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## Forensic Implications of Biting Behavior: A Conceptually Underdeveloped Area of Investigation

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**ABSTRACT:** Within the context of a criminal investigation the human bitemark traditionally provides the forensic dentist with both physical and biological evidence. In recent years, however, examples exist where in addition to discussing physical and biological evidence, expert witnesses have also testified in court regarding the behavioral aspects of biting behavior. Interested in this additional source of evidence, the authors reviewed the research literature from which biting behavior could be explained. The review found a hiatus of empirical knowledge in this respect, with only two papers seemingly related to the topic.

With this dearth of knowledge in mind, the authors present a framework for further analysis and tentatively suggest reasons for biting behaviors, using a range of psychological models. The article ends with a cautionary note that vague and often misleading behavioral assumptions must not be applied to bitemark testimony until further data are available.

**KEYWORDS:** forensic science, bitemarks, forensic dentistry, psychology, profiling, comment

Human bitemarks are frequently found on the victims of violent and sexual crimes, i.e., serial murder, rape, and child abuse (1). In such cases, it is widely accepted that the bitemark may provide forensic odontologists with both physical and biological evidence. The former represented by the patterned injury, typically on the victim's skin, and the latter in the form of saliva that may reveal the perpetrator's DNA (2).

The primary aim of this investigation is to suggest that in addition to physical and biological evidence, behavioral evidence should also be considered and researched within a framework of bitemark analysis. In order to justify this proposition this paper will: (a) document the reasons why bitemark analysis requires a behavioral critique; (b) show that very few if any empirical explanations exist in relation to biting behavior at crime scenes; and (c) highlight areas of inquiry that the authors feel would help facilitate

a more thorough understanding of why individuals bite in the commission of their crimes.

The call for a greater understanding of biting behavior arose primarily from a perceived need to help clarify and inform legal proceedings in cases that linked biting behavior to suspects in criminal trials.

A review of the current status of bitemarks in the U.S. legal system revealed cases in which the behavioral aspects of a bitemark were introduced as evidence. The premise that if an individual has bitten before they are more likely to bite again has been offered into evidence by prosecutors and tenaciously objected to by defense attorneys. The *State v. Victor Cazes* (3) represents a notable case in point, where the appellant was charged and eventually convicted of murder and aggravated sexual assault. During the trial odontological evidence was introduced based upon analysis of a bite on the breast of the victim. Two forensic dentists testified that they matched the teeth of the defendant to the bitemark. However, the State called two additional witnesses who were previous sexual partners of Cazes. These women testified that the appellant had bitten them during consensual sexual intercourse and the State used this testimony to indicate that it was likely that Cazes was responsible for the bite on the deceased. Hence, the State had introduced evidence purporting to show a behavioral link between biting behavior exhibited during consensual sex and biting behavior exhibited during the commission of an alleged rape. There is no scientific basis for such a hypothesis.

Another example of the use of behavioral evidence pertaining to bitemarks can be found in the military legal literature. In *United States v. Martin* (4) the prosecution offered a link between the appellant's habit of biting objects (such as pens, pencils, toothbrushes, etc.) under stressful situations to a bitemark on his deceased wife's neck. Their argument was that, in the process of strangling his wife, Martin would have been stressed and therefore prone to biting. The Court ruled against the admission of this evidence. In another Court case (5), a forensic dentist testified that he was able to distinguish lunatic and fighting bitemarks from attacking or sadistic bitemarks and from sexually oriented bitemarks. The witness claimed that the essence of the distinction is "that fighting bitemarks are less well defined because they are done carelessly and quickly, whereas attacking or sadistic bitemarks are made slowly and produce a clearer pattern." The dentist stated that sadistic bites are well defined, while sexual bitemarks often have a red center caused by sucking actions. The conclusion drawn in this case was that the bite was sadistic in nature. It must be stated that there is little support in the literature for these views. Indeed, much has been discounted, especially relating to the "suck mark" (6).

