

## COMMENT

# AN INCONVENIENT TOOTH: FORENSIC ODONTOLOGY IS AN INADMISSIBLE JUNK SCIENCE WHEN IT IS USED TO “MATCH” TEETH TO BITEMARKS IN SKIN

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While the advent of DNA analysis has paved the way for wrongfully convicted individuals to contest their convictions, flaws in traditionally accepted forensic sciences are still being uncovered. Bitemark evidence has been consistently admitted in courts across the country and has formed the basis of numerous criminal convictions. However, research over the past decade demonstrates the serious fallibility of this questionable forensic science when it is used to conclusively “match” a person’s teeth to a bitemark in human skin. This Comment outlines the flaws in bitemark identification as a science and concludes that under modern evidentiary standards, including *Daubert*’s application of the Federal Rules of Evidence and Wisconsin’s relevancy test, courts can and should refuse to admit bitemark-matching testimony in the courtroom.

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## INTRODUCTION

In 1992, Ray Krone was convicted of a brutal murder in Arizona based in large part on the testimony of a forensic dentist who stated that the bitemarks found on the victim's body conclusively matched Krone's teeth.<sup>1</sup> The expert—Raymond Rawson—testified that he had “the highest order of confidence that no other person caused the bitemark injuries.”<sup>2</sup> After Krone's first conviction was reversed due to a technicality, nine other forensic odontologists reviewed the evidence and concluded that Krone did not inflict the bites.<sup>3</sup> Rawson testified again at Krone's second trial, sticking by his original analysis, and Krone was convicted a second time.<sup>4</sup> Krone spent three years on Arizona's death row and ten years total in prison.<sup>5</sup> In 2002, DNA testing of blood found on the victim proved that Rawson had been wrong all along: the DNA evidence exonerated Krone and identified a convicted sex offender as the true perpetrator of the crime.<sup>6</sup> Surprisingly, even after the DNA exonerated Krone, Rawson was quoted as saying that “[t]he bitemark evidence was solid.”<sup>7</sup>

Ray Krone's case is not unique. In fact, incorrectly “matched” bitemarks have led to wrongful convictions and have been called into question in several states across the country, including Florida,<sup>8</sup> Illinois,<sup>9</sup> Massachusetts,<sup>10</sup> Michigan,<sup>11</sup> Mississippi,<sup>12</sup> New York,<sup>13</sup> and

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1. *State v. Krone*, 897 P.2d 621, 621–23 (Ariz. 1995).

2. Robert Nelson, *About Face*, PHOENIX NEW TIMES, Apr. 21, 2005, available at <http://www.phoenixnewtimes.com/2005-04-21/news/about-face>.

3. *Id.*

4. Flynn McRoberts, *Bitemark Verdict Faces New Scrutiny*, CHI. TRIB., Nov. 29, 2004, available at <http://www.chicagotribune.com/news/watchdog/chi-0411290148nov29,0,1894615.story>.

5. Nelson, *supra* note 2.

6. *Id.*

7. Beth DeFalco, *Doubts Plagued Trails [sic] in '91 Killing*, ARIZ. REPUBLIC, Apr. 8, 2002, at 1B.

8. See Innocence Project, *Cases Where DNA Revealed that Bite Mark Analysis Led to Wrongful Arrests and Convictions*, <http://www.innocenceproject.org/Content/394.php> (last visited Oct. 12, 2009).

9. See *id.*

Wisconsin.<sup>14</sup> The details of *State v. Stinson*, a decades-old Wisconsin case in which bitemark-matching testimony almost exclusively formed the basis for the defendant's homicide conviction,<sup>15</sup> is a prime example of why this type of evidence should be universally excluded. The case involved the testimony of two prominent forensic odontologists who were pioneers of bitemark identification as a science.<sup>16</sup> The defendant's alleged guilt—and the bitemark evidence used to support it—was challenged as recently as July 2009.<sup>17</sup> Based on the wrongful convictions involving bitemark evidence and new research illuminating a lack of scientific underpinnings behind this type of forensic odontology, courts can and should categorically exclude testimony that purports to “match” a bitemark to an individual's dentition.

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10. *See id.*

11. *See, e.g., Ege v. Yukins*, 380 F. Supp. 2d 852, 869–71 (E.D. Mich. 2005) (rejecting testimony offered at trial by a forensic odontologist who claimed that the chances were 3.5 million to one that someone other than the defendant inflicted bitemark wounds on the victim). In *Ege*, the Sixth Circuit granted the defendant habeas corpus relief because the testimony offered at trial could not be supported by any empirical or scientific basis. *Id.* at 857–58. *See also Otero v. Warnick*, 614 N.W.2d 177, 178 (Mich. Ct. App. 2000) (noting that charges against the defendant were dropped after DNA excluded him as a possible perpetrator despite the testimony of a forensic odontologist who stated that defendant was “the only person in the world who could have inflicted the bite”).

12. *See, e.g., Brewer v. State*, 819 So. 2d 1169 (Miss. 2002) (ordering an evidentiary hearing to review newly discovered DNA evidence to determine whether a new trial was warranted).

13. *See Innocence Project, supra* note 8.

14. *State v. Stinson*, 134 Wis. 2d 224, 397 N.W.2d 136 (Ct. App. 1986).

15. *See Sharif Durhams, Judge Frees Man After 23 Years: Attorneys Challenged Key Evidence in '84 Killing*, MILWAUKEE J. SENTINEL, Jan. 31, 2009, at A1, available at <http://www.jsonline.com/news/milwaukee/38736747.html>.

16. Dr. Raymond D. Rawson wrote the seminal article asserting the case for the possibility that the human dentition is unique. *See R.D. Rawson et al., Statistical Evidence for the Individuality of the Human Dentition*, 29 J. FORENSIC SCI. 245 (1984). Rawson also served as President of the American Board of Forensic Odontology. Nevada Legislature, Legislative Biography – 71st (2001) Session: Raymond (Ray) D. Rawson, <http://www.leg.state.nv.us/71st/Legislators/Senators/RAWSON.cfm> (last visited Jan. 31, 2010). Dr. L. Thomas Johnson also was one of the earliest proponents of bitemark-matching as a sub-field within forensic odontology. *See L. Thomas Johnson & David Cadle, Bite Mark Evidence: Recognition, Preservation, Analysis and Courtroom Presentation*, N.Y. STATE DENTAL J., Mar. 1989, at 38.

17. *See Maurice Possley & Steve Mills, Guilty, Said Bite Expert. Bogus, Says DNA.*, CHI. TRIB., July 10, 2008, available at <http://www.chicagotribune.com/news/chi-bite-mark-exonerationjul10,0,2835607.story>.

Forensic odontology is the field of dentistry in which teeth are analyzed in the course of police or legal proceedings.<sup>18</sup> The field of forensic odontology was founded when dentists started working to identify the remains of victims of large-scale disasters using dental records;<sup>19</sup> forensic odontologists are still routinely enlisted to identify bodies in instances of mass fatality.<sup>20</sup> Though this use of forensic odontology is widely accepted,<sup>21</sup> some studies indicate that identifications result approximately a quarter of the time in such cases.<sup>22</sup>

Starting in the 1970s, a relatively small group of forensic odontologists began work to extend the applications of their trade in an effort to match a criminal suspect's dentition to bitemarks found at crime scenes on the bodies of victims.<sup>23</sup> The process generally involves comparing a cast of an alleged biter's dentition to an image or cast of the victim's bite wound.<sup>24</sup> Testimony from forensic odontologists has been used to support prosecutions against perpetrators of crimes hundreds of times across the country.<sup>25</sup> In fact, bitemark identification has even been used in cases where forensic odontologists have compared bitemarks in sandwiches<sup>26</sup> and cheese<sup>27</sup> to a suspect's dentition.

When this type of forensic odontology is used to *conclusively match* bitemarks to human dentitions, it resembles other controversial

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18. See Flynn McRoberts & Steve Mills, *From the Start, a Faulty Science: Testimony on Bitemarks Prone to Error*, CHI. TRIB., Oct. 19, 2004, available at <http://www.chicagotribune.com/news/watchdog/chi-041019forensics,0,7597688.story>.

19. Jane Campbell Moriarty & Michael J. Saks, *Forensic Science: Grand Goals, Tragic Flaws, and Judicial Gatekeeping*, JUDGES' J., Fall 2005, at 16, 21.

20. See McRoberts & Mills, *supra* note 18.

21. I.A. Pretty & D. Sweet, *The Scientific Basis for Human Bitemark Analyses – A Critical Review*, 41 SCI. & JUSTICE 85, 86 (2001).

22. Moriarty & Saks, *supra* note 19, at 21.

23. See McRoberts & Mills, *supra* note 18. At an annual meeting of forensic scientists in 1970, a group of eight odontologists decided to—and did—create their own division within the American Academy of Forensic Sciences for the purposes of adding credibility to the subjective “matching” of bitemarks to dentitions. See *id.*

24. Moriarty & Saks, *supra* note 19, at 21.

25. See McRoberts, *supra* note 4; McRoberts & Mills, *supra* note 18.

26. *Banks v. State*, 725 So. 2d 711 (Miss. 1997). In *Banks*, the court ultimately ruled that the bitemark evidence was inadmissible, not because the bitemarks were found in a bologna sandwich, but because after his analysis, the odontologist simply threw out the sandwich. *Id.* at 714–16. The defense did not have the opportunity to see or evaluate the sandwich. *Id.*

27. D. Sweet & D. Hildebrand, *Saliva from Cheese Bite Yields DNA Profile of Burglar: A Case Report*, 112 INT'L J. LEGAL MED. 201, 201–02 (1999).

forensic sciences.<sup>28</sup> Like handwriting, voiceprints, tool marks, tire prints, and shoe prints, bitemark “matching” involves the comparison of some kind of imprint with a series of possible implements used to create it.<sup>29</sup> A “match” implies that a bitemark has been made by one individual’s dentition *to the exclusion of all other individuals’ dentitions*.<sup>30</sup> Such an assertion rests on the inherent assumption that the human dentition or the imprint it creates is unique.<sup>31</sup> Unlike more credible forensic sciences—most specifically DNA analysis—bitemark matching is a “soft” forensic science because it lacks the empirical and statistical underpinnings that define traditional science.<sup>32</sup> In fact, there is currently no agreement that the human dentition is unique, and therefore not a commonly agreed-upon foundation for any declaration that a “conclusive match” could exist.<sup>33</sup> Today, one of the governing organizations in forensic odontology actually bans the use of testimony that expresses too high a degree of confidence in a match.<sup>34</sup> However, this type of testimony has been offered without contention in many criminal cases, inevitably leading to at least some wrongful convictions.

