cerebral ischemia following a punitive choke-chain hanging technique.

The third is the failure of the necessity claim. Cooper et al. (2014) and China et al. (2020) do not support the necessity claim for electronic collars. No peer-reviewed controlled study has demonstrated necessity for prong or choke collars. Johnson and Wynne (2024) is a narrow efficacy finding that has been challenged in the peer-reviewed literature for its protocol design (Bastos et al., 2025) and in the present author's separately published methodological critique (Bangura, 2025, SSRN). Herron et al. (2009) identifies confrontational handling as a clinical risk factor for guardian-directed aggression, not a safe training modality.

The fourth is the empirical record on real-world use. Masson et al. (2018b), Blackwell et al. (2012), and Herron et al. (2009) show that most users of aversive equipment and aversive methods operate without professional guidance, and that guardian-reported success is not higher for aversive-based approaches. That is an additional layer of welfare concern, not the foundation of the case. The foundation of the case is that aversive control engages nociception and threat circuitry regardless of who is operating the device, which is why the international veterinary and professional consensus calls for these tools to be removed from use entirely rather than restricted to expert hands.

The fifth is the existence of less intrusive alternatives. The Hierarchy of Dog Needs® and Best Force-Free Practices (Michaels, 2022), endorsed by veterinary behavior organizations and aligned with the international professional consensus, addresses the full range of problems proponents claim as the strongest applications of aversive tools: recall, predatory chasing, reactivity, aggression, and barking. The ethical standard in behavior change intervention, applied widely in human behavior analysis and in veterinary medicine, is the least intrusive effective method. Aversive equipment and aversive methods are not the least intrusive effective option for any presenting problem in canine training or behavior modification, in anyone's hands, in any setting. The international veterinary, professional, and welfare consensus has reached this conclusion on the same evidence presented in this paper. The conclusion is not that aversive equipment is acceptable when applied skillfully and unacceptable otherwise. The conclusion is that aversive equipment is not the appropriate tool, regardless of who is holding it, because less intrusive effective alternatives exist.

The sixth is international veterinary consensus, which has already reached the policy conclusion. The June 2024 joint position paper unanimously adopted by the Federation of Veterinarians of Europe, the Federation of European Companion Animal Veterinary Associations, the Federation of European Equine Veterinary Associations, and the World Small Animal Veterinary Association

formally calls for a complete ban on the sale and use of electric pulse training devices including electric shock collars, and broadly states that equipment causing pain or discomfort should not be used (FVE, FECAVA, FEEVA, and WSAVA, 2024). The United States can either align with this international veterinary consensus or remain an outlier. The evidence does not support the outlier position. Linda Michaels' Hierarchy of Dog Needs® (Michaels, 2022) provides a leading articulation of the substantive force-free standards through which the United States can operationalize that international consensus as a model state standard of practice, adoptable across multiple jurisdictions.

10.5 Supporting Infrastructure

A United States ban should be paired with public education, professional standards for trainers, and accessible humane training alternatives. Legislation should be accompanied by funding or incentives for reward-based public education, veterinary referral pathways, accessible behavior consultation resources, and support for pet guardians dealing with serious behavior problems such as aggression, predatory chasing, separation-related issues, and reactivity. A prohibition without supporting infrastructure is less effective than a prohibition embedded in a broader public policy of humane companion animal care.

Trainer regulation is not within the traditional scope of federal companion animal legislation in the United States, but the states and professional bodies can support this infrastructure with certification requirements aligned with the force-free standards of practice, continuing education standards, and public information resources. The absence of dog trainer regulation has been identified, including by Todd (2018), as a structural barrier to widespread adoption of humane methods. Any serious welfare policy benefits from closing that gap.

States should adopt licensure requirements for any person who provides dog training or behavior modification services for pet dogs on a commercial, fee-for-service basis. Licensure should require, at minimum, demonstrated competency through certification by an independent credentialing organization whose standards align with the substantive force-free standards of practice set forth in Section 10.2, including reward-based methods, welfare-centered methodology, and exclusion of positive punishment, negative reinforcement, engineered extinction where it creates distress or welfare risk, and aversive control procedures generally; documented continuing education in evidence-based and science-based behavior practice, with periodic renewal requirements; adherence to a published professional code of conduct; and accountability through a state regulatory board with authority to investigate complaints and impose disciplinary action, including license suspension or revocation. Existing credentialing bodies may qualify under this framework if their published standards align with the substantive state standard, including force-free practice, welfare-centered methodology, and exclusion of aversive control methods, regardless of whether their internal documentation references the Hierarchy of Dog Needs® or any other particular external framework by name. The qualifying

test is alignment with the substantive principles set forth in Section 10.2, not affiliation with any specific external publication. The current US baseline, under which anyone can advertise as a dog trainer or behavior consultant with no education, no certification, no examination, no continuing education, and no professional accountability, is not consistent with the welfare interests of dogs or with the consumer-protection interests of the public. Comparable licensure requirements already exist for veterinarians, veterinary technicians, mental health counselors, social workers, and many other professions whose practice carries welfare or public-safety implications. Dog training and behavior modification, which directly affect canine welfare, the human-animal bond, and the public safety profile of dogs in the community, warrant the same regulatory seriousness.