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These examples serve to demonstrate that biting behavior has obvious forensic implications and as such warrants attention within the narrative of appropriate disciplines. For instance, forensic psychology—defined here as “that branch of applied psychology which is concerned with the collection, examination, and presentation of evidence for judicial purposes” (7) represents one such discipline. By locating biting behavior within its discourse, it becomes easier to evaluate its forensic implications. For example, we can now see from the cases outlined above that biting behavior is being employed to serve a judicial purpose, and, as such, we would expect this to have been done so on the basis of the collection, examination, and presentation of evidence. This, however, does not appear to be the case.

Despite a thorough literature review being conducted (using both MedLine and PsychLit) only two papers were found relating to explanations of crime-related biting behavior (8,9). Interestingly, the author states that his first paper was based upon “a call-to-arms for greater understanding of bitemark evidence,” a call-to-arms that seems to have gone unheeded for over 15 years.

The original paper (8) sought to critique the psychological aspects of bitemarks and in doing so elucidated three motivational dimensions: anger-impulsive biting, sadistic biting, and ego-cannibalistic biting. The anger-impulsive bite is said to often result from frustration and incompetence in dealing effectively with conflict situations on the part of the perpetrator and is “governed by time, location, situation, and type of anger.” The sadistic bite is said to satisfy the need for power, domination, control, and omniscience. The ego-cannibalistic biter bites in an attempt to satisfy ego demands by annihilating, consuming, and absorbing life essences from the victim (8).

The mere fact that we are dealing with a single study demands that the findings be treated with caution. Nevertheless, the paper is useful insofar as it offers a point of reference from which to launch a contemporary evaluation of biting behavior.

Faced with a complete lack of research material from which to draw upon, the authors set about reviewing and then thematically arranging categories of information that it was believed had the potential to inform our understanding of biting behavior. These themes are given in Table 1.

Armed with this framework of inquiry it became possible to elicit, albeit tentatively, both defining aspects of biting behavior and additional avenues of investigation. What follows is an outline of each category encompassing what we consider to be relevant markers in the search for a more erudite examination of behavioral bitemark analysis.

### Profiling and Offender Typologies

The empirical research on violent crimes that served as the basis for the development of criminal personality profiling began as a pi-

lot project at the Federal Bureau of Investigation Academy, Quantico, Virginia, in 1977. Subjects who were incarcerated for serial sexual murders were identified and interviewed by special agents who were assigned to the FBI Behavioral Science Unit. This study was unique in that it was the first time that serial and violent offenders were studied from a law enforcement perspective, instead of a clinical or academic perspective (10). The research was expanded in 1978 to include serial rapists. The original research established the standard in the law enforcement community and enhanced the knowledge of all professionals who deal with these offenses, offenders, and victims. The research provided part of the scientific foundation for the investigative technique of profiling by offering insights into the motives and behaviors of offenders, and by providing correlational base-rate data regarding offender characteristics and their behaviors in the commission of crimes (10). By identifying commonalities, the profilers have been able to develop typologies, understand the link between crime scenes and the characteristics of offenders, and develop information that is useful in violent crime investigations.

The FBI defines profiling as an investigative technique by which to identify the major personality and behavioral characteristics of the offender based on an analysis of the crime(s) he or she has committed (11). It is very different from the clinical personality profiling of patients done by mental health professionals in the course of clinical and forensic practice (10). Profiling, now more commonly known as criminal investigative analysis, is an investigative tool. The profilers work as a team with the investigators to determine what happened, why it happened, and use their combined experience to describe who (what type of person) did it.

The profile process is similar to that used by clinicians to formulate a diagnosis and a treatment plan. Data are collected and assessed, the situation is reconstructed, hypotheses are formulated, a profile is developed and tested, and the results are reported (11). Suggestions regarding possible motives and investigative strategies are usually provided to the investigators. One reason for oversimplifying the profile process for the public is to deprive criminals of specific knowledge of profiling techniques (12).

In the analysis of homicide cases that involve human bite marks, profilers would consider the number and location of the bite marks and the estimated time the bites were inflicted in relation to the victim's death. The determination that the bites were inflicted pre-mortem, antemortem, or postmortem would be viewed differently. Bites to the breasts, genitals, back, neck, and face would be interpreted differently than bites to the hands or forearms.