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28. Michael J. Saks & David L. Faigman, *Failed Forensics: How Forensic Science Lost Its Way and How It Might Yet Find It*, ANN. REV. L. & SOC. SCI. 149, 150 (2008). Scholars and experts who question the validity of bitemark “matching” as a science do not raise the same questions about forensic odontology where it is used for its original purpose of identifying human remains based on dental records. See Innocence Project, *supra* note 8. The main criticisms come when statements of certainty like “match” are used to compare a bitemark to a human dentition. See Moriarty & Saks, *supra* note 19, at 29–30.

29. See Moriarty & Saks, *supra* note 19, at 21.

30. See Saks & Faigman, *supra* note 28, at 150.

31. *Id.*

32. Rather than bearing the hallmarks of traditional science, these “nonscience” forensic sciences base assertions and conclusions on “anecdotal experience and proclamations of success over time.” Saks & Faigman, *supra* note 28, at 150. DNA profiling is different from the “soft” forensic sciences because it is rooted in science, error rates and confidence intervals have been systematically tested, and everyone has been proven to have “virtually unique” DNA. See *id.* at 153.

33. See D. Sweet & I.A. Pretty, *A Look at Forensic Dentistry—Part 2: Teeth as Weapons of Violence—Identification of Bitemark Perpetrators*, 190 BRITISH DENTAL J. 415 (2001).

34. In a section of its manual titled “AFBO Bitemark Terminology Guidelines,” the American Board of Forensic Odontology recommends four possible categorizations when comparing bitemarks and dentitions: “Reasonable Dental/Medical Certainty” (to indicate that the two are alike “beyond a reasonable doubt”); “Probable” (defined as “more likely than not”); “Exclusion” (meaning that one is “ruled out”); and “Inconclusive” (to indicate that there is not enough evidence to relate the bitemark to the suspected perpetrator). AMERICAN BOARD OF FORENSIC ODONTOLOGY, DIPLOMATES REFERENCE MANUAL 125 (2009), available at <http://www.abfo.org/pdfs/ABFO%20Manual%206-2009%20Update%206-1--2009.pdf>.

Perhaps the quintessential example of such a case is that of Robert Lee Stinson. Early on a November morning in 1984, the body of a sixty-three-year-old woman was discovered in a yard near her home in Milwaukee, Wisconsin.<sup>35</sup> The victim was wearing only a bra, socks, one shoe, and a sweater that had been pulled up to her neck; her other clothes were found strewn about near her body.<sup>36</sup> Aside from bruises and lacerations, police discovered what appeared to be eight bitemarks on her breasts, abdomen, and pelvic area.<sup>37</sup> Police brought in an odontologist to evaluate the bitemarks and analyze the pattern of the perpetrator's teeth.<sup>38</sup> The odontologist, Dr. L. Thomas Johnson, photographed the bite wounds and described to police that the perpetrator was likely to have a missing or broken front incisor.<sup>39</sup>

Police interviewed numerous suspects, several of whom had criminal histories of violent sexual assault; during an interview, one suspect actually gave police a tooth that he claimed had been loosened during a previous sexual assault.<sup>40</sup> In the course of a neighborhood canvass, police also interviewed Robert Lee Stinson, a twenty-one-year-old resident of a building adjacent to the crime scene.<sup>41</sup> When an officer noticed that Stinson had a broken front tooth, Stinson immediately became a suspect in the homicide, and his dentition was examined by Dr. Johnson.<sup>42</sup> Dr. Johnson concluded that Stinson's dentition matched the bitemarks found on the victim's body, and Stinson was charged with the murder.<sup>43</sup>

At trial, Dr. Johnson testified that the bitemarks on the victim's body "would have to have been made by Robert Lee Stinson" with "no

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35. See Transcript of Record at 24–25, *State v. Stinson*, No. L-0937 (Wis. Cir. Ct. Dec. 10, 1985, PM), *aff'd*, 134 Wis. 2d 224, 397 N.W.2d 136 (Wis. Ct. App. 1986) [hereinafter Stinson Transcript, Dec. 10, 1985, PM].

36. See Motion for a New Trial Based on Newly Discovered Evidence or Ineffective Assistance of Counsel Under Wis. Stat. § 974.06, or In the Interest of Justice at 2, *State v. Stinson*, No. 85-CF-957 (Wis. Cir. Ct. Aug. 6, 2008) [hereinafter Stinson Motion].

37. Stinson Transcript, Dec. 10, 1985, PM, *supra* note 35, at 32.

38. Stinson Motion, *supra* note 36, at 2.

39. *Id.*

40. *Id.* According to Stinson's post-conviction motion, among the alternate suspects, "one had a dentition that matched the dentition of the suspected perpetrator; another had lost a tooth during a recent attack on a different woman; and another had been heard bragging about committing the murder." *Id.* at 17.

41. *Id.* at 3. The house in which Stinson was living adjoined the yard where the body was found, as did several other houses. *Id.* at 16. In addition, there was a public alley leading from the street to the yard. *Id.*

42. *Id.* at 3.

43. *Id.*

margin for error.”<sup>44</sup> A second odontologist—Raymond Rawson, the dentist responsible for Ray Krone’s wrongful conviction in Arizona—testified that Johnson’s analysis was “exceptionally fine”<sup>45</sup> and that “there was no question that there was a match to a reasonable scientific certainty.”<sup>46</sup> Prosecutors presented no other direct evidence that connected Stinson to the crime.<sup>47</sup> In fact, in her closing argument, the prosecutor admitted that without the bitemarks, there would not have been a case against Stinson.<sup>48</sup>

After hearing the odontologists’ expert testimony and the certainty they expressed, the jury found Stinson guilty of homicide.<sup>49</sup> In 2008, four expert odontologists reviewed the same bitemark evidence and concluded that Stinson could not have inflicted any of the bites found on the victim’s body.<sup>50</sup> Additionally, male DNA profiles recovered from the victim’s sweater—a place where the perpetrator’s DNA would likely be found—did not match Stinson’s.<sup>51</sup> After Stinson filed a motion for a new trial and presented prosecutors with the new bitemark and DNA evidence,<sup>52</sup> a circuit court judge released Stinson after twenty-three years of wrongful imprisonment, leaving the district attorney to decide whether to retry Stinson for the murder.<sup>53</sup>

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44. Transcript of Record at 77, 83, *State v. Stinson*, No. L-0937 (Wis. Cir. Ct. Dec. 11, 1985, AM), *aff’d*, 134 Wis. 2d 224, 397 N.W.2d 136 (Wis. Ct. App. 1986) [hereinafter *Stinson Transcript*, Dec. 11, 1985, AM].

45. *Id.* at 10.

46. Transcript of Record at 13, *State v. Stinson*, No. L-0937 (Wis. Cir. Ct. Dec. 11, 1985, PM), *aff’d*, 134 Wis. 2d 224, 397 N.W.2d 136 (Wis. Ct. App. 1986).

47. The other evidence presented at trial against Stinson included the location of the victim’s body, which was found in a shared yard behind the building in which Stinson was living, and the slight variations in Stinson’s story of his whereabouts the night of the murder. See Transcript of Record at 59, *State v. Stinson*, No. L-0937 (Wis. Cir. Ct. Dec. 12, 1985, Part 1), *aff’d*, 134 Wis. 2d 224, 397 N.W.2d 136 (Wis. Ct. App. 1986).

48. In her closing argument, the prosecutor said that “without the bitemarks, [the evidence] is not enough or nearly enough.” *Id.*

49. Transcript of Record at 36, *State v. Stinson*, No. L-0937 (Wis. Cir. Ct. Dec. 12, 1985, PM), *aff’d*, 134 Wis. 2d 224, 397 N.W.2d 136 (Wis. Ct. App. 1986) [hereinafter *Stinson Transcript*, Dec. 12, 1985, PM].

50. See *Stinson Motion*, *supra* note 36, at 5. The odontology panel produced a twenty-five-page report detailing its analysis and excluding Stinson as a possible contributor of any of six bitemarks that the panel was able to analyze. See *generally id.* at Exhibit E. Though at trial Dr. Johnson claimed that he was able to evaluate eight bitemarks, the panel determined that two of the marks were not clear enough to be at all conclusive. *Id.* at Exhibit E, at 3.

51. *Id.* at 15.

52. See *Stinson Motion*, *supra* note 36.

53. Durhams, *supra* note 15.

Bitemark–identification evidence is fast becoming the archetype for questionable forensic science.<sup>54</sup> In fact, the United States Congress commissioned a study on the overall use and effectiveness of forensic sciences in the American criminal justice system, which was released in 2009 and highlighted failings of forensic odontology.<sup>55</sup> While some legal scholarship has focused on the inherent shortcomings of many forensic sciences,<sup>56</sup> few articles illuminate those associated most specifically with bitemark identification. One recent article addresses flaws with bitemark analysis and stresses the importance for judges to exercise their role as gatekeepers, but it does not explore the evidentiary standards through which a court must analyze bitemark identification.<sup>57</sup>

This Comment focuses on the questions courts face when bitemark-matching testimony is presented and offers a framework for the evaluation of bitemark evidence. Part I of this Comment discusses the standards courts in the United States apply to expert testimony involving bitemark identification. Part II provides an overview of the controversial state of forensic odontology as a science when it comes to matching bitemarks to dentitions. Finally, Part III applies the *Daubert* and Wisconsin standards for admissibility to bitemark-matching testimony and concludes that under both stringent and lenient standards, this type of expert testimony can and should be excluded.

