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# Forensic Science: Dental and Bite Mark Evidence

Paul C. Giannelli \*

Forensic dentistry, also known as forensic odontology, concerns the application of dentistry to law. In criminal trials, forensic dentistry typically is used in two ways: (1) to establish the identity of a homicide victim and (2) to connect a defendant with a crime by means of bite-mark analysis.

## *Dental Identification of Deceased Persons*

Dental identification is based on the assumption that every person's dentition is unique. The human adult dentition consists of thirty-two teeth, each with five anatomic surfaces. Thus, there are 160 dental surfaces that may contain identifying characteristics. Restorations alone, with varying shapes, sizes, and restorative materials, may offer numerous points of individuality. In addition to restorations, the number of teeth, prostheses, decay, malposition, malrotation, peculiar shapes, root canal therapy, bone patterns, bite relationship, and oral pathology all may provide identifying characteristics.<sup>1</sup> One study has established the uniqueness of human dentition through a statistical analysis of a general population sample.<sup>2</sup>

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<sup>1</sup> I. Sopher, *Forensic Dentistry* 82 (1976).

<sup>2</sup> Rawson, Ommen, Kinard, Johnson & Yfantis, "Statistical Evidence for the Individuality of the Human Dentition,"

The identification involves a comparison of antemortem records and postmortem findings to determine points of identity. The antemortem records may consist of written records (including charts), x-rays, and casts. Radiographs are particularly helpful because they provide details not usually present in dental charts, and they do not contain the errors that are found in charts.<sup>3</sup> Without a putative identity, however, there is no way to obtain these records since dental records are not maintained in a central depository as are fingerprints. Even when records are available, a positive identification may not be possible if the records are incomplete or inaccurate. Moreover, the amount and condition of the postmortem dentition available for comparison also affects whether a positive identification can be made.<sup>4</sup>

The courts have accepted dental identification as a means of establishing the identity of a homicide victim.<sup>5</sup>

29 J. Forensic Sci. 245, 252 (1984) ("This mathematical evaluation of a general population sample demonstrates the uniqueness of the human dentition beyond any reasonable doubt.").

<sup>3</sup> Stimson, "Radiology in Forensic Odontology," 48 *Dental Radiography & Photography* 51, 53-55 (1975).

<sup>4</sup> I. Sopher, note 1 *supra*, chs. 5 & 7.

<sup>5</sup> E.g., *People v. Westlake*, 106 Cal. App. 247, 289 P. 212 (1930); *Wooley v. People*, 148 Colo. 392, 367 P.2d 903 (1961); *State v. Johnston*, 62 Idaho 601, 113 P.2d 809 (1941); *State v. Goodson*, 299 Mo. 321, 252 S.W. 389 (1923); *Fields v. State*, 322 P.2d 431 (Okla. Crim. App. 1958); *Williamson v. State*, 679 S.W.2d 523, 529-530 (Tex. Ct.

According to one court, "it cannot be seriously disputed that a dental structure may constitute a means of identifying a deceased person . . . where there is some dental record of that person with which the structure may be compared."<sup>6</sup>

### *Bite-Mark Analysis*

Bite-mark analysis is a relatively new but important method of establishing a connection between a defendant and a crime. Bite marks occur primarily in sex-related crimes, child abuse cases, and offenses involving physical altercations.<sup>7</sup>

Identification of a suspect by matching his dentition with a bite mark found on a crime victim rests on the theory that each person's dentition is unique. In this respect, bite-mark comparisons are based on the same principle as the identification of a deceased person.<sup>8</sup> Although the courts have accepted this theory,<sup>9</sup>

App. 1983), *rev'd on other grounds*; 672 S.W.2d 484 (Tex. Crim. App. 1984). See also Annot., 86 A.L.R.2d 722 (1962).

<sup>6</sup> *People v. Mattox*, 96 Ill. App. 2d 148, 150-151, 237 N.E.2d 845, 846 (1968).

<sup>7</sup> Vale & Noguchi, "Anatomical Distribution of Human Bite Marks in a Series of 67 Cases," 28 J. Forensic Sci. 61 (1983).

