

CASE REPORT

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Not All Bite Marks Are Associated with Abuse, Sexual Activities, or Homicides: A Case Study of a Self-Inflicted Bite Mark

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ABSTRACT: A case of self-inflicted bite mark during an episode of myocardial ischemia is presented. Using current bite mark identification techniques, the bite mark was shown to be self-inflicted. Self-biting may be an emotional response to pain or a type of counterirritation to alleviate pain. The recognition and documentation of this unusual case of a self-inflicted bite mark was due to the cooperation of the forensic pathologist and forensic odontologist.

KEYWORDS: odontology, pathology and biology, bite marks, self-biting

Most bite marks evaluated in the course of a medicolegal death investigation are associated with violent death. Analysis of such bite marks by a forensic odontologist is crucial in the identification and preservation of dental evidence that may identify the assailant.

Self-biting is a type of self-destructive behavior that has been described in individuals who are mentally retarded or psychologically disturbed [1,2]. Sobel and Perper [3] describe a case of a self-inflicted bite mark in a woman with organic brain syndrome who committed suicide. We present an unusual case of a self-inflicted bite mark associated with the pain of myocardial ischemia.

Case

A 51-year-old man was found by police, slumped in his car, apparently dead for some time. The car was unlocked, the keys were missing, and the decedent's wallet was in the front seat. The car was parked in an area distant from the decedent's home.

The body was fully clothed; nitroglycerin tablets were found in his shirt pocket. On exter-

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nal examination, a bite mark was observed on the posterior left wrist (Fig. 1) and irregular abrasions were present over the back of the right hand. No other injuries were present.

On internal examination, significant findings were limited to the cardiovascular system. The heart weighed 430 g. There was an old myocardial infarct of the inferior-septal area of the left ventricle with aneurysm formation and adherent mural thrombus. The proximal right coronary artery was totally occluded and the left anterior descending coronary artery was 50% occluded by atheromatous plaque.

The blood ethanol concentration was 0.20% w/v and the urine ethanol concentration was 0.29% w/v. A swab of the bite mark of the left wrist was positive for amylase and blood group substances A and H. The decedent's blood type was A.

The cause of death was atherosclerotic cardiovascular disease and the manner of death was natural. The decedent probably had an episode of myocardial ischemia resulting in further infarct or an arrhythmia or both.

Method of Bite Mark Analysis

Color transparencies as well as black-and-white photographs of the bite mark were taken, some of which included a ruler, color scale, and flat round object as recommended by the American Board of Forensic Odontology. Impressions of the bite mark were taken using vinyl polysiloxane (Reprosil®). Alginate impressions were taken of the decedent's maxillary and mandibular arches. Photographs were taken both of the decedent's mouth with his partial dentures in place (Fig. 2) and of the partial dentures themselves. Models of the alginate impressions were made with a crown and bridge die stone (Fig. 3) and an acrylic resin. The acrylic models were sent to the Northwestern University School of Dentistry for examination with a scanning electron microscope.

The stone models were used to make occlusal registration marks in pink base plate wax. These wax exemplars were then filled with metal filings and radiographs were taken at 90 kVp — 15 MA at 0.5 s or 12 to 15 impulses. Enlargements of the radiographs were made



FIG. 1—Bite mark of left wrist.



FIG. 2—Decedent's maxillary arch with partial denture in place.



FIG. 3—Die stone models of decedent.

to match the scale of enlarged photographs of the bite marks. The radiograph was then placed on the photograph as an overlay.

Discussion

The bite mark of the decedent's wrist was shown to be self-inflicted. The radiograph overlay matched the bite pattern on the wrist with the maxillary arch causing the 9 to 3 o'clock mark (using the wristwatch position as a reference) and the lower arch causing the mark from 3 to 9 o'clock (Fig. 4). The dentition of the decedent and the bite mark pattern were compatible by scanning electron microscope (SEM) examination as well. The SEM analysis confirmed the consistencies seen in the overlay study. It clearly identified the incisal edges of the teeth on the removable partial dentures as those making the bite pattern on the decedent's wrist. Serologic analysis of the swab from the bite mark was consistent with a self-inflicted bite.

Pain is a common symptom of myocardial ischemia. The decedent's possession of nitroglycerin indicates that he had angina. In both angina and myocardial infarction, the pain felt by the victim is visceral in nature and is often described as pressure or tightness. Feelings of alarm and impending death may accompany the discomfort [4]. Sensations of numbness, heaviness, or tingling may be referred to other areas, most commonly the left chest, shoulder, and arm.

Considering the severity of the decedent's coronary artery disease, the previous infarct, and the evidence that he had angina, he probably had severe pain before death as a result of myocardial ischemia. He may have responded to pain by self-biting. The biting could be a reflection of his emotional state. Emotional concomitants to pain include anxiety, anger, aggression, and even sexual arousal [4]. As discussed above, myocardial pain is frequently associated with emotional changes and feelings of dread. Therefore, these feelings alone may have led to the decedent's biting his wrist during pain.

It is also possible that the decedent was trying to alleviate his pain through counterirrita-

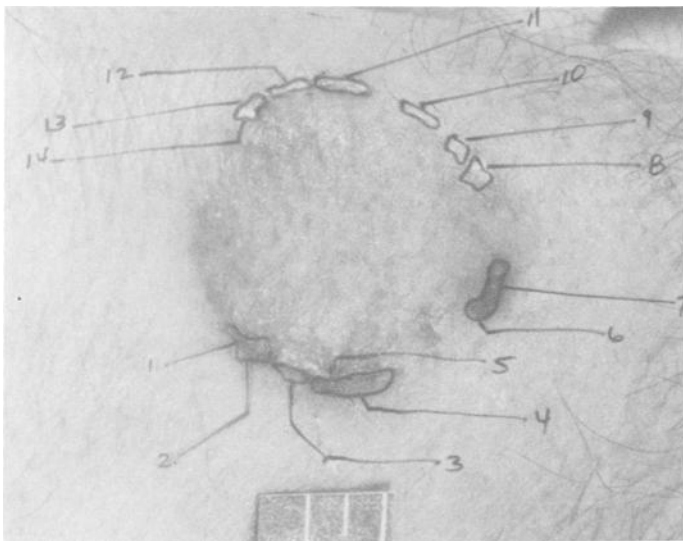


FIG. 4—Radiographic overlay of decedent's dentition and bite mark.

tion. Time-tested treatments for pain have included painful procedures such as "cupping" (suction), cautery, and hot compresses [5].

Self-biting could represent the decedent's effort to alleviate the referred left arm pain as a result of myocardial ischemia.

Conclusion

This case is unusual in several respects: (1) self-inflicted bite marks are rarely seen in cases referred for medicolegal death investigation, (2) bite marks are not usually observed in cases of natural death, and (3) the decedent's bite mark was made with partial dentures in place creating a unique and characteristic impression. Awareness of the possibility of self-biting during pain may result in the recognition of more self-inflicted bite marks.

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