

REGULATING BITE MARK EVIDENCE: LESBIAN VAMPIRES AND OTHER MYTHS OF FORENSIC ODONTOLOGY

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Abstract: This is the third piece in a trilogy that examines and evaluates the standards that American courts apply to admit forensic “science” evidence proffered by prosecutors in criminal trials. The first two articles in the trilogy expose the criminal courts’ on-going practice of admitting false forensic evidence that is virtually always excluded in civil cases. They also advance a panoply of procedural and evidentiary solutions aimed at reforming this legally unviable discrepancy. Those solutions are court-centric insofar as they advocate for, among other things, open and early criminal discovery, pre-trial *Daubert* hearings to challenge evidence and experts, and court-appointment of qualified forensic science experts.

This Article takes a comprehensive look at the criminal courts’ treatment of scientifically rebuked bite mark identification evidence. Bite mark identification testimony is unreliable and, as a result, is responsible for dozens of wrongful convictions. Moreover, bite mark analysts have targeted sexual minority defendants by baselessly theorizing that bite marks are more common in crimes involving sexual minorities, generally, and lesbians, more particularly. American courts continue to admit bite mark identification testimony notwithstanding its lack of scientific validation, recurring role in wrongful convictions, and espousal of lesbian vampire mythology.

This Article, therefore, does not rely on the criminal legal system to keep faulty bite mark identification evidence out of the courts. Instead, it demands that the scientific community of forensic odontologists and dentists police flawed bite mark testimony. Specifically, it calls on the national and state forensic odontology oversight entities to enhance their weak or non-existent regulation of bite mark proponents and fulfill their legal mandate to protect the public from unscrupulous and unsupported expert testimony. It further proposes that state boards of dental practice satisfy their statutory mandates and discipline licensee dentists who provide faulty bite mark identification evidence in court.

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INTRODUCTION

“Science does move on. So should the Criminal Justice system”¹

This is the third in a trilogy of articles and essays that dissect and critique the unjustifiably lax and, sometimes, non-existent admission standards that American courts apply to forensic “science” evidence proffered by prosecutors in criminal trials. As the first essay in this trilogy² explains, the Federal Rules of Evidence and virtually every one of its state counterparts are trans-substantive. Consequently, the evidentiary rules that pertain to the admission of expert forensic evidence in civil cases are identical to those that apply in criminal cases. This uncontroversial contention notwithstanding, judges presiding over criminal cases routinely admit unreliable forensic expert evidence that fails to comport with the applicable evidentiary rules and that those very same judges reject in civil cases.³

The first Article in our trilogy, *Discovering Forensic Fraud*, examines the various rationales that have been advanced to explain this extra-legal discrepancy and proposes a potential solution.⁴ Specifically, it advocates that jurisdictions amend their rules of criminal procedure to create open file discovery rights for criminal defendants analogous to the robust discovery rights that pertain to civil litigants under the federal and state rules of civil procedure.⁵

Our second Article, *Evidence on Fire*,⁶ drills down on one particularly disreputable area of forensic evidence to expose the gulf between the types of flimsy arson evidence admitted by the criminal courts and the high-

1. C. Michael Bowers, *Bite Mark Evidence*, in FORENSIC SCI. REFORM: PROTECTING THE INNOCENT 145, 150 (Wendy J. Koen & C. Michael Bowers eds., 2017).

2. Jennifer D. Oliva & Valena E. Beety, *Discovering Forensic Fraud*, 112 NW. U. L. REV. 121 (2017).

3. See, e.g., Jane Campbell Moriarty, *Will History Be Servitude?: The NAS Report on Forensic Science and the Role of the Judiciary*, 2010 UTAH L. REV. 299, 315 (2010) (explaining that “[i]n civil cases, courts seem quite up to the task of evaluating microbiology, teratology, and toxicology evidence . . . [y]et when it comes to evaluating the shortcomings of lip prints and handwriting, courts are unable to muster the most minimal grasp of why a standardless form of comparison might lack evidentiary reliability or trustworthiness”); D. Michael Risinger, *Navigating Expert Reliability: Are Criminal Standards of Certainty Being Left on the Dock?*, 64 ALB. L. REV. 99, 99 (2000) (demonstrating that “as to proffers of asserted expert testimony, civil defendants win their *Daubert* reliability challenges to plaintiffs’ proffers most of the time, and that criminal defendants virtually always lose their reliability challenges to government proffers”).

4. Oliva & Beety, *Discovering Forensic Fraud*, *supra* note 2, at 125–27.

5. *Id.* at 134–37.

6. Valena E. Beety & Jennifer D. Oliva, *Evidence on Fire*, 97 N.C. L. REV. 483 (2019).

quality fire science expert testimony those same courts demand in civil cases. As the article explains, criminal courts continue to allow non-science trained law enforcement officers to regale the jury with proven-false, arson-related myths, which then leads to wrongful convictions.⁷ Thus, the first two pieces in our trilogy expose the criminal courts' ongoing practice of admitting false forensic evidence that is virtually always excluded in civil cases and advance procedural and evidentiary solutions aimed at reform. Those solutions are court-centric insofar as they advocate for open and early criminal discovery, pre-trial *Daubert*⁸ hearings to challenge evidence and experts, and court-appointment of qualified forensic science experts.

As empirical research and the relevant literature illustrates, judges have proven resistant to excluding questionable forensic science evidence during criminal trials, preferring to leave it to lay jurors to discern between reliable methodologies and junk science.⁹ Studies demonstrate that even when jurors are apprised of the problems with forensic evidence through cross-examination, such knowledge has little impact on their decision-making.¹⁰ As a result, we take a different tack in this final Article in our trilogy.

This Article conducts a deep examination of criminal courts' treatment of scientifically rebuked bite mark identification evidence. Research conclusively proves that bite mark identification analysis fails in its trifecta of primary assertions: (1) that experts can differentiate a human bite mark from other bite marks; (2) that experts can associate bite marks with a suspect's dentition;¹¹ and (3) that experts can estimate the

7. *Id.* at 486–87.

8. *Daubert v. Merrell Dow Pharm.*, 516 U.S. 579 (1993).

9. See, e.g., Erin Murphy, *The New Forensics: Criminal Justice, False Certainty, and the Second Generation of Scientific Evidence*, 95 CALIF. L. REV. 721, 724 (2007) (noting that “[e]xamination studies have demonstrated the shocking degree to which the criminal justice system has historically failed to prevent the government from deploying spurious sciences and faulty or fraudulent evidence to aid in the conviction of innocent defendants,” and “one study found that defective scientific evidence contributed to over one-half of wrongfully obtained convictions”); see also Aliza B. Kaplan & Janis C. Puracal, *It’s Not a Match: Why the Law Can’t Let Go of Junk Science*, 81 ALB. L. REV. 895, 898 (2018) (arguing that “the law (along with many actors in the criminal justice system) turns a blind eye to advances in science, insisting that it must follow precedent”).

10. Dawn McQuiston-Surrett & Michael J. Saks, *Communicating Opinion Evidence in the Forensic Identification Sciences: Accuracy and Impact*, 59 HASTINGS L.J. 1159, 1167–69 (2008) (explaining that “[w]hether or not jurors were informed about the limitations of microscopic hair examination on cross-examination or by the judge had little measurable or meaningful impact on their judgments about the likelihood that the defendant was the source of the crime-scene hair or their perceived understanding of the expert’s testimony”).

11. The medical term “dentition” refers to “the character of a set of teeth especially with regard to their number, kind, and arrangement.” *Dentition*, MERRIAM-WEBSTER DICTIONARY ONLINE, <https://www.merriam-webster.com/dictionary/dentition> [<https://perma.cc/9B4Y-HKFM>].

frequency of such an association.¹² Indeed, studies demonstrate that forensic odontologist bite mark identification error rates are the highest of any forensic identification specialty.¹³

Consistent with such findings, bite mark identification testimony is responsible for dozens of wrongful convictions,¹⁴ several of which involve sexual minorities.¹⁵ This is because certain forensic odontologists have advanced the scientifically baseless and stigmatizing claim that bite marks are more common in crimes involving sexual minorities, generally, and lesbians, specifically.¹⁶ Worse yet, criminal courts have permitted bite mark experts to provide this sort of illegitimate and highly-inflammatory opinion testimony to juries in cases involving sexual minority defendants.¹⁷

The bottom line is that American trial courts continue to admit bite mark identification testimony notwithstanding its lack of scientific validation, starring role in wrongful convictions, and espousal of lesbian vampire mythology. Pleas aimed at the judiciary to reform this problematic practice have fallen on deaf ears. As journalist Radley Balko has aptly observed, “[t]he fact that no [trial] court has yet to rule against ‘scientific [bite mark] evidence’ that nearly every scientist in the country agrees *isn’t* scientific at all is a damning indictment of the courts and their inability to self-correct.”¹⁸

This Article does not rely on the courts or the criminal legal system to remedy the admission of faulty bite mark identification testimony.