<sup>8</sup> See *People v. Milone*, 43 Ill. App. 3d 385, 397, 356 N.E.2d 1350, 1358 (1976) ("The concept of identifying a suspect by matching his dentition to a bite mark found at the scene of a crime is a logical extension of the accepted principle that each person's dentition is unique.").

<sup>9</sup> See *State v. Sager*, 600 S.W.2d 541, 573 (Mo. Ct. App. 1980), *cert. denied*, 450 U.S. 910 (1981); *People v. Smith*, 110 Misc. 2d 118, 125, 443 N.Y.S.2d 551, 556-557 (Cty. Ct. 1981) ("The basic premise is the unique nature of individual dentition . . . and the virtually infinite number of individual bite configurations."); *State v. Green*, 305 N.C. 463, 471, 290 S.E.2d 625, 630 (1982);

there are significant differences in the application of these two uses of forensic dentistry. One authority has noted the following problems with bite-mark analysis:

[Bite]marks can never be taken to reproduce accurately the dental features of the originator. This is due partially to the fact that bite marks generally include only a limited number of teeth. Furthermore, the material (whether food stuff or human skin) in which the mark has been left is usually found to be a very unsatisfactory impression material with shrinkage and distortion characteristics that are unknown. Finally, these marks represent only the remaining and fixed picture of an action, the mechanism of which may vary from case to case. For instance, there is as yet no precise knowledge of the possible differences between biting off a morsel of food and using one's teeth for purposes of attack or defense.<sup>10</sup>

None of these problems is involved with dental identifications. In sum, bite-mark identification depends not only on the uniqueness of each person's dentition but also on "whether there is a [sufficient] representation of that uniqueness in the mark found on the skin or other inanimate object."<sup>11</sup> Indeed, some critics have questioned the underlying foundation for bite-mark evidence:

There is effectively no valid documented scientific data to support the hypothesis that bite marks are demonstrably unique. Additional-

*State v. Temple*, 302 N.C. 1, 11-13, 273 S.E.2d 273, 280-281 (1981).

<sup>10</sup> Keiser-Nielsen, "Forensic Odontology," 1 U. Toledo L. Rev. 633, 636 (1969).

<sup>11</sup> Rawson, Ommen, Kinard, Johnson & Yfantis, note 2 *supra*, at 252.

ly, there is no documented scientific data to support the hypothesis that a latent bite mark, like a latent fingerprint, is a true and accurate reflection of this uniqueness. To the contrary, what little scientific evidence that does exist clearly supports the conclusion that crime-related bite marks are grossly distorted, inaccurate, and therefore unreliable as a method of identification.<sup>12</sup>

### *Methods of Comparison*

Several methods of bite-mark analysis have been proposed.<sup>13</sup> All methods involve three steps: (1) registration of the bite mark and the suspect's dentition; (2) comparison of the dentition and bite mark; and (3) evaluation of the points of similarity or dissimilarity. Registration of the bite mark by photography is used in all cases; the photographs are then enlarged to life-size proportion for comparison. Where bite indentations (three-dimensional bite marks) are present in the skin tissue, impressions may be obtained; these are used to reproduce models of the bite mark, which can be used for comparison. The defendant's dentition is reproduced by means of models. The reproductions of the bite mark and the defendant's dentition are then analyzed through a variety of different methods, including transparent overlays, direct comparison of photographs, or direct comparison of photographs with models. New tech-

niques, including computerized bite analysis, have been reported.<sup>14</sup>

In 1984, the American Board of Forensic Odontology adopted guidelines for bite-mark analysis, including a uniform scoring system.<sup>15</sup> According to the committee that drafted the guidelines, "The scoring system . . . has demonstrated a method of evaluation that produced a high degree of reliability among observers."<sup>16</sup> Moreover, "[t]he scoring guide . . . is the beginning of a truly scientific approach to bite-mark analysis."<sup>17</sup> In a subsequent letter, however, the committee that proposed the scoring system wrote: "[We] believe that further research is needed regarding the quantification of bite mark evidence before precise point counts can be relied upon in court proceedings."<sup>18</sup>

It is easier to conclude that a person's dentition and a bite mark do *not* match than it is to find a match.<sup>19</sup> This

<sup>14</sup> See Beckstead, Rawson, & Giles, "Review of Bite Mark Evidence," 99 J. Am. Dental Assoc. 69, 72 (1979); Sognnaes, Rawson, Gratt, & Nguyen, "Computer Comparison of Bitemark Patterns in Identical Twins," 105 J. Am. Dental Assoc. 449, 450 (1982) (citing a case in which computerized bite analysis was admitted in evidence).