The licensure architecture this section recommends is already under active legislative consideration in multiple United States jurisdictions, as documented in Section 7.4. New York Assembly Bill A 6985 and Senate Bill S 7723 of the 2025-2026 session would require licensing and educational standards for canine trainers under non-aversive, evidence-based, positive reinforcement principles. New Jersey Assembly Bill A 4206 (Dog Trainer Licensing Act) and Assembly Bill A 4207 (Dog Training Licensure Act), both introduced 19 February 2026, would establish state licensure boards and tie licensure standards to professional codes of ethics that incorporate the Least Intrusive, Minimally Aversive Effective Behavior Intervention Policy. New Jersey's earlier Senate Bill S 3814 of 2024 would have established a Dog Training Licensing Board with an evidence-based humane training code precluding aversive methods. The pattern across these proposals reflects an emerging United States legislative interest in implementing the licensure framework recommended here, even though no comprehensive licensure statute had been enacted at the United States state level as of the date of this paper.

Implementation of the licensure framework recommended above should include a transition period and a grandfathering mechanism that respect the practical realities of an existing trainer workforce while preserving the welfare standard the framework is designed to deliver. A 36-month transition period from the effective date of state licensure legislation should be specified, during which existing practitioners are permitted to continue commercial practice while completing the requirements for licensure. Trainers with five or more years of continuous documented commercial practice as of the effective date should be eligible for moderate grandfathering through an examination-based or portfolio-based competency demonstration that confirms alignment with the substantive standards of practice in Section 10.2, rather than requiring completion of a full certification curriculum. Trainers credentialed by the Certification Council for Professional Dog Trainers (CCPDT) or the International Association of Animal Behavior Consultants (IAABC) at the time of the effective date should be eligible for an explicit bridging pathway, in which their existing credential is treated as presumptive evidence of competency on the technical examination components, subject to a supplemental requirement demonstrating alignment with the substantive standards of practice. The transition and

grandfathering provisions are not intended to create a permanent exemption: at the end of the 36-month transition period, all commercial practitioners operating in the licensure jurisdiction should be required to hold a current state license under the framework. The structure is designed to recognize accumulated experience and existing professional credentials while delivering the welfare standard the framework requires.

Scope-of-practice boundary with veterinary medicine. The licensure framework recommended in this section regulates the commercial practice of dog training and behavior modification. It does not authorize non-veterinarians to diagnose or treat behavior disorders that fall within the scope of veterinary medicine or veterinary behavior medicine as defined under each adopting state's veterinary practice act. Examples of behavior issues that warrant veterinary referral or veterinary treatment, rather than independent management by a licensed trainer or behavior consultant, include severe aggression presenting significant injury risk, severe anxiety or compulsive presentations involving self-injurious behavior, and behavior issues co-occurring with medical conditions or otherwise requiring psychopharmacological evaluation. Licensed trainers and behavior consultants under the recommended framework are expected to operate within the scope of practice defined by the licensing statute, which is non-aversive applied behavior modification, and to refer clients to a licensed veterinarian or to a board-certified veterinary behaviorist when a presenting concern reaches the threshold of veterinary scope of practice as defined under the applicable state veterinary practice act. The framework recommended here is designed to coexist with, and not to displace, the existing state veterinary regulatory framework.

Conduct-versus-speech regulatory boundary. The licensure framework recommended in this section regulates professional conduct, by which is meant what licensed trainers actually do with the dogs in their care during the delivery of commercial training and behavior modification services. The framework does not regulate trainer speech, viewpoint, or expression. Trainers, including those licensed under this framework, remain free to discuss, describe, criticize, debate, analyze, and publicly comment on training methods of any kind, including aversive methods that fall outside the licensed scope of practice, and including disagreement with the framework itself. The regulatory target of the framework is the applied conduct of professional services delivered to clients, not the content of any trainer's public commentary, social media presence, podcast appearances, blog posts, instructional videos, books, articles, or educational content. The framework is designed to operate within the conduct-not-speech distinction that governs occupational licensure under federal First Amendment doctrine.

Active state supervision of the licensure board. The licensure board contemplated by this framework will, in the ordinary course, include active practitioners of the regulated profession among its members. Under federal antitrust doctrine, a state licensure board composed of active market participants must be subject to active state supervision by a non-market-participant state actor in order to qualify for state-action immunity from federal antitrust scrutiny. The

framework recommended here therefore presumes that state legislatures adopting this licensure model will lodge supervisory authority with a non-market-participant state actor, which depending on the adopting state's existing regulatory architecture may be the state department of agriculture, the state department of consumer affairs, the state veterinary medical board, or another appropriate agency. The supervising state actor should have authority to review, modify, or veto the licensure board's disciplinary decisions, scope-of-practice determinations, and rule-making, exercising substantive review rather than rubber-stamp approval. The framework is designed to be adopted with active state supervision in place; the specific configuration of that supervision is a matter for each adopting state's existing regulatory structure.

SECTION 11

Conclusion

Aversive training equipment and aversive training methods change behavior. That is not the disputed point. The questions that actually matter scientifically are how they change behavior, what welfare risks come with that mechanism, whether they are necessary, and whether public access to such devices and methods is justified when less intrusive alternatives exist. This paper has answered each of those questions using convergent evidence drawn from multiple independent scientific disciplines, peer-reviewed veterinary research on the physical effects of neck-pressure equipment, clinical behavior medicine, veterinary welfare consensus, and established regulatory practice.

When aversive equipment or an aversive handling technique reduces a behavior, the equipment or technique is functioning as positive punishment. When a behavior increases because the dog can escape, avoid, delay, or prevent the aversive event, the equipment or technique is functioning as negative reinforcement. In both cases, the stimulus has to function as an aversive event for the dog. That requirement is not eliminated by a softer vocabulary, by a lower intensity setting, by a trainer self-testing the device on their own arm, by a fifteen-second video of an engaged dog, by an appeal to controllability, or by an appeal to discredited dominance theory. None of those moves changes the underlying mechanism. The mechanism is what it is, and what follows from the mechanism follows. This is not a matter of preference or ideology. It follows from the definitions of the procedures by which these tools and methods operate.