## I. THE ADMISSIBILITY OF BITEMARK-MATCHING TESTIMONY

### A. *The Modern Standard: Daubert and Federal Rule of Evidence 702*

The standards for the admission of scientific expert testimony vary from state to state but are generally guided by Rule 702 of the Federal Rules of Evidence<sup>58</sup> and two main cases, *Frye v. United States*<sup>59</sup> and *Daubert v. Merrell Dow Pharmaceuticals, Inc.*<sup>60</sup> *Frye* outlined a test for admissibility that requires the scientific principle in question “to have gained general acceptance in the particular field in which it belongs.”<sup>61</sup> If a court determines that a technique has gained general acceptance in

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54. See McRoberts, *supra* note 4.

55. NAT’L RESEARCH COUNCIL, STRENGTHENING FORENSIC SCIENCE IN THE UNITED STATES: A PATH FORWARD 1–37, 173–76 (2009).

56. See, e.g., Moriarty & Saks, *supra* note 19.

57. Erica Beecher-Monas, *Reality Bites: The Illusion of Science in Bite-Mark Evidence*, 30 CARDOZO L. REV. 1369, 1371, 1374–75 (2009).

58. FED. R. EVID. 702.

59. 293 F. 1013 (D.C. Cir. 1923).

60. 509 U.S. 579 (1993).

61. *Frye*, 293 F. at 1014.

its field, then the technique is deemed reliable enough to be admitted at trial.<sup>62</sup>

In 1993, the *Daubert* court held that Rule 702 of the Federal Rules of Evidence trumped the *Frye* test.<sup>63</sup> Rule 702 states in part: “If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise . . . .”<sup>64</sup> Though in *Daubert* the Supreme Court retained *Frye*’s general-acceptance principle for admission, it also stated that scientific evidence must be both relevant and reliable.<sup>65</sup> The *Daubert* court also outlined several factors relevant to the admissibility of scientific expert testimony to aid trial-court judges, including: (1) the theory or technique must be able to be, and have been, tested; (2) it must have been “subjected to peer review and publication;” (3) the known or possible error rate of the scientific technique must be taken into consideration; (4) the court should take into account the “relevant scientific community” and a determination of the degree to which the theory or technique in question is accepted in that community; and (5) the focus is on the principles and methodology behind the technique, not necessarily on the conclusions generated.<sup>66</sup>

### B. The Wisconsin Standard for Admissibility

Wisconsin, one of the states that does not currently follow the *Daubert* standard, flatly rejected the *Frye* test<sup>67</sup> and was therefore unaffected by the “new” standard outlined by *Daubert*.<sup>68</sup> Wisconsin

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62. See *United States v. Jakobetz*, 955 F.2d 786, 794 (2d Cir. 1992).

63. *Daubert*, 509 U.S. at 587.

64. FED. R. EVID. 702.

65. *Daubert*, 509 U.S. at 594 (citing *United States v. Downing*, 753 F.2d 1224, 1238 (3d Cir. 1985)); see also *id.* at 597.

66. *Daubert*, 509 U.S. at 593–95. The Supreme Court is careful not to deem these factors requirements per se: “Many factors will bear on the inquiry, and we do not presume to set out a definitive checklist or test.” *Id.* at 593. That said, the Court takes the time to lay out its series of factors that are relevant to trial judges’ analysis for admissibility. Though these factors are not numbered, there are four clearly listed in the decision, and the fifth is set aside as a separate but additional recommendation. *Id.* at 593–95.

67. *Watson v. State*, 64 Wis. 2d 264, 273–74, 219 N.W.2d 398, 403 (1974) (stating that Wisconsin expressly rejected the *Frye* test).

68. *State v. Peters*, 192 Wis. 2d 674, 687, 534 N.W.2d 867, 872 (Ct. App. 1995). The case to which Wisconsin courts generally cite for the relevancy test is *State v. Walstad*, 119 Wis. 2d 483, 516, 351 N.W.2d 469, 485–86 (1984).

continues to follow its own “relevancy test.”<sup>69</sup> This test merely requires that (1) the scientific testimony be relevant,<sup>70</sup> (2) the expert is qualified,<sup>71</sup> and (3) the testimony “will assist the trier of fact . . . to determine a fact in issue . . . .”<sup>72</sup> Unlike *Frye* and *Daubert* jurisdictions, Wisconsin trial courts are not required to take the reliability of a technique into account when deciding whether to admit scientific evidence.<sup>73</sup> But judges serve as “limited and indirect gatekeep[ers]” when evaluating the admissibility of scientific evidence.<sup>74</sup>

In *State v. Peters*, the Wisconsin Court of Appeals affirmed the state’s adherence to the relevancy test, but it also outlined several exceptions to the state’s otherwise wide-open standard for admissibility.<sup>75</sup> Evidence deemed relevant may still be rejected if (1) “the evidence is superfluous,” (2) the evidence will waste judicial resources, (3) “the probative value of the evidence is outweighed by [potential] prejudice,” (4) the jury would be able to draw conclusions without the aid of the evidence, (5) “the evidence is inherently improbable,” or (6) “the area of testimony is not suitable for expert opinion.”<sup>76</sup>

## II. BITEMARK MATCHING IS NOT “REAL SCIENCE”

Questions and concerns about the scientific validity and basis for bitemark matching began to arise in the mid-1970s and started to garner more attention and widespread publication in the past ten years. The first known case that involved bitemark identification was a 1975 California case, *People v. Marx*.<sup>77</sup> Though in *Marx* the expert testimony allegedly identifying the bitemark was admitted, the case marked the commencement of questions and controversy surrounding

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69. See, e.g., *Walstad*, 119 Wis. 2d at 519, 351 N.W.2d at 487.

70. WIS. STAT. § 904.01 (2005–06).

71. *Walstad*, 119 Wis. 2d at 516, 351 N.W.2d at 486.

72. WIS. STAT. § 907.02 (2005–06).

73. *Peters*, 192 Wis. 2d at 687, 534 N.W.2d at 872.

74. *Id.* at 688, 534 N.W.2d at 872.

75. *Id.* at 689, 534 N.W.2d at 873.

76. *Id.* The court noted that this list of exceptions is not an exhaustive list. *Id.* at 689–90, 534 N.W.2d at 873. In fact, the court stated that “although Wisconsin judges do not evaluate the reliability of scientific evidence, they may restrict the admissibility of such evidence through their limited gatekeeping functions.” *Id.* at 690, 534 N.W.2d at 873.

77. *People v. Marx*, 126 Cal. Rptr. 350 (Cal. Ct. App. 1975).

this type of testimony.<sup>78</sup> Since *Marx*, bitemark cases have arisen in thirty-three states, and—despite strong arguments to the contrary—testimony purporting to match a suspect’s dentition to a bitemark in human skin has consistently passed the evidentiary tests posed by *Daubert*, *Frye*, and other standards.<sup>79</sup> In fact, since *Marx*, courts have admitted bitemark evidence “virtually unanimously” under *Daubert*, *Frye*, or the Federal Rules of Evidence.<sup>80</sup>

#### *A. Lack of Scientific Basis for Soft Forensic Sciences*

Despite what would seem to be consistent judicial acceptance, bitemark-matching testimony has come under substantive scrutiny and is the subject of much dissension among legal scholars.<sup>81</sup> The primary source of controversy relates to the lack of scientific and statistical underpinnings normally associated with science.<sup>82</sup> Whereas other sciences—and some other forensic sciences, like DNA typing—are based on statistical data and probabilities, no such information exists when it comes to bitemark matching.<sup>83</sup> Real science is marked by factors that include a reliance on the scientific method, the ability for other researchers to replicate the tests conducted, clear statements of operational definitions, full exposition of research methods and statistics, and limits on the extent to which subjectivity plays a role in rendering conclusions.<sup>84</sup> Many of the most common forensic sciences, including bitemark matching, lack these factors.<sup>85</sup> For bitemark identification, the key to showing a scientific basis is either proving that the human dentition is unique or demonstrating that uniqueness is

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78. I.A. Pretty & D.J. Sweet, *The Judicial View of Bitemarks Within the United States Criminal Justice System*, J. FORENSIC ODONTO-STOMATOLOGY, June 2006, at 1, 2.

79. *See id.* at 2 tbl.1.

80. *Id.* at 1. The likely explanation for the consistent admission of bitemark evidence is that, despite its many flaws, this type of forensic odontology bears the “trappings of science.” Beecher-Monas, *supra* note 57, at 1372. That is, when forensic odontologists who present bitemark-matching testimony have advanced degrees, belong to national associations, and make confident statements of certainty, judges mistake bitemark matching for “real science.” *See id.*

81. *See, e.g.*, Saks & Faigman, *supra* note 28. Scholars and experts who question the validity of bitemark “matching” as a science do not raise the same questions about forensic odontology where it was used for its original purpose of identifying human remains based on dental records; the main criticisms come when statements of certainty like “match” are used to compare a bitemark to a human dentition. *See id.*

82. Pretty & Sweet, *supra* note 21, at 91.

83. *See* Saks & Faigman, *supra* note 28, at 150.

84. *Id.* at 151.

85. *See id.*

reflected in the injury itself.<sup>86</sup> Without either of these presuppositions, there is no actual basis for a forensic odontologist to conclusively declare that a bitemark “matches” a specific human dentition or—as was stated in the *Stinson* case—that a bitemark “would have to have been made by” a certain individual.<sup>87</sup>

The two steps in forensic identification are to (1) compare a mark or imprint in evidence to a known source and determine whether they are so alike that they are a match, and (2) assess the probability that the imprint and implement came from the same source.<sup>88</sup> Risks are inherent in both of these steps: a purported match might not actually be a match, or the reason for a so-called match might be coincidence rather than the sharing of a common source.<sup>89</sup> Very little research has been conducted on either of these fronts in any science of forensic identification, including bitemark matching.<sup>90</sup> Without an overarching scientific basis or statistical calculation accepted by experts within a field of forensic science, the standards on which courts and verdicts rely are those dictated by the individual examiners. In the field of forensic odontology, the standards that form the basis of a declared bitemark match are merely those utilized by the testifying odontologist.<sup>91</sup> In fact, experts argue that “no data that could permit forensic scientists to offer an identification ‘to the exclusion of all others in the world’ exist, and they are unlikely to come into being in the foreseeable future.”<sup>92</sup>

Questions over the scientific basis of forensic-identification sciences, especially those relating to underlying claims of uniqueness, are not new. To prove the uniqueness of the human fingerprint, for example, the Federal Bureau of Investigation commissioned a study in 1999 that led to satisfactory but controversial results.<sup>93</sup> A new study is now being conducted in an attempt to prove the uniqueness of the human dentition.<sup>94</sup>

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86. See Pretty & Sweet, *supra* note 21, at 88.