<sup>15</sup> A.B.F.O., "Guidelines For Bite Mark Analysis," 112 J. Am. Dental Assoc. 383 (1986).

<sup>16</sup> Rawson, Vale, Sperber, Herschaft & Yfantis, "Reliability of the Scoring System of the American Board of Forensic Odontology for Human Bite Marks," 31 J. Forensic Sci. 1235, 1256 (1986).

<sup>17</sup> *Id.* at 1259.

<sup>18</sup> 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).

<sup>19</sup> See Keiser-Nielson, note 10 *supra*, at 637-638; I. Sopher, note 1 *supra*, at 140.

<sup>12</sup> Wilkinson & Gerughty, "Bite Mark Evidence: Its Admissibility Is Hard to Swallow," 12 West. St. U.L. Rev. 519, 560 (1985).

<sup>13</sup> See I. Sopher, note 1 *supra*, at 125-126; State v. Sager, note 9 *supra*, 600 S.W.2d at 541, 569-570 (outlining different methods), *cert. denied*, 450 U.S. 910 (1981).

is due to the fact that any unexplained inconsistency between the bite mark and the dentition means that the suspect could not have made the bite mark. A positive identification, however, may still be possible even though some inconsistencies are present, provided the inconsistencies can be explained. One commentator has written:

There may, of course, be slight variations that are consistent—*i. e.*, all of the bite marks are on a larger (or smaller) arch than the teeth themselves. In other words, depending on the location of the bite marks, whether the person (victim or suspect) was passive, unconscious, or struggling, the degree of sucking that occurred during the biting and manual manipulation, the forensic odontologist may be able to explain “consistent variations” in the comparison.<sup>20</sup>

There is no accepted minimum number of points of identity required for a positive identification.<sup>21</sup> The experts who have testified in bite-mark cases have used a low of eight points of comparison to a high of fifty-two points.<sup>22</sup>

<sup>20</sup> Sperber, “Forensic Odontology,” in Practising Law Institute, *Scientific and Expert Evidence* 721, 747–748 (E. Imwinkelried ed. 1981).

<sup>21</sup> See Keiser-Nielson, note 10 *supra*, at 637–638.

<sup>22</sup> E.g., *State v. Garrison*, 120 Ariz. 255, 258, 585 P.2d 563, 566 (1978) (ten points); *People v. Slone*, 76 Cal. App. 3d 611, 621, 143 Cal. Rptr. 61, 62 (1978) (ten points); *People v. Milone*, note 8 *supra*, 43 Ill. App. 3d at 385, 393, 356 N.E.2d at 1350, 1356 (twenty-nine points); *State v. Sager*, note 9 *supra*, 600 S.W.2d, at 541, 564 (fifty-two points), *cert. denied*, 450 U.S. at 910; *State v. Green*, note 9 *supra*, 305 N.C. at 463, 471, 290 S.E.2d at 625, 630 (fourteen points); *State v. Temple*, note 9 *supra*, 302 N.C. at 1, 10, 273 S.E.2d at 273, 279 (eight points); *Kennedy v. State*, 640

### Possible Conclusions

The conclusions that an expert can draw from the evaluation depends on the number and quality of the points of comparison. In some cases experts have testified only that a bite mark is consistent with the defendant's teeth.<sup>23</sup> In other cases experts have testified that it is “highly probable” or “very highly probable” that the defendant made the mark.<sup>24</sup> In still other cases experts have made positive identifications.<sup>25</sup>

In one case, *State v. Garrison*,<sup>26</sup> the expert stated his conclusion in terms of probability theory, testifying that “there is an eight in one million probability that the teeth marks found on the deceased's breast were not made by appellant.”<sup>27</sup> Such a state-

P.2d 971, 976 (Okla. Crim. App. 1982) (forty points); *State v. Jones*, 273 S.C. 723, 732, 259 S.E.2d 120, 124 (1979) (thirty-seven points).