12. NAT’L RESEARCH COUNCIL OF THE NAT’L ACADS., STRENGTHENING FORENSIC SCIENCE IN THE UNITED STATES: A PATH FORWARD 175–76 (2009) [hereinafter NAS REPORT], <https://www.ncjrs.gov/pdffiles1/nij/grants/228091.pdf> [<https://perma.cc/Z9VR-ADYV>]; Pamela Zarkowski, *Bite Mark Evidence: Its Worth in the Eyes of the Expert*, 1 J.L. & ETHICS IN DENTISTRY 47, 52 (1988) (“The acceptance of bite mark analysis as a scientific procedure evolved from a weak beginning . . . Experiments were not conducted, nor were techniques tested, to apply the theory of bite mark analysis and evaluate the concept . . . The acceptance of bite mark evidence seemed to be premised on the assumption that anatomical configurations, like fingerprints, are unique to each individual, although support for this belief was not apparent.”).

13. See, e.g., Gowri Vijay Reesu & Nathan Lee Brown, *Inconsistency in Opinions of Forensic Odontologists When Considering Bite Mark Evidence*, 266 FORENSIC SCI. INT’L 263, 263 (2016); Michael J. Saks et al., *Forensic Bitemark Identification: Weak Foundations, Exaggerated Claims*, 3 J.L. & BIOSCIENCES 538, 540 (2016).

14. Seth Augenstein, *Bite-Mark Evidence Should Be ‘Deceased,’ Dentist Says*, FORENSIC MAG., (Nov. 5, 2018, 12:22 PM), <https://www.forensicmag.com/news/2018/11/bite-mark-evidence-skin-should-be-deceased-dentist-says> [<https://perma.cc/KL3E-RF3Z>].

15. Affidavit of Ruthann Robson, Professor of Law & Univ. Distinguished Professor, CUNY School of Law (Feb. 2012) [hereinafter Robson Affidavit] (on file with the authors).

16. See *Stubbs v. State*, 845 So. 2d 656, 661–69 (Miss. 2003).

17. *Id.*

18. Radley Balko, *Incredibly, Prosecutors are Still Defending Bite Mark Evidence*, WASH. POST (Jan. 30, 2017), https://www.washingtonpost.com/news/the-watch/wp/2017/01/30/incredibly-prosecutors-are-still-defending-bite-mark-evidence/?utm_term=.b174ec1ea4ba [<https://perma.cc/LC9L-FQWZ>].

Instead, it seeks broad regulatory responses from the scientific community. Specifically, it calls on the national and state entities responsible for the oversight of forensic odontology, including national accreditation and certifying organizations, state forensic science commissions, and state boards of dental practice, to take responsibility, enhance their weak or non-existent regulation of bite mark proponents, and fulfill their mandate to protect the public from unscrupulous and unsupported expert testimony.

This Article proceeds in six parts. Part I provides a brief overview of the field of forensic odontology and the development and methodology of bite mark analysis. Part II chronicles the litany of criticism that has been levelled at bite mark identification evidence, surveys the studies that prove bite mark identification error rates are extraordinary, and summarizes the significant role that bite mark identification testimony has played in dozens of wrongful convictions. Part II also explains that bite mark experts have advanced scientifically unfounded and stigmatizing claims—based in lesbian vampire and other pop culture mythologies—that bite marks are more common in crimes involving sexual minorities, and that the courts have permitted these experts to submit these theories to the jury as opinion evidence in cases involving sexual minority defendants.

Part III examines the bite mark identification evidence case law pre- and post-*Daubert* and discusses state legislative interventions aimed at enhancing incarcerated individuals' opportunities to challenge faulty bite mark expert evidence on post-conviction review. Part IV introduces and evaluates the regulation and oversight of forensic odontology evidence at the federal and state level. Part V concludes this Article by proposing extra-judicial solutions aimed at the national forensic odontology accreditation and certification organizations and the state boards of dental practice. These solutions are intended to limit the admissibility of faulty forensic bite mark evidence in criminal proceedings.

I. BITE MARK IDENTIFICATION OVERVIEW

“Bitemark identification presents especially challenging questions to odontologists and, in turn, to courts.”¹⁹

19. DAVID L. FAIGMAN ET AL., 4 MODERN SCIENTIFIC EVIDENCE: THE LAW AND SCIENCE OF EXPERT TESTIMONY § 35:1 (2018) [hereinafter MODERN SCIENTIFIC EVIDENCE].

A. *Forensic Odontology*

Forensic dentistry has a long and storied history, dating back to at least 49 A.D., when the Roman Emperor Nero's mother, Agrippina, "recognized her rival Lollia-Paulina's discolored front teeth after her assassination."²⁰ Forensic dentistry,²¹ which is known today as forensic odontology and characterized as "the application of the science of dentistry to the field of law," comprises several sub-fields.²² These include: (1) dental identification of bodies of victims of crime or disaster; (2) bite mark comparison; (3) trauma and oral injury; and (4) dental malpractice.²³

The forensic odontology sub-field of bite mark comparison is of relatively recent vintage.²⁴ This is because the historic practice of forensic odontology has primarily focused on identifying the victims of natural disasters, wars, and other calamities, which involves comparing a victim's dentition to a limited set of dental records.²⁵ Patriot Paul Revere, for example, is often cited as "America's first forensic dentist" due to his work identifying soldiers who died in the Revolutionary War.²⁶

20. Anoop K. Verma et al., *Role of Dental Expert in Forensic Odontology*, 5 NAT. J. MAXILLOFACIAL SURGERY 2, 2 (2014), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4178350/?report=reader#_ffn_sec1title [https://perma.cc/E62V-EFA2]; see also Bruce R. Rothwell, *Bite Marks in Forensic Dentistry: A Review of Legal, Scientific Issues*, 126 J. AM. DENTAL ASS'N 223, 223 (1995), https://pdfs.semanticscholar.org/101e/61ff69c7e6778a8eeac3d099f2bc527e0c33.pdf?_ga=2.79531031.2066121463.1570898679-1866739416.1570898679 [https://perma.cc/4X9W-BJ44] (explaining that "William the Conqueror reportedly validated royal documents by biting into a wax seal with his characteristic dentition. Debtors coming from Britain or Europe to America to work as servants verified their agreements by biting the seal on the pact in lieu of a signature and became known as indentured servants.").

21. Amanda Lee Myers, *Bites Derided as Unreliable in Court*, ASSOCIATED PRESS (June 13, 2013), <https://news.yahoo.com/ap-impact-bites-derided-unreliable-court-150004412.html> [https://perma.cc/XB76-2EPW] (explaining that neither the FBI nor the American Dental Association recognizes the forensic odontology sub-field of bite mark identification analysis).

22. NAS REPORT, *supra* note 12, at 173.

23. *Id.*; see also IRVIN M. SOPHER, FORENSIC DENTISTRY 3–4 (1976).

24. ANDRE MOENSSENS ET AL., SCIENTIFIC EVIDENCE IN CIVIL AND CRIMINAL CASES § 16.07, at 985 (4th ed. 1995) (noting that "[t]he wholesale acceptance, by the courts, of testimony on bite mark identifications has transformed the profession. Whereas prior to 1974 the main thrust of forensic dentistry was to prove identity of persons by means of a comparison of postmortem and antemortem dental records in mass disasters, the profession has changed direction and is now heavily involved in assisting prosecutors in homicides and sex offense cases. Having received judicial approval of bite mark comparisons, there seems to be no more limit on the extent of forensic odontological conclusions.").

