F13 Determination of the Accuracy of Decision Making in the Interpretation of Bite Mark Analysis

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After the presentation, attendees will understand that training and certification of professionals who are to give opinion-evidence in cases of bite mark patterned injuries is important to the successful outcome of the analysis.

This presentation will impact the forensic science community by demonstrating how experience and training for bite mark patterned injuries is important to the successful outcome of the analysis.

This presentation will provide information regarding the accuracy of examiners in distinguishing the correct dentition that may have made a bite mark. The study was designed to evaluate the reliability of responses in bite mark analysis between two observational periods, between three groups of examiners.

A series of simulated bite marks were made on three juvenile female domestic pigs using a device design to mechanically produced bite marks in-vivo. A biting device consisting of upper and lower dentition-anvils were attached to a vice-grip. A monitoring load cell was used to maintain pressure consistency of 23kg/50lbs for 60 seconds. Three removable sets of dentitions made in chrome cobalt were inserted in the device for the study of individual bite mark characteristics. All sets of teeth had the same class characteristics with the same surface contact area to make sure the force applied was equally distributed. The dentitions used differed only with respect to the individual position of the teeth i.e., angulations and rotations. Models were labeled suspect A, B, and D. Suspect D was used to create the bite marks but was not sent to the examiners, creating a situation in which one of the biters was not represented in the circulated sample. A fourth set of teeth labeled suspect C was prepared and sent for examination but was not used for biting, creating another situation in which none of the cases represented the biter. With the animal under general anesthesia, 18 bite marks (six per pig) were made on the pigs' abdomen and thorax.

Thirty volunteers were recruited for the analysis of the bite marks. Ten participants were recruited from three separate groups: inexperienced local dentists (Novices), dentists with an interest in forensic, members of a forensic association or society (Members) and experienced examiners, Diplomates of the American Board of Forensic Odontology (Diplomates). Each participant received 18 simulated bite mark cases, which contained 3 sets of dental models identified suspect A, B, and C, 18 casts of bite marks respectively identified, a CD-ROM containing photographs of each bite mark, paper photos of the bite marks, forms and answer sheets to be completed. Examiners had to decide, among other questions, whether each bite mark could be attributed to one of the suspects. A second assessment of the same cases was conducted a few months later to evaluate the reliability of responses.

The results of the study demonstrated that the Novices often did as well as the Diplomates, and better than the Members. Incorrect suspect identifications were more common among Members meaning they falsely attributed a dentition to a bite mark it did not make. For dentition A and B, the rates of critical errors for the Diplomates were consistent with those seen in some studies on fingerprinting. For dentition D, all three groups had higher percentages of incorrect identification. There was no apparent effect on the time period between evaluations.

The study demonstrates that experience and training for bite mark patterned injuries is important to the successful outcome of the analysis. Bite mark analysis should be evaluated and considered on a case-by-case basis by trained professionals respecting the principals of bite mark investigations. If such evidence is obvious, logical, and understandable to the trier of fact, it should be admissible and the appropriate weight given to the evidence based on the merits of each case.

Bite Mark Analysis, Porcine Skin, Biting Device