<sup>23</sup> E.g., *People v. Watson*, 75 Cal. App. 3d 384, 400–401, 142 Cal. Rptr. 134, 143 (1977); *People v. Williams*, 128 Ill. App. 3d 384, 398, 470 N.E.2d 1140, 1150 (1984) (“could have”); *People v. Marsh*, 177 Mich. App. 161, 164, 441 N.W.2d 33, 35 (1989); *Bludsworth v. State*, 98 Nev. 289, 292 n.1, 646 P.2d 558, 559 n.1 (1982); *People v. Bethune*, 105 A.D.2d 262, 266, 484 N.Y.S.2d 577, 580–581 (1984); *State v. Routh*, 30 Or. App. 901, 903, 568 P.2d 704, 705 (1977) (“similarity”).

<sup>24</sup> E.g., *People v. Slone*, note 22 *supra*, 76 Cal. App. 3d at 611, 621, 143 Cal. Rptr. at 61, 67; *People v. Johnson*, 8 Ill. App. 3d 457, 461, 289 N.E.2d 722, 726 (1972).

<sup>25</sup> E.g., *State v. Sager*, note 9 *supra*, 600 S.W.2d at 541, 564, 450 U.S. 910; *State v. Temple*, note 9 *supra*, 302 N.C. at 1, 10, 273 S.E.2d at 273, 279; *People v. Milone*, note 8 *supra*, 43 Ill. App. 3d at 385, 392–393, 356 N.E.2d at 1350, 1355–1356.

<sup>26</sup> 120 Ariz. 255, 585 P.2d 563 (1978).

<sup>27</sup> *Id.*, 120 Ariz. at 258, 585 P.2d at 566.

ment appears to be without scientific foundation. The dissent wrote: "[W]hile Dr. Campbell may have a great deal of expertise in the actual comparison techniques of bite-mark identification, he is totally out of his field when the discussion turns to probability theory."<sup>28</sup> As one commentator has noted:

The problem of specificity in the bite mark analysis results from the lack of a scientific core of basic data for comparison. The results of the bite mark comparison may indicate a perfect or reasonably perfect fit between the bite mark and a suspect's dentition; however, how can one be absolutely or even perhaps reasonably certain that no other individual could have produced a particular bite? Classified bite mark characteristics on large segments of the population are unavailable; therefore, an absolute scientific estimation of specificity regarding the particular bite mark/suspect comparison is not possible. The situation is comparable to the point in the distant past when the 100th set of fingerprints was classified. At the time, it was known that the set of prints did not match the ninety-nine others previously recorded, but it was not known if the set of prints were specific for only the one individual fingerprinted.<sup>29</sup>

#### *Disagreement Among Experts*

Although the expert's conclusions are based on objective data, the opinion is essentially a subjective one.<sup>30</sup>

The conclusions are based on the examiner's experience and expertise. Consequently, it is perhaps not surprising to find qualified experts disagreeing in individual cases.<sup>31</sup> In some cases the experts have arrived at diametrically opposed conclusions, while in others they disagree only on whether the data are sufficient to support a positive identification. The scientific literature acknowledges this development: "Although bite mark evidence has demonstrated a high degree of acceptance, it continues to be hotly contested in 'battles of the experts.' Review of trial transcripts reveals that distortion and the interpretation of distortion is a factor in most cases."<sup>32</sup>

*People v. Milone*<sup>33</sup> is an example. In that case three experts testified for the prosecution and four experts testified for the defense. The prosecution experts all positively identified the defendant's teeth as the source of the bite mark found on the victim. The defense experts testified either that a positive identification could not be made, or that the defendant's teeth did not make the mark.<sup>34</sup> Despite this disagreement, the defendant was con-

<sup>31</sup> E.g., *State v. Sager*, note 9 *supra*, 600 S.W.2d at 541, 563-567, 450 U.S. at 910; *People v. Bethune*, note 22 *supra*, 105 A.D.2d at 262, 266-271, 484 N.Y.S.2d at 577, 580-583; *Spence v. State*, 795 S.W.2d 743, 750-752 (Tex. Crim. App. 1990); *Patterson v. State*, 509 S.W.2d 857, 862 (Tex. Crim. App. 1974); *State v. Howe*, 136 Vt. 53, 65, 386 A.2d 1125, 1132 (1978).