87. *Stinson* Transcript, Dec. 11, 1985, AM, *supra* note 44, at 77.

88. Michael J. Saks & Jonathan J. Koehler, *The Individualization Fallacy in Forensic Science Evidence*, 61 VAND. L. REV. 199, 199 (2008).

89. *Id.* at 200.

90. *Id.*

91. See *id.* at 200–01.

92. *Id.* at 217.

93. *Id.* at 210. Though the commissioned study evidently supported the notion that it is “virtually impossible” for two people to have the same fingerprint, a published statistical analysis identified “substantial errors” in the study’s design and called into question its conclusions. *Id.*

94. Todd Richmond, *Scientists Hope Database of Bite Marks Gives Forensics Teeth*, S.F. CHRON., May 16, 2008, at A18, available at <http://sfgate.com/cgi-bin/article.cgi?f=/c/a/2008/05/16/MN2P10MABD.DTL>. Ironically, this research is being conducted by L. Thomas Johnson, *id.*, the forensic odontologist who, with Raymond

The primary argument against uniqueness in bitemarks, tool marks, and many other identification sciences is that without examining *every* possible source implement (whether the implement is a dentition, tool, or tire), it is impossible to determine whether any particular implement is truly unique.<sup>95</sup> Furthermore, if such a study falls short in reaching conclusive uniqueness in its results, it could lead to proving the rate at which an implement is likely to have caused a mark; because any such probability involves a number greater than zero, there would be no such thing as a 100-percent conclusive match.<sup>96</sup> Though providing the very scientific basis necessary for legitimizing these types of forensic sciences, a calculated probability would undermine the belief and testimony of forensic experts who have claimed time and again that an individual's bitemarks, fingerprints, or hair "would have to have been made by" one particular individual.

### *B. Additional Problems with Bitemark Identification*

Forensic odontologists encounter additional problems when trying to match a dentition to a bitemark.<sup>97</sup> As a surface for analysis, skin is malleable; bitemarks can move, especially when made during a struggle, and fade quickly.<sup>98</sup> This ultimately means that a bitemark may have shifted or changed in appearance since being inflicted.<sup>99</sup> Furthermore, only a small portion of the human dentition—usually the four upper and lower front teeth—is left in a bitemark.<sup>100</sup> Therefore, even if the human dentition, including all the upper and lower teeth, were proven to be unique, such a revelation would be useless if only a small percentage of teeth leave bitemarks. In order for such proof to form the true scientific basis for odontological matches, the four upper

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Rawson, testified that bitemarks found on a victim "would have to have been made by Robert Lee Stinson," Stinson Transcript, Dec. 11, 1985, AM, *supra* note 44, at 77.

95. See Saks & Koehler, *supra* note 88, at 211 (quoting DAVID J. BALDING, WEIGHT-OF-EVIDENCE FOR FORENSIC DNA PROFILES 54 (2005)).

96. Cf. Saks & Koehler, *supra* note 88, at 202–06 (concluding that "[t]he concept of 'individualization' . . . exists only in a metaphysical or rhetorical sense").

97. Despite overwhelming judicial acceptance to date, recent research has uncovered disconcerting flaws in the techniques used and testimony offered. Beecher-Monas, *supra* note 57, at 1376. For instance, bitemark testimony "is based on unsupportable assumptions, the data is absent and what we do have demonstrates the invalidity of the theory, and the methodology lacks professional guidelines or standards, and is entirely subjective." *Id.* Furthermore, available data regarding forensic odontologists' ability to correctly match a bitemark to an individual's dentition reveal alarmingly high error rates. See *infra* Part III.A.3.

98. Moriarty & Saks, *supra* note 19, at 21.

99. See *id.*

100. See *id.*

and lower front teeth of each human being—and the mark these teeth would make in skin—would have to be proven unique.

To further complicate the process, forensic odontologists encounter “observer effects,” which means that when presented by police with a *suspect’s* dentition, they may be more likely to find a match given their—albeit subconscious—predisposition that there *should* be a match.<sup>101</sup> That is, because the police have indicated that the dentition to be compared to a bitemark is from the person whom they suspect is the perpetrator, the odontologist is not blindly analyzing a dentition to a bitemark. Studies have indicated that when forensic odontologists conduct an analysis where they know that the subject exemplar belongs to a suspected perpetrator, they are more likely to find a “match.”<sup>102</sup> Additionally, the more confirmation a forensic scientist receives before and after his analysis that the suspect should be a match, the more confident his testimony is likely to be at trial.<sup>103</sup>

Beyond these substantive scientific and logical conundrums, forensic odontologists confront even more problems when seeking to establish a match in court.<sup>104</sup> Defense attorneys have raised constitutional arguments against bitemark-matching testimony, challenged the photographs used by odontologists as too inflammatory, and pointed to possible errors in odontological protocol.<sup>105</sup> Moreover, defense attorneys often lack the funds necessary to procure a qualified bitemark expert in an effort to present alternative testimony to the prosecution’s employed odontologist.<sup>106</sup>

The techniques employed by forensic odontologists in evaluating bitemarks are not without utility. There is a recognized difference between using forensic odontology to match—or include—a suspect’s dentition to a bitemark and using them to *exclude* an individual from a group of possible suspects.<sup>107</sup> The former requires a scientific and statistical basis to determine whether a match exists.<sup>108</sup> Exclusion, on

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101. See generally D. Michael Risinger et al., *The Daubert/Kumho Implications of Observer Effects in Forensic Science: Hidden Problems of Expectation and Suggestion*, 90 CAL. L. REV. 1 (2002).

102. See *id.* at 28–30.

103. *Id.* at 30.

104. Pretty & Sweet, *supra* note 78.

105. *Id.* at 4–7 (citing *State v. Peoples*, 605 P.2d 135 (Kan. 1980); *State v. Sapsford*, 488 N.E.2d 218 (Ohio Ct. App. 1983); *State v. Kendrick*, 736 P.2d 1079 (Wash. Ct. App. 1987)).

106. *Id.* at 8.

107. See Moriarty & Saks, *supra* note 19, at 18. The authors note that in forensic sciences generally—including bitemark comparison but excluding DNA typing—exclusions require different judgments than inclusions. *Id.* at 18–19.

108. See *id.* at 18. Other than DNA typing, no forensic science has the database from which statistical probabilities can be derived. *Id.* at 18–19.

the other hand, does not require such a basis and is less difficult to establish.<sup>109</sup> If an individual's dentition simply does not match up with a bitemark—if, for example, a tooth is missing or completely misaligned—a forensic odontologist can exclude this individual as a possible contributor with a far higher degree of certainty than that with which he can declare a match.<sup>110</sup>

The advent of DNA analysis, in addition to bringing a semblance of real science to the field of forensic identification, has enabled convicted individuals to test physical evidence in an effort to determine, with a high degree of certainty, whether they are guilty of a crime.<sup>111</sup> Especially in instances where the prosecution's case relies on analyzable physical evidence, like blood or semen, DNA testing can lead to fairly conclusive results.<sup>112</sup> Furthermore, DNA profiles derived from physical evidence can be run through a national databank in an effort to determine—again, oftentimes with a high degree of measurable certainty—who the perpetrator of a crime is.<sup>113</sup>

DNA analysis has brought a layer of accountability to the field of bitemark matching that previously did not exist.<sup>114</sup> Though DNA confirmed the bitemark analysis in the aforementioned sandwich case,<sup>115</sup> it has led to multiple exonerations and upended the otherwise-incontrovertible testimony of forensic odontologists at trial.<sup>116</sup> It also fortunately supersedes bitemark analysis in many cases; swabs taken of bitemarks frequently uncover saliva, a fluid rich in DNA that can be used to identify a perpetrator instead of relying on bitemark matching.<sup>117</sup> Unfortunately, in the many criminal cases that lack testable physical evidence, bitemark-matching testimony may cause wrongful convictions. For individuals like Robert Lee Stinson—who was convicted based on bitemark-matching testimony where no DNA evidence was available at trial—the only recourse is to attempt to contest the bitemark testimony in court.

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109. *See id.* at 18.

110. *See id.*

111. Michael J. Saks and Jonathan J. Koehler, *The Coming Paradigm Shift in Forensic Identification Science*, 309 *SCIENCE* 892, 892–93 (2005).

112. *See id.* at 892.

113. *See id.* at 892–93.

114. Because physical evidence is often required for forensic analysis, including bitemark identification, DNA can oftentimes be found and subsequently tested. DNA found in cases where other forensic sciences had previously been used can be tested with actual and higher degrees of certainty. *See Moriarty & Saks, supra* note 19, at 25.

115. *See supra* note 26 and accompanying text.

116. *See supra* Introduction.

117. *See Sweet & Hildebrand, supra* note 27, at 201–02.

### III. BITEMARK-MATCHING TESTIMONY SHOULD BE INADMISSIBLE UNDER THE STANDARDS SET FORTH IN *DAUBERT* AND IN WISCONSIN

Based on current standards, both nationally and in Wisconsin, bitemark-matching testimony should be inadmissible in criminal trials. Though no court has yet to exclude such testimony,<sup>118</sup> any judge who puts such evidence through the full rigors of a modern evidentiary standard does not have to look hard to find a basis for exclusion. The lack of any scientific basis for the testimony, the dearth of research and publications on the topic, the schism in the forensic odontological community about whether such testimony should be offered, and the inherent prejudicial effect of the testimony combine to render bitemark identification a “junk science.” Under either the *Daubert* or Wisconsin evidentiary standards, courts everywhere should categorically exclude bitemark-matching testimony.

#### A. Bitemark Matching Under *Daubert*

No court has yet to exclude bitemark-matching testimony based on the standards set forth in *Daubert*. Because forensic odontology, even as it relates to bitemark identification, portends to bear the hallmarks of traditional science,<sup>119</sup> it might be easy for a judge to believe that such evidence passes *Daubert* muster. In some cases, courts have applied *Daubert* to fingerprint expert testimony but allowed a prior court’s decision to admit similar evidence to form the “scientific” grounds for legitimate admission.<sup>120</sup> Bitemark-matching testimony, however, fails each of the five prongs of the *Daubert* test.