25. See *id.*

26. Paul Revere, *America's First Forensic Dentist*, NEW ENG. HIST. SOC'Y, <http://www.newenglandhistoricalsociety.com/paul-revere-americas-first-forensic-dentist/> [https://perma.cc/4LEL-7RW7]; see also William James Maloney & George Raymond, *Paul Revere: Founding Father and America's First Forensic Dentist*, 105 OKLA. DENTAL ASS'N J. 11, 11 (2014); Malvin E. Ring, *Paul Revere—Dentist, and Our Country's Symbol of Freedom*, 42 N.Y. ST. DENTAL J. 598, 559–601 (1976).

It is also important to note the significant differences between the deployment of dentistry to identify victims of disasters and wars, and the use of dental expertise to “match” a crime victim’s bite mark to a suspect’s dentition. As explained by dental expert and prominent forensic odontologist C. Michael Bowers:

In the disaster situation, there is a finite number of candidates to identify, and full dentition often is available from the victims as well as from the dental charts. In forensic bitemark cases, the number of potential suspects is huge, the bitemarks include only a limited portion of the dentition, and flesh is a far less clear medium than having the teeth (of the disaster victim) themselves.²⁷

Moreover, and as explained in detail in the following sections, while “the identification of human remains by their dental characteristics is well established in the forensic science disciplines, there is continuing dispute over the value and scientific validity of comparing and identifying bite marks.”²⁸

B. Development and Methodology of Bite Mark Analysis

The use of bite mark analysis to connect a criminal suspect with a crime in North America has its genesis in the infamous Salem witch trials.²⁹ Massachusetts Colony “witch hunter,” Cotton Mather, presented bite mark identification evidence to secure the conviction and execution of Reverend George Burroughs for the crime of recruiting several young girls to practice witchcraft.³⁰ The only evidence presented against Reverend Burroughs was the alleged “match” of his dentition to bite marks located on those girls.³¹ The prosecution forced open the Reverend’s mouth during his trial to compare his teeth with the bite marks on his purported victims present in the courtroom.³² Burroughs was posthumously exonerated of any crime and Massachusetts Colony ultimately compensated his surviving children for his wrongful execution.³³

27. C. Michael Bowers, *Identification from Bitemarks*, in *MODERN SCIENTIFIC EVIDENCE: THE LAW AND SCIENCE OF EXPERT TESTIMONY* § 35:1 (David L. Faigman et al. eds., 2010).

28. NAS REPORT, *supra* note 12, at 173 (citing Jules A. Kieser, *Weighing Bitemark Evidence: A Postmodern Perspective*, 1 J. FORENSIC SCI., MED. & PATHOLOGY 75–80 (2005)).

29. Radley Balko, *It Literally Started With a Witch Hunt: A History of Bite Mark Evidence*, WASH. POST (Feb. 17, 2015, 7:57 AM), <https://www.washingtonpost.com/news/the-watch/wp/2015/02/17/it-literally-started-with-a-witch-hunt-a-history-of-bite-mark-evidence/> [<https://perma.cc/2KTD-F3PH>] [hereinafter Balko, *History of Bite Mark Evidence*].

30. *Id.*

31. *Id.*

32. *Id.*

33. *Id.*

Bite mark analysis has been utilized to link suspects to crime victims in modern times for at least six decades.³⁴ Research indicates that bite marks are more prevalent in violent crimes, such as homicides, rapes, sexual assaults, and child abuse cases, than in other types of offenses.³⁵ A survey of 101 cases reported that “[b]itemarks were associated with the following types of crimes: murder, including attempted murder (53.9%), rape (20.8%), sexual assault (9.7%), child abuse (9.7%), burglary (3.3%), and kidnapping (2.6%).”³⁶ Because “[b]ite marks often are associated with highly sensationalized and prejudicial cases, . . . there can be a great deal of pressure on the examining expert to match a bite mark to a suspect.”³⁷

Like several of its sister forensic “science” disciplines, bite mark analysis lacks any standardized methodology or criteria.³⁸ The American Board of Forensic Odontology’s single attempt to develop a standardized bite mark methodology “failed . . . due to inter examiner discord and unreliable quantitative interpretation.”³⁹ Although bite mark identification methodology varies widely and is non-standardized, it generally involves a three-step process: first, the analyst preserves the bite mark evidence via photography, impression molding, or other techniques; second, they create a cast of the suspect’s dentition; and third, they compare the preserved bite mark evidence with the suspect’s dentition.⁴⁰ Succinctly stated, “[b]ite mark comparison protocols include measurement and analysis of the pattern, size, and shape of teeth against similar characteristics observed in an injury on skin or a mark on an object.”⁴¹ Unfortunately and as explained in more detail below, each step of this process is prone to distortion and riddled with human subjectivity.⁴²

34. NAT’L RESEARCH COUNCIL, REFERENCE MANUAL ON SCIENTIFIC EVIDENCE 104 (Paul C. Giannelli et al. eds., 3d ed. 2011) (citing Edward H. Dinkel, *The Use of Bite Mark Evidence as an Investigative Aid*, 19 J. FORENSIC SCI. 535 (1974)).

35. Iain A. Pretty & David J. Sweet, *Anatomical Location of Bitemarks and Associated Findings in 101 Cases from the United States*, 45 J. FORENSIC SCI. 812, 814 (2000).

36. *Id.* at 812.

37. NAS REPORT, *supra* note 12, at 175.

38. Erica Beecher-Monas, *Reality Bites: The Illusion of Science in Bite-Mark Evidence*, 30 CARDOZO L. REV. 1369, 1387 (2009) [hereinafter Beecher-Monas, *Reality Bites*] (explaining that bite mark analysis has “no official standards, no guidelines, no criteria”).

39. C. Michael Bowers, *Problem-Based Analysis of Bitemark Misidentifications: The Role of DNA*, 159S FORENSIC SCI. INT’L S104, S106 (2006).

40. Iain A. Pretty & David J. Sweet, *The Scientific Basis for Human Bitemark Analyses – A Critical Review*, 41 SCI. & JUST. 85, 87–90 (2001) [hereinafter Pretty & Sweet, *Scientific Basis*].

41. David J. Sweet et al., *Computer-Based Production of Bite Mark Comparison Overlays*, 43 J. FORENSIC SCI. 1050, 1050 (1998).

42. Beecher-Monas, *Reality Bites*, *supra* note 38, at 1387–88; Reesu & Brown, *supra* note 13, at 263–64.

II. BITE MARK IDENTIFICATION CRITICISM

“Bite mark evidence has been challenged . . . both because of its perceived lack of scientific merit and its potentially prejudicial aspects.”⁴³

A. *NAS Report*

It is well-documented that much of the forensic science expert evidence that courts routinely admit in criminal litigation teeters on a skeletal scientific foundation. In 2009, the National Academy of Sciences (“NAS”) issued a report, *Strengthening Forensic Science in the United States: A Path Forward*,⁴⁴ in which it criticized evidence proffered by comparison or matching forensic practitioners,⁴⁵ including fingerprint analysts, hair microscopy experts, bloodstain pattern analysts, fiber analysts, and forensic odontologists.⁴⁶ The NAS Report reserved particularly harsh criticism for the forensic odontology sub-discipline of bite mark comparison analysis.

Bite mark analysts claim that they can match a bite mark on human skin to a unique individual by comparing the mark to the suspect’s alleged unique dentition. As the report points out, neither “[t]he uniqueness of human dentition,” “[t]he ability of the dentition, if unique, to transfer a unique pattern to human skin and the ability of the skin to maintain that uniqueness” nor any “standard for the type, quality, and number of individual characteristics required to indicate that a bite mark has reached a threshold of evidentiary value” has been scientifically established.⁴⁷ As a result, the NAS Report damningly concludes that there is no scientific evidence that supports the notion that bite mark comparison analysis is capable of “identifying an individual to the exclusion of all others”⁴⁸:

There is no science on the reproducibility of the different methods of analysis that lead to conclusions about the probability of a match. This includes reproducibility between experts and with the

43. Rothwell, *supra* note 20, at 224.

44. NAS REPORT, *supra* note 12.

45. *Id.* at 7 (explaining that “forensic evidence is offered to support conclusions about ‘individualization’ (sometimes referred to as ‘matching’ a specimen to a particular individual or other source) or about classification of the source of the specimen into one of several categories. With the exception of nuclear DNA analysis, however, no forensic method has been rigorously shown to have the capacity to consistently, and with a high degree of certainty, demonstrate a connection between evidence and a specific individual or source.”).