<sup>32</sup> Rawson, Vale, Herschaft, Sperber & Dowell, "Analysis of Photographic Distortion in Bite Marks: A Report of the Bite Mark Guidelines Committee," 31 J. Forensic Sci. 1261-1262 (1986).

<sup>33</sup> 43 Ill. App. 3d 385, 356 N.E.2d 1350 (1976).

<sup>34</sup> *Id.*, 43 Ill. App. 3d at 393, 356 N.E.2d at 1356.

<sup>28</sup> *Id.*, 120 Ariz. at 260, 585 P.2d at 568.

<sup>29</sup> I. Sopher, note 1 *supra*, at 140.

<sup>30</sup> See Sobel, "Forensic Odontology," in 2 *Forensic Sciences* 28-32 (C. Wecht ed. 1984); I. Sopher, note 1 *supra*, at 140.

victed. Interestingly, one of the experts in that case subsequently wrote that "[r]ecently discovered evidence proves that Milone . . . is innocent."<sup>35</sup>

Similarly, in *People v. Smith*<sup>36</sup> seven experts testified, four for the prosecution and three for the defense. While the prosecution experts found that the bite mark on a murder victim had been made by the accused, the defense experts testified that not only was the mark not made by the defendant but that the mark "was not a bite mark at all."<sup>37</sup> In addition, the experts disagreed about the proper methods that may be used for the comparison. The prosecution experts used two methods of comparison. First, they compared a stone model of the defendant's dentition and impressions made in aluwax from the model with life-size photographs of the mark on the victim. Second, they made photo-to-photo comparisons of the victim's mark and a bite mark known to have been made by the defendant on human tissue four years earlier.<sup>38</sup> In contrast, the defense experts compared transparencies made from a model of the defendant's teeth with a photograph of the mark on the victim. The transparencies were then laid over the photograph.<sup>39</sup> The defense experts, however, conceded that there was no completely objective method for identifying bite marks and that each method ultimately re-

lied on the judgment of the individual expert.

In another controversial state case, the Robert Golub murder trial in New York, recognized experts also disagreed. A prosecution expert testified that the "bite mark was definitely that of Mr. Golub."<sup>40</sup> Three defense experts disagreed, one testifying that he did not believe that the marks were bite marks: "They could have been made by an object like a buckle or a necklace," he said.<sup>41</sup> Another prosecution expert then testified on rebuttal that "the buttock wound was a bite mark inflicted by Mr. Golub."<sup>42</sup> The jurors later told the press that they had matched the casts and photographs themselves just before they voted to convict: "They found a perfect match."<sup>43</sup>

In still another case, two odontologists made a positive identification of bite marks in a murder trial. Defense experts, however, showed that the mark had been misinterpreted—that it was not even a bite mark. The jury acquitted the accused.<sup>44</sup>

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<sup>40</sup> Lyall, "Expert Links Bite Mark on Body to Murder Suspect," N.Y. Times, Mar. 14, 1990, at B6, col. 5.

<sup>41</sup> Lyall, "Marks on Body Not From Bites, Dentist Testifies," N.Y. Times, Mar. 23, 1990, at B4, col. 6.

<sup>42</sup> Lyall, "Defendant Silent as Defense Rests in L.I. Slaying," N.Y. Times, Mar. 29, 1990, at B2, col. 5.

<sup>43</sup> Willen, "The Perfect Match: Jurors felt sure after their own bite-mark test," Newsday, Apr. 5, 1990, at 2.

<sup>44</sup> Sperry & Campbell, "An Elliptical Incised Wound of the Breast Misinterpreted as a Bite Injury," 35 J. Forensic Sci. 1226 (1990). See also Karazulas, "The Presentation of Bite Mark Evidence Resulting in the Acquittal of a Man After Serving Years in Prison for Murder," 29 J. Forensic Sci. 355 (1984).

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<sup>35</sup> Levine, "Forensic Dentistry: Our Most Controversial Case," in *Legal Medicine Annual* 73 (C. Wecht ed. 1978).

<sup>36</sup> 63 N.Y.2d 41, 468 N.E.2d 879, 479 N.Y.S.2d 706 (1984), *cert. denied*, 469 U.S. 1227 (1985).

