



### F24 Bite Mark Analysis: Additional Investigations of Accuracy and Reliability

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The goals of this project are 1) to determine if odontologists of varying experience can select the correct biter from a group of suspects, 2) to evaluate and compare bite mark analysis on human skin in a limited but more extensive population, and 3) to assess the range of opinion in bite mark interpretation by examiners in the current study.

This study is the next logical step of a pilot study presented at the 2004 AAFS meeting by Gould and Cardoza. This study will impact the forensic community by providing information to support or question the concept that bite mark analysis can offer objective, reliable and credible science-based opinion. The study further examines the importance of using quality evidence, skillful interpretation, and trained forensic odontologists.

**Background:** Bite mark evidence has been accepted by the North American forensic community and legally admissible in courts in the United States of America. It has played an important part in the successful prosecution in numerous criminal cases. Nevertheless, there are critics who have questioned the scientific validity of bite mark analysis. This constructive skepticism about the process and how forensic experts derive bite mark opinions is healthy and welcome. It is also perceived as a tool in helping to excel deliberately and to strengthen the process of bite mark analysis.

**Introduction:** Bite marks are indicative of violence whether made by the perpetrator during an assault or the victim in self-defense. To recognize a human bite mark is an important criterion in an initial investigative phase in deceased or living human victims. Therefore, it is critical to understand and follow the protocol for data collection and preservation of bite mark evidence. If these steps are followed, quality evidence may be available to maximize accurate evidentiary analysis.

Are evidentiary opinions based on the same evidence similar among forensic odontologists? This experiment is designed to provide insight to the stated question. The accurate interpretation of bite mark evidence is essential. The implications for the lives and liberty of the accused are an enormous responsibility not to be taken lightly by competent and experienced investigators. This study explores the relationship between quality evidence and accurate interpretation of bite marks in reaching forensic evidentiary opinion. If quality bite mark evidence is properly analyzed, can trained odontologists assist triers of fact to make appropriate decisions and judgments?

**Method:** Dental models of ten different individual's teeth were selected and used for the exercise. One set of the models made the bite marks on the skin of a living human volunteer. To serve as test bites, each set of models made one upper and one lower bite impression on modeling clay. The test bites and bite mark on human skin were photographed with Sony cameras: 1 megapixel FD-Mavica, 1.55 megapixel DCR-PC120, 8 megapixel FV-828 and a ABFO No. 2 ruler appropriately placed. The Universal Numbering System was used in the study. Adobe Photoshop 7.0 was used to fabricate hollow volume overlays using the technique described in the Digital Analysis of Bite Mark Evidence by Raymond Johansen, DMD and Michael Bowers, DDS, JD. Dentists with wide range of forensic experience in bite mark analysis volunteered to be examiners. The examiners were asked to compare the overlays to the test bite and bite photographs and to determine the level of confidence for each as having caused the bite marks on skin. Examiners were asked to utilize the ABFO Bite Mark Terminology Guidelines.

**Conclusion:** The details and results of the study will be presented at the conference. The study emphasizes the contribution and combination of quality evidence, proper application of science-based methodology, plus accurate analysis and interpretation by forensic odontologists who seek the truth. Consequently, the forensic and judicial communities are encouraged to continue to rely upon the scientific application of bite mark analysis and the opinions of forensic experts who conscientiously apply those principals.

**Bite Mark Analysis, Overlays, Scientific Method**