

1992

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### Recommended Citation

Steven Weigler, *Bite Mark Evidence: Forensic Odontology and the Law*, 2 Health Matrix 303 (1992)  
Available at: <https://scholarlycommons.law.case.edu/healthmatrix/vol2/iss2/10>

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# BITE MARK EVIDENCE: FORENSIC ODONTOLOGY AND THE LAW

*Steven Weigler*†

## INTRODUCTION

AS OF MARCH, 1992, there has been one hundred and ninety-three reported cases where human bite mark evidence has been introduced or noted in appeal. Comparisons of bite marks by expert witnesses have been used as evidence to convict for the crimes of burglary,<sup>1</sup> homicide,<sup>2</sup> child abuse<sup>3</sup> and rape.<sup>4</sup> Furthermore, bite mark evidence has been accepted as admissible in thirty-five states.<sup>5</sup> As the use of bite mark evidence becomes increasingly popular, the risk of the evidence not satisfying a state's test for admissibility, including the stringent test found in *Frye v. United States*,<sup>6</sup> becomes virtually nil. However, a bite mark's admissibility does not always guarantee its reliability. This note presents an overview of the science of forensic odontology. It will emphasize bite mark analysis and will review the history of admissibility of bite mark evidence. Finally, it will address some of the other evidentiary issues raised in this area.

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† The author would like to thank L. Thomas Johnson, D.D.S., and adjunct professor at Marquette University School of Dentistry, for his helpful comments. Dr. Johnson is also Chairman of the Certification and Examining Committee, American Board of Forensic Odontology, Inc. Any mistakes, of course, remain the author's oversights. Also, the views expressed herein are solely those of the author.

1. The first recorded being *Doyle v. State*, 263 S.W.2d 779 (Texas Crim. App. 1954).

2. The first recorded being *People v. Marx*, 126 Cal. Rptr. 350 (Cal. Ct. App. 1975).

3. The first recorded being *Bludsworth v. State*, 646 P.2d 558 (Nev. 1982).

4. The first recorded being *People v. Johnson*, 289 N.E.2d 722 (Ill. App. Ct. 1984).

5. The following states as of March, 1992 have not had published cases pertaining to the admission of bite mark evidence: Delaware, Hawaii, Idaho, Iowa, Kentucky, Maryland, Montana, Nebraska, New Hampshire, New Jersey, New Mexico, North Dakota, South Dakota, Utah and Wyoming. For a discussion of forensic odontology evidence in England, see CYRIL J. POLSON ET AL., *ESSENTIALS OF FORENSIC MEDICINE* 68-71 (1985). For a somewhat dated discussion of the admissibility of bite mark evidence in the U.S., see Adrienne Hale, Note, *The Admissibility of Bite Mark Evidence*, 51 S. CAL. L. REV. 309 (1978).

6. *Frye v. United States*, 293 F. 1013 (D.C. Cir. 1923). For a full discussion of *Frye*, see Paul C. Giannelli, *The Admissibility of Novel Scientific Evidence: Frye v. United States, a Half-Century Later*, 80 COLUM. L. REV. 1197 (1980).

## I. THE SCIENCE OF FORENSIC ODONTOLOGY

### A. In General

Forensic odontology can be broadly defined as the application of the science of dentistry to the field of law.<sup>7</sup> There are four major areas of interest:<sup>8</sup>

1. *Dental identification of the Unknown Body*: Comparing the dental records and X-rays to that of a corpse (or otherwise unidentifiable human remains<sup>9</sup>) for identification purposes.
2. *Trauma and the Oral Tissues*: Interpreting the oral injury and applying it to legal matters.
3. *Dental Malpractice and Negligence*: Analyzing the treatment of a patient by a dentist, and reporting the findings to a court of law.
4. *Bite Mark Comparison*: Comparing the bite mark found on a victim to the dental impressions of criminal suspects.

Bite mark comparison has been an especially controversial aspect in the field of forensic odontology.<sup>10</sup>

The first formal forensic odontology training in the United States took place in 1962, at the Armed Forces Institute of Pathology.<sup>11</sup> In the early 1970s, the Odontology Section of the American Academy of Forensic Sciences (OSAAFS) was established.<sup>12</sup> The OSAAFS, which has three hundred and twelve members,<sup>13</sup> does not have explicit initial standards for admission,<sup>14</sup> other than being em-

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7. IRWIN M. SOPHER, *FORENSIC DENTISTRY* vii (1976). The term "forensic odontology" is synonymous with forensic dentistry.

8. *Id.* at 3-4.

9. Interview with L. Thomas Johnson, D.D.S., Chairman of the Certification and Examining Committee, American Board of Forensic Odontology Inc. in Milwaukee, WI. (Mar. 30, 1991) [hereinafter Interview with Johnson].

10. "Many commentators and defense attorneys have criticized bite mark identification, arguing that the scientific process is unproven. Forensic dentists, prosecutors and judges, however, generally view bite mark evidence in a more positive light regarding it as a valid method in conclusively identifying an assailant." Robert A. De La Cruz, Note, *Forensic Dentistry and the Law: Is Bite Mark Evidence Here to Stay?* 24 AM. CRIM. L. REV. 983 (1987). See also Allen P. Wilkerson & Ronald M. Gerugthy, *Bite Mark Evidence: It's Admissibility is Hard to Swallow*, 12 W.S. L.REV. 519, 561 (1985) ("Until such time as bite marks are demonstrably unique and there is the requisite core of scientific data with which to support such conclusion, bite mark evidence should be uniformly rejected by the courts." *Id.*).

11. L. Thomas Johnson, *The Significance of Bite Mark Evidence in Homicide Investigation*, (Sept. 20-21, 1990) (unpublished manuscript on file with author) (presented at the 2nd Annual Forensic Science Seminar of the Milwaukee County Medical Examiner).

12. *Id.*

13. Telephone interview with Lynn Stuart, Administrative Assistant, American Academy of Forensic Sciences (Apr. 13, 1992).

14. De La Cruz, *supra* note 10, at 991.

ployed in the field of forensic odontology.<sup>15</sup> The odontology section is one of ten sections of the American Academy of Forensic Sciences.<sup>16</sup> It is not a certifying board, but instead "offer(s) a forum to communicate, exchange ideas, and pass information back and forth" pertaining to forensic odontology.<sup>17</sup>

The American Board of Forensic Odontology, Inc. (ABFO) is the certifying board for the field of forensic odontology,<sup>18</sup> being made so by the Forensic Sciences Foundation, a education and research organization closely related to the American Academy of Forensic Sciences.<sup>19</sup> In 1986, the ABFO published the first standard guidelines for bite mark analysis.<sup>20</sup> Membership in the ABFO currently stands at approximately ninety-five members.<sup>21</sup> To gain admission, a dentist must submit a transcript of professional training.<sup>22</sup> Furthermore, the applicant should be very familiar with pathology (as well as the other basic sciences<sup>23</sup>), and some knowledge of physical anthropology.<sup>24</sup> They must also have five years experience in the field of forensic odontology.<sup>25</sup> This experience can be gained through work at a medical examiner's office, a military mortuary service, the Army's Central Identification Laboratory (CILHI), or through related work at a governmental agency or a dental school.<sup>26</sup> In order to become board eligible, a candidate must also submit their portfolio of required cases performed in the

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15. Interview with Johnson, *supra* note 9.