<sup>37</sup> *Id.*, 63 N.Y.2d at 58, 468 N.E.2d at 886, 479 N.Y.S.2d at 713.

<sup>38</sup> *Id.*

<sup>39</sup> *Id.*

*Admissibility of Bite-Mark Evidence*

Courts have admitted bite-mark evidence in homicide,<sup>45</sup> rape,<sup>46</sup> and child abuse cases.<sup>47</sup> The typical bite-mark case has involved the identification of the defendant by matching his dentition with a mark left on the victim. In several other cases, however, the victim's teeth have been compared with marks on the defendant's body.<sup>48</sup> Two cases involved bite impressions on foodstuff found at a crime scene; in one case the mark was left on an apple<sup>49</sup> and in the other the mark was left on a piece of cheese.<sup>50</sup>

*People v. Marx*<sup>51</sup> is the leading bite-mark case. The court in *Marx*

<sup>45</sup> E.g., *State v. Garrison*, note 26 *supra*; *People v. Marx*, 54 Cal. App. 3d 100, 126 Cal. Rptr. 350 (1975); *People v. Milone*, note 33 *supra*; *State v. Temple*, note 9 *supra*, 302 N.C. at 1, 273 S.E.2d at 273; *State v. Howe*, note 31 *supra*, 136 Vt. at 53, 386 A.2d at 1125.

<sup>46</sup> E.g., *People v. Johnson*, note 24 *supra*, 8 Ill. App. 3d at 457, 289 N.E.2d at 722; *State v. Routh*, note 23 *supra*, 30 Or. App. at 901, 568 P.2d at 704; *People v. Bethune*, note 23 *supra*, 105 A.D.2d at 262, 484 N.Y.S.2d at 577; *State v. Green*, note 9 *supra*, 305 N.C. at 463, 290 S.E.2d at 625; *State v. Jones*, note 22 *supra*, 273 S.C. at 723, 259 S.E.2d at 120.

<sup>47</sup> *Bludsworth v. State*, 98 Nev. 289, 292 n.1, 646 P.2d 558, 559 n.1 (1982).

<sup>48</sup> See *Bradford v. State*, 460 So. 2d 926, 929-930 (Fla. Dist. Ct. App. 1984); *People v. Bethune*, note 23 *supra*, 105 A.D.2d at 262, 265-267, 484 N.Y.S.2d at 577, 580-583 (1984).

<sup>49</sup> *State v. Ortiz*, 198 Conn. 220, 502 A.2d 400 (1985).

<sup>50</sup> *Doyle v. State*, 159 Tex. Crim. 310, 263 S.W.2d 779 (1954).

<sup>51</sup> 54 Cal. App. 2d 100, 126 Cal. Rptr. 350 (1975). This case is discussed in Note, "The Admissibility of Bite Mark Evidence," 51 So. Cal. L. Rev. 309 (1978); Vale, Sognnaes, Felando & Noguchi, "Unusual Three-Dimensional

avoided applying the *Frye* test, which requires acceptance of a novel technique by the scientific community as a prerequisite to admissibility.<sup>52</sup> According to the court, the *Frye* test "finds its rational basis in the degree to which 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>53</sup> The court went on to hold that bite-mark evidence did not involve such acceptance by the jury. The basis on which the expert reached his conclusions—models, photographs, and X-rays—were shown to the trier of fact, and the expert's conclusions were verifiable by the court. Thus, the "court did not have to sacrifice its independence and common sense in evaluating" the evidence.<sup>54</sup>

Other courts have also admitted bite-mark evidence without applying the *Frye* test.<sup>55</sup> Nevertheless, courts

Bite Mark Evidence in a Homicide Case," 21 J. Forensic Sci. 642 (1976).

<sup>52</sup> For a discussion of the *Frye* test, see Giannelli, "The Admissibility of Novel Scientific Evidence: *Frye v. United States*, a Half-Century Later," 80 Colum. L. Rev. 1197 (1980).

<sup>53</sup> *People v. Marx*, note 51 *supra*, 54 Cal. App. 3d at 110, 126 Cal. Rptr. at 355-356.

<sup>54</sup> *Id.*, 54 Cal. App. 3d at 111, 126 Cal. Rptr. at 356.