46. *Id.* at 4.

47. *Id.* at 175–76.

48. *Id.* at 176.

same expert over time. Even when using the [American Board of Forensic Odontology] guidelines, different experts provide widely differing results and a high percentage of false positive matches of bite marks using controlled comparison studies.⁴⁹

Simply stated, bite mark identification proficiency studies prove that it can no longer be assumed either that human dentition is unique or that human skin can accurately record features of dentition. As the NAS Report makes clear, “the uniqueness of the human dentition has not been scientifically established.”⁵⁰ With only six teeth evaluated in a bite mark, it may actually prove impossible to decipher unique features, and, thus far, accurate associations between dentition and marks have only been possible within limited populations.⁵¹ Likewise, the NAS Report found that “bite marks on the skin will change over time and can be distorted by the elasticity of the skin, the unevenness of the surface bite, and swelling and healing. These features may severely limit the validity of forensic odontology.”⁵²

B. Texas Forensic Science Commission Report

The Texas Forensic Science Commission ("Commission") issued a similarly condemning assessment of bite mark evidence in 2016.⁵³ The nine-member Commission, which was established by the Texas legislature in 2005 and is composed of seven scientists and two attorneys,⁵⁴ opened its discussion about the integrity and reliability of bite mark identification by explaining that “there is no scientific basis for stating that a particular patterned injury can be associated to an

49. *Id.* at 174.

50. *Id.* at 175.

51. Mary A. Bush et al., *Statistical Evidence for the Similarity of the Human Dentition*, 56 J. FORENSIC SCI. 118, 118 (2011) (observing significant correlations and non-uniform distributions of tooth positions as well as matches between dentitions and concluding that “statements of dental uniqueness with respect to bitemark analysis in an open population are unsupportable and that use of the product rule is inappropriate”); Mary A. Bush et al., *Similarity and Match Rates of the Human Dentition in Three Dimensions: Relevance to Bitemark Analysis*, 125 INT’L J. LEGAL MED. 779, 779 (2011) (explaining that three dimensional models reduce but do not limit random matches and “a zero match rate cannot be claimed for the population studied”); H. David Sheets et al., *Dental Shape Match Rates in Selected and Orthodontically Treated Populations in New York State: A Two-Dimensional Study*, 56 J. FORENSIC SCI. 621, 621 (2011) (finding random dental shape matches and concluding that “statements of certainty concerning individualization in such populations should be approached with caution”).

52. NAS REPORT, *supra* note 12, at 174.

53. TEX. FORENSIC SCI. COMM’N, FORENSIC BITEMARK COMPARISON COMPLAINT FILED BY NATIONAL INNOCENCE PROJECT ON BEHALF OF STEVEN MARK CHANEY – FINAL REPORT (Apr. 12, 2016) [hereinafter TFSC BITEMARK REPORT], <https://www.txcourts.gov/media/1440871/finalbitemarkreport.pdf> [<https://perma.cc/M4M4-GMCSJ>].

54. *Id.* at 2.

individual's dentition"⁵⁵ and "[a]ny testimony describing human dentition as 'like a fingerprint' or incorporating similar analogies lacks scientific support."⁵⁶ The Commission ultimately concluded that analyst testimony regarding the probability or weight of any association between a bite mark and an individual's dentition has "no place in our criminal justice system because they lack any credible supporting data."⁵⁷

Prior to releasing its report, the Commission held several hearings, during which members of the American Board of Forensic Odontology (ABFO) vigorously defended the reliability and importance of bite mark identification analysis.⁵⁸ In fact, ABFO members went so far as to represent to the Commission that "recommending a moratorium on bitemark comparison would 'hurt children'" because, according to the ABFO, bite mark victims are frequently very young.⁵⁹ The Commission did not mince words in its response, explaining that "if anyone should take responsibility for the current state of bitemark comparison, it is the very organization of practitioners that, due to its glacial pace, reticence to publish critical data, and willingness to allow overstatements of science to go unchecked for decades, is facing a barrage of well-founded criticism."⁶⁰ The Commission determined that bite mark evidence was so unreliable that it expressly rejected the notion that prosecutors should ever secure a conviction for a crime against a child by relying exclusively on bite mark identification analysis.⁶¹

C. PCAST Report

Just a few months after the Texas Forensic Science Commission mandated a moratorium on bite mark identification evidence in state criminal trials, the President's Council of Advisors on Science and Technology (PCAST) published a report assessing the scientific validity of several of the feature-comparison forensic disciplines, including bite mark analysis.⁶² Subsequent to a thorough examination of several studies

55. *Id.* at 11–12.

56. *Id.* at 12.

57. *Id.*

58. *Id.* at 8–11.

59. *Id.* at 17.

60. *Id.*

61. *Id.* (explaining that "we must be vigilant to ensure the science used in criminal cases stands on a solid foundation of research and data, both for the benefit of victims and the accused").

62. PRESIDENT'S COUNCIL OF ADVISORS ON SCI. & TECH., EXEC. OFFICE OF THE PRESIDENT, FORENSIC SCIENCE IN CRIMINAL COURTS: ENSURING SCIENTIFIC VALIDITY OF FEATURE-COMPARISON METHODS (2016), https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/PCAST/pcast_forensic_science_report_final.pdf [<https://perma.cc/2FC5-JLWN>].

debunking the uniqueness of human dentition and validity of bite mark identification evidence,⁶³ the Council concluded that “available scientific evidence strongly suggests that examiners not only cannot identify the source of bitemark with reasonable accuracy, they cannot even consistently agree on whether an injury is a human bitemark.”⁶⁴ Ultimately, the Council determined that the prospects of developing bite mark analysis into a scientifically valid method were so low that they warranted advising the president against dedicating any resources in that direction.⁶⁵

D. Error Rates

Bite mark identification evidence fails in many of its primary assertions. There is simply no scientific support for the assertion that experts can: (1) differentiate a human bite mark from other bite marks; (2) associate bite marks with a suspect’s dentition; or (3) estimate the frequency of such an association.⁶⁶ Even the ABFO has conceded that bite mark evidence cannot be used for individualization in “open population” cases, where there is an unknown number of potential suspects.⁶⁷ Moreover, the accuracy, reliability, and value of bite mark evidence have been fundamentally undermined by the few proficiency studies that have been conducted.⁶⁸ These studies demonstrate that bite mark identification “error rates by forensic dentists are perhaps the highest of any forensic identification specialty still being practiced.”⁶⁹

63. *Id.* at 85–86.

64. *Id.* at 9 (emphasis omitted); *see also id.* at 85.

65. *Id.* at 9.

66. NAS REPORT, *supra* note 12, 175–76; Zarkowski, *supra* note 12, at 52.

67. AM. BD. OF FORENSIC ODONTOLOGY, INC., DIPLOMATES REFERENCE MANUAL 102 (2015) [hereinafter AM. BD. OF FORENSIC ODONTOLOGY, GUIDELINES AND STANDARDS] (explaining that “[t]he ABFO does not support a conclusion of ‘The Biter’ in an open population case(s)”).

68. Bowers, *supra* note 39, at S106–S107 (noting a 1999 ABFO “Bitemark Workshop where ABFO diplomats attempted to match four bitemarks to seven dental models [and] found 63.5% false positives”); *see also* NAS REPORT, *supra* note 12, at 42 (“The fact is that many forensic tests—such as those used to infer the source of toolmarks or bite marks—have never been exposed to stringent scientific scrutiny. Most of these techniques were developed in crime laboratories to aid in the investigation of evidence from a particular crime scene, and researching their limitations and foundations was never a top priority.”).