16. Telephone interview with Nancy Jackson, Membership Services Coordinator, American Academy of Forensic Sciences (Apr. 13, 1992). The other nine sections include Criminalistic, Engineering Sciences, Jurisprudence, Pathology-Biology, Psychiatry and Behavioral Sciences, Questioned Documents, Toxicology, General, and Physical Anthropology.

17. *Id.*

18. See AMERICAN BOARD OF FORENSIC ODONTOLOGY, INC. BYLAWS & CODE OF ETHICS, ARTICLE II, NAME AND PURPOSE, Section 2(c); "To grant and issue certification certificates, and/or other recognition, in cognizance of special qualifications in forensic odontology to voluntary applicants who conform to the standards established by the Board. . . ." *Id.* AMERICAN BOARD OF FORENSIC ODONTOLOGY, INC., *Guidelines for Bite Mark Analysis*, 122 J. AM. DENTAL ASS'N 383 (1986).

19. Interview with N. Jackson, *supra* note 16.

20. But stating that "In 1977 the odontology section of the American Academy of Forensic Sciences received a report from its committee on recommended [bite mark analysis] methods. However, the report was not published in scientific literature." ABFO *Guidelines supra* 18, at 383.

21. Interview with Johnson, *supra* note 9.

22. *Id.*

23. *Id.*

24. De La Cruz, *supra* note 10, at 991.

25. Interview with Johnson, *supra* note 9.

26. *Id.*

area of forensic odontology and pass a rigorous examination.<sup>27</sup>

The National Board of Forensic Odontology set itself up as a parallel organization to the ABFO, instituting a certification process for forensic odontology.<sup>28</sup> The organization's weakness was that, unlike the ABFO, it lacked official sponsorship.<sup>29</sup> The organization is no longer involved in certification, but instead currently considers itself an educational organization.<sup>30</sup>

The last organization directly involved in forensic odontology is the American Society of Forensic Odontology (ASFO) which has approximately four hundred and fifty members.<sup>31</sup> Membership is open to all interested in the field of forensic odontology, including non-dentists.<sup>32</sup> The organization's activities includes the publication of a newsletter, as well as the recent publication of a forensic odontology manual.<sup>33</sup>

### B. Bite Mark Analysis

The theory behind bite mark analysis is that "teeth, like tools can leave recognizable marks."<sup>34</sup> Accordingly, the presence of unique features of the suspect's dentition registered in the injury, make it possible for the forensic odontologist to make identifications. For example, in *State v. Stinson*,<sup>35</sup> the forensic odontologist noted that out of the defendant's eight incisors, one incisor was fractured, a second incisor in the upper jaw was set back from the other teeth, a third incisor was worn to a pointed edge, and a fourth incisor was set out from the other teeth on the lower jaw.<sup>36</sup> Furthermore, all of the defendant's upper front teeth were flared.<sup>37</sup> The forensic odontologist also noted that there were eight complete bite marks on the victim, some three dimensional.<sup>38</sup> There was "a repe-

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27. *Id.*

28. Telephone interview with Earl Lewis, D.D.S., co-founding member of the National Board of Forensic Odontology (Apr. 12, 1992).

29. Interview with Johnson, *supra* note 9.

30. Telephone interview with David Magey, D.D.S., co-founding member of the National Board of Forensic Odontology (Apr. 12, 1992).

31. Telephone interview with George E. Burgman, D.D.S., Immediate Past President of the American Society of Forensic Odontology (Apr. 13, 1992).

32. *Id.*

33. *Id.*

34. L. Thomas Johnson, *Bite Mark Evidence: Recognition, Analysis and Court Room Presentation*, 55 N.Y. ST. DENTAL J. 153 (1990).

35. 397 N.W.2d 136 (Wis. 1986).

36. *Id.* at 142.

37. *Id.*

38. *Id.* at 138.

tition of some particularly unique features in several of the bites."<sup>39</sup> The forensic odontologist, using this evidence, was able to conclude "to a reasonable degree of scientific certainty,"<sup>40</sup> that the bite marks found on the victim were made by the defendant.

Other factors play a part in bite mark identification such as: if the biter used his tongue, lips or cheeks; the movement of his jaw; and the angle of the bite.<sup>41</sup> Also essential is the physical condition of the victim.<sup>42</sup> In simple terms, because the human body is active, a bite mark on a living subject could fade quickly.<sup>43</sup> When the subject is dead, because of the stagnancy of any body mechanisms, the bite mark could last much longer.<sup>44</sup>

Bite marks are usually found in either foodstuffs or on the surface area of the assailant or victim.<sup>45</sup> However, bite marks have been found and analyzed in hard surfaces as rigid as a car hood or an empty beer can.<sup>46</sup> Bite marks in food are usually found in relatively hard foods which produce a more clearly defined bite mark.<sup>47</sup> The marks against the assailant are usually found in the areas of the hands, arms, neck, face, and possibly around the genitalia.<sup>48</sup> Victims are usually bitten in the areas close to the breasts, neck, arms, cheeks, thighs, buttocks, and stomach.<sup>49</sup>

## 1. The ABFO Guidelines

As noted above, the ABFO initiated the first standardized guidelines for the collection and analysis of bite mark evidence. In its statement of purpose, the organization noted that "careful use of these guidelines in bite mark analysis will enhance the quality of the

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39. *Id.* at 142.

40. *Id.* at 138.

41. See De La Cruz, *supra* note 10, at 985 (citing Lowell J. Levine, *Bite Mark Evidence*, in *OUTLINE OF FORENSIC DENTISTRY* 112, 114 (J. Cottone & S. Standish eds. 1982)); SOPHER, *FORENSIC DENTISTRY*, *supra* note 7, at 139.

42. *Id.*

43. Interview with Johnson, *supra* note 9.

44. See *People v. Marx*, 126 Cal. Rptr. at 354 (1975) (where a bite mark on a dead victim lasted more than 7 weeks); *People v. Milone*, 356 N.E.2d 1350, 1356 (Ill. App. Ct. 1976) (stating "... because the victim was already deceased when the bite was inflicted, the skin and underlying tissue provided an unchanging medium for the marks" *Id.*).