#### 1. THE FIRST PRONG: TESTABILITY

To be admissible under the first prong in *Daubert*, bitemark identification as a technique must be able to be (and have been) scientifically tested.<sup>121</sup> When a scientific technique is tested, the goal is generally to determine the accuracy and precision with which the technique can be used and the statistics that underpin the technique.<sup>122</sup>

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118. See *Pretty & Sweet*, *supra* note 78, at 1.

119. Beecher-Monas, *supra* note 57, at 1372.

120. Saks & Faigman, *supra* note 28, at 162. The authors cite a case in which a judge ruled forensic identification was admissible not because it had been tested and evaluated under the umbrella of scientific review, but because it had been subjected to the rigors of prior litigation. *Id.* (citing *United States v. Havvard*, 117 F. Supp. 2d 848, 849 (S.D. Ind. 2000), *aff’d*, 260 F.3d 597 (7th Cir. 2001)).

121. *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 593 (1993).

122. See Moriarty & Saks, *supra* note 19, at 24–25.

Fingerprint analysis is an example of another historically accepted forensic science that has been called into question.<sup>123</sup> When fingerprint analysis was subjected to its first *Daubert* analysis in 1999, no such testing had been conducted, and the prosecution commissioned a study in order to satisfy this prong.<sup>124</sup>

Scientific testing of bitemark matching hinges on the fundamental question of whether and to what extent the human dentition is unique. Though some efforts have been made to determine whether this is the case, the uniqueness of the human dentition has never been—and may never be—proven.<sup>125</sup> Dr. Johnson recently began a study to prove uniqueness.<sup>126</sup> The study began with the collection and analysis of over 400 human dentitions.<sup>127</sup> Dr. Johnson is charting the specific locations of each tooth within these dentitions in an effort to form what would be the first legitimate basis toward conclusive evidence regarding the uniqueness of the human dentition.<sup>128</sup>

The fact, however, that the goal of this analysis is to prove the uniqueness of the human dentition implies that no such proof existed prior to this study. Not only does this admission directly undermine any basis for Dr. Johnson's testimony at Stinson's trial, but it also implies that bitemark matching has yet to undergo the testing necessary to pass this first *Daubert* prong.<sup>129</sup> Furthermore, there are still legitimate questions as to whether Dr. Johnson's test can ever lead to conclusive results.<sup>130</sup> These questions mean that bitemark matching may actually never be tested. Even in a pool of 400 human dentitions, conclusive results that no two human dentitions can produce the same bitemark seem doubtful, especially when bitemarks are formed by just the four upper and lower front teeth. Ultimately, as long as the ability for bitemark matching to be tested remains unknown, the technique fails to meet the first *Daubert* prong.

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123. Saks & Koehler, *supra* note 88, at 210.

124. *Id.*

125. Sweet & Pretty, *supra* note 33, at 415.

126. Marquette University, A Bite Out of Crime, [http://www.marquette.edu/research/profile\\_blinkajohnson.shtml](http://www.marquette.edu/research/profile_blinkajohnson.shtml) (last visited Oct. 5, 2009).

127. *Id.*

128. *Cf.* Sweet & Pretty, *supra* note 33, at 415.

129. The testing of the mere *hypothesis* that the human dentition is unique indicates that Dr. Johnson recognizes the real possibility that it is not, or at least that there is currently no basis for assertions implying such uniqueness.

130. *See* Sweet & Pretty, *supra* note 33, at 415.

## 2. THE SECOND PRONG: PEER REVIEW AND PUBLICATION

The second *Daubert* prong requires that bitemark identification be “subjected to peer review and publication.”<sup>131</sup> The relatively small group of forensic odontologists who have offered bitemark-matching testimony has, in fact, published articles about forensic odontology and the possible uniqueness of the human dentition.<sup>132</sup> The main critique of this type of peer review and publication is that the group of scientists among whom such articles and theories are presented and reviewed is small and closed. Forensic odontologists typically belong to one of two organizations, the American Board of Forensic Odontology<sup>133</sup> or the American Society for Forensic Odontology.<sup>134</sup> These organizations facilitate peer review of research performed by some bitemark-matching odontologists among other bitemark-matching odontologists.<sup>135</sup> Similarly, these odontologists write articles that circulate within this small group.<sup>136</sup>

The question as to whether bitemark identification passes the second *Daubert* prong hinges on whether the Supreme Court meant that the theory or technique be subject to *any* peer review or publication *anywhere*, or whether the peer review and publication has to meet some baseline threshold of credibility. If the Court meant that any peer review or publication would suffice, then bitemark matching passes this requirement. If, however, that is what the court meant, then any technique is admissible so long as another who practices it has had the opportunity to conduct similar research or write an article that another practicing the technique has read.

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131. *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 593–94 (1993).

132. *See, e.g.*, Rawson et al., *supra* note 16; *see also* Gerald L. Vale et al., *Discussion of “Reliability of the Scoring System of the American Board of Forensic Odontology for Human Bite Marks,”* 33 J. FORENSIC SCI. 20 (1988).

133. The American Board of Forensic Odontology (ABFO) is the organization to which Drs. Johnson and Rawson belong. American Board of Forensic Odontology, Member List, [http://www.abfo.org/member\\_list.htm](http://www.abfo.org/member_list.htm) (last visited Jan. 21, 2010). Gregory S. Golden, David R. Senn, and Norman D. Sperber—three members of the panel of odontologists who reviewed the Stinson evidence and excluded Stinson as a possible perpetrator—also belong to the ABFO, *id.*, and the fourth, Denise C. Murmann, belongs to the American Society for Forensic Odontology (ASFO). American Society of Forensic Odontology, ASFO Board Members, <http://asfo.org/contactus.asp?memberID=> (last visited Jan. 21, 2010).

134. Beecher-Monas, *supra* note 57, at 1377.

135. *Id.* *See also* American Board of Forensic Odontology, About American Board of Forensic Odontology, [http://www.abfo.org/about\\_abfo.htm](http://www.abfo.org/about_abfo.htm) (last visited Jan. 21, 2010); American Society for Forensic Odontology, About the ASFO, <http://asfo.org/index.asp> (last visited Jan. 21, 2010).

136. Beecher-Monas, *supra* note 57, at 1377.

If the Court actually intended that the technique be subjected to peer review or publication that meets a threshold of credibility, substantive questions about whether bitemark identification meets this requirement are raised. No article providing empirical data or statistical support for the ability of an odontologist to conclusively match a bitemark to an individual's dentition has ever been published in a scientific journal whose readership extends beyond the field of forensic odontology.<sup>137</sup> Whereas articles about DNA typing have been widely reviewed and published in journals that extend far beyond the genetic research field,<sup>138</sup> bitemark-matching research has not been subjected to such scrutiny.<sup>139</sup> In fact, in reviews and publications that transcend the field of forensic odontology, published articles call the reliability and credibility of bitemark identification into question.<sup>140</sup>

### 3. THE THIRD PRONG: KNOWN OR POSSIBLE ERROR RATES

To pass the third *Daubert* requirement, courts must take into consideration the known or possible error rate of bitemark identification.<sup>141</sup> Because of the lack of scientific or statistical bases for bitemark matching, it is difficult to determine the actual error rate for odontologists attempting to match a bitemark to a dentition. Multiple studies have tested the ability of odontologists to match bitemarks in skin to an individual's dentition.<sup>142</sup> The results of these studies are not favorable to the field of bitemark identification. In fact, one study revealed an error rate of up to 91 percent.<sup>143</sup> Another study, conducted by the American Board of Forensic Odontology itself, registered an error rate of nearly 64 percent.<sup>144</sup>

The calculated error rates for bitemark matching are alarmingly high. If a court were to follow the third *Daubert* prong, it would have to acknowledge the extraordinary possibility for erroneous testimony.

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137. As stated earlier, without evidence of the uniqueness of the human dentition, it is impossible for an individual dentition to be matched with certainty to a bitemark. So not only has no article to this end been published in a scientific journal, but no article with empirical support could even have been published in a publication within the forensic odontological community.

138. See Moriarty & Saks, *supra* note 19, at 19.

139. See Saks & Koehler, *supra* note 88, at 215.

140. See, e.g., Saks & Koehler, *supra* note 111, at 895.

141. *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 594 (1993).

142. Beecher-Monas, *supra* note 57, at 1383; see also Fernanda Santos, *Evidence from Bite Marks, it Turns Out, is Not So Elementary*, N.Y. TIMES, Jan. 28, 2007, § 4, at 4, available at <http://www.nytimes.com/2007/01/28/weekinreview/28santos.html>.

143. Beecher-Monas, *supra* note 57, at 1383.

144. Innocence Project, *supra* note 8.

Though the requirement only states that the court must take error rates “into consideration” and does not provide a baseline rate for admissibility, error rates as high as those associated with bitemark identification should preclude the technique’s passage of this third prong.

#### 4. THE FOURTH PRONG: ACCEPTANCE IN THE RELEVANT SCIENTIFIC COMMUNITY

*Daubert*’s fourth prong mandates that courts consider the “relevant scientific community”—here, the forensic science community generally—as well as determine the extent to which bitemark matching is accepted in that community.<sup>145</sup> Many forensic sciences—even several whose scientific underpinnings are questioned—pass this prong of *Daubert* easily.<sup>146</sup> Bitemark matching does not meet this requirement because within the broader field of forensic science and the narrow field of forensic odontology, there is no consensus as to the acceptance of bitemark identification. In fact, many scientists within the field contest the notion that a bitemark can ever be matched to an individual dentition.

Many, if not most, of the published articles calling bitemark matching into question have been written by trained forensic odontologists who bristle at the idea that their colleagues dare to make assertions like those offered by Drs. Johnson and Rawson in the *Stinson* trial.<sup>147</sup> Others have been written by social scientists and forensic experts outside the relevant scientific community.<sup>148</sup> Because of the

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145. *Daubert*, 509 U.S. at 594. The “forensic science community” is appropriate for analysis under this prong; in *Daubert*, the Court sought to ascertain whether a technique had attained “[w]idespread acceptance.” *Id.*

146. The amount of controversy within the forensic odontological community itself precludes bitemark identification from passing this prong. Not only do social scientists critique the lack of an empirical basis for testimony that has been offered, but forensic odontologists are among the technique’s harshest critics. *See, e.g.*, Pretty & Sweet, *supra* note 78.