69. TFSC BITEMARK REPORT, *supra* note 53, at 990 (citing Pretty & Sweet, *Scientific Basis*, *supra* note 40, at 87–90); NAS REPORT, *supra* note 12, at 176; *see also* C. Michael Bowers, *Identification from Bitemarks*, in MODERN SCIENTIFIC EVIDENCE: THE LAW AND SCIENCE OF EXPERT TESTIMONY (David L. Faigman et al. eds., 2014)); Mary A. Bush & Peter J. Bush, *Current Context of Bitemark Analysis and Research*, in BITEMARK EVIDENCE: A COLOR ATLAS AND TEXT § 6-303 (Robert B.J. Dorion ed., 2d ed. 2010); Ademir Franco et al., *The Uniqueness of the Human Dentition as Forensic Evidence: A Systematic Review on the Technological Methodology*, INT’L J. LEGAL MED. (Nov. 15, 2010); Iain A. Pretty & David J. Sweet, *Digital Bitemark Overlays—An Analysis of Effectiveness*, 46 J. FORENSIC SCI. 1385 (2001); Paul Giannelli et al., *Reference Guide on Forensic Identification*

Within its own ranks, the ABFO conducted a confidential study entitled *Construct Validity Bitemark Assessments Using the ABFO Bitemark Decision Tree*.⁷⁰ This experiment presented 100 injuries to 39 ABFO board-certified forensic odontologists,⁷¹ which the ABFO refers to as “Diplomates.” The Diplomates were asked to determine whether the injury at issue was a human bite mark and, if so, whether it had distinct identifiable arches and individual toothmarks.⁷² Thirty-nine Diplomates completed the survey, and “came to unanimous agreement on just 4 of the 100 case studies Of the initial 100, there remained just 8 case studies in which at least 90 percent of the analysts were still in agreement.”⁷³ As a result, even the ABFO’s internal research undermines the reliability and validity of bite mark identification evidence.

E. *Wrongful Convictions*

A disproportionately high number of wrongful convictions involve faulty bite mark identification evidence. According to a recent report, “[t]hirty-one exonerations have come from a re-examination of cases based on the forensic comparison of bite marks.”⁷⁴ As Professor Beecher-Monas fairly pointed out, the vast majority of the wrongful bite mark identification convictions have been exposed by—and overturned as a result of—DNA evidence and not courts’ willingness to directly take issue with the underlying flawed bite mark methodology that led to those convictions in the first instance.⁷⁵

For example, an Arizona court found Ray Milton Krone—dubbed the “Snaggletooth Killer”⁷⁶—guilty of murder and kidnapping, and sentenced him to death based almost exclusively on the bite mark identification

Expertise, in FED. JUDICIAL CTR., REFERENCE MANUAL ON SCIENTIFIC EVIDENCE (3d ed. 2011).

70. Adam Freedman & Iain Pretty, Presentation at the 2016 Annual Meeting of the Am. Acad. of Forensic Scis.: *Construct Validation of Bitemark Assessments Using the ABFO Decision Tree* (2016), <https://online.wsj.com/public/resources/documents/ConstructValidBMdecisiontreePRETTYFREEMAN.pdf> [<https://perma.cc/WX9E-79MX>].

71. Radley Balko, *A Bite Mark Matching Advocacy Group Just Conducted a Study that Discredits Bite Mark Evidence*, WASH. POST (Apr. 8, 2015, 3:36 PM), <https://www.washingtonpost.com/news/the-watch/wp/2015/04/08/a-bite-mark-matching-advocacy-group-just-conducted-a-study-that-discredits-bite-mark-evidence/?noredirect=on> [<https://perma.cc/S2DL-ZREX>].

72. *Id.*

73. *Id.*

74. Augenstein, *supra* note 14.

75. Beecher-Monas, *Reality Bites*, *supra* note 38, at 1373–74.

76. Hans Sherrer, *Ray Krone Settles for \$4.4 Million After Two Wrongful Murder Convictions*, 32 JUST. DENIED: THE MAG. FOR THE WRONGFULLY CONVICTED 16, 16 (2006), http://justicedenied.org/issue/issue_32/krone_jd32.pdf [<https://perma.cc/93EC-S3M4>].

evidence presented at his trial.⁷⁷ As the Arizona Supreme Court acknowledged in reviewing Mr. Krone's initial appeal of his conviction, "[t]he bite marks were crucial to the State's case because there was little other evidence to suggest Krone's guilt" and "[w]ithout the bite marks, the State arguably had no case."⁷⁸ The Arizona Supreme Court ultimately reversed Mr. Krone's conviction due to a *Brady* violation,⁷⁹ but Mr. Krone was retried, reconvicted, and sentenced to life in prison.⁸⁰ Mr. Krone was eventually exonerated on the basis of post-conviction DNA evidence, which excluded him as the perpetrator and implicated an Arizona prisoner who was doing time for the sexual assault of a seven-year-old girl.⁸¹

A Mississippi court similarly sentenced Kennedy Brewer to death⁸² on the basis of flawed bite mark identification expert testimony.⁸³ Dentist and forensic odontologist Dr. Michael West, who is discussed extensively in the following section of this Article,⁸⁴ provided faulty bite mark evidence on behalf of the State during Mr. Brewer's trial.⁸⁵ Specifically, Dr. West contended that he had discovered nineteen bite marks on the three-year-old victim's body and testified that "Brewer's teeth inflicted the five [good] bite mark[s] . . . found on" the child "[t]o a reasonable degree of medical certainty."⁸⁶

To counter Dr. West's testimony, the defense called Richard Souviron, a dentist and founding member of the ABFO. Dr. Souviron "opined that none of the wounds on the child's body were [human] bite marks . . . because there were no corresponding lower teeth prints."⁸⁷ The jury nonetheless convicted Mr. Brewer of rape and capital murder of a child and the Supreme Court of Mississippi affirmed the conviction on appeal.⁸⁸

During Mr. Brewer's post-conviction proceedings, he successfully petitioned the trial court to order the State to test DNA that had been found

77. *State v. Krone*, 879 P.2d 621, 621–22 (Ariz. 1995).

78. *Id.* at 622.

79. *See Brady v. Maryland*, 373 U.S. 83, 87–88 (1963) (holding that the prosecution is required to turn over to the defendant any evidence that is both "exculpat[ory]" and "material" to the defense).

80. Sherrer, *supra* note 76, at 16.

81. *Id.*

82. *Brewer v. State*, 725 So. 2d 106, 117 (Miss. 1998).

83. Craig M. Cooley & Gabriel S. Oberfield, *Increasing Forensic Evidence's Reliability and Minimizing Wrongful Convictions: Applying Daubert Isn't the Only Problem*, 43 TULSA L. REV. 285, 358–59 (2007). Dr. West's nefarious role as a jack-of-all-trades Mississippi expert witness is discussed extensively in the following section of this Article, see *infra* section II.F.

84. *See infra* section II.F.

85. *Brewer*, 725 So. 2d at 116.

86. *Id.*

87. *Id.*

88. *Id.* at 136.

on the victim's body during the pre-trial murder investigation.⁸⁹ The DNA results excluded Mr. Brewer, who sought an evidentiary hearing on the basis of the exculpatory DNA as well as newly discovered "evidence challenging the reliability of the method used to determine that the bite marks inflicted upon the victim matched Brewer's teeth."⁹⁰ The Supreme Court of Mississippi agreed that Mr. Brewer was entitled to a hearing "[b]ecause of the compelling nature of the newly discovered DNA evidence,"⁹¹ but rejected Mr. Brewer's challenge to Dr. West's bite mark identification testimony and refused to revisit its reliability.⁹² Mr. Brewer was subsequently exonerated and released from prison after the DNA evidence identified the true perpetrator.⁹³

Interestingly, Dr. West was the target of a sting instigated by Ray Krone's criminal defense attorney, Christopher Plourd, nearly a year before the Mississippi Supreme Court granted Brewer a new hearing.⁹⁴ During the sting, Mr. Plourd's private investigator, James Rix, sent photos of the bite marks introduced into evidence at Mr. Krone's trial to Dr. West.⁹⁵ Mr. Rix also forwarded to Dr. West a mold of *Mr. Rix's own teeth*, but told Dr. West that the cast captured the dentition of the chief suspect in the case.⁹⁶ Unsurprisingly, Dr. West confidently concluded that Mr. Rix's dentition matched the victim's bite mark.⁹⁷

Unfortunately, Dr. West is not the only forensic dentist whose false bite mark testimony led to the convictions of individuals later exonerated by DNA testing. James O'Donnell and Roy Brown also were wrongfully convicted in New York due to the admission of unreliable bite mark identification evidence during their respective trials.⁹⁸ And both Mr. O'Donnell and Mr. Brown were ultimately exonerated due to exculpatory DNA evidence.⁹⁹

89. *Brewer v. State*, 819 So. 2d 1169, 1172 (Miss. 2002).