45. R. Groffy, *Recognition, Preservation, and Collection of Bite Mark Evidence*, Wisconsin Department of Justice, Crime Laboratory Bureau 1 (1989) (unpublished manuscript) (on file with author).

46. *Id.* at 2.

47. *Id.* at 1.

48. *Id.*

49. *Id.*

investigation and the conclusions.”<sup>50</sup> The guidelines separate the analysis into the description of the bite mark, collection of the evidence from the victim, collection of the evidence from the suspect, and an analysis of the evidence.<sup>51</sup> When describing the bite mark, the guidelines state that the analyst should note the demographics such as name, age, and race of the victim; location, shape, color, and size of the bite mark; and if the injury was a laceration, an abrasion, a contusion, an incision, an avulsion or an artifact.<sup>52</sup>

When collecting evidence from the victim, the examiner should determine if the bite mark has been “affected by washing, contamination, lividity, embalming, decomposition, or change of position.”<sup>53</sup> Then one of the various ABFO suggested photographic methods should be used to document the bite mark.<sup>54</sup> Salivary swabbing should then be applied to the wound to determine if the biter is an antigen secretor.<sup>55</sup> Tissue samples should also be obtained.<sup>56</sup> Finally, if three dimensional characteristics are present, impressions should be made according to standards set by the American Dental Association. The materials used to make the cast should be noted in the examiner’s report.<sup>57</sup>

Once the necessary warrants, court orders, or legal consent is obtained, the examiner should begin to collect evidence from the suspect. The examiner should first obtain a complete history of dental treatments subsequent to the time of the recorded bite mark.<sup>58</sup> Both the front and the profile of the suspect’s face should then be photographed.<sup>59</sup> An extraoral and intraoral examination should also be made.<sup>60</sup> Finally, a dental chart, study casts and two different sets of impressions should be made of the suspect’s teeth,

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50. ABFO *Guidelines*, *supra* note 18, at 384.

51. *Id.*

52. *Id.*

53. *Id.*

54. *Id.* at 384-385. *See also* Groffy, *supra* note 45, at 2.

55. ABFO *Guidelines*, *supra* note 18, at 384-385. *See generally* M. Stolorow, *Saliva in Bitemarks*, Bureau of Scientific Services, Illinois Department of Law Enforcement (1980) (unpublished manuscript on file with author).

56. ABFO *Guidelines*, *supra* note 18, at 385.

57. *Id.*

58. *Id.*

59. *Id.*

60. The extraoral examination “should include observation and recording of significant soft and hard tissue factors that may influence biting dynamics . . . (m)measurement of maximum opening of the mouth . . . and significant occlusal disharmonies-irregularities in the way the top and bottom tooth surfaces meet.” Intraoral examination “should include that of the tongue, saliva excretion [if saliva evidence has been taken from the victim], and periodontal condition.” *Id.*

"whenever feasible."<sup>61</sup>

The standard comparison technique of the forensic odontologist is to match a photograph or model of the bite mark to a template<sup>62</sup> of the suspect's dentation through an overlay technique at the same scale.<sup>63</sup> The ABFO has created a scoring guide to evaluate the strength of the comparison.<sup>64</sup> Points are awarded for various matches in gross dental anatomy, tooth position, and intradental features.<sup>65</sup> A 1986 study published in the *Journal of Forensic Sciences* reports a high degree of reliability associated with the use of the scoring guide.<sup>66</sup> However, in 1988, the authors of the 1986 study seemed to recant their initial optimism when they stated:

Subsequent discussion and review has led the authors to the conclusion that much more work and consideration will be needed before a stable and accurate index is developed that can be widely applied. . . . [T]he authors' present recommendation is that all odontologists await the results of further research before relying on precise point counts in evidentiary proceedings.<sup>67</sup>

According to a prominent member of the ABFO, the scoring guidelines are not a perfect tool and should not be relied upon exclusively.<sup>68</sup> However, by placing relative weights on various matches between a suspect's dentition and the bite mark, the scoring provides a valuable aid, especially to the neophyte.<sup>69</sup>

### C. New Techniques in Bite Mark Analysis

As discussed above, forensic odontologists use the standard

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61. *Id.*

62. Michael H. West, et al. *The Use of Human Skin in the Fabrication of a Bite Mark Template: Two Case Reports*, 35 J. FORENSIC SCI. 1477 (1990) (stating that the method of manufacturing a template "consists of the dentist impressing study models of, or the suspected biter's dentation, into the chosen medium for several millimeters in order to register . . . patterns generated by the teeth. . . . Acetate overlay tracings, photography, and various radiographic techniques [are then] . . . used to produce the template" *Id.*).

63. SOPHER, *supra* note 7, at 145-50.

64. ABFO Guidelines, *supra* note 18, at 386.

65. *Id.*

66. Raymond D. Rawson et al., *Reliability of the Scoring System of the American Board of Forensic Odontology for Human Bite Marks*, 31 J. OF FORENSIC SCIENCES 1235, 1259 (1986).

67. Letter, *Discussion of "Reliability of the Scoring System of the American Board of Forensic Odontology for Human Bite Marks,"* 33 J. FORENSIC SCI. 20 (1988).

68. Interview with Johnson, *supra* note 9.

69. *Id.* See also Letter, *supra* note 67, at 20 (stating "This does not mean that the investigator should not use the scoring system or other method of analysis that he or she may find helpful. It does mean that the authors believe that further research is needed regarding the quantification of bite mark evidence before precise point counts can be relied upon in court proceedings").



overlay technique in the typical bite mark case.<sup>70</sup> However, new techniques in the analysis of bite marks have been reported, some using advances in bio-medical technology.

A scanning electron microscope (SEM) has been used to determine certain three dimensional characteristics that were not visible to the human eye, such as a roughened edge in the biter's tooth.<sup>71</sup> The obvious draw back to the use of a scanning electronic microscope is the expense and lack of availability of the necessary equipment.

An alternative method to find normally imperceptible characteristics of a bite mark is through the use of scanning photomacrography.<sup>72</sup> This method uses a series of illuminator-slamps that are able to project a thin, adjustable light beam on the object to be photographed; a mounted camera with a microscopic lens; and a motorized stage.<sup>73</sup> The study states that "[t]he resulting photographs are comparable to those obtained using the SEM."<sup>74</sup>

The use of computerized axial tomographic scanning (CAT scanning) to obtain specific registration of the suspect's incisal edges for comparison to the victim's bite mark has also been reported.<sup>75</sup> The impressions of a suspect's dentition gained from the CAT scan were then transmitted onto a transparency for comparison purposes.<sup>76</sup> This method is suggested to use in addition to or replacement of a traditional wax bite method of incisal registration.<sup>77</sup> The authors note that a disadvantage of the traditional wax bite method is that incisal edge is demonstrated only to one specific depth.<sup>78</sup> "If other depths are needed for comparison, new bites have to be taken

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70. Interview with Johnson, *supra* note 9.