The evidence does not support the claim that aversive training equipment is necessary for effective dog training or behavior modification. The welfare case against electronic collars does not rest on a claim that they cause tissue damage. The case rests on what the equipment must do to function. Modern electronic collar proponents commonly argue that the stimulation is mild, imperceptible, comparable to a tap on the shoulder, or therapeutically similar to a TENS unit. The nociception framework answers those sensation-severity arguments directly. Nociceptors and threat circuitry respond to stimuli well below the threshold of actual injury. The system exists to warn the organism away from potentially harmful events before damage occurs. A stimulus that is behaviorally effective because the dog works to avoid, escape, or terminate it is, by that fact alone, crossing the nociceptive and threat-system thresholds, regardless of whether the stimulus would ever leave a mark. The argument from absence-of-marks is not an argument about welfare. It is an argument about visibility. For prong and choke collars, a separate evidentiary question does arise, because these tools operate by applying mechanical force to the canine neck. Peer-reviewed veterinary research establishes that such force produces measurable physical effects: elevated intraocular pressure during ordinary pulling (Pauli et al., 2006), neck pressures in injury-relevant ranges (Carter et al., 2020; Hunter et al., 2019), and, in the peer-

reviewed case report of Grohmann et al. (2013), fatal cerebral ischemia following a punitive choke-chain hanging technique. The mechanical-injury literature applies specifically to neck-pressure equipment, and it adds a second layer of welfare concern beyond the nociception argument for that category of tools.

Two of the fear-conditioning researchers whose work has been frequently cited by aversive-equipment proponents, Dr. Luiz Pessoa and Dr. David Knight, have each now confirmed in direct correspondence that their published findings on controllability and predictability cannot be used to support the claim that predictable or controllable aversive stimulation is neurologically neutral. The neuroscience of fear conditioning does not vindicate aversive equipment use. It undermines the rhetorical defense that has been built on its back.

The paper also anticipates and answers the principal proponent rhetorical and definitional moves directly. Section 9.12 addresses the contemporary neuroscientific argument that successful electronic-collar training transitions dogs to a welfare-neutral goal-directed anxiety state, and shows that the same neuroscience the argument invokes locates the dog's calm under aversive contingency in an anxiety state mediated by an effective avoidance response, not in the absence of threat representation. Section 9.13 catalogs the most common terminology and rhetorical moves used to make aversive procedures sound benign, with the accurate behavior-science translation for each. Section 9.15 catalogs the ten most common defensive justifications a proponent uses to make aversive use sound cautious, necessary, compassionate, or moderate, with the evidence response to each. The convergent welfare evidence applies to the underlying mechanism, which is aversive control. Renaming, reframing, or rejustifying that mechanism does not change it.

The professional consensus is not a matter of opinion. It is documented, convergent, and international. In June 2024, the Federation of Veterinarians of Europe, the Federation of European Companion Animal Veterinary Associations, the Federation of European Equine Veterinary Associations, and the World Small Animal Veterinary Association unanimously adopted a joint position paper formally calling for a complete ban on the sale and use of electric pulse training devices including electric shock collars for dogs, and broadly stating that equipment causing pain or discomfort should not be used. The American Veterinary Society of Animal Behavior, the American College of Veterinary Behaviorists, the American Animal Hospital Association, the British Veterinary Association, the British Small Animal Veterinary Association, the Australian Veterinary Association, the Canadian Veterinary Medical Association, the New Zealand Veterinary Association, and the European Society of Veterinary Clinical Ethology have each independently reached the same position. The largest animal welfare organizations in the English-speaking world have reached it. The leading professional training and behavior organizations, including the International Association of Animal Behavior Consultants, the Karen Pryor Academy, the Victoria Stilwell Academy, the Academy for Dog Trainers, the Pet Professional

Guild, and APDT International, have reached it. Multiple jurisdictions have enacted legislative bans, in some cases for more than fifteen years, without producing peer-reviewed evidence of increased public safety risk attributable to the prohibition.

The convergent welfare and consensus arguments are reinforced by what we know about how these devices are actually used in the population and what United States guardians actually believe about them. Real-world use data show that aversive equipment is predominantly purchased and operated by lay guardians without professional supervision, applied after few or no alternative methods have been attempted, and associated with physical wounds in a measurable percentage of cases (Masson et al., 2018b). The devices themselves vary by nearly two orders of magnitude in delivered electrical energy across products marketed for the same use category, with no manufacturer disclosure of pulse parameters and no United States regulatory framework comparable to the medical-device framework applied to therapeutic electrical stimulation units for human use (Lines, van Driel, and Cooper, 2013). Survey data from Petco's October 2020 corporate disclosure indicate that 70 percent of United States dog guardians believe shock collars harm their pet's emotional or mental wellbeing, that 69 percent consider them cruel, and that 59 percent would prefer to shock themselves than their dog (Petco, 2020). The constituency that would be inconvenienced by a sale and use prohibition is a minority of the consumer population, not a majority of it. A prohibition on the sale, import, and use of aversive training equipment is therefore not only an animal welfare measure but a consumer protection measure. It aligns the United States consumer marketplace with the welfare consensus the international veterinary profession has already reached and that, on the available data, a substantial majority of United States guardians already share. The convergence on which the present argument rests is structural rather than reliant on any single line of evidence: it covers experimental, observational, and population-level methodologies; pet-dog and working-dog populations, including the protection-trained and operational military working dogs most often invoked to defend aversive methods (Haverbeke et al., 2008); both human-directed and dog-directed aggression as separable behavioral classes (Casey et al., 2013, 2014); and review-level synthesis through both peer-reviewed comparative reviews (Ziv, 2017; Fernandes, Olsson, and Vieira de Castro, 2017) and an evidence-based professional-accreditation reference (Makowska, 2018, non-peer-reviewed).

