



G3 A Review of the Published Research on the Use of Overlays for the Analysis of Bitemarks in Skin

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Learning Overview: After attending this presentation, attendees will understand the published research to date relating to the ability of the forensic odontologist to accurately interpret bitemarks on skin in regard to their source and the scientific support for said interpretation.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by advancing the discussion of the use of bitemark analysis in the courts.

The hypothesis that human or animal dentitions can leave identifiable patterned impressions on skin (human or otherwise) after having bitten said substrate seems intuitive. The underlying assumption is that individual dentitions are just that—unique. For the purposes of this presentation, that assumption will be a given, as this presentation will not discuss the literature in support or opposed to the unique nature of dentitions but will simply stipulate that human dentitions are unique.

Carrying the hypothesis one step further, it had been put forth that one could identify the originator of a bitemark (the biter) via analysis of the shape and pattern of the mark and comparison with overlays of dentitions of the individuals who may have made the mark.

Research to investigate this hypothesis was undertaken in the 1970s, then after a nearly two-decade hiatus, research began again in the 2000s. In the intervening years, most of the published articles referencing bitemarks dealt with individual cases or an odontologist's preferred methodology rather than an exploration of the validity of the hypothesis or the faithfulness or reliability of skin (human or porcine) as a recording medium. This change of focus may have been due to the notoriety afforded odontologists after the Ted Bundy conviction and/or the enthusiasm with which bitemark analysis was embraced by law enforcement in this country.

This presentation will offer a summary of the research performed, the conclusions, and the recommendations of this study.

The 2009 publication of the National Academy of Sciences Report, *Strengthening Forensic Science in The United States, A Path Forward*, noted in the Summary Assessment of bitemark analysis that: "Although the majority of forensic odontologists are satisfied that bitemarks can demonstrate sufficient detail for positive identification, no scientific studies support this assessment, and no large population studies have been conducted. In numerous instances, experts diverge widely in their evaluations of the same bitemark evidence, which has led to questioning of the value and scientific objectivity of such evidence ... the committee received no evidence of an existing scientific basis for identifying an individual to the exclusion of all others. That same finding was reported in a 2001 review, which 'revealed a lack of valid evidence to support many of the assumptions made by forensic dentists during bitemark comparisons.' Some research is warranted to identify the circumstances within which the methods of forensic odontology can provide probative value."¹

In addition to reviewing the above-captioned research, this presentation will touch upon the topic of wrongful convictions and why they may have occurred, and an alternative path forward will be offered.

Reference(s):

1. National Academy of Sciences. *Strengthening Forensic Science in the United States: A Path Forward*. Committee on Identifying the Needs of the Forensic Science Community, Committee on Science, Technology, and Law Policy and Global Affairs, Committee on Applied and Theoretical Statistics Division on Engineering and Physical Sciences, *The National Academies Press*, 2009, 500 Fifth Street, N.W. Washington, DC 20001.

Bitemark Research, Hollow Volume Overlays, Wrongful Conviction