147. *See id.* Drs. David Sweet, Iain Pretty, and Michael Bowers are all forensic odontologists by profession who regularly publish and speak about the fallacies to the technique of bitemark matching. *See* UBC Dentistry, David Sweet O.C., [http://www.dentistry.ubc.ca/AboutUs/FacultyStaffList/detail.asp?user\\_id=104&from\\_directory=1](http://www.dentistry.ubc.ca/AboutUs/FacultyStaffList/detail.asp?user_id=104&from_directory=1) (last visited Jan. 26, 2010); The University of Manchester School of Dentistry, Dr. Iain Pretty, <http://www.dentistry.manchester.ac.uk/staff/IainPretty> (last visited Jan. 22, 2010); McRoberts & Mills, *supra* note 18 (referencing Michael Bowers’ affiliation with the American Board of Forensic Odontology and his co-authored study questioning the accuracy bitemark identifications).

148. For example, Michael J. Saks, whose work is cited throughout this Article, does not have expertise in bitemark identification. His expertise is in differences between traditional sciences and the intersection of law and social science.

level of criticism present in these articles, bitemark identification is certainly not “accepted” in the forensic science community. Though some odontologists do believe passionately that bitemark matching is possible, it is, at best, a highly controversial technique. If “highly controversial” falls short of “accepted in that community,” then bitemark matching fails to meet the fourth *Daubert* prong.

#### 5. THE FIFTH PRONG: THE FOCUS IS ON THE PRINCIPLES AND METHODOLOGY

*Daubert*'s fifth prong requires that the court not be blinded by the conclusions generated by bitemark identification, but rather focus on the principles and methodology behind the technique.<sup>149</sup> This prong means that the odontologist's conclusions based on the bitemark evidence is less important for admissibility than the manner in which the conclusions were reached.<sup>150</sup> By placing the focus on methodology, *Daubert* compels the exclusion of any scientific evidence lacking a solid foundation.

As stated previously, the principles and methodology of bitemark matching lack the hallmarks of actual science.<sup>151</sup> The principles necessary for bitemark identification to pass this prong—formality, reproducibility, clear statements of operational definitions, exposition of research methods employed, and strict limits on the extent of subjectivity in the analysis—are virtually nonexistent in the field.<sup>152</sup> Though any odontologist might detail his or her methodology for the court, *Daubert* shifts the attention from the results of the analysis to the very principles and scientific basis bitemark identification lacks. Such a prong underscores the necessity for courts to exclude any testimony purporting to match bitemarks in skin to an individual dentition. By reemphasizing the importance of underlying methodology, *Daubert* strengthens the requisite basis and credibility for scientific testimony and further reduces the likelihood that insufficiently tested techniques will be admitted.

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Sandra Day O'Connor College of Law, Arizona State University, Michael J. Saks, [http://www.law.asu.edu/Apps/Faculty/Faculty.aspx?Individual\\_ID=28](http://www.law.asu.edu/Apps/Faculty/Faculty.aspx?Individual_ID=28) (last visited Dec. 30, 2009).

149. *Daubert*, 509 U.S. at 594–95.

150. *Id.*

151. See Saks & Faigman, *supra* note 28, at 150; *supra* notes 32–33 and accompanying text.

152. See Saks & Faigman, *supra* note 28, at 150–51.

*B. State v. Stinson and the Wisconsin Standard for Admissibility*

Scientific evidence is admissible in Wisconsin so long as it is relevant, the witness is qualified as an expert, and the testimony will help the fact finder “to determine a fact in issue.”<sup>153</sup> Courts have stated explicitly that “the admissibility of scientific evidence [in Wisconsin] is not conditioned upon its reliability.”<sup>154</sup> Under such a standard, it is easy to see why a wider breadth of expert testimony could be rendered admissible in Wisconsin, especially in comparison to *Daubert*. The argument against the admissibility of bitemark-matching testimony may be best supported by using exceptions to the relevancy test that have been enumerated by Wisconsin courts.<sup>155</sup> They are discussed below. A Wisconsin case excluding polygraph testimony provides further precedent and an additional framework for the exclusion of bitemark-matching evidence.<sup>156</sup>

Implicit in the Wisconsin relevancy test’s standard is an element of requisite reliability and therefore a case against default admissibility. The odontological testimony from the *Stinson* trial will be used in this Section to elucidate the Wisconsin standard and its exceptions.<sup>157</sup> Even under Wisconsin’s broad standard for admissibility, judges are equipped with the precedent necessary to bar flawed techniques like bitemark matching from the courtroom.

First, the statutory requirement for relevance in Wisconsin means that evidence is admissible if it has some propensity “to make the existence of any fact that is of consequence to the determination of the action” more or less likely than it would be without the testimony.<sup>158</sup> It seems that almost any expert testimony one side would offer in criminal or civil litigation would be “relevant” by the common definition of the word. However, the statutory relevance requirement that the evidence make a fact “more probable or less probable”<sup>159</sup> could mean that the evidence—in the *Stinson* case, testimony that his teeth inflicted the bite wounds on the victim—must to some extent help the jury decide whether *Stinson* inflicted the bitemarks.

If Dr. Johnson’s odontological testimony that the bitemarks could only have been made by *Stinson* was accurate, then the evidence would make a fact in issue more probable and therefore meet the full statutory

153. *State v. Walstad*, 119 Wis. 2d 483, 516, 351 N.W.2d 469, 486 (1984).

154. *State v. Peters*, 192 Wis. 2d 674, 687, 534 N.W.2d 867, 872 (Ct. App. 1995).

155. *See infra* Part III.B.1.

156. *State v. Dean*, 103 Wis. 2d 228, 307 N.W.2d 628 (1981).

157. *State v. Stinson*, 134 Wis. 2d 224, 397 N.W.2d 136 (Ct. App. 1986).

158. WIS. STAT. § 904.01 (2005-06).

159. *Id.*

definition of relevance.<sup>160</sup> But if Dr. Johnson's testimony had no scientific basis and was mostly pure conjecture, then it actually did not make a fact in issue more or less probable and, therefore, did not meet the statutory definition of relevance.<sup>161</sup> That is, if Dr. Johnson offered conclusive testimony that no other individual could have inflicted the bitemarks found on the victim and this testimony had no basis whatsoever—after all, Johnson has now implicitly admitted that no proof currently exists that the human dentition is unique<sup>162</sup>—then his speculative testimony would have only helped to mislead the jury.

Under the second prong of Wisconsin's test for admissibility, the witness must be qualified as an expert under Wisconsin Statutes section 907.02 by "knowledge, skill, experience, training, or education."<sup>163</sup> There is little question that forensic odontologists like Dr. Johnson satisfy the second prong. Through his education as a dentist, experience analyzing and identifying the dentitions of victims of mass casualties, and years of work with the tools utilized in bitemark analysis, Dr. Johnson meets the statutory requirements for dental expertise.<sup>164</sup>

Under the third prong, the testimony offered must help the fact finder "to understand the evidence or to determine a fact in issue."<sup>165</sup> Certainly, when bitemarks are left in the flesh of a victim of a violent crime, some odontological testimony could help the jury understand the significance of the bitemarks and therefore should be admissible. Regularly admissible odontological testimony should include descriptions of bitemarks, explanations of which teeth might have made certain marks, and any evidence that excludes individuals whose teeth could not have inflicted the wound. This type of testimony can be adequately based on the expertise of an odontological witness and inevitably satisfies this third prong.

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160. If he could have based his conclusive bitemark-matching testimony on some kind of statistical analysis, Dr. Johnson would have helped the jury quantify the likelihood that Stinson committed the crime.

161. See Saks & Faigman, *supra* note 28, at 155 (arguing that "the absence of knowledge has been filled with assertions supported by little more than intuition, anecdote, and *ipse dixit*").

162. See Richmond, *supra* note 94 and accompanying text.

163. WIS. STAT. § 907.02 (2005-06).

164. A counterargument to Dr. Johnson's qualifications might be that, though he had the knowledge, experience, and education to be a dental expert, this training did not apply to his ability to conclusively match a dentition to a bitemark. That is, though he may have been qualified to offer a variety of types of expert dental testimony, this type was not encompassed by his education. Such a standard of admission under this prong would place a cumbersome burden on trial judges, not just to evaluate the relevance of the evidence itself, but also the intricacies of whether an expert's experience qualifies him to offer very specific kinds of testimony.

165. WIS. STAT. § 907.02 (2005-06).

However, the extent to which odontological testimony assists the trier of fact to understand bitemark evidence is limited. If a forensic odontologist offers testimony that a “match” exists or that the bitemark was inflicted by one individual to the exclusion of all others, he or she is actually clouding the view of the evidence for the fact finder. When Dr. Johnson testified that the bitemarks “would have to have been made by Robert Lee Stinson” and “with no margin for error,”<sup>166</sup> he was misleading the jury to believe that he *knew* that Stinson inflicted the bites. Without any basis for such an assertion, he cannot possibly be assisting the jury to understand the bitemark evidence. Statements of certainty that have no basis whatsoever in science, like those Dr. Johnson offered, do not meet this third requirement; bitemark identification cannot and does not illuminate facts in issue or the truth of a matter if it is speculative or blatantly misleading.<sup>167</sup>

The common argument supporting the notion that bitemark-matching testimony will assist the fact finder is that the opposing side has the opportunity to cross-examine the witness or present another expert.<sup>168</sup> However, there are few attorneys who understand the intricacies of forensic odontology, and oftentimes defendants lack the resources to seek out and procure another odontologist.<sup>169</sup> Without either the requisite knowledge or the ability to enlist a qualified expert, defense attorneys will not be able to adequately cross-examine a prosecution’s odontologist. Ensuring that the presented scientific testimony actually has the potential to assist the trier of fact will prevent these contingencies and protect the rights of defendants. Excluding evidence that purports to conclusively match a bitemark to one specific dentition will aid juries in truly understanding evidence and determining facts in issue.