The case for a United States ban on aversive training equipment, and for the adoption of a substantive force-free model state standard of practice, drawing on Linda Michaels' Hierarchy of Dog Needs® and Best Force-Free Practices (Michaels, 2022) as a leading reference framework, is not radical. It is conservative in the technical sense. It follows established scientific evidence, established veterinary welfare consensus, established peer-reviewed veterinary research on the physical effects of neck-pressure equipment, and established international regulatory practice. It aligns the United States with the recommendations of the international veterinary profession. It protects dogs from nociceptive engagement, threat conditioning, conditioned emotional harm,

and, in the case of prong and choke collars, the mechanical pressure effects documented in peer-reviewed veterinary research. It protects guardians from the clinically documented risk of guardian-directed aggression associated with confrontational handling. It supports public safety by prioritizing the methods that actually resolve, rather than suppress, problem behavior. And it removes from the consumer market a category of devices whose mechanism is aversive control and whose risks accumulate with every hour of exposure.

The policy conclusion is direct. Aversive training equipment works through aversive control. Aversive training methods work through aversive control. Aversive control comes with welfare risk. For the specific category of equipment that applies mechanical force to the canine neck, peer-reviewed veterinary research adds documented physical effects on top of that welfare risk. Less intrusive alternatives exist and are supported by the international veterinary profession. Real-world users overwhelmingly operate without professional guidance. Multiple jurisdictions have already restricted or banned these devices without producing peer-reviewed evidence of increased public safety risk. The United States should follow the evidence and the international veterinary consensus. The recommended policy has two parts. The first is the prohibition of the sale, import, and use of aversive training equipment, including electronic collars, prong collars, choke chains, and citronella and scentless-air spray collars (with ultrasonic and audible-tone variants regulated under professional standards of practice rather than under the equipment-prohibition framework). The second is the adoption of a substantive force-free model state standard of practice for commercial dog training and behavior modification, drawing on Linda Michaels' Hierarchy of Dog Needs® and Best Force-Free Practices (Michaels, 2022) as a leading reference framework, enforced through state licensure of trainers and behavior consultants, with confrontational handling techniques excluded from licensed practice. Pending United States legislation in the 2024 to 2026 period in New York, New Jersey, Massachusetts, and Rhode Island, documented in Section 7.4, indicates that aversive-equipment regulation and trainer licensure are already under active legislative consideration in multiple states. Both parts are necessary. Together, they are a measured, evidence-based, and conservative response to convergent scientific evidence, to international veterinary consensus, and to the welfare risks the peer-reviewed literature has already documented.

Closing Note for the Practitioner Community

This paper is written first for the practitioner community: the trainers, behavior consultants, certified applied animal behaviorists, and veterinary behaviorists who carry the responsibility of explaining, defending, and operationalizing the science of canine welfare in their daily work. Legislative and broader policy use may follow. The immediate purpose, though, is to put a comprehensive, citable, science-based reference in the hands of the practitioners who are already doing the work of moving the field toward force-free standards of practice articulated in Linda Michaels' Hierarchy of Dog Needs® and Best Force-Free Practices (Michaels, 2022) and aligned with the international veterinary and welfare consensus and away from aversive training equipment and confrontational handling techniques.

The deployment contexts for this paper are concrete and immediate. In a client conversation, the paper supports the practitioner who needs to explain to a guardian why a training colleague's recommendation of an electronic or prong collar should be declined. Sections 2, 3.6, 4.1, and 9.13 provide ready language. In online debate and social media exchange, the paper supports the practitioner who encounters balanced trainer rhetoric in real time. Sections 9 and 9.13 catalog the most common arguments and terminology moves and pair them with direct rebuttals, and Section 9.15 catalogs the ten most common defensive justifications and the evidence response to each. In continuing education and professional speaking, the paper provides a structured, citable scaffold suitable for course development, conference presentation, professional webinars, and guest lectures, with Tables 1 and 5 functioning as ready visual aids. In professional advocacy, whether that means correspondence with veterinary practices, shelters, training schools, training certification organizations, or animal welfare organizations, the paper consolidates the convergent scientific evidence, the institutional consensus, the comparative international jurisdictional record, and the policy logic in a single citable document. In mentoring relationships with junior practitioners and force-free credential candidates, the paper offers an in-depth treatment of the operant, neuroscientific, and clinical foundations of the force-free position, suitable for study and discussion in mentoring conversations, peer study groups, and continuing education cohorts.

Practitioners are welcome to use, cite, share, and build on the material in this paper. Cite it in client handouts, in educational content, in social media posts and blog posts, in podcast episodes, in video scripts, in continuing education materials. Quote passages with attribution. Adapt the structured arguments for new contexts, including legislative testimony, public comment letters, professional position statements, and academic teaching materials. The paper exists to be used. The purpose is not to sit on a server. The purpose is to circulate through the practitioner community and into the professional and public conversation about canine welfare, training methodology, and consumer protection policy.