90. *Id.*

91. *Id.* at 1176.

92. *Id.* at 1175–76.

93. Cooley & Oberfield, *supra* note 83, at 359.

94. Radley Balko, *A Forensic Charlatan Gets Caught in the Act*, REASON (May 15, 2009, 1:30 PM), <http://reason.com/archives/2009/05/15/a-forensics-charlatan-gets-cau> [<https://perma.cc/WG5Y-T8VN>]. The entire sting is captured on video that is available online on the Reason website. *Id.*

95. *Id.*

96. *Id.*

97. *Id.*

98. *O'Donnell v. State*, 782 N.Y.S.2d 603, 606 (N.Y. Ct. Cl. 2004); *People v. Brown*, 618 N.Y.S.2d 188, 188 (N.Y. Co. Ct. 1994).

99. *James O'Donnell*, NAT'L REGISTRY EXONERATIONS (June 2012), <https://www.law.umich.edu/special/exoneration/Pages/casedetail.aspx?caseid=3444>

Willie Jackson faced a similar fate in Louisiana, where he was convicted of sexual assault and first-degree robbery on the basis of bite mark testimony, notwithstanding his presentation of numerous alibi witnesses at trial.¹⁰⁰ Mr. Jackson, too, was exonerated as a result of DNA evidence that excluded him as the assailant and implicated his brother.¹⁰¹ Daniel Young, Jr. and Harold Hill similarly were convicted of a brutal rape and murder due to bite mark evidence¹⁰² and were later released and exonerated because of exculpatory DNA test results.¹⁰³ Despite the myriad wrongful convictions tied to faulty bite mark evidence, “not a single [trial] court in the United States has upheld a challenge to bite mark evidence.”¹⁰⁴

F. Bite Mark Evidence & Sexual Minorities: The Myth of Lesbian Vampires

Forensic odontologists have convinced American criminal courts to continue to admit bite mark identification testimony notwithstanding its scientific unreliability and recurring role in wrongful convictions.¹⁰⁵ Above and beyond their commitment to a fundamentally flawed methodology, forensic odontologists also have advanced the unfounded and stigmatizing claim that bite marks are more common in crimes involving sexual minorities.¹⁰⁶ Worse yet, courts have permitted bite mark

[<https://perma.cc/JJ3L-8UB3>]; *Roy Brown*, NAT'L REGISTRY OF EXONERATIONS (July 17, 2019), <http://www.law.umich.edu/special/exoneration/Pages/casedetail.aspx?caseid=3064> [<https://perma.cc/J5K4-JEBF>].

100. *State v. Jackson*, 570 So. 2d 227, 228 (La. App. 1990).

101. *Willie Jackson*, NAT'L REGISTRY EXONERATIONS (July 10, 2014), <https://www.law.umich.edu/special/exoneration/Pages/casedetail.aspx?caseid=3319> [<https://perma.cc/YU2Q-YJ7T>].

102. *Young v. Walls*, 311 F.3d 846 (7th Cir. 2002); U.S. *ex rel. Young v. Snider*, No. 01 C 6027, 2001 WL 1298704 (N.D. Ill. Oct. 25, 2001); *People v. Hill*, 671 N.E.2d 737 (Ill. 1996).

103. *Dan Young, Jr.*, NAT'L REGISTRY EXONERATIONS (Nov. 4, 2016), <http://www.law.umich.edu/special/exoneration/Pages/casedetail.aspx?caseid=3773> [<https://perma.cc/Y9ZZ-WXX8>]; *Harold Hill*, NAT'L REGISTRY EXONERATIONS (Nov. 4, 2016), <https://www.law.umich.edu/special/exoneration/Pages/casedetail.aspx?caseid=3296> [<https://perma.cc/NH9G-VAEE>].

104. Balko, *Incredibly, Prosecutors are Still Defending Bite Mark Evidence*, *supra* note 18.

105. *Id.*

106. *See, e.g.*, Rothwell, *supra* note 20, at 223 (opining that “[s]ince biting may be part of foreplay or other sexual activities, bite injuries are often seen in sex crimes, particularly among male homosexuals”). This broad and unsupported generalization, of course, is consistent with historical claims that homosexuals commit more violent crimes than heterosexuals and, relatedly, that homosexuality is analogous with sadism. *See, e.g.*, Michael Bell & Raul Villa, *Homicide in Homosexual Victims: A Study of 67 Cases from the Broward County, Florida, Medical Examiner's Office (1982–1992), with Special Emphasis on “Overkill,”* 17 AM. J. FORENSIC MED. & PATHOLOGY 65, 65 (1996) (declaring that “[h]omosexual homicides are more violent than heterosexual homicides” and citing to other publications which, among other things make the following and concededly

experts to provide this sort of illegitimate and highly inflammatory opinion-testimony to juries in cases involving sexual minority defendants. One need not look any further than the Mississippi prosecution and conviction of Leigh Stubbs and Tammy Vance to find just such a case.¹⁰⁷

On March 7, 2000, Ms. Stubbs and Ms. Vance called the clerk at the Brookhaven, Mississippi Comfort Inn where they had rented a room with their friend, Kimberly Williams, to report that Ms. Williams had stopped breathing and to solicit an ambulance.¹⁰⁸ The emergency team that responded to the scene determined that Ms. Williams had suffered an overdose, administered CPR to her, and transported her to a hospital.¹⁰⁹ Dr. Joe Moak examined Ms. Williams upon her admission to the hospital emergency room and “discovered several injuries to Williams’s body,” which he described as “brutal,” including “teeth and scratch marks around her nipples,” “a ‘tremendous amount of swelling and bruising and almost a fresh kind of wound type of appearance’ in her vaginal area,” and red marks on her buttocks.¹¹⁰ Dr. Moak immediately contacted the police.¹¹¹

On March 10, 2000, the Brookhaven District Attorney’s office contacted dentist and forensic odontologist Dr. Michael West, who served as Mississippi’s leading proponent of bite mark identification evidence throughout the 1990s and 2000s and, as revealed in the previous section of this Article,¹¹² was responsible for the wrongful conviction of Kennedy Brewer and other individuals.¹¹³ That same day, Dr. West conducted an

anecdotal claims: “in the majority of cases [involving homosexuals] there is overkill: wounding far beyond that required to cause death,” “the use of excessive violence is a common finding in homosexual killings,” “it is a fact that some of the most violent homicides seen by pathologists are among male homosexuals,” “homosexual homicides are more violent than heterosexual rape-homicides,” and “when murder does occur involving homosexuals it is exceptionally brutal with overkill appearance”) (internal alterations, quotation marks, and citations omitted)).

107. *Stubbs v. State*, 845 So. 2d 656 (Miss. 2003).

108. *Id.* at 658–69.

109. *Id.* Leigh Stubbs and Tammy Vance were exonerated in 2013. *Leigh Stubbs*, NAT’L REGISTRY EXONERATIONS (Oct. 25, 2018), <https://www.law.umich.edu/special/exoneration/Pages/casedetail.aspx?caseid=5398> [<https://perma.cc/4V5X-BXYT>]; *Tammy Vance*, NAT’L REGISTRY EXONERATIONS (Oct. 25, 2018), <https://www.law.umich.edu/special/exoneration/Pages/casedetail.aspx?caseid=5399> [<https://perma.cc/DL7C-NWEN>].

110. *Stubbs*, 845 So. 2d at 661.

111. *Id.*

112. *See infra* section II.E.