Within the literature on forensic profiling, the issue of signature behavior provides an intuitive link to a more conceptual understanding of biting behavior. Signature behavior refers to aspects of a perpetrator's criminal repertoire that appears to transcend his modus operandi. “The MO is what the offender does to effect the crime; the signature, in a sense, is why he does it” (13).

According to Keppel and Birnes (14) a killer's signature is a unique behavioral calling card that he is psychologically compelled to leave. They stated that “Hidden among the evidence, often gleaned from the marks and wounds on the victim's body . . . these signatures are the only ways the killer truly expresses himself.” With this in mind, a reasonable premise would be that certain biting behavior could conceivably be signature based.

In articulating the notion of signature behavior, Keppel and Birnes suggest that a specific signature or signatures can be classified within “one or more of the basic traits of sexual-sadism-control humiliation, progression, posing, torture, overkill, necrophilia, and cannibalism” (14). Some of these traits would appear to res-

TABLE 1—Identified themes pertaining to biting behavior.

Profiling	Offender Typologies	Childhood Biting	Theoretical Signposts
Signature behavior	Anger-impulsive	Experimental biter	Sexual deviation
	Sexual-sadism-control	Frustrated biter	Offender cognition
	Cannibalistic	Threatened biter Power biter	Personal constructs

onate with the motivational dimensions of biting behavior alluded to earlier, i.e., anger-impulsive biting, sadistic biting, and ego-cannibalistic biting. If one accepts the validity of these constructs, it could be argued that the anger-impulsive bite should not be afforded the status of signature behavior, insofar as its reactive nature seems at odds with the notion of a stable personality marker. Furthermore, it would seem reasonable to assume that a signature behavior stems from either sadistic or cannibalistic intent when bitemarks are present consistently across a series of abhorrent crime scenes. Conversely, in serial offences where bitemarks do not present consistently, it is more likely that the biting behavior was driven by an impulsive display of anger or frustration.

The proposition that a particular biting behavior can be located within signature and trait classifications is a speculative one. Nevertheless we would argue that if such an approach were to be considered, biting behavior would need to be studied separately despite the fact that it is likely to reside within a cluster of behaviors that collectively would be defined as aggressive or violent.

From an investigative standpoint, the doctrine that the whole is more important than the sum of its parts would have to be resisted, as this particular line of thinking increases the likelihood that some of the parts (i.e., biting behavior) may be inappropriately subsumed within a ubiquitous definition. For instance, the behavioral analysis of a crime scene may conclude—based in part on the presence of a bitemark—that the offender was sadistically motivated. However, if it transpires that the bite was inflicted postmortem, the sadistic label no longer applies to the biting behavior. This last point, albeit a hypothetical one, highlights the need to objectively study biting behavior in its own right.

### Childhood Biting

In the course of reviewing relevant offender typologies the authors were struck by the similarities between explanatory labels employed to describe childhood biting and a number of the traits and motivational dimensions outlined above.

In a report produced by the National Association for the Education of Young Children (15), biting is construed as a normal developmental phase insofar as one out of ten toddlers and two-year-olds demonstrate biting behavior. The report claims that it is possible to identify the kind of biter you are dealing with and classifies these biting types as follows. The experimental biter is driven by a need to touch, smell, and taste other people in order to learn more about their world. The frustrated biter is driven by a lack of the skills necessary to cope with social situations such as the desire for attention. The threatened biter tends to be overwhelmed by their surroundings and bites as a means of regaining control. The power biter is driven by a strong need for autonomy and may resort to biting in order to feel a sense of personal power.

According to Campbell (16), most biters will tend to outgrow the behavior as they develop new skills for coping with stress and feelings of anger. This may help explain why the developmental critique of biting ends at childhood. However, what are the consequences if the child is unable to fully develop these negating skills? Could childhood biting behavior manifest itself in adulthood? Research directed toward such questions would offer useful developmental leads in the search for coherent explanations of biting behavior across one's life span.

### Theoretical Signposts

Given that biting behavior is often displayed within a sexual context (e.g., rape and child abuse), it seemed a logical step to ex-

amine whether established theories of sexual deviation could help explain dysfunctional biting.