71. Thomas J. David, *Adjunctive Use of Scanning Electron Microscopy in Bite Mark Analysis: A Three-Dimensional Study*, 31 J. FORENSIC SCI. 1126, 1130 (1986).

72. L. Thomas Johnson, *Scanning Photomacrography: An Investigative Tool*, study presented at the 43rd Annual Meeting of the American Academy of Forensic Sciences at Anaheim, California (Feb. 18-23, 1991) (unpublished manuscript) (stating that this method avoids "preparation of the object to be examined by sputter coating with gold" and eliminates "limitations imposed by the size of the vacuum chamber of the SEM").

73. *Id.*

74. *Id.*

75. William L. Farrell et al., *Computerized Axial Tomography as an Aid in Bite Mark Analysis: A Case Report*, 32 J. FORENSIC SCI. 266, 269-70 (1987).

76. *Id.* at 270 (stating "hard copy transparencies were produced CT/T camera designed for the CAT scanner. . . . The end product is a 14- by 17- in[ch] . . . transparency with several axial images of the teeth at various depths and at precisely a one to one image size. . . . The photographs of the wounds and the CAT scan of the teeth were [then] prepared for presentation using a video overlay technique . . .").

77. *Id.* at 266.

78. *Id.* at 268.

into thicker material.”<sup>79</sup> The study was conducted to determine if CAT scanning technology “would produce a simplified method of precise incisal registration with the need of (the above mentioned) numerous wax bites.”<sup>80</sup> The study concluded that the CAT scan “. . . produced precise registrations. . . .”<sup>81</sup>

Another report cites the use of Polaroid® R Type 691 Colorgraph Transparency Film to instantly produce transparent prints of the bite and overlays of the teeth in bite mark evidence.<sup>82</sup> Besides the advantage of obtaining an almost instantaneous transparency print,<sup>83</sup> the overlays and bite mark transparencies produced are “by definition” one to one, eliminating the need for a dark room.<sup>84</sup>

A report lists the use of human skin as a material for the production of bite mark templates.<sup>85</sup> The skin of the victim or a subject “of like age, sex, anatomic size and shape, muscle tone, skin texture, body fat, and other physical characteristics” can be used for the template production.<sup>86</sup> The author comments that traditional dental wax and styrofoam templates “can introduce errors due to differences in the physical properties of the respective materials and the skin.”<sup>87</sup> These errors could lead to an incorrect finding.<sup>88</sup> The authors conclude by implying that the use of a human skin template is important for accurate bite mark comparison.<sup>89</sup>

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79. *Id.*

80. *Id.*

81. *Id.* at 270.

82. L. Thomas Johnson et al., Polaroid® Colorgraph Transparency Film: A New Approach to the Bite Mark Overlay Technique, presented at the 41st Annual Meeting of the American Academy of Forensic Sciences, Las Vegas, NV (Feb., 1989) (unpublished manuscript). (The outfit includes “a Polaroid® CU-5 camera with its 1:1 attachments and the Polaroid® Type 691 Colorgraph Transparency Film.”)

83. *Id.* (stating that processing time varies between four and five minutes).

84. *Id.*

85. West, *supra* note 62, at 1477. The author reports the use of the following method: “[T]he incisal and occlusal surfaces of the model are ‘inked’ by rolling or depressing the model onto a standard office ink pad. . . . The inked models are then placed on the skin of the victim or an anatomically suitable volunteer in the same orientation as the original bite. The ink is transferred to the skin ([in a manner similar to the use of a rubber stamp]), and a simulated bite mark is obtained. A properly composed photograph is taken of the inked bite mark, and a transparency is traced from a one-to-one print.” *Id.* at 1478.

86. *Id.* at 1478.

87. *Id.* at 1477-78 (stating, “Dental waxes and styrofoam are nonelastic materials and are most often used in flat configuration. Skin is elastic and the areas involved in bite mark injury are almost always curved to some degree”).

88. *Id.* at 1484 (stating, “[I]f a substrate is chosen that differs in elasticity and compressibility, error may be incorporated into the analysis and lead to an incorrect finding”).

89. *Id.* at 1484 (stating, “The correlation of the elasticity and the compressibility of the substrate in which the bite mark is left is critical to the successful duplication of the wound pattern for comparison purposes”). See also *People v. Smith*, 468 N.E.2d 879, 887 (N.Y.

Finally, a recent newspaper article states that an ultraviolet scanner is being used by a forensic odontologist in the much publicized Gainesville murder cases which took place near the University of Florida campus.<sup>90</sup> As of March, 1992, no articles have been published on the application of this particular science to forensic odontology.<sup>91</sup>

## II. THE ADMISSIBILITY OF BITE MARK EVIDENCE

Bite mark evidence has been held admissible in every cited state, federal and military case. Under Federal Rule of Evidence § 702, to be admissible, testimony on bite marks, as any type of scientific testimony, must be able to assist the trier of fact "to understand the evidence or to determine a fact in issue."<sup>92</sup> The evidence must also be introduced by an expert in that field who has become such "by knowledge, skill, experience, training or education."<sup>93</sup> However, a witness may risk impeachment on cross-examination because of lack of qualifications, such as certification by the ABFO. The trial judge has a great deal of discretion in determining if a witness is an expert.<sup>94</sup>

Bite mark evidence, as any other type of scientific evidence, must generally pass the test of validity as well.<sup>95</sup> Many courts follow the general acceptance test enumerated in *Frye* requiring that a scientific principle be placed in an identified field and that the principle be generally accepted by members of that field.<sup>96</sup> The principal alternative to the *Frye* test, mandated in the Federal Rules of

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1984), *cert. denied*, 469 U.S. 1227 (1985) where "a prosecution expert testified on cross-examination that, for purposes of identifying bite marks, human skin was the ideal material in which to take the bite mark impressions."

90. *Detectives Hope Ultraviolet Scanner Will Yield Clues*, U.P.I., Sept. 5, 1990 (NEXIS).

91. But cf. PAUL C. GIANNELLI & EDWARD J. IMWINKELRIED, SCIENTIFIC EVIDENCE § 25-5, at 1121 (1986) [hereinafter GIANNELLI & IMWINKELRIED] (stating, "UV instrumentation has . . . forensic applications. For example, UV equipment can be used to detect the presence of body fluids, including seminal material").