A final note about the role of the practitioner community in the welfare argument itself. The convergent welfare evidence catalogued in Section 3 and Table 1 has existed in the peer-reviewed literature for years, in some cases for two decades. The international veterinary consensus catalogued in Section 7 has been in place since the 2024 joint position paper of the Federation of Veterinarians of Europe, the Federation of European Companion Animal Veterinary Associations, the Federation of European Equine Veterinary Associations, and the World Small Animal Veterinary Association. The mechanical-injury literature on neck-pressure equipment has been published since 2006. None of this material is new. What is needed at this point is not more evidence. What is needed is for the practitioner community to translate the existing evidence into client conversations, into professional advocacy, into public education, and into policy pressure. Trainers, behavior consultants, certified applied animal behaviorists, and veterinary behaviorists are the professional bridge between the peer-reviewed welfare science and people living with dogs. The dogs who will benefit from a future shift away from aversive training equipment will not benefit from the welfare research alone. They will benefit from the practitioners who carry that research into the daily contexts where dogs are actually trained, where behavior is actually modified, and where equipment is actually purchased and used. This paper exists to support that work.

Glossary

This glossary covers technical vocabulary used in the body of the paper that goes beyond the standard learning theory and behavior modification terminology with which the practitioner audience is presumed to be familiar. The basics of operant conditioning (positive and negative reinforcement, positive and negative punishment), the classical conditioning paradigm, and the standard force-free training procedures (counter-conditioning, desensitization, differential reinforcement) are not redefined here. The terms below are organized by domain: neuroscience and threat-circuit terminology, stress physiology, nociception and pain science, anatomy specific to neck-pressure injury, welfare science and assessment methodology, specialized learning theory beyond the basics, electronic device and electrical terminology, and regulatory and professional terms. Within each category, terms are listed alphabetically.

Neuroscience and threat-circuit terminology

Amygdala. A subcortical structure in the temporal lobe of the mammalian brain, central to processing threat-related stimuli, fear conditioning, and the assignment of negative affective valence to events. Activation of the basolateral and central amygdala is one of the most replicable findings in the fear-conditioning neuroscience literature on which Section 4.3 of this paper draws.

Anterior cingulate cortex. A cortical region involved in pain processing, conflict monitoring, and the integration of affective and cognitive information. Part of the broader threat-processing network that responds to aversive stimuli regardless of predictability or controllability.

Conditioned emotional response (CER). A learned emotional reaction, typically fear or anxiety, elicited by a previously neutral stimulus that has been paired with an aversive event. CERs are central to understanding why aversive training produces emotional sequelae beyond the immediate behavior change. A dog corrected with a prong collar in the presence of other dogs may develop a CER linking other dogs with aversive stimulation. Treated in detail in Section 3.4.

Conditioned freezing. A defensive immobility response to a stimulus that has been paired with an aversive unconditioned stimulus. One of the standard behavioral indicators in fear-conditioning research, used as a measure of threat-circuit activation in mammalian models.

Controllability. In aversive learning research, the technical property of an aversive stimulus referring to whether the subject can perform a behavior that terminates or prevents the stimulus. Pessoa, Knight, and others have shown that controllability attenuates threat-related neural responses without eliminating them. A dog who can turn off a shock by performing a behavior is in a more controllable condition than a dog who cannot, but both dogs are still in an aversive condition. Discussed in Section 4.3.

Defensive circuitry (also called survival circuits). Joseph LeDoux's preferred terminology for the neural networks (centered on the amygdala but extending through hypothalamus, periaqueductal gray, and locus coeruleus) that process threat-relevant stimuli and produce species-typical defensive behaviors. LeDoux distinguishes defensive-circuit activation from the conscious experience of fear, but does not characterize circuit activation as welfare-neutral.

Extinction learning. In Pavlovian terms, the process by which a conditioned response weakens when the conditioned stimulus is repeatedly presented without the unconditioned stimulus. In contemporary threat-circuit research, extinction is understood as new inhibitory learning rather than erasure of the original association. The original threat-related learning remains and can be reinstated. Relevant to claims that aversive training can be "faded out" once the dog has learned the association.

Fear conditioning (the experimental paradigm). A research protocol in which an organism learns to associate a neutral stimulus with an aversive unconditioned stimulus, typically electric shock in animal research. The paradigm has produced decades of neuroscience documenting the neural substrates of threat learning. References to fear conditioning in this paper are to the experimental paradigm and the science derived from it, not to colloquial usage.

Hippocampus (and hippocampal involvement). A medial temporal lobe structure central to spatial and contextual memory. In threat-conditioning research, hippocampal involvement is associated with contextual fear, where the threat is associated with a place or situation rather than a discrete cue. Relevant to predictions about generalization of fear from a specific aversive event to broader environmental contexts.

Hypothalamic-pituitary-adrenal (HPA) axis. The neuroendocrine system that produces the physiological stress response, releasing cortisol and other glucocorticoids in response to perceived threats. Repeated activation of the HPA axis over time produces documented changes in brain structure and function. See "chronic stress."

Learned helplessness. A behavioral and neural state, originally identified by Maier and Seligman, in which an organism exposed to inescapable aversive stimulation later fails to escape or avoid the same stimulus when escape becomes possible. The original work used uncontrollable shock. Subsequent research, particularly Maier and Watkins (2005), has refined the framework but reinforced the conclusion that lack of control over aversive events produces lasting behavioral and neural changes.

Locus coeruleus. A brainstem nucleus that is the primary source of noradrenergic projections in the mammalian brain. Activated by threat-related stimuli, contributing to arousal, vigilance, and the autonomic component of the stress response.