Arguably the most influential theory of sexually deviant behavior is that put forward by Freud who maintained that all sexually deviant behaviors result from a single type of psychopathology. Interestingly, given our earlier question as to whether inappropriate biting behavior could transcend childhood, Freud described the causes of sexual deviation as the continuation into adult life of infantile sexual desires and practices (17).

Unfortunately, Freud's classic explanatory mechanisms, i.e., oedipal conflicts and castration anxiety, have resulted in what many see as circular discussions that are at odds with empirical study when applied to specific behaviors, e.g., psychopathy (18). In addition, contrary to the popular belief that the sex offender is mentally unstable, most sex offenders are not clinically disordered. Rather, the motivation for this unacceptable behavior is said to reside in more "normal" explanations, such as the exercise of male power or the expression of anger (19).

This may explain why contemporary research into sexually deviant behavior is increasingly exploring the offender's cognitive processes, attitudes, and distortions (19). Persuaded by this more rational approach we would suggest that research into biting behavior would benefit from adopting a similar theoretical stance across the continuum of biting behaviors from physical child abuse to serial rape and murder.

According to Houston (20) researchers exploring cognition have provided valuable insight into the ways in which offenders make sense of their own behavior. The author cites as an early example the work of Sykes and Matza (21), who were able to elicit the main ways in which delinquents validated their behavior. These included such things as the "denial of responsibility" (i.e., the offender claimed to be drunk at the time) and "denial of the victim" (i.e., the offender claimed the victim deserved it).

Arguably the most influential cognitive critique of offender behavior evolved from the case study work of Yochelson and Samenow (22). Based on research conducted with recidivistic offenders, the authors concluded that the thought processes of criminals often display evidence of "thinking errors" (e.g., impulsiveness, perfectionism, inability to place oneself in the position of others, etc.).

The cognitive premise that it is possible to reveal the thinking patterns of those whose behavior we seek to understand would appear to provide a logical framework from which to explore the psychological mind set of the biter.

The theory of personal constructs (23) arguably provides the methodological tools from which to launch such an inquiry. In essence the theory maintains, "If we want to understand other people, their thoughts, their feelings or their behavior we have to know how these people allocate meaning to the things that happen" (24). The emphasis is very much on individual perceptions of the world, such as how we as individuals impose our personal constructions on events in an attempt to make sense out of them. It follows, therefore, that if we are able to elicit, examine, and explore what influences the personal construct systems of offenders who have bitten, they should tell us something new and highly relevant regarding the dimensions of the behavior we wish to understand. A number of theory-led techniques have been developed in order to elicit the personal constructs of individuals. For instance, the repertory grid is a structured interview procedure employed to allow the researcher to tap into the construct system of the respondent (25).

It should be noted that personal construct psychology and the methodological techniques contained therein have been employed

with offenders whose behavioral profile is most likely to include biting behavior, namely, violent offenders (26) and sex offenders (27). More recently, personal construct psychology was used to help explain the motivational mind-set of the notorious British serial killer Fred West (28,29). It does not seem unreasonable to assume, therefore, that this research strategy could be employed with a particular emphasis on why offenders bite.

## Conclusions

Forensic involvement in cases where biting behavior is present invariably poses the question why do people bite? At present there does not appear to be a satisfactory answer despite the fact that examples exist within the criminal justice system where biting behavior is debated at the behavioral level.

The modest aim of this paper was to highlight the point that biting behavior is conceptually underdeveloped and in doing so review areas that might help redress this situation. The paper is not intended to be a vehicle for any particular idea *per se*; rather, it was developed as a way of stimulating debate and hopefully moving the topic forward. The authors do not claim to have any particular insight into why people bite. We are simply interested in the topic and we sincerely believe that it warrants closer inspection.

If we are to accommodate a valid and reliable behavioral component into the existing framework of bitemark analysis, it goes without saying that a sustained research agenda is required. In the course of this paper, we have provided a speculative framework containing potential agenda items that will hopefully be examined, revised, and modified by those who have both the necessary knowledge base and working environment from which to launch a contemporary investigation into relevant facets of biting behavior.

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