92. Fed. R. Evid. § 702.

93. *Id.*

94. See GIANNELLI & IMWINKELRIED, *supra* note 91, § 5-3 at 154 (stating, "Determining whether a witness is properly qualified is a matter entrusted to the trial court's discretion and thus is renewable on appeal only for abuse of discretion").

95. See generally GIANNELLI & IMWINKELRIED, *supra* note 91 § 1-1 at 1-3.

96. GIANNELLI & IMWINKELRIED, *supra* note 91, § 1-5(B) at 16, summarizing the *Frye* doctrine, stating:

Just when a scientific principle or discovery crosses the line between the experimental and demonstrable stages is difficult to define. Somewhere in this twilight zone the evidential force of the principle must be recognized, and while the courts will go a long way in admitting expert testimony deduced from a well recognized scientific principle or discovery, the thing from which the deduction is made must

Evidence, involves ascertaining the probative value of the evidence; identifying any countervailing dangers or considerations; and balancing the probative value against the identified dangers.<sup>97</sup>

In the earliest cases, bite mark analysis never had the problem of passing the *Frye* test for admissibility. *Doyle v. State*<sup>98</sup> was the first recorded case in the United States where bite marks were introduced into evidence. In *Doyle*, a firearms examiner found bite marks in a piece of cheese at a burglary scene and made plaster of Paris impressions.<sup>99</sup> The suspect was later told to bite into a similar piece of cheese.<sup>100</sup> Both the cheese and the impressions were introduced at trial.<sup>101</sup> A dentist, as a witness for the prosecution, testified that the teeth marks in the cheese were that of the defendant.<sup>102</sup> In a two-page decision, the court perfunctorily addressed the question of admissibility of bite mark evidence comparing it to that of fingerprints.<sup>103</sup>

In the next recorded case, *People v. Johnson*,<sup>104</sup> an oral pathologist testified that it was "highly probable" that bite marks found on the victim's breasts were made by the defendant's teeth.<sup>105</sup> The admissibility of the bite mark evidence in this case was never challenged by counsel. However, the next reported case, *Patterson v. State*,<sup>106</sup> introduced the proposition that bite mark evidence is admissible because its reliability pertains to its weight, not its admissibility.<sup>107</sup>

*People v. Marx*<sup>108</sup> was the first case extensively dealing with the issue of admissibility. In *Marx*, three dentists, each identifying seventeen specific identification characteristics, testified that the de-

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be sufficiently established to have gained general acceptance in the particular field in which it belongs.

*Id.*

97. GIANNELLI & IMWINKELRIED, *supra* note 91, § 1-6 at 31.

98. 263 S.W.2d at 779 (Tex. Crim. App. 1954).

99. *Id.* at 779.

100. *Id.*

101. *Id.*

102. *Id.*

103. *Id.* at 780 ("[W]e fail to perceive any material distinction between the case at bar and the footprint and fingerprint cases so long recognized by this court"). For a discussion critical of the forensic odontology methods used in *Doyle*, see Wilkerson & Gerugthy, *supra* note 10, at 529-30.

104. 289 N.E.2d at 722 (1972).

105. *Id.* at 724.

106. 509 S.W.2d 857 (Tex. Crim. App. 1974).

107. *Id.* at 863 (stating, "We held similar evidence admissible in *Doyle v. State* . . . [t]he objection goes to the weight rather than the admissibility").

108. 126 Cal. Rptr. at 350.

fendant inflicted the bite marks on the victim's nose. After noting that the prosecution experts did not cite prior cases where bite marks were used as evidence, nor did they show that systematic experimentation was performed in that area,<sup>109</sup> the *Marx* court stated that the *Frye* standard of "general acceptance by recognized experts in the field" was not applicable.<sup>110</sup> The court explained its reasoning by distinguishing *Frye* situations where "the trier of fact must accept, on faith, scientific hypotheses not capable of proof or disproof in court and not even generally accepted outside the courtroom,"<sup>111</sup> to bite mark analysis, where the basic data on which the experts based their conclusion were verifiable by the court and based on scientifically and professionally established techniques.<sup>112</sup> In bite mark cases, "[T]he [trial] court [does] not have to sacrifice its independence and common sense in evaluating" the bite mark evidence.<sup>113</sup>

In another early case of note, *People v. Milone*,<sup>114</sup> prosecution and defense expert witnesses disagreed as to whether the defendant inflicted the bite mark found on the victim. The court states that "[a] lack of complete unanimity in the medical profession as to the reliability of certain scientific testimony does not mean that it fails to satisfy the requirements of *Frye*."<sup>115</sup> The *Milone* court did not explicitly state that the evidence passed the *Frye* test for admissibility. Instead, the court, citing from the *Doyle*, *Patterson* and *Marx* holdings above, determined that the trial judge was correct in allowing the bite mark testimony into evidence.<sup>116</sup>

The first case to expressly state that bite mark evidence passed the *Frye* test for admissibility<sup>117</sup> was *People v. Slone*.<sup>118</sup> In doing so,

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109. *Id.* at 360.

110. *Id.* (citing *Frye*, 293 F. at 1014).

111. *Id.*

112. *Id.*

113. GIANNELLI & IMWINKELRIED, *supra* note 91, § 13-4, at 380 (quoting *People v. Marx*, 126 Cal. Rptr. at 361).

114. 356 N.E.2d at 1350 (Ill. App. Ct. 1976).

115. *Id.* at 1352.

116. *Id.* at 1355 (stating "the weight given [to the bite mark] testimony was within the province of the court, and nothing in the record indicates that the trial judge abused his discretion in allowing the testimony").

117. (The *Frye* test in California has been included in the of a three prong test enunciated in *People v. Kelly*, 130 Cal. Rptr. 144 (1976). The three prongs include the following: "1) the reliability of the method must be established by expert testimony, and 2) the witness furnishing such testimony must be properly qualified as an expert to give an opinion on the subject. Additionally, the proponent of the evidence must demonstrate that correct scientific procedures were used in the particular case." The *Kelly* court continues, stating that "[t]he test for determining the underlying reliability of a new scientific technique was described in

the court stated that the testimony of three forensic odontologists called as expert witnesses by the prosecution "established that the bite-mark identification technique has gained general acceptance in the scientific community of dentistry, the relevant scientific community involved."<sup>119</sup> The *Slone* court further noted that "there is no requirement in our law that the admissibility of the scientific-test evidence must be predicated on a 100 percent accuracy."<sup>120</sup>

Another early case confident that bite mark evidence met the *Frye* test for admissibility was *State v. Sager*.<sup>121</sup> After surveying cases pertaining to bite mark admissibility, the *Sager* court summed up their opinion using a seminal forensic dentistry treatise stating:

The defense counsel may attempt to totally exclude the admission of bite mark evidence on the basis of its credibility. Such action merely eliminates a valuable segment of evidence offered to arrive at the truth. The methods of bite mark comparison are based on scientific principles as advanced as the current state of the art. Such evidence should not be suppressed if one wishes to pursue the totality that can be afforded by medicological evidence in search of truth.<sup>122</sup>

Soon after *Sager*, a New York Court of Appeals held that judicial notice could be taken in regards to bite mark evidence.<sup>123</sup> Judicial notice has been widely accepted in the contemporary cases,<sup>124</sup> even in cases of first impression.<sup>125</sup> Many other contemporary cases do not even note admissibility.<sup>126</sup> Accordingly, it appears that there

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the germinal case of *Frye v. United States* . . . [stating] the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs" [emphasis original].)