113. *Stubbs*, 845 So. 2d at 662. During his trial testimony, Dr. West informed the jury that he had “investigated over four thousands deaths . . . attended over two thousand autopsies . . . ordered about five hundred autopsies” and “analyzed over three hundred bite marks.” Transcript of Proceedings at 456–57, *Stubbs v. State*, 845 So. 2d 656 (Miss. 2003) (No. 00-362-MS) [hereinafter *Stubbs Transcript of Trial*] (on file with the authors) (Testimony of Michael West). Dr. West further asserted that it was his “seventieth time in court.” *Id.* at 457. For a thorough examination of Dr. West’s extensive service as an expert witness in Mississippi during this time, *see generally* RADLEY BALKO & TUCKER

examination of Ms. Williams’s naked body, including her vulva.¹¹⁴ He also videotaped his examination of Ms. Williams—who was still unconscious and, therefore, could not consent.¹¹⁵

During his nonconsensual examination of Ms. Williams, Dr. West claimed that he located “what appeared to be a bite mark on her right thigh”—an injury that no one else on Ms. Williams’s treating team had discovered or documented at that point in the investigation.¹¹⁶ He promptly informed the district attorney of his findings and requested “dental molds for any possible suspects.”¹¹⁷ The State presented Dr. West with the molds of four individuals, including Ms. Stubbs and Ms. Vance.¹¹⁸ Dr. West then compared those molds to Ms. Williams’s alleged bite mark and concluded that he could not exclude Stubbs as the biter.¹¹⁹ “One of . . . [Dr. West’s] testing procedures was to press the [suspect’s] dental molds literally into Williams’s skin,”¹²⁰ which Ms. Stubbs and Ms. Vance contended amounted to evidence tampering.¹²¹ Months later, Ms. Stubbs and Ms. Vance were arrested and charged with, among other things, aggravated assault of Williams.¹²²

CARRINGTON, THE CADAVER KING AND THE COUNTY DENTIST: A TRUE STORY OF INJUSTICE IN THE AMERICAN SOUTH (2018).

114. Stubbs Transcript of Trial, *supra* note 113, at 509–10, 512 (Testimony of Michael West).

115. *Id.* at 500 (testifying that, while he “examined Kimberly’s injuries” in the hospital intensive care unit, “[s]he was unconscious . . . [s]he was on a ventilator”); *id.* at 511 (testifying that, throughout his examination, “the machine . . . [was] breathing for [Williams]”). While playing the video of his examination of Williams to the jury, Dr. West testified as follows: “The vaginal area. Notice the swelling. I’m asking the nurses to spread the labia. And notice we have a labia on the left side, but we’re missing the labia on the right. It’s very asymmetrical. This area of the labia appears to have been chewed or masticated. This could be teeth marks, but I can’t say with any reasonable assurance. I’m just documenting them here.” *Id.* at 512–13. For a discussion about medical informed consent and unconscious female patients, see generally Robin Fretwell Wilson, *Autonomy Suspended: Using Female Patients to Teach Intimate Exams Without Their Knowledge or Consent*, 8 J. HEALTH CARE L. & POL’Y 240 (2005).

116. *Stubbs*, 845 So. 2d at 661–62; *see also* Stubbs Transcript of Trial, *supra* note 113, at 501 (Testimony of Michael West).

117. *Stubbs*, 845 So. 2d at 662; *see also* Stubbs Transcript of Trial, *supra* note 113, at 501 (Testimony of Michael West).

118. *Stubbs*, 845 So. 2d at 662.

119. *Id.*

120. *Id.*

121. *Id.* at 667–68. Dr. West’s bite mark identification methodology had been previously criticized by the Mississippi Supreme Court:

Under the methodology employed by Dr. West, there is no statistical probability, no control group, and no check on the materials and regents used in performance. Essentially, there are no independent checks on Dr. West’s scientific findings and opinions. He is given free rein to account for himself without any independent confirmation of his methodology or techniques.

Howard v. State, 853 So. 2d 781, 803 (Miss. 2003) (McRae, J., dissenting).

122. *Stubbs*, 845 So. 2d at 658.

During Ms. Stubbs's and Ms. Vance's joint trial, the State called Dr. West as its key witness.¹²³ On cross-examination, defense counsel asked Dr. West whether forensic odontology was "generally accepted within the scientific community as an exact science."¹²⁴ His response was telling: "[i]t's not a science. It's part science, but it's part art."¹²⁵ Defense counsel and Dr. West then engaged in the following exchange:

Q: So you would consider what you do to be an art?

A: And a science, yes, sir.

Q: Would it be more art or more science?

A: Fifty/fifty.¹²⁶

With regard to the alleged bite mark that he had discovered on Ms. Williams's right thigh, Dr. West testified that, while he could not exclude Stubbs as the biter, he could not conclude with 100% certainty that the bite mark on Ms. Williams's body matched Ms. Stubbs's dentition.¹²⁷ He also testified about additional alleged bite mark injuries that he had purportedly found on Ms. Williams's body while examining her vulva. Specifically, and without any evidence to support such a contention, Dr. West—a dentist, not a medical doctor, let alone one with any training in gynecology—opined to the jury that part of Ms. Williams's right labia was "missing" and, in his opinion, may have been "bitten off" during an episode of "intense" oral sex, as follows:

Here we see some chew marks on the inside of the labia These injuries . . . lead me to think that . . . [her] left labia had been chewed on, the clitoral region had negative pressure or a sucking of great intensity applied to it . . . I am missing the right labia, labia majora. And I can't say, with any certainty, was the, you know, lip missing earlier and just the edge of it chewed or was it bitten off or was it avulsed, bitten and pulled off. I can't say.¹²⁸

In addition to the fact that Dr. West was entirely unqualified to determine whether Ms. Williams's labia was symmetrical, asymmetrical, avulsed, or otherwise, no other record evidence corroborated his theory that either Vance or Stubbs or anyone else had bitten or chewed off Ms. Williams's

123. Dr. West's testimony comprises nearly a third of the entire testimony that was presented at trial. See generally Stubbs Transcript of Trial, *supra* note 113 (demonstrating that West's testimony comprised 200 pages of an approximately 600-page transcript).

124. Stubbs Transcript of Trial, *supra* note 113, at 478 (Testimony of Michael West).

125. *Id.* at 479.

126. *Id.*

127. *Id.* at 530–31.

128. *Id.* at 513.

labia.¹²⁹ Instead, uncontroverted evidence—including the dearth of blood discovered at the scene, on Ms. Williams’s clothes, and on Ms. Williams’s body—undermined the notion that Williams had suffered any attack (such as labia dismemberment) certain to result in profuse bleeding.¹³⁰

Dr. West’s testimony did not, however, stop at labia biting conjecture. He went on to conflate the very presence of bite marks on a victim with homosexual assault.¹³¹ Prior to Dr. West’s testimony, the state “called two witnesses who testified that Stubbs and Vance had romantic feelings toward each other and . . . saw them kissing.”¹³² Having presumably established that the co-defendants were involved in a lesbian relationship, the prosecutor proceeded to conduct the following examination of Dr. West:

Q: Have you investigated homosexual type assaults?

A: Yes, sir.

Q: Are . . . [bite marks] any more or less prevalent in a homosexual assault than a heterosexual rape case?

A: In male homosexuality, in those cases of violence, there seems to be a much greater propensity of bite marks. In female homosexual activity, I haven’t had enough experience or read anything in the literature, but it’s documented that male homosexual activity is much greater in bite marks.

Q: So, in . . . a homosexual rape case, you would expect to find bite marks, it would not be unusual at all to find bite marks on the skin?

A: No, it wouldn’t be unusual.

Q: In fact, it would almost be expected?

A: Almost.¹³³

Dr. West’s homosexual rape-related testimony was never challenged as beyond the scope of his expertise at trial. He was, however, asked about his bite mark identification error rate. At first, he contended that error rates are inapplicable to the feature comparison forensic disciplines.¹³⁴ Upon

129. When queried about Dr. West’s labia biting/chewing theory, defense expert and forensic pathologist Dr. Galvez testified: “what I can tell you, and I am under oath, with [an] absolute degree of certainty, [is that] there is nothing that can prove there was chewing.” *Id.* at 765 (Testimony of Rodrigo Galvez).

130. *Id.* at 819–20 (Closing argument of Mr. Rushing).

131. *Id.* at 558–59 (Testimony of Michael West).

132. *Tammy Vance*, *supra* note 109; *see also* Stubbs Transcript of Trial, *supra* note 113, at 133–34, 141–43 (Testimony of Samantha Burge); *id.* at 268 (Testimony of Kathy Hanna).