Periaqueductal gray (PAG). A midbrain region central to producing defensive behaviors (freezing, flight) and to descending pain modulation. Part of the canonical fear-conditioning circuit. PAG activation is a robust marker of threat-related neural processing.

Predictability. In aversive learning research, the property of an aversive stimulus referring to whether it is reliably preceded by a warning signal. Predictability attenuates some threat-related neural responses but, like controllability, does not eliminate them. The Pessoa and Knight personal communications referenced in Sections 4.3 and 9.4 specifically clarify that attenuated does not equal absent.

Prefrontal cortex. A set of cortical regions involved in executive function, decision-making, and top-down regulation of subcortical structures including the amygdala. Chronic stress produces documented atrophy of prefrontal dendrites and impairment of prefrontal function, which feeds back into reduced regulation of threat responses.

Safety signal. In aversive learning research, a stimulus that reliably predicts the absence of an aversive event. Safety signals are studied in the broader context of how predictability and controllability shape welfare during aversive procedures. Relevant to the proponent argument that structured, predictable aversive training is welfare-neutral, an argument the predictability and controllability literature does not support.

Threat circuit. A general term for the neural networks (centered on the amygdala, with contributions from hypothalamus, periaqueductal gray, locus coeruleus, and prefrontal cortex) that process aversive and threat-related stimuli and produce defensive responses. Contemporary fear-conditioning neuroscience characterizes aversive training, regardless of method or modality, as engaging this circuitry. Section 4.1 develops the implications.

Stress physiology

Allostatic load. The cumulative biological cost of chronic activation of the stress response systems, with documented effects on cardiovascular function, immune function, brain structure, and metabolic regulation. Relevant to the cumulative-exposure argument in Section 3.5: a single aversive correction may produce a modest stress response, but repeated exposure across months or years produces cumulative biological cost.

Catecholamines. Norepinephrine and epinephrine. Hormones and neurotransmitters released during the acute stress response, producing increased heart rate, blood pressure, and vigilance.

Chronic stress. Sustained activation of the stress response over extended time, producing documented changes in HPA axis regulation, hippocampal volume, prefrontal function, and amygdala reactivity. Distinct from the everyday colloquial use of "stress." References to chronic stress in this paper are to the technical research literature.

Cortisol. A glucocorticoid hormone released by the adrenal cortex as part of the HPA axis response. Often measured in welfare research as a proxy for stress, but with significant limitations. Cortisol can be suppressed, lagged, or buffered by context, and a non-significant cortisol finding does not establish welfare neutrality. Discussed in Section 3.3.

Glucocorticoids. A class of steroid hormones, of which cortisol is the primary one in dogs and humans. Produced by the adrenal cortex in response to HPA axis activation. Long-term elevation produces documented effects on brain, immune, and metabolic function.

Heart rate variability (HRV). The variability in time intervals between heartbeats, regulated by the autonomic nervous system. Reduced HRV is associated with sympathetic dominance and chronic stress states. Used as a non-invasive welfare marker in some canine research.

Stress reactivity. The magnitude and duration of the physiological response to a stressor. Chronic stress produces documented changes in stress reactivity, generally in the direction of heightened response to subsequent stressors.

Sympathetic nervous system (and autonomic arousal). The branch of the autonomic nervous system that produces the fight-or-flight response, including increased heart rate, blood pressure, and vigilance. Activated rapidly by threat-related stimuli, including aversive training events.

Nociception and pain science

A-delta fiber. A type of myelinated nerve fiber that conducts sharp, fast pain signals from the periphery to the spinal cord. Activated by the high-intensity stimuli used in aversive training equipment, particularly mechanical-pressure equipment.

C-fiber. A type of unmyelinated nerve fiber that conducts slow, dull, burning pain signals. Often activated alongside A-delta fibers during sustained or intense nociceptive stimulation.

Gate-control theory of pain. The Melzack and Wall theoretical framework explaining how non-painful sensory input can modulate the transmission of pain signals at the spinal cord level. Underlies the mechanism by which therapeutic transcutaneous electrical nerve stimulation (TENS) units produce analgesia. Critically, gate control operates only at sub-nociceptive intensities. Stimulation strong enough to drive avoidance learning is, by functional definition, above this range. Section 9.7 develops the comparison between TENS units and electronic dog training collars.

Mechanonociceptor. A nociceptor that responds preferentially to mechanical stimulation (pressure, pinching, stretching). Activated by the concentrated point pressure of prong collars and by the circumferential compression of choke chains.

Nociception. The neural process of detecting and transmitting potentially damaging stimuli. Distinct from pain, which is the conscious experience that may or may not result from nociceptive input. Aversive training equipment, by operating at intensities sufficient to drive avoidance learning, engages nociception by definition. Section 4.1 develops the distinction.

Nociceptive threshold. The minimum stimulus intensity that activates nociceptors. Stimuli below this threshold are not registered by the nociceptive system. The "working level" of an electronic collar, which by definition is sufficient to drive avoidance learning, is above the nociceptive threshold.

Nociceptor. A specialized sensory neuron that detects potentially damaging stimuli (mechanical, thermal, or chemical). The receptor end of the nociceptive system.

Tissue damage threshold. The stimulus intensity above which physical tissue injury occurs. Distinct from the nociceptive threshold: a stimulus can be nociceptive (engaging the pain system) without producing tissue damage. Aversive equipment proponents sometimes argue that a stimulus is harmless if it produces no visible tissue damage. That argument confuses these two thresholds.