118. 143 Cal. Rptr. 61 (1978).

119. *Id.* at 69.

120. *Id.* at 70.

121. 600 S.W.2d 541 (Mo. Ct. App. 1980) cert. denied, 450 U.S. 910 (1981).

122. *Id.* at 573 (citing *SOPHER*, supra note 7, at 137).

123. *People v. Middleton*, 429 N.E.2d 100, 104 (N.Y. 1980) (stating, "[t]he reliability of bite mark evidence as a means of identification is sufficiently established in the scientific community to make such evidence admissible in a criminal case, without separately establishing scientific reliability in each case . . .").

124. See *State v. Richards*, 804 P.2d 109, 112 (Ariz. App. 1990) (stating, "In summary, we hold that where bite mark evidence is admissible without a preliminary determination of reliability and that any argument concerning the reliability of such evidence is properly addressed to the jury."); *Spence v. State*, 795 S.W.2d 743, 752 (Tex. Crim. App. 1990) (stating, "[W]e find that bite mark evidence has received sufficient general acceptance by recognized experts in the field of forensic odontology that it is unnecessary for us to consider the applicability of the *Frye* test to this cause"). See also *People v. Calabro*, 555 N.Y.S.2d 321 (1990); *State v. Ford*, 392 S.E.2d 781 (S.C. 1990).

125. See e.g., *State v. Armstrong*, 369 S.E.2d 870 (W.Va. 1988).

126. See *People v. Bass*, 160 A.D.2d 715 (N.Y. 1990); *Bouie v. State*, 559 So.2d 1113 (Fla. App. 1990); *Williams v. State*, 790 S.W.2d 643 (Tex. Ct. App. 1990); *Commonwealth v.*

is little chance that any state of first impression would find bite mark evidence to be inadmissible.

### III. OTHER EVIDENTIARY ISSUES

#### A. The Weight Bite Mark Evidence Has Been Given

Various triers of facts have given differing weight to bite mark evidence. In most cases, bite mark evidence is not the only evidence introduced to link the defendant to the crime. For example, in *Litiker v. State*,<sup>127</sup> a forensic odontologist noted three distinct consistencies between the defendant's dentition and bite marks found on the victim.<sup>128</sup> The following evidence was also introduced: a towel found in the defendant's workroom was identical to that used as a wick to set fire to the victim; type B blood, found inside the defendant's watchband, was the blood type of the victim and not the defendant; and type B blood was found on a fingerprint matching the defendant's which was left on a vase in the victim's home.<sup>129</sup> Accordingly, the trier of fact did not have to put a great deal of weight on the bite mark evidence because of the abundance of other circumstantial evidence.

As a natural corollary, the less circumstantial evidence introduced, the more the trier of fact must put weight on bite mark evidence. Accordingly, the reliability<sup>130</sup> of that evidence becomes increasingly important.

Ordinarily, appellate courts have not interfered with the trier of fact's judgment on the reliability of a positive bite mark identification made by an expert witness. However, in one case, *Jackson v. State*,<sup>131</sup> the appellate court did just that. In *Jackson*, the prosecution's case was based solely on inculpatory hair and bite mark evidence. A forensic odontologist testifying for the prosecution stated that a bite mark, made through clothing and found on the murder victim, was consistent with the defendant's dentition.<sup>132</sup> The *Jack-*

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Thomas, 561 A.2d 699 (Pa. 1989); *Commonwealth v. Edwards*, 555 A.2d 818 (Pa. 1989); *People v. Hernandez*, 763 P.2d 1289 (Cal. 1988).

127. 784 S.W.2d 739 (Tex. Crim. App. 1990).

128. *Id.* at 749 (noting that these consistencies included the distance from canine to canine; that the sharpness of one of the teeth in the bite mark causing a puncture wound in the victim was analogous to D's teeth; and that both the bite mark and the defendant's teeth had a matching overall outline and arch).

129. *Id.*

130. "Whether the technique was properly applied on the particular occasion involved in the case." GIANNELLI & IMWINKELRIED, *supra* note 91, § 1-8 at 39.

131. 511 So.2d 1047 (Fla. Dis. Ct. App. 1987).

132. *Id.* at 1049.

son court discounted the value of that testimony noting that the forensic odontologist further stated that "this was not a positive bite,"<sup>133</sup> as well as that he hoped the defendant was not arrested solely on that bite.<sup>134</sup> To add to the court's reservation, a forensic odontologist called by the defense testified that the bite mark was not that of the defendant.<sup>135</sup> Furthermore, the defense introduced evidence.<sup>136</sup> The court overturned the conviction.<sup>137</sup>

### B. Who Is the Expert?

As stated above, evidence may be introduced by an expert in that field, who had become such "by knowledge, skill, experience, training or education."<sup>138</sup> Most courts have also not interfered with the determination of whether the expert witness is considered qualified to testify, ruling that a dentist need not be a forensic odontologist or have any experience in the area of bite mark analysis to testify.<sup>139</sup> Some courts have allowed bite mark testimony from expert witnesses that are less than credible. For example, in *Commonwealth v. Henry*,<sup>140</sup> a general dentist testified that he could distinguish lunatic and fighting bite marks; attacking and sadistic bite marks; and sexually oriented bite marks.<sup>141</sup> This finding has been proven false in the field of forensic odontology.<sup>142</sup> The *Henry* trial judge allowed this testimony<sup>143</sup>, instructing the jury that:

As I have stated, the fact that I am permitting this witness to opine in this area does not in any way mean that you are going to find his opinions reliable or worthy of belief. You will have to make that decision. On the other hand, it doesn't mean you

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133. *Id.*

134. *Id.*

135. *Id.*

136. *Id.* at 1048 (stating, "[t]he defendant then introduced evidence on his own behalf, none of which tended to incriminate him.").

137. *Id.* at 1050.