### 1. THE *PETERS* EXCEPTIONS

Despite Wisconsin’s liberal standard for admissibility, courts have outlined a series of exceptions through which scientific evidence like bitemark testimony can be rendered inadmissible. Wisconsin’s three-prong standard for the admissibility of scientific evidence has long allowed for much testimony to be offered and has long relied on cross-

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166. Stinson Transcript, Dec. 11, 1985, AM, *supra* note 44, at 77, 83.

167. See Saks & Faigman, *supra* note 28, at 154.

168. See, e.g., *Delaware v. Fensterer*, 474 U.S. 15, 20 (1985) (noting the importance of effective cross-examination and the presentation of an opposing expert witness); Moriarty & Saks, *supra* note 19, at 31 (suggesting that defense attorneys frequently go to trial on the assumption that “they can expose all of the weaknesses they need to on cross-examination”).

169. See Pretty & Sweet, *supra* note 78, at 8.

examination to impeach offered evidence.<sup>170</sup> Because so much expert testimony—including that which purports to match bitemarks—has been admitted, it may be unlikely for such evidence to be deemed inadmissible on the face of this standard. In *State v. Peters*,<sup>171</sup> however, a Wisconsin court enumerated six exceptions to the relevancy test and summarized them as reasons why judges can exclude otherwise relevant evidence.<sup>172</sup> Though they are just factors that judges can take into consideration, bitemark matching fits into four of these exceptions: (1) the “probative value” of bitemark-matching testimony “is outweighed by its prejudice to the defendant,” (2) “the area of testimony is not suitable for expert opinion,” (3) “the evidence will involve a waste of judicial . . . resources,” and (4) the jury would be able to reach its own conclusions without the matching testimony.<sup>173</sup>

First, though it sounds impressive and highly probative, the value of bitemark-matching testimony is exaggerated and outweighed by the extent to which it prejudices the defendant. As discussed above, there is a difference between bitemark evidence that describes the bitemarks or excludes possible suspects and that which purports to “match.”<sup>174</sup> But the lack of any basis for the declaration of a “match” reduces the otherwise-substantive probative value of bitemark-matching testimony.<sup>175</sup>

More importantly, such evidence inflicts dramatic prejudice on the defendant who, at best, can only cross-examine the odontologist or produce a dentist offering conflicting testimony. Juries who hear from a witness qualified by the court as an expert that a bitemark “would have to have been made by” the defendant are likely to believe this testimony. The *Stinson* jury, which heard exactly that testimony, believed it and subsequently convicted Stinson.<sup>176</sup>

In an age of television programs depicting various types of fictional and real forensic sciences as capable of solving crimes, juries seem likely to defer to the testimony of a forensic odontologist.<sup>177</sup> Juries

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170. See Daniel D. Blinka, *Expert Testimony and the Relevancy Rule in the Age of Daubert*, 90 MARQ. L. REV. 173, 174 (2006).

171. 192 Wis. 2d 674, 534 N.W.2d 867 (Ct. App. 1995).

172. *Id.* at 689, 534 N.W.2d at 873.

173. *Id.*

174. See Moriarty & Saks, *supra* note 19, at 18.

175. Testimony purporting to “match” a bitemark to an individual dentition is speculative and subjective and, therefore, by definition not probative. See Risinger et al., *supra* note 101, at 26–27.

176. Stinson Transcript, Dec. 12, 1985, PM, *supra* note 49, at 36.

177. Kit R. Roane, *The CSI Effect*, U.S. NEWS & WORLD REP., Apr. 25, 2005, at 48, 51, available at <http://www.usnews.com/usnews/culture/articles/050425/25csi.htm>.

may be captivated by expert testimony that purports to definitively match physical or biological evidence at a crime scene to a specific individual.<sup>178</sup> When a jury hears that a tire print, shoe print, fingerprint, or bitemark could only have been made by the defendant's car, sneakers, hand, or tire, how could a jury not convict?

Disallowing evidence presented in the guise of being probative but that is actually prejudicial is the responsibility of Wisconsin judges.<sup>179</sup> The *Peters* court outlines a framework a judge can use to exclude such evidence or admit only probative portions of that evidence.<sup>180</sup> For example, the probative value of an odontologist's testimony that a bitemark is "consistent with" the defendant's teeth is still high, but also much more accurate and far less prejudicial than testimony claiming a "match."

Second, bitemark-matching testimony seems likely to be an area not suitable for expert opinion because of its lack of scientific underpinnings. If other forensic odontological evidence—including statements that bitemarks are merely "consistent with" an individual's teeth—is separated from the conclusive "matching" testimony, the former category is ripe for admissible expert opinion while the latter is not. Suitability for expert opinion has yet to be explicitly defined by a Wisconsin court. In *Steele v. State*,<sup>181</sup> the Wisconsin Supreme Court outlined a public-policy argument against the admissibility of psychiatric testimony regarding the ability to form intent by questioning the extent to which the expert testimony was "scientifically sound."<sup>182</sup> The court ultimately decided that such testimony is not suitable for expert opinion, but it did not outline a basis for what would or would not be deemed suitable.<sup>183</sup>

Whether an area of testimony is suitable for expert opinion has to be based at least in part on what underpinnings, if any, support the testimony. Such a requirement seems to encompass some of the *Daubert* elements of testability and peer review.<sup>184</sup> If a technique has been and is able to be tested, or has been subjected to appropriate peer review, it is suitable for expert opinion.<sup>185</sup> It is logical for the corollary to be true: a technique is unsuitable for expert opinion if it cannot be

178. See generally Joel Cooper et al., *Complex Scientific Testimony: How Do Jurors Make Decisions?*, 20 LAW & HUM. BEHAV. 379 (1996).

179. WIS. STAT. § 904.03 (2005-06).

180. *State v. Peters*, 192 Wis. 2d 674, 689, 534 N.W.2d 867, 873 (Ct. App. 1995).

181. 97 Wis. 2d 72, 294 N.W.2d 2 (1980).

182. *Id.* at 96-97, 294 N.W.2d at 13.

183. *Id.*

184. *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 593-95 (1993).

185. See *supra* Part III.A.1.

tested or has not been subject to sufficient peer review. Because bitemark-matching testimony does not meet these prongs of *Daubert*,<sup>186</sup> it is not suitable for expert testimony. Though bitemark science can be used in other ways more suitable for expert opinion, matching a bitemark to an individual human dentition is not one of them.

Third, admitting bitemark-matching testimony is a waste of judicial time and resources, especially if the testimony will not advance a trial or, worse, will cloud a jury's ability to get to the truth. The argument in favor of admitting bitemark-matching testimony involves the ability of the opposing side to cross-examine the witness or call another odontologist.<sup>187</sup> Such a recourse unavoidably consumes judicial resources. Instead, by limiting the level of certainty that will be admitted in an odontologist's testimony, the court will reduce the time it would take for the opposing side to cross-examine the witness and perhaps obviate the need for an opposing expert.

Fourth, the jury would be able to reach its own conclusions without the bitemark-matching testimony. Forensic odontological testimony, when limited to what falls within an odontologist's base of knowledge or research, provides the jury with useful information and background that it would otherwise lack. This type of information—explaining the bitemark evidence and perhaps making a “consistent with” assertion—is not the type about which a jury could draw its own conclusions without expert testimony. But when the odontologist pushes interpretation to the brink of speculation by declaring that an individual's dentition fits into a bitemark to the exclusion of all other dentitions, he or she would be better off allowing the jury to reach its own conclusions without the testimony.

In this respect, bitemark matching is like handwriting matching.<sup>188</sup> Two handwriting samples can be consistent with one another, but there is no empirical basis for handwriting to be a “match” to the exclusion of all others.<sup>189</sup> In fact, there is an argument that a layperson may be as qualified as an expert when testimony evaluates similarities between two samples.<sup>190</sup> Similarly, no odontologist has the training, knowledge, or scientific basis to declare a match, and any layperson is capable of looking at a set of teeth and lining it up with a bitemark. At least one

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186. See *supra* Part III.A.

187. See Moriarty & Saks, *supra* note 19, at 31 (noting the common misconception that fallibilities in expert testimony can be exposed on cross-examination).

188. See Moriarty & Saks, *supra* note 19, at 21.

189. See *id.*

190. See, e.g., *United States v. Hines*, 55 F. Supp. 2d 62, 69 (D. Mass. 1999) (stating that in some instances “[t]here is no question that lay witnesses are permitted to draw inferences of authorship from handwriting”).

court has implied that jurors could perform their own evaluation of bitemark-matching evidence.<sup>191</sup> Without data to support a match or even to calculate the probability of a match, a jury is just as able to draw conclusions from bitemark evidence as a forensic odontologist who would be willing to testify beyond the proven limits of bitemark analysis in his or her testimony.

## 2. THE POLYGRAPH PARALLEL

The manner in which Wisconsin courts have dealt with the prejudicial flaws and dangers of polygraph evidence provides a cogent parallel to bitemark-matching testimony. Polygraph evidence has been ruled inadmissible in Wisconsin and questioned in courts throughout the country.<sup>192</sup> Though the exclusion of polygraph evidence rests not on the lack of scientific or empirical underpinnings, the precedent-setting Wisconsin case lays the foundation for the exclusion of evidence that does lack these evidentiary prerequisites.<sup>193</sup> In fact, multiple courts have compared bitemark-matching evidence to polygraph evidence.<sup>194</sup>

In *State v. Dean*,<sup>195</sup> the Wisconsin Supreme Court made several important observations regarding how a technique's reliability factors into the state's relevancy test for admissibility. First, the court acknowledged the division between the legal and scientific communities on whether the polygraph was reliable or useful in criminal cases.<sup>196</sup> The court noted that "while the polygraph is enveloped in an aura of scientific precision and objective measurement of body responses," the individual examiner subjectively and almost exclusively controls the process by which conclusions are drawn.<sup>197</sup> The court acknowledged that multiple states exclude polygraph evidence on the basis that it lacks scientific reliability.<sup>198</sup> Finally, the court stated that judges "obviously

191. *People v. Marx*, 126 Cal. Rptr. 350, 356 (Ct. App. 1975).

