

Can Shock-collars Burn?

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Professional dog trainers can be a contentious lot. Our methods fall on a continuum; from positive with no use of corrections to painful and physically damaging. We argue as to whose methods are most effective or quickest at achieving results or most psychologically sound for the dog. I suggest there is no topic more divisive nor more hotly debated than the shock collar, often referred to as an e-collar or remote collar.

The arguments both pro and con regarding shock collars are endless. The latest battle in the war revolves around the claim that shock collars cannot cause a burn to the animal wearing it. “Shock collars are not capable of causing burns because there simply isn’t the voltage required to generate the joules necessary for combustion.” It’s a pretty grandiose statement involving technical terms from which many of us will shy away.

Those of us who question that claim do so because of anecdotal evidence to the contrary from a variety of sources. [Blogs written by well-respected trainers such as Grisha Stewart](#) describe and provide photographic evidence of ‘burns’ on a dog’s neck, the result of a shock collar. Don Hanson, past president of the APDT and also a respected trainer, [writes of personally witnessing burns on a dog’s neck](#). There are letters from veterinarians claiming to have treated burns created by shock collars. In the midst of the battle, some whose war cry has been “no shock collars” seem to be in agreement that a shock collar cannot create a burn, that there is no documented evidence of such burns occurring. What is the truth? I do not want to support a myth, but I also find it hard to buy that argument, especially when it originates with a company whose success is based on the sale of shock collars. I am not an engineer, so how can I tell whether the technical explanations given are truthful or just smoke and mirrors.

My first option was to corner my husband, Jim Casey, for an opinion. He is my go-to guru, knowledgeable in all things mechanical and electrical, holding a degree in engineering from the University of Florida and having more than 35 years experience in the field, working primarily with electric and nuclear power plants. He has previously described how shock collars

work and this information is available at <http://www.holysden.com/say-no-to-shock-collars.htm>. With a cautionary note that he does not mince words, here is his response:

“It has been claimed that the discharge from shock collars does not contain enough energy to cause a burn. I will concede that a properly-operating shock-collar should not cause burns. ‘Should not’ is not the same as ‘can not.’

There are no national regulations as to the energy level or wave-form of a ‘properly operating’ shock collar. I cruised through the descriptions of shock collars on the Internet for an hour or so and the energy-per-zap is not posted by any manufacturer I found. Wikipedia shows the energy per zap at 0.0003 joules but did not cite a specific source for this bit of data.

Shock collars that I have seen have pointed electrodes. Those penetrate the hair and remain in contact with the skin. I get irritated when the tag on my t-shirt has a sharp corner, so having a pair of de-energized metal cones pressed into my neck sounds bad enough to make me grumpy. One negative in having the dog wear a shock collar is the possibility of skin injury from the pointed electrodes; either mechanical abrasion or contact dermatitis as the electrodes are unlikely to be made from a hypoallergenic alloy. An open sore is not only more likely to become infected, but it is substantially more electrically conductive and invites electrical burns. Domed electrodes are more comfortable but actually require more voltage to launch a spark.

IF the electrical circuit in the shock-collar always parcels out the same energy bundle there are still variables. Pressing the electrodes firmly against the skin contacts more surface area and spreads out the energy of the zap. Conversely, if the pointed electrode hovers just above the skin and a spark jumps, the energy discharge will be concentrated into the tiny pinpoint of the area of the spark. We see a spark because it is hot enough to make the air glow. Some tiny amount of tissue is burned with every spark.

Spark intensity also depends upon the duration of the spark. If the 0.0003 joule spark occurs in 1/10,000 second over an area of one square micron then the instantaneous power consumed would be 3,000,000 joules/cm². That would vaporize the tiny area of tissue affected. Since waveforms are not published I can’t know if these values are ‘real’, but they are certainly possible.

Third-world assemblers with dodgy quality assurance, lack of standards, and overly-enthusiastic trainers (who I will refrain from referring to as cruel SOBs) all can contribute to multiple-shock trauma or injuries to the animal.”

Okay, except for his final sentence, this is still technical for me, but I surmise his basic answer is “yes, it is possible for a shock collar to cause a burn.” Still, this is pretty technical jargon for me. How do those of us who are still wondering about the difference between a joule and a volt determine whether the engineer or the manufacturer is correct regarding the ability of a shock collar to burn? I continued to read. From the [Radio Systems Corporation PetSafe pages](#): “Some descriptions of advanced bed sores or pressure necrosis describe the sores as looking like burns on the dog’s neck. Be assured that electronic collars do not use enough energy to create burns. The energy in an output pulse is less than a few thousandths of a Joule; it is similar in nature to the static pulse that you may feel when you shuffle your feet across carpet and then touch a door knob or metal object.” That is almost exactly the same as the statements I am hearing from the non-corporate advocates who claim shock collars cannot cause a burn. I become skeptical when I hear rebuttals from a variety of sources that sound like a script.

From what source does a shock collar derive its power? For many, it is a 9-volt battery. How could that be harmful or produce enough energy to burn? Thinking that I had heard stun guns are also powered by a 9 volt battery, I checked the [FAQs page for Taser®](#). And yes, a Taser® also only requires a 9 volt battery, but the effects produced by a Taser® are pretty impressive. It seems the shock collar and the stun gun both store energy in a “capacitor” which releases the energy when the button is pushed. A simpler analogy is this: water flowing through a hose will not hurt your foot when it hits. Send that same water through a pressure washer and it will cause lacerations on your foot.

As an aside, the Taser® website produced a similar comparison of the effects one experiences when shuffling feet across the carpet: “One can receive a 25,000-volt shock of static electricity from a doorknob on a dry day without harm.” As noted above, the PetSafe site describes the feel of the shock collar being like this. While the jolt one receives from the doorknob may not cause physical harm, I don’t know of anyone who finds

the experience pleasant or who would volunteer to repeat it intentionally. I do know of at least one person who finds it so aversive, she makes me open the door so she will not be shocked. My personal experience is that it hurts – a lot.

Back to the argument of whether shock collars can produce burns. The manufacturers and many trainers will say it is impossible. Would I be willing to bet \$10,000 that a shock collar is incapable of causing a burn? Not a chance. The greater question for me is why would anyone care whether the extensive damage on a dog's throat is a burn or pressure necrosis or edema or contact dermatitis? The fact remains that, had the dog not been wearing a shock collar, the painful injury would not be there. The shock collar has caused physical damage. That's the only factual information I need.

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