138. Fed. R. Evid. § 702.

139. See C. McCORMICK, EVIDENCE, § 13, at 33 (3rd ed. 1984) (stating, "while the court may rule that a certain subject of inquiry requires that a member of a given profession, . . . be called; usually a specialist in a particular branch within that profession will not be required). See also, *Commonwealth v. Henry*, 569 A.2d 929, 933 (Pa. 1990) (stating, "generally, if a witness has any reasonable pretension to specialized knowledge on the subject matter under investigation, he may testify and the weight to be given to his evidence is for the jury").

140. *Commonwealth v. Henry*, 569 A.2d at 929, 33 (Pa. 1990).

141. *Id.* at 940.

142. See e.g., Norman D. Sperber, *Lingual Markings of Anterior Teeth as Seen in Human Bite Marks*, 35 J. FORENSIC SCI. 838, 844 (1990) (stating, "[o]nce the phenomenon of lingual marking is recognized and understood, it is less likely that examiners will view these lesions as . . . the state of the biter's mind").

143. *Commonwealth v. Henry*, 569 A.2d at 929, 40 (Pa. 1990)



won't. What I am trying to tell you is don't attach any significance that by permitting it that you are obliged to follow it. You will get a whole set of instructions that deals with how a jury approaches testimony given by expert witnesses. And the bottom line of those instructions will be that if the jury finds in a given case that the expert's opinion is not worthy of belief, the jury has the full right, under the law to reject it.<sup>144</sup>

The appellate court found that because the dentist was practicing, had specialized knowledge of bite marks, and because the above instructions were read, the bite mark evidence was admissible.<sup>145</sup>

One appellate court viewed the need for specific expertise differently. In *State v. Adams*,<sup>146</sup> an appellate court remanded a case for a new trial where a dentist was permitted to testify at trial, over the objection of the defense, that the marks appearing on the victim's wrist were "consistent with bite marks."<sup>147</sup> The court stated that "it should have been apparent to the trial judge that [the doctor] was not testifying, to a reasonable degree of medical certainty that the marks on the victim's wrist were bite marks"<sup>148</sup> after the dentist admitted during cross-examination that he could not state with any degree of medical certainty that they were bite marks and only a forensic odontologist could testify to that degree of certainty.<sup>149</sup>

### C. Cases Where Forensic Odontologists Presented Conflicting Testimony

In certain cases, forensic odontologists have presented conflicting testimony as to whether the particular defendant inflicted the bite mark on the victim. In *Milone*, above, three forensic odontologists testified for the prosecution and four testified for the defendant.<sup>150</sup> Both Dr. Irwin Sopher for the prosecution and Dr. Lowell Levine for the defense were noted leaders in the field of forensic odontology.<sup>151</sup> The prosecution's witnesses positively identified the defendant as inflicting the bite mark on the victim.<sup>152</sup> The four defense witnesses all "pointed out areas of inconsistency between the

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144. *Id.*

145. *Id.*

146. 481 A.2d 718 (R.I. 1984).

147. *Id.* at 727.

148. *Id.*

149. *Id.*

150. 356 N.E.2d at 1356.

151. See SOPHER, FORENSIC DENTISTRY, *supra* note 7; "Forensic Dentistry," 119 J. AM. DENTAL ASS'N 355, 368 (1988) (stating that Dr. Levine is a leaders in the field of forensic odontology).

152. 356 N.E.2d at 1356.

bitemark and [the] molds of defendant's teeth, and for this reason either denied that a positive identification could be made, or specifically ruled out the defendant as the person responsible for the tooth marks on the victim."<sup>153</sup> Despite this controversy, the defendant was convicted,<sup>154</sup> and his conviction was upheld by the appellate court.<sup>155</sup>

Facts occurring after *Milone* raised suspicion of the reliability of the positive bite mark identification in that case. Richard Macek, a confessed mass murderer, testified "in general detail" that he committed the crime that Milone was convicted of.<sup>156</sup> Furthermore, the defense's dental experts testified in Milone's clemency hearing that "there was unique and individual characteristics common to all three victims that could not have been made by Milone and could only be made by Macek."<sup>157</sup> However, Dr. Sopher, who testified for the prosecution at trial, "steadfastly maintained" that the bite mark was that of Milone and not Macek.<sup>158</sup> This controversy was somewhat quelled when, in determining whether to grant executive clemency, the Governor of Illinois appointed a counsel of forensic odontologists for independent analysis. The counsel found that there were consistencies proving that Milone inflicted the bite mark found on the victim and that "distinguishing irregularities" eliminated Macek as the person inflicting the bite marks on the victim.<sup>159</sup> Based on these facts, the Governor denied Milone's petition for executive clemency.<sup>160</sup>

The controversy surrounding conflicting bite mark testimony arose again in a recent murder case. In *People v. Golub*, two forensic odontologists, including Dr. Levine,<sup>161</sup> testified for the prosecution that the defendant inflicted a bite mark found on the victim's neck and buttocks.<sup>162</sup> Although stating in a prior report that the buttocks bite was only "consistent" with that found on the vic-

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153. *Id.*

154. *Id.* at 1353.

155. *Id.* at 1360.

156. Statement of Governor James R. Thompson in the Matter of the Executive Clemency Petition of Richard Milone 9 (Apr. 20, 1989) (unpublished manuscript on file with author).

157. *Id.* at 12.

158. *Id.*

159. *Id.* at 13.

160. *Id.* at 16.

161. Sarah Lyall, *Expert Links Bite Mark on Body to Murder Suspect*, N.Y. TIMES, Mar. 14, 1990, at B6.

162. Wasserman, *To Him Teeth Will Tell*, Newsday, March 14, 1990 at 3.

tim,<sup>163</sup> Dr. Levine testified at trial that the bite mark found on the victim's buttock was "99.999 percent to infinity" guaranteed to have been made by the defendant.<sup>164</sup>

Countering this testimony was Dr. Norman Sperber, the chief of forensic dentistry for San Diego County, California and one of the leaders in establishing bite mark analysis guidelines.<sup>165</sup> He and two other forensic odontologists testified for the defense that the bite mark found on the buttocks was not made by the defendant and that found on the neck may not have even been a bite mark.<sup>166</sup> One defense witness was particularly alarmed at the method used to photograph the victim's bite mark.<sup>167</sup>

In rebuttal, an orthodontist and chief of forensic dentistry for Westchester County, New York testified for the prosecution. He contradicted defense witness' testimony and supported the prosecution's expert witnesses, stating that the buttock wound was inflicted by the defendant.<sup>168</sup> He further stated that Dr. Sperber had mis-numbered the teeth in his testimony.<sup>169</sup> In actuality, that mistake was not made.<sup>170</sup>

Further testimony displayed that there was no apparent motive for the murder. The prosecution introduced 100 pieces of evidence including the bite marks; DNA analysis made on blood found at the crime scene; a strand of hair found on the defendant's bed sheet that closely matched that of the victim; and a bloody palm print matching the defendant's palm print that was found on the wall.<sup>171</sup> The prosecution also called twenty-nine witnesses as compared to the defense's twelve. The jury, after deliberating for seven and one-half hours, found the defendant guilty of second-degree murder.

