G12 Evaluating a Bitemark in Light of the Scientific Research Regarding Skin Distortion

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After attending this presentation, attendees will better understand the issues at hand with regard to traditional bitemark analysis.

This presentation will impact the forensic science community by highlighting the fact that traditional analysis of bitemark evidence cannot be viewed as axiomatic.

Bitemark analysis, as has been taught and accepted in this country (as well as in others) for the past 30^{+} years, has been based on the intuitive concept that teeth will leave marks on a bitten surface that are distinct and attributable. A basic tenet underlying this conceit, according to opinion, is that each human dentition is unique. Early methods of analysis involved the use of tracings of the biting edges of the anterior dentition on acetate and the superimposition of said tracing on a photograph of the mark in question (as opposed to comparison to the mark itself, due to the obvious logistical complications that would be associated with such an approach). The fabrication of these overlays has evolved from tracing on acetate to computer-assisted overlays, and the comparisons to the marks are also computer assisted. Additionally, metrics are used.

Research on the fidelity of skin as a recording medium, particularly with regard to bitemarks, led the researchers to caution that this approach was scientifically unsupported as early as the early 1970s, yet this research seems to have been marginalized or ignored.[1-3] More recent research has led current researchers to the same conclusions.[4-7]

The case to be discussed involves a bitemark on the right forearm of a deceased 5-year-old mentally disabled child. The child was received at the Kings County Office of Chief Medical Examiner of the City of New York in 2012. In addition to the bitemark, there were multiple bruises consistent with physical abuse. The cause of death was determined to be drowning.

As the bitemark was in a position where it might have been self-inflicted, impressions of the child's dentition were made and stone models created. Photographs of the bitemark were taken with an American Board of Forensic Odontology (ABFO) ruler in place. The subcutaneous tissue displayed a somewhat sharper image of the mark and it was photographed as well.

By convention, after first identifying the mark to be a bite, the next question which must be posed is, "Does the mark have sufficient clarity and definition to warrant further analysis?" Should one answer, "Yes," then a traditional forensic dental workup (measurements, overlays, etc.) is initiated, as in this case, to determine first whether the wound was self-inflicted; however, the far more important question is, whatever the determination of the analyst with regard to the source of the bite, can the analyst reference a scientific underpinning to support it?

Reference(s):

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4. Bush M.A., Miller R.G., Bush P.J., Dorion R.B.J. Biochemical factors in human dermal bitemarks in a cadaver model. *J Forensic Sci.* 1-2009; vol. 54: no.1.
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6. Bush M.A., Cooper H.I., Dorion R.B.J. Inquiry into the scientific basis for bitemark profiling and arbitrary distortion compensation. *J Forensic Sci.* 7-2010; vol. 55: no. 4.
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Bitemark, Distortion, Evidence