192. *See, e.g., State v. Dean*, 103 Wis. 2d 228, 307 N.W.2d 628 (1981) (holding that polygraph evidence should no longer be admitted in criminal proceedings); *United States v. Urquidez*, 356 F. Supp. 1363, 1367 (C.D. Cal. 1973) (noting that "the experience of this case has amply shown that, as of now, the validity of a polygraphic test is dependent upon a large number of variable factors, many of which would be very difficult, and perhaps impossible, to assess").

193. *See Dean*, 103 Wis. 2d at 228-79, 307 N.W.2d at 629-53.

194. *See, e.g., Marx*, 126 Cal. Rptr. 350; *Niehaus v. State*, 359 N.E.2d 513 (Ind. 1977).

195. 103 Wis. 2d 228, 307 N.W.2d 628.

196. *Id.* at 234-35, 307 N.W.2d at 632.

197. *Id.* at 237, 307 N.W.2d at 633.

198. *Id.* at 265, 307 N.W.2d at 646. These examples included states that excluded polygraph evidence due to a lack of scientific reliability, as well as because the prejudicial effect of the evidence outweighed its probative value. *Id.*

fear that the trier of fact will be unduly persuaded by the polygraph thinking it infallible scientific evidence” and that polygraph evidence is ostensibly cloaked in a façade of objectivity and infallibility so great as to overwhelm a jury instruction designed to counter it.<sup>199</sup>

Despite these acknowledgements, the court explicitly stated that it would not hold either that the polygraph is acceptable as scientific evidence or that it is so unreliable as to be categorically inadmissible.<sup>200</sup> In fact, the court stated that it recognized that the polygraph was, at least to an extent, valid.<sup>201</sup> The court ultimately was moved by the possibility that polygraph evidence presented a prejudicial effect significant enough that it outweighed its probative value.<sup>202</sup>

The court’s acknowledgements about the failings and risks of polygraph testimony and its holding that the polygraph’s prejudicial effect may outweigh its probative value present an interesting and useful parallel to bitemark-matching testimony. As with polygraph evidence, there are substantive scientific and legal disputes as to whether bitemark matching has any basis in science.<sup>203</sup> The *Dean* court registered its concern about the division in these communities over the reliability of polygraph evidence.<sup>204</sup> Because there is greater concern about and less support for bitemark-matching testimony, Wisconsin courts should be more inclined to exclude bitemark identification than polygraph evidence.

Also like polygraph evidence, bitemark-matching testimony is draped in an “aura of scientific precision and objective measurement . . . .”<sup>205</sup> Forensic odontologists like Dr. Johnson in the *Stinson* case talk about the number of bitemarks present, the total number of individual teeth presenting in the bitemarks, and testify that their conclusions were reached using the objective standards sanctioned by the American Board of Forensic Odontology.<sup>206</sup> In reality, without an iota of statistical or empirical support for testimony that “matches” teeth to a bitemark, this line of odontological testimony is incredibly subjective.<sup>207</sup> This type of analysis and opinion is drawn—just as the court noted regarding polygraph evidence—from a protocol that is

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199. *Id.* at 276, 307 N.W.2d at 652.

200. *Id.* at 265, 307 N.W.2d at 646.

201. *Id.* at 278, 307 N.W.2d at 653.

202. *Id.* at 279, 307 N.W.2d at 653.

203. *See supra* Part II.

204. *Dean*, 103 Wis. 2d at 234–35, 307 N.W.2d at 632.

205. *Id.* at 237, 307 N.W.2d at 633.

206. *See State v. Stinson*, 134 Wis. 2d 224, 230–31, 397 N.W.2d 136, 138 (Ct. App. 1986).

207. *See* Risinger et al., *supra* note 101, at 26–27.

“almost completely in the control of the examiner.”<sup>208</sup> It is merely the odontologist’s subjective opinion that forms the basis for a declared match.

The *Dean* court’s concern about the powerful impact that polygraph evidence has on juries translates well onto bitemark-matching evidence. Studies show that jurors are generally susceptible to and persuaded by expert evidence.<sup>209</sup> This includes both polygraph evidence and forensic-odontological evidence. Conventional wisdom dictates that the most persuasive form of any type of expert testimony is that which purports to conclusively identify a perpetrator or tie a defendant to a crime. The concerns about polygraph evidence rest in the possibility that jurors will hear that an individual passed or failed a polygraph test, and that the results of this test will dictate guilt or innocence.<sup>210</sup> This is exactly what happens when a jury hears testimony like that which Dr. Johnson offered against Stinson: it would be hard for testimony to be more conclusive than that the bitemarks “would have to have been made by Robert Lee Stinson.”<sup>211</sup> This is the precise type of expert testimony that the *Dean* court feared would fall victim to a jury’s “inclination to accept the seemingly objective and scientific evidence.”<sup>212</sup>

In addition to these acknowledgements that weighed on the *Dean* court in rendering its decision,<sup>213</sup> the court’s holding was predicated on Wisconsin Statutes section 904.03, which precludes courts from admitting evidence when its prejudicial effect on the defendant outweighs its probative value.<sup>214</sup> The *Dean* court cited a decision in which the prejudicial effect of polygraph was deemed to meet the court’s worst fears: juries were swayed by the “aura” of the lie detector test to the point that it was inhibiting their ability to act as just fact-finders.<sup>215</sup> Just as polygraph evidence brings with it an inadmissible amount of prejudicial effect, so too does bitemark-matching testimony.

In addition to the lack of scientific and empirical bases for the testimony, the conclusive, certain, and misleading nature of a bitemark “match” brings too much prejudicial effect on the defendant to be

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208. *Dean*, 103 Wis. 2d at 237, 307 N.W.2d at 633.

209. See Cooper et al., *supra* note 178, at 382.

210. See, e.g., *Dean*, 103 Wis. 2d at 276, 307 N.W.2d at 652.

211. Stinson Transcript, Dec. 11, 1985, AM, *supra* note 44, at 77, 83.

212. *Dean*, 103 Wis. 2d at 276, 307 N.W.2d at 652.

213. *Id.* at 265, 301 N.W.2d at 646.

214. WIS. STAT. § 904.03 (2005–06).

215. The court cited a Louisiana decision which, though acknowledging what it deemed to be the reliability of polygraph evidence, ruled such evidence was too prejudicial to be admitted. *Dean*, 103 Wis. 2d at 265, 307 N.W.2d at 646 (citing *State v. Catanese*, 368 So. 2d 975, 981 (La. 1979)).

admissible. The same juries that are swayed by polygraph evidence—even in the face of an instruction, which the *Dean* court took into account<sup>216</sup>—will invariably be moved by testimony that matches a defendant's teeth to bitemarks on a victim's body,<sup>217</sup> as Dr. Johnson testified, “with no margin for error.”<sup>218</sup> Where the probative value of evidence is so outweighed by its prejudicial effect, it must be held to be unconditionally inadmissible.<sup>219</sup>

Though polygraph evidence and bitemark-matching testimony may have little in common in terms of what they attempt to uncover, both are techniques that have little scientific or statistical basis, are entirely in the hands of the examiner, are far more subjective than the actual testimony offered would portend, and introduce an effect so prejudicial as to outweigh almost any probative value. Wisconsin courts can and should use the *Dean* decision as a framework for rejecting bitemark-matching testimony.

#### CONCLUSION

Research has exposed critical and fundamental flaws in the theories—or lack thereof—behind bitemark-matching evidence.<sup>220</sup> Without any scientific, empirical, or statistical basis, there are no grounds for an odontologist to declare that a bitemark in skin “would have to have been made by” a particular individual. Fortunately, the governing odontological organization now recommends against using statements that imply too high a degree of certainty when testifying about bitemarks.<sup>221</sup> However, even the terminology still supported by the organization implies an impossibly high degree of certainty.

Ray Krone spent a decade in Arizona prisons for a crime he did not commit.<sup>222</sup> But for the physical evidence in his case that could be tested for DNA and prove his innocence, he would likely still be awaiting his execution today. Likewise, Robert Lee Stinson, whose conviction was based almost exclusively on flawed and baseless bitemark testimony, spent nearly twenty-four years in a Wisconsin prison with the hope that a judge would recognize the inadequacy of the

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216. *Dean*, 103 Wis. 2d at 248, 307 N.W.2d at 636–37.

217. See generally Cooper et al., *supra* note 178, at 382.

218. Stinson Transcript, Dec. 11, 1985, AM, *supra* note 44, at 83.

219. See *State v. Peters*, 192 Wis. 2d 674, 689, 534 N.W.2d 867, 873 (Ct. App. 1995).

220. See *supra* Part II.

221. AMERICAN BOARD OF FORENSIC ODONTOLOGY, *supra* note 34.

222. See *supra* notes 1–7 and accompanying text.

case against him and the strong evidence supporting his claim of innocence.<sup>223</sup>

Even though bitemark-matching testimony has yet to be ruled inadmissible under modern standards of admissibility, these standards do provide a framework under which a judge could so rule.<sup>224</sup> *Daubert* outlined five factors that judges could—and should—take into account when deciding whether to allow certain expert testimony. When evaluated under these factors, bitemark-matching testimony fails on every count. Even in a state like Wisconsin, where the evidentiary standard is far more inclusive than the *Daubert* standard, courts have created a template for judges to appraise the credibility of expert testimony. Under the exceptions to the Wisconsin relevancy test enumerated in *Peters*,<sup>225</sup> a judge could easily find grounds to render bitemark-matching testimony inadmissible.

Given the social science research damning the bases upon which bitemark-matching testimony supposedly rests, the individuals sent to prison by bitemark evidence but later proven to be innocent, and the real possibility that more people could be convicted wrongfully by the tenets of a junk science, courts must begin to rule inadmissible any testimony that purports to match a bitemark in skin to an individual's dentition. The path toward such a ruling exists in cases like *Daubert* and *Peters*, and the lives of innocent men like Ray Krone and Robert Lee Stinson depend on it.

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223. See *supra* notes 35–52 and accompanying text.

224. See *supra* Part III.B.1–2.

225. *State v. Peters*, 192 Wis. 2d 674, 689, 534 N.W.2d 867, 873 (Ct. App. 1995).