One disturbing element of *Golub* is the direct contradiction in testimony between noted experts in the field of bite mark analysis. During trial, Dr. Sperber stated that after full analysis, he saw key differences between the photographed marks and the models.<sup>172</sup> Based on these photographs and models, "[it] was so obvious that

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163. *Id.*, see also Lyall, *supra* note 161, at B6.

164. *Id.*

165. Shirley E. Perlman & Scovel, *Bite Marks Not Golub's*, *NEWSDAY*, March 27, 1990.

166. Shirley E. Perlman, *Golub Verdict Boosts Role of DNA Testimony*, *NEWSDAY*, April 6, 1990, at 21.

167. *N.Y. TIMES*, April 8, 1990, at B1.

168. *Id.*

169. *Id.*

170. *Id.*

171. *Id.*

172. Perlman & Scovel, *supra* note 165, at 5.

those teeth could not have caused those marks.”<sup>173</sup> Dr. Levine, in a subsequent interview, stated that the defense experts “were not seeing the characteristics . . . [t]hey were not able to interpret it correctly, which makes you wonder because the jurors had it all figured out.”<sup>174</sup>

The fact that the jury relied on their own analysis in a case where noted forensic odontologists disagreed is also disturbing. Two of the *Golub* jurors stated that the jury as a whole did rely heavily on their own analysis of the bite marks.<sup>175</sup> They further stated that during deliberations, the jurors “passed around two plaster casts of [the defendant’s] teeth first pressing them into one juror’s arm to see what a bite mark looks like, and then comparing the molds with life-sized photos of bites found on [the victim’s] body.”<sup>176</sup> “One to one the photographs and molding matched up. We were also to see for ourselves that they really matched.”<sup>177</sup>

Bite mark analysis is a complicated science requiring expert analysis.<sup>178</sup> Accordingly, visual comparison of photos of the bite mark, or the actual bite mark itself, and overlays of the defendant’s dentition is not always accurate, even if done by an expert.

This can be shown through a recent murder case where two forensic odontologists misread an incised wound of the breast of a murdered victim as being caused by a bite mark.<sup>179</sup> When the body was found, a local dentist was consulted to prepare photographs and impressions of the wound.<sup>180</sup> Meanwhile, a suspect in the murder was apprehended and dental impressions were obtained.<sup>181</sup> All the relevant evidence was submitted to a forensic odontologist who returned a report stating that not only was the injury caused by a human bite, but that “individual characteristics of the injury identi-

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173. *Id.*

174. Perlman, *supra* note 165, at 3.

175. Willen, *The Perfect Match; Jurors Felt Sure After Their Own Bite-Mark Test*, NEWS-DAY, April 5, 1990, at 2.

176. *Id.*

177. *Id.*

178. Kris Sperry & Homer R. Campbell, *An Elliptical Incised Wound of the Breast Misinterpreted as a Bite Injury*, 35 J. FORENSIC SCI. 1226 (1990) (stating that bite mark analysis “has always been a challenging aspect of forensic medicine, requiring both an experienced pathologist to recognize the bite injury’s true nature and an odontologist to characterize properly the dental arch orientation, individual tooth imprint arrangements and relationships, and other specific features.”).

179. *Id.*

180. *Id.* at 1228.

181. *Id.*

cally matched the suspect's dentition."<sup>182</sup> Another forensic odontologist subsequently agreed to this finding.<sup>183</sup> The suspect was indicted.<sup>184</sup>

The defense attorneys submitted the evidence to a separate team of forensic odontologists.<sup>185</sup> These experts noted a "striking scalloped appearance which suggested the outlines of individual tooth margins."<sup>186</sup> However, they noticed that "the edges were sharply delineated rather than torn, abraded, or fragmented."<sup>187</sup> These experts concluded that the tissue had been lacerated by a sharp instrument rather than avulsed by human teeth.<sup>188</sup> To prove this, they obtained a female cadaver and proceeded to simulate the injury found on the victim.<sup>189</sup> They then obtained dental models of the defendant as well as fifteen other non-related models and placed them next to the simulated wound.<sup>190</sup> They found that "the teeth from all of the models could be made to match exactly the marginal contours"<sup>191</sup> of the wound.

The prosecution introduced evidence stating that the wound was caused by the defendant's teeth, "to the exclusion of all other persons."<sup>192</sup> The defense expert witnesses introduced their evidence through sequential photography.<sup>193</sup> The jury acquitted the defendant after four hours of deliberation.<sup>194</sup>

#### IV. CONCLUSION

Forensic odontology is a valid science. Accordingly, if the relevant factors such as the quality of the bite mark, and the expertise and integrity of the analyst fall into place, a forensic odontologist can provide a reliable analysis. However, if those factors are questionable, bite mark evidence can become no less than dangerous.

As shown above, no court has found bite mark evidence inadmissible, either using the *Frye* general acceptance test or the alterna-

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182. *Id.* at 1228.

183. *Id.*

184. *Id.*

185. *Id.* at 1229.

186. *Id.*

187. *Id.*

188. *Id.* at 1230.

189. *Id.* at 1231.

190. *Id.*

191. *Id.*

192. *Id.* at 1233.

193. *Id.*

194. *Id.*

tive relevancy test. On a similar note, courts have generally not taken issue with the reliability of bite mark analysis in particular cases, except for cases of egregious incompetence on the part of the examiner.

Accordingly, many times attorneys, only through direct and cross-examination of the bite mark examiner, can insure the reliability of the bite mark evidence. It is essential that the trier of fact be informed as to the process of analysis that the bite mark examiner used, as well as educated in the complexities of forensic odontology. Other important considerations include: if the examiner a qualified forensic odontologist and certified by the ABFO, if the examiner been involved with other bite mark cases; the number of points of comparison the examiner feels is necessary to make a positive bite mark analysis, if they have followed the ABFO guidelines, if they are aware of relevant studies, and whether they have testified exclusively for the prosecution or the defense in past cases.<sup>195</sup> If pertinent, the examiner should also be asked to explain any discrepancies found in their analysis. Only when the trier of fact obtains all this relevant information, will they be able to determine the true weight that the bite mark evidence should be given.

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195. Interview with Johnson, *supra* note 9.

