

Dog Collar –Thermochromics

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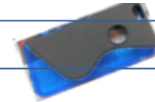


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Dog collars are used to keep a dog safe and under control, especially when in public spaces. Collars should not be tight fitting around the dog's neck, as this can be very uncomfortable for the dog. There should be space between the collar and the dog's neck to insert two fingers comfortably without pinching the dog's skin. Collars are introduced when the pup and is also useful for training the pup. Normal body temperature of a dog is between 38.3°C and 39.2°C (Geller 1998). Dog's body temperature is taken using a rectal thermometer. Like humans, dogs can suffer from fever and hypothermia, amongst other diseases caused by varying factors (Earley 2010). In dogs, hypothermia can be mild (32°C to 35°C), moderate (28°C to 32°C) or severe (less than 28°C). Studies in dogs have shown that hypothermia can reduce heart rate by 34% and oxygen consumption by 38% (Boyer and Gerstein 1977). Hypothermia has also been shown to cause damage to a dog's heart (Samuli Sarajas and Cand 1956). Fever is usually defined as anything above 39.7°C to 40°C (Battersby et. al 2006). Fever has been shown to cause an increase in a dog's pulse rate, production of carbon dioxide and increased oxygen intake (Kubicek et. al 1958) and it can be difficult to determine the cause of a fever (Harkin 2016).

This experiment sought to use thermochromic ink, applied to a typical dog collar, as a means of identifying the overall health of the dog. As thermochromic ink with a critical temperature of 31°C was used, the ink should have been a light colour, indicating a normal body temperature of the dog. Applying the ink directly to the collar proved ineffective despite many attempts and the use of different types of collars. The ink easily rubbed off the collar, or was washed off with water. In other instances the ink did not bind to the collar at all. No discomfort to the dogs was observed as the dogs used were family pets and had been fitted with a collar from an early age. The use of the thermochromic ink can indicate if the dog starts to become mildly hypothermic (the ink will start to turn pink to red in colour as body temperature gets lower) or starting to develop a fever (the ink will go a very light colour as body temperature gets higher). This in turn will give the dog's owner a visual indication that their pet is unwell. It can also be used to indicate if the dog is in an environment that is too warm.



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