Transcutaneous electrical nerve stimulation (TENS). A therapeutic medical device that delivers low-intensity electrical pulses through skin electrodes for pain management, operating by gate-control mechanisms at sub-nociceptive intensities. TENS units are FDA-regulated medical devices with required disclosure of pulse parameters and adverse event reporting. The asymmetric regulation between TENS units and electronic dog training collars (which deliver substantially higher peak voltages with no comparable regulatory framework) is examined in Sections 8.3 and 9.7.

Anatomy specific to neck-pressure injury

Carotid artery. The major artery supplying blood to the head, located in the neck. Compression of the carotid by neck-pressure equipment can produce reduced cerebral perfusion and acute increases in intraocular pressure.

Cervical spine. The vertebral column of the neck, comprising vertebrae C1 through C7. Vulnerable to compression and shear injury under the forces produced by neck-pressure equipment.

Hyoid apparatus. The set of bones and connective tissue suspending the larynx and pharynx, located in the throat. Vulnerable to compression and dislocation injury under choke chain compression.

Intraocular pressure. Fluid pressure within the eyeball. Documented in peer-reviewed canine research (Pauli et al., 2006) to increase under leash-and-collar pulling forces, with measurable elevations from neck-pressure equipment. Relevant to dogs with glaucoma or other ocular conditions, but elevation is documented in healthy dogs as well.

Jugular vein. The major venous return from the head, located in the neck. Compression of the jugular by neck-pressure equipment produces venous engorgement that contributes to the documented elevation of intraocular pressure.

Larynx (and laryngeal). The voice box, located in the upper neck. Contains the vocal folds and is the entry point of the airway. Vulnerable to compression injury, edema, and paralysis under neck-pressure equipment.

Recurrent laryngeal nerve. A branch of the vagus nerve that innervates the laryngeal muscles. Vulnerable to compression injury from neck-pressure equipment, with potential for laryngeal paralysis and airway compromise.

Thyroid gland. An endocrine gland located in the upper neck near the trachea. Anatomical proximity makes it vulnerable to compression from neck-pressure equipment, with case-report-level documentation of thyroid impact in some clinical literature.

Trachea (and tracheal). The windpipe. The primary airway between the larynx and the bronchi. Vulnerable to compression and structural injury under choke chain and prong collar forces, including documented tracheal collapse.

Welfare science and assessment methodology

Affective state. The internal emotional condition of the animal, comprising both valence (positive vs negative) and arousal. Contemporary welfare science treats affective state as a primary outcome of welfare assessment, alongside physical health.

Behavioral stress markers. The set of validated, observable behaviors used in canine welfare research as indicators of stress, including lip licking, yawning, low body posture, displacement behaviors, conflict behaviors, reduced approach, and increased vigilance. These markers are robust and meaningful as welfare indicators on their own and do not depend on convergent physiological measures. Section 3.3 develops this point.

Cognitive bias paradigm (also called judgment bias test). An experimental method for assessing affective state by measuring how an animal interprets ambiguous stimuli. Animals in negative affective states tend to interpret ambiguous cues pessimistically, anticipating a negative outcome. Animals in positive affective states interpret them optimistically. One of the few research paradigms that can directly assess affective state in non-verbal animals.

Convergent evidence. A research finding that the same conclusion is supported by multiple independent lines of evidence using different methods, populations, and outcome measures. The strongest form of evidence in any empirical field, because it cannot be undermined by methodological

critique of any single study. The argument of this paper rests on convergent evidence across canine welfare science, neuroscience, stress physiology, nociception research, and clinical behavior medicine.

Five Domains model. A contemporary framework for welfare assessment, developed by Mellor and colleagues (Mellor et al., 2020), that evaluates an animal's welfare across five domains: nutrition, environment, health, behavior, and mental state. Has largely replaced the older Five Freedoms framework in scientific welfare assessment.

Welfare indicator. Any measurable variable used to assess an animal's welfare state. Contemporary welfare science emphasizes that welfare assessment requires convergence across multiple indicators (behavioral, physiological, affective) rather than reliance on any single measure.

Specialized learning theory beyond the basics

Compound schedule of reinforcement. A schedule in which two or more contingencies operate simultaneously or in alternation. When food rewards and aversive corrections are both present in a training session, the dog is operating under a compound schedule. The apparent absence of stress in the food-presentation moments does not subtract the welfare cost of the aversive component. Section 4.4 develops this analysis.

Conditioned suppression. A reduction in ongoing operant behavior in the presence of a stimulus that has been paired with an aversive event. A measure used in some research paradigms. Relevant because it shows that aversive associations affect behavior beyond the immediate punished response, suppressing other ongoing behaviors as well.

Functional definition. A definition based on the effect a procedure has on behavior, not on the procedure's label, topography, or descriptive properties. The behavior science definition of "aversive" is functional. A stimulus is aversive if its delivery decreases behavior or its termination reinforces behavior. This is the framework used throughout the paper. Section 2.1 sets it out.

Humane Hierarchy. Susan Friedman's procedural ranking of behavior-change interventions, ordered from least intrusive to most intrusive: distant antecedents, immediate antecedents, positive reinforcement, differential reinforcement of alternative behaviors, negative reinforcement, extinction and negative punishment, and positive punishment (Friedman, 2009). Developed as a teaching framework within applied behavior analysis. The Humane Hierarchy is methodologically rigorous as a description of the operant landscape but, because it includes all four operant quadrants, it does not function as a standards-of-practice framework. Discussed in Section 10.2.