<sup>55</sup> See *Handley v. State*, 515 So. 2d 121, 130-131 (Ala. Crim. App. 1987); *State v. Garrison*, note 26 *supra*, 120 Ariz. at 255, 585 P.2d at 563; *People v. Watson*, 75 Cal. App. 3d 384, 142 Cal. Rptr. 134 (1977); *Bundy v. State*, 455 So. 2d 330, 348-349 (Fla. 1984); *People v. Milone*, note 33 *supra*, 43 Ill. App. 3d at 385, 356 N.E.2d at 1350 (1976); *People v. Johnson*, note 24 *supra*, 8 Ill. App. 3d at 457, 289 N.E.2d at 722; *Niehaus v. State*, 265 Ind. 655, 359 N.E.2d 513, *cert. denied*, 434 U.S. 902 (1977); *State v. Peoples*, 227 Kan. 127, 605 P.2d 135 (1980); *Commonwealth v. Cifizzari*, 397 Mass. 560, 569-572, 492



applying the *Frye* general acceptance standard have reached the same result.<sup>56</sup> No reported case has rejected bite-mark evidence. Indeed, its acceptance is so well-established that the New York Court of Appeals has held that its validity need not be proved in every case:

The 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, but subject, of course, to the establishment by foundation evidence of the authenticity of the materials used and propriety of the procedure followed in the particu-

lar case and to cross-examination intended to test the reliability of the conclusion reached in that case.<sup>57</sup>

In short, courts may judicially notice the general validity of bite-mark evidence. Judicial notice, however, does not extend to the validity of an identification in a particular case.

Although the qualifications of experts who have testified in the bite-mark cases have been challenged in some prosecutions,<sup>58</sup> these challenges have failed. Most of the experts have been experienced forensic odontologists. In one case, however, the court ruled a dentist qualified even though the comparison in issue was the first he had made.<sup>59</sup> The American Academy of Forensic Sciences created an Odontology Section in the 1970s. This section later established the American Board of Forensic Odontology, which has established certification standards.

Defendants have challenged the admissibility of bite-mark evidence on the grounds that compelling them

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N.E.2d 357, 363-364 (1986); *People v. Marsh*, note 23 *supra*, 177 Mich. App. at 161, 167, 441 N.W.2d at 33, 35-36 (1989); *Bludsworth v. State*, note 47 *supra*, 98 Nev. at 289, 646 P.2d at 558; *State v. Green*, note 9 *supra*, 305 N.C. at 463, 290 N.E.2d at 625; *State v. Temple*, note 9 *supra*, 302 N.C. at 1, 273 S.E.2d at 273; *Kennedy v. State*, note 22 *supra*, 640 P.2d at 971; *State v. Routh*, note 23 *supra*, 30 Or. App. at 901, 568 P.2d at 704; *State v. Jones*, note 22 *supra*, 273 S.C. at 723, 259 S.E.2d at 120; *Spence v. State*, note 31 *supra*, 795 S.W.2d 743, 750-752; *Patterson v. State*, note 31 *supra*, 509 S.W.2d at 857; *State v. Howe*, note 31 *supra*, 136 Vt. at 53, 386 A.2d at 1125.

<sup>56</sup> See *United States v. Martin*, 13 M.J. 66, 67-68 (C.M.A. 1982); *People v. Slone*, note 22 *supra*, 76 Cal. App. 3d at 611, 623-624, 143 Cal. Rptr. 61, 68-69; *State v. Kleypas*, 602 S.W.2d 863, 868-870 (Mo. Ct. App. 1980); *State v. Sager*, note 9 *supra*, 600 S.W.2d at 541, 573 450 U.S. at 910; *People v. Middleton*, 54 N.Y.2d 42, 49-50, 429 N.E.2d 100, 103-104, 444 N.Y.S.2d 581, 584-585 (1981); *People v. Bethune*, note 23 *supra*, 105 A.D.2d at 262, 267, 484 N.Y.S.2d at 577, 581; *People v. Smith*, note 9 *supra*, 110 Misc. 2d at 118, 124-126, 443 N.Y.S.2d at 551, 556-557.

