E13   Dog Bite-Related Accidents: A New Forensic Approach

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After attending this presentation, attendees will be able to apply a new forensic approach to offending dog identification when dog bite-related accidents occur. The interaction between domestic animals and humans has not been free of conflicts, and dog attacks represent a real problem, not only for health consequences, but also for possible crimes and can affect legal or financial outcomes.

This presentation will impact the forensic science community by providing scientific data from a well-controlled experiment, thus increasing gathered information. An appropriate forensic approach should include an exhaustive analysis of the scene, the victim, and the dog.

The alarming statistics reported around the world have shown that dog attacks today represent a health hazard in cases in which prevention strategies have not always been successful.[1,2] Most dogs involved in these events are known to or belong to the victim. This study found 19 dog bite-related fatalities in Italy from 2009 to 2016 (2.37 cases per year); these data have sharply increased from a previous study that described 32 dog bite-related fatalities between 1984 and 2009 with a frequency of 1.28 cases per year.[3]

A scientific inclusion/exclusion of the involved dog is possible and recommended because of possible consequences for the animal's owner that could have civil consequences (or criminal consequences, in the most serious cases). Since dog bitemark analysis should involve different forensic professionals, such as pathologists, odontologists, veterinarians, biologists, and police investigators, a review focused on this type of evidence from a multidisciplinary point of view is presented.

There are different approaches for the identification of an offending dog when an attack on a human occurs. Forensic investigations in dog attacks usually involve the examination of bitemarks, tooth prints, the dog's stomach, and other pathological methods. For the identification of the offending dog, the best approach is to evaluate the canine Short Tandem Repeat (STR) typing in saliva traces of the dog bitemarks. Generally, it is possible to obtain a canine-specific STR profile from the dog's saliva on the wounded area, even when a high background of human DNA is present (blood).

This approach is often a problem because the surface of the wound may have already been treated (for example, by first aid workers), removing the canine cells. This approach is less successful in obtaining useful STR results than before medicolegal techniques are applied. Furthermore, dogs appear more frequently in human social life, so it is not rare for canine DNA to be present on the hands, arms, legs, or feet of humans.

A new forensic approach was described for offending dog identification beginning with dog buccal swabs: the target is the identification of a human profile beginning with this sample. An additional goal of this presentation was to determine the latency time of this biological trace in the dog's mouth.

In this study, ten different dog breeds were used to bite a beef meat sample that was previously typed (internal control profile). At different minute intervals (30, 45, 60, 90, 120, 150, 180, and 240), two dog buccal swabs were taken (a swab for each dental arch). One hundred and sixty samples were collected. Subsequently, DNA was extracted and a bovine genotyping kit was used. In all samples, a complete profile of the internal control was found for 45 minutes and a partial profile of the internal control for 150 minutes.

These data are very important to confirm the possibility of using buccal swabs to identify an offending dog. Human STR typing kits are much more specific and sensitive compared to cattle kits, so one can suppose that a complete human STR profile could be obtained from the dog buccal swab, after an aggressive act, for at least 150 minutes. This is usually enough time for a medicolegal team arrive.

This study may offer a model that could always be applied to identify offending dogs; furthermore, dog bite-related accidents can provide concrete cases, even when fatal, making it possible to develop, refine, or validate medicolegal techniques.

Reference(s):

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