LIMA (Least Intrusive, Minimally Aversive). A procedural-priority principle, coined by Steven Lindsay (2005) in volume 3 of the Handbook of Applied Dog Behavior and Training, that directs trainers and behavior consultants to select the least intrusive, minimally aversive procedure reasonably expected to succeed. LIMA orders interventions by intrusiveness but does not categorically exclude aversive procedures, allowing them at the bottom of the priority hierarchy under an "exhaust less intrusive alternatives first" principle. Adopted in modified form by several professional training organizations including the International Association of Animal Behavior Consultants and the Certification Council for Professional Dog Trainers. Discussed in Section 10.2.

Operant function vs operant procedure. The function of an operant procedure is the contingency that defines it (positive reinforcement, negative reinforcement, positive punishment, negative punishment). The procedure is the specific topographic form (a leash correction, a click-and-treat, a shock, a praise word). The same procedure can serve different functions depending on contingency, and the same function can be served by many different procedures. The distinction matters because welfare arguments apply to function, not to procedure.

Standards-of-practice framework. A normative document that specifies what working professionals should and should not do within their scope of practice, with the lines drawn from welfare evidence rather than from a methodological inventory. Distinct from a learning-theory framework (which catalogs the full operant landscape) and from a procedural-priority principle (which orders interventions but does not categorically exclude any). The Hierarchy of Dog Needs® and Best Force-Free Practices (Michaels, 2022) is the standards-of-practice framework recommended in this paper for the United States. Section 10.2 develops the distinction.

Two-factor (or two-process) theory of avoidance. Mowrer's classic theoretical framework (Mowrer, 1947) for avoidance learning. The organism first acquires a Pavlovian fear association to the warning signal, then operantly learns to perform a response that terminates the warning signal (negative reinforcement). The framework explains why avoidance behaviors, once learned, are remarkably persistent and resistant to extinction. Directly relevant to electronic collar training, where the dog is in a continuous Pavlovian-plus-operant compound contingency.

Electronic device and electrical terminology

Bark-activated mode. An electronic collar configuration that delivers stimulation automatically when the dog vocalizes. Removed from Petco's retail inventory in October 2020 along with handheld remote-controlled shock collars.

Continuous, momentary, and "nick" stimulation modes. Different temporal profiles of electrical stimulation delivered by electronic training collars. Continuous delivers a sustained stimulus. Momentary delivers a brief pulse. "Nick" is a marketing term for a very brief stimulus. The terms are not standardized across manufacturers and do not reliably predict the actual electrical characteristics of the delivered stimulus.

Electrical impedance. The resistance to electrical current flow through tissue, varying significantly based on coat type, skin moisture, and electrode contact quality. Lines, van Driel, and Cooper (2013) documented that impedance varies substantially across realistic conditions, contributing to large variations in delivered stimulus energy from the same nominal collar setting.

Peak voltage. The maximum instantaneous voltage delivered during a stimulation pulse. One of several electrical characteristics that determine the actual stimulus intensity experienced by the dog. Lines, van Driel, and Cooper (2013) documented that peak voltage varies dramatically across commercially available products at the same nominal setting.

Pulse duration (also called pulse width). The temporal length of an individual electrical pulse delivered by an electronic collar, typically measured in microseconds or milliseconds. Combined with peak voltage and pulse rate, determines the total energy delivered. Not standardized across manufacturers and not disclosed at the point of sale.

Remote-controlled mode. An electronic collar configuration in which the handler manually triggers stimulation. The most common configuration in use among lay guardians per Masson, Nigron, and Gaultier (2018b).

Stimulus energy. The total energy delivered in a stimulation event, typically measured in joules or millijoules. The product of voltage, current, and time. Lines, van Driel, and Cooper (2013) documented an 87-fold range of stimulus energy across commercially available models at the same nominal maximum setting, ranging from 3.3 millijoules to 287 millijoules.

Regulatory and professional terms

Accreditation. Independent evaluation and certification of an organization's training programs or credentialing standards. Distinct from individual certification.

Board-certified veterinary behaviorist. A veterinarian who has completed a residency in veterinary behavior and passed the certification examination of the American College of Veterinary Behaviorists or its international equivalents. The highest credential in the canine behavior field.

Certified applied animal behaviorist (CAAB or ACAAB). A non-veterinary credential issued by the Animal Behavior Society in the United States, requiring graduate-level academic training in animal behavior and supervised clinical experience.

Credentialing. The formal evaluation and recognition of an individual's professional qualifications, typically through examination and continuing-education requirements.

Diplomate of the American College of Veterinary Behaviorists (DACVB). The credential held by board-certified veterinary behaviorists in the United States. Comparable credentials exist internationally.

Licensure. Government-issued authorization to practice a profession, with associated standards-of-practice requirements and disciplinary mechanisms. Required for veterinarians, mental health counselors, social workers, and many other welfare-affecting professions. Currently not required for dog trainers or behavior consultants in any United States jurisdiction. The recommended policy in Section 10 includes state licensure of commercial dog training and behavior modification under a model state standard of practice that states may adopt individually, with multi-state adoption capable of producing a de facto national standard.

Scope of practice. The set of activities that a licensed professional is authorized to perform under their license. Practicing outside scope is a basis for disciplinary action under most state licensing frameworks.

Standards of practice. The body of professional norms that define what constitutes competent practice within a field. The recommended policy in Section 10 sets forth a substantive force-free model state standard of practice for commercial dog training and behavior modification, drawing on Linda Michaels' Hierarchy of Dog Needs® and Best Force-Free Practices (Michaels, 2022) as a leading reference framework.

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