<sup>57</sup> *People v. Middleton*, note 56 *supra*, 54 N.Y.2d 42, 45, 429 N.E.2d 100, 101, 444 N.Y.S.2d 581, 582. See also *State v. Richards*, 166 Ariz. App. 576, 579, 804 P.2d 109, 112 (1990) ("bite mark evidence is admissible without a preliminary determination of reliability"); *People v. Smith*, note 36 *supra*, 63 N.Y.2d at 41, 63, 468 N.E.2d at 879, 889, 479 N.Y.S.2d at 706, 716, 469 U.S. at 1227; *State v. Armstrong*, 369 S.E.2d 870, 877 (W. Va. 1988) (judicially noticing the reliability of bite-mark evidence).

<sup>58</sup> See *People v. Williams*, note 23 *supra*, 128 Ill. App. 3d at 384, 397, 470 N.E.2d at 1140, 1149-1150 (1984); *State v. Peoples*, note 55 *supra*, 227 Kan. at 127, 132-133, 605 P.2d 135, 139-140; *State v. Temple*, note 9 *supra*, 302 N.C.1, 12-13, 273 S.E.2d 273, 280 (1981).

<sup>59</sup> *Niehaus v. State*, note 55 *supra*, 265 Ind. 655, 359 N.E.2d 513; 434 U.S. at 902.

to submit to a dental examination is unconstitutional. Search and seizure,<sup>60</sup> self-incrimination,<sup>61</sup> and right

<sup>60</sup> In the following cases the courts ruled that obtaining dental impressions from a defendant did not violate the Fourth Amendment's proscription against unreasonable searches and seizures: *United States v. Holland*, 378 F. Supp. 144, 154-155 (E.D. Pa.), *aff'd sub. nom.* Appeal of Ehly, 506 F.2d 1050 (3d Cir. 1974), *cert. denied*, *Ehly v. United States*, 420 U.S. 994 (1975); *People v. Milone*, note 33 *supra*, 43 Ill. App. 3d at 385, 390-391, 356 N.E.2d 1350, 1354; *People v. Smith*, note 9 *supra*, 110 Misc. 2d at 118, 122-123, 443 N.Y.S.2d 551, 554; *State v. Sapsford*, 22 Ohio App. 3d 1, 3, 488 N.E.2d 218, 220 (1983); *State v. Howe*, note 31 *supra*, 136 Vt. at 53, 64, 386 A.2d 1125, 1131-1132. But see *People v. Dace*, 153 Ill. App. 3d 891, 896-899, 506 NE2d 332, 335-337 (1987) (warrant for bite impression and photographs lacked probable cause).

<sup>61</sup> See *United States v. Holland*, note 60 *supra*, 378 F. Supp. 144, 154-155 (E.D. Pa.) (obtaining dental impressions

to counsel<sup>62</sup> challenges have been resolved against the defendants in these cases.

from a defendant is not compelled self-incrimination), *aff'd sub. nom.* Appeal of Ehly, 506 F.2d at 1050, *cert. denied*, *Ehly v. United States*, 420 U.S. at 994; *State v. Asherman*, 193 Conn. 695, 715, 478 A.2d 227, 240 (1984) (state constitution); *State v. Thornton*, 253 Ga. 524, 525, 322 S.E.2d 711, 712 (1984) (state constitution); *People v. Milone*, note 33 *supra*, 43 Ill. App. 3d at 385, 392, 356 N.E.2d at 1350, 1355; *People v. Smith*, note 9 *supra*, 110 Misc. 2d at 118, 121-122, 443 N.Y.S.2d at 551, 554-555; *People v. Allah*, 84 Misc. 2d 500, 502, 376 N.Y.S.2d 399, 401 (Sup. Ct. 1975); *State v. Sapsford*, 22 Ohio App. 3d 1, 3, 488 N.E.2d 218, 220 (1983); *Patterson v. State*, note 31 *supra*, 509 S.W.2d at 857, 862-863.

<sup>62</sup> See *State v. Howe*, note 31 *supra*, 136 Vt. at 53, 63, 386 A.2d at 1125, 1131 (right to counsel had not attached at time dental impressions taken); *Spence v. State*, note 31 *supra*, 795 S.W.2d 743, 752-753 (right to counsel had not attached at time impressions taken).