133. Stubbs Transcript of Trial, *supra* note 113, at 558–59 (Testimony of Michael West).

134. *Id.* at 615 (testifying that “[e]rror rates do not apply to [the] direct comparison” forensic fields); *id.* at 618 (testifying that he had “never given an error rate. An error rate is a term used in

further prodding, however, he conceded that he had previously characterized his bite mark identification error rate with precision, specifically, as “slightly less than that of [my savior] Jesus Christ.”¹³⁵

Tragically, defense expert and forensic pathologist Dr. Rodrigo Galvez also shared his thoughts about bite marks and “lesbian rape” on cross-examination during the trial.¹³⁶ The prosecution asked Dr. Galvez if he “would . . . expect to find biting or would biting be consistent with a lesbian rape type situation.”¹³⁷ Dr. Galvez not only answered “yes,” but he went on to explain that “homosexual crimes . . . are very sadistic. More violent crimes I [‘ve] seen in my experience as homosexual to homosexual. They do what we call the over kill. They do tremendous damage, tremendous damage.”¹³⁸ Dr. Galvez further added that “they’re more gory, the more repulsive crimes I’ve ever seen were homosexual to homosexual.”¹³⁹

The state elicited this gratuitous and inflammatory testimony from Dr. West and Dr. Galvez to bolster its central—and empirically unfounded—claim that the more “brutal” the assault, the more likely it was committed by a homosexual.¹⁴⁰ The state’s commitment to this theory was particularly curious given that the prosecution failed to establish with any reliable evidence that Williams ever suffered either human bites or sexual assault.

The prosecutor nonetheless doubled down on the State’s supposition in his closing. First, he informed the jury that “[t]he bite marks are important because it indicates a homosexual assault. It indicates a sexual assault.”¹⁴¹ Next, the prosecutor reminded the trier of fact that the co-defendants were lesbian “lovers” and expressly attributed their “lifestyle” to Ms. Williams’s “vicious[]” assault.¹⁴² He then wrapped up his closing by repeating that “homosexual assault is the most brutal, [it] involves torture”¹⁴³ and insisting that the state had presented evidence of the two purportedly irrefutable indicia of lesbian rape: bite marks on the victim and a lack of semen at the scene.¹⁴⁴ Ms. Stubbs and Ms. Vance were convicted

chemistry.”).

135. *Id.* at 618.

136. *Id.* at 777.

137. *Id.*

138. *Id.*

139. *Id.*

140. *Id.* at 588–59, 777.

141. *Id.* at 854.

142. *Id.* at 857 (stating that “[w]hen you look at all the evidence, you’ll realize that while it’s a circumstantial evidence case, these two women who were living together, were lovers, whether because of the drugs or the alcohol or their lifestyle, viciously attacked Kimberly Williams for no reason and tried to cover it up”).

143. *Id.* at 851.

144. *Id.* at 851–52 (explaining that “if you believe . . . the brutality of [the assault on Williams],

of, among other things, the aggravated assault of Kimberly Williams, and were each sentenced to a forty-four year term of incarceration.¹⁴⁵

Ten years later, Ms. Stubbs and Ms. Vance submitted an affidavit sworn by Ruthann Robson, Professor of Law and University Distinguished Professor at the City University of New York, in support of their petition for post-conviction review of their convictions.¹⁴⁶ In that affidavit, Professor Robson summarized her decades-long research on juror bias against lesbians and other sexual minorities.¹⁴⁷ Professor Robson confirmed that “absolutely no empirical evidence” existed to support the proposition that lesbians are more likely than other people either to commit violent crimes or to commit those crimes in a particularly brutal fashion.¹⁴⁸ She also expressly reported that there is “absolutely no empirical evidence” to support the contention that lesbians are more likely than others to bite a victim during an assault.¹⁴⁹ Professor Robson did, however, point to empirical research that concluded that lesbians are more likely to be convicted of crimes than heterosexual women.¹⁵⁰

As Professor Robson explained, the “notion that lesbians are especially brutal” is attributable to the “frequent negative stereotype” of “killer lesbians” in popular culture.¹⁵¹ In support of those contentions, Professor

then you would look to see if there is evidence that it is a homosexual rape. There was no semen found and there were marks”).

145. *Id.* at 866.

146. Robson Affidavit, *supra* note 15.

147. *Id.* at 2–3 (“As reported in *The Chicago Sun-Times* in 1998, potential jurors were more than three times as likely to think they could not be fair or impartial toward a gay or lesbian defendant as toward a defendant from other minority groups, such as blacks, Hispanics, or Asian Americans. This finding, based on the Juror Outlook Survey conducted by the National Law Journal and Decision Quest, a national trial consulting and legal communications company, is especially striking given that more than 40 percent of those polled and more than 70 percent of blacks polled believe that minorities are treated less fairly than others in the criminal justice system, meaning that sexual minorities are treated even less fairly. A study published in the *Journal of Homosexuality* in the year that Stubbs and Vance were indicted demonstrated that *sexual orientation was three times more likely than racial identity to be a cause of bias against a defendant.*” (emphasis added) (internal quotations omitted)); see also Cynthia Lee, *The Gay Panic Defense*, 42 U.C.D. L. REV. 471 (2008) (discussing jury bias against sexual minority defendants and proposing *voir dire* questions involving sexual orientation).

148. Robson Affidavit, *supra* note 146, at 4–5.

149. *Id.* at 5.

150. *Id.* at 3.

151. *Id.* at 5; see also JOEY MOGUL ET AL., QUEER (IN)JUSTICE: THE CRIMINALIZATION OF LGBT PEOPLE IN THE UNITED STATES 69 (2011) (referencing the case of Miguel Castillo, who was wrongfully convicted for 11 years, and explaining that “[i]n May 1988, Rene China, a fifty-year-old gay Cuban immigrant, was murdered in Chicago, Illinois. His throat was slashed, his penis and hands cut off, and his legs partially severed. His decomposing and dismembered body was found in a garbage bag inside his closet. The Chicago police detectives who investigated the homicide determined China was the victim of a ‘homosexual murder.’ In so doing, they were not suggesting that China was the victim of violence motivated by his sexual orientation, that is, a hate crime.

Robson cited a 1991 Gay and Lesbian Alliance Against Defamation (GLAAD) report, which determined that “the depiction of lesbians on television and movies is ‘almost uniformly negative.’”¹⁵² The GLAAD report noted that “images in film and television depict [lesbians] as man-hating, society-destroying, sex-driven or sexless creatures who have no hearts, homes, families, values, or reasons to live.”¹⁵³

Lesbian brutality may also be convincing to a lay jury due to the consistent stereotyping “of lesbians as possessing animal sexuality, or as vampires.”¹⁵⁴ As has been pointed out by prominent women’s studies scholar Bonnie Zimmerman, “the lesbian vampire myth has a long history in literature, legend, and film.”¹⁵⁵ Indeed, “the lesbian Dracula, a woman who bites other women because she must do so to survive, is a stereotype, often unconscious or not fully articulated, that permeates popular culture.”¹⁵⁶ Professor Robson powerfully concluded her affidavit by espousing that “[d]octors, attorneys, jurors and even judges can be biased and unthinkingly accept outdated stereotypes that lesbians are brutal sexual torturers with a propensity to bite. But courts can also act to remedy such prejudice.”¹⁵⁷

In June 2012, Lincoln County Mississippi Circuit Court Judge Michael M. Taylor reversed Ms. Stubbs’s and Ms. Vance’s convictions.¹⁵⁸ Ms. Stubbs and Ms. Vance, each of whom spent more than a decade in prison for an aggravated assault they did not commit, have since been exonerated.¹⁵⁹ More surprisingly, during Ms. Stubbs’s and Ms. Vance’s post-conviction discovery proceedings, Dr. West retracted his bite mark

Rather, they believed that this grisly murder must have been committed by another ‘homosexual.’ This belief was based on the premise that gay men who are lovers or roommates are ‘particularly violent’ when they fight, often engaging in ‘gruesome-type, serious cuttings,’ and it shaped the investigation from the moment police responded to the scene.”)

152. Robson Affidavit, *supra* note 146, at 5.

153. *Id.*

154. *Id.*

155. *Id.* at 5–6 (“[C]ontemporary films, television plots, novels, and stories draw on two sources: [o]ne is the Countess Elisabeth Bathory, a sixteenth century Hungarian noblewoman who was reputed to have tortured and murdered 650 virgins, bathing in their blood in order to preserve her youth. The second source is Joseph Sheridan *LeFanu’s Carmilla* (1871), an intensely erotic novella recounting the story of the Countess Millarca Karnstein, who lives through the centuries by vampirizing young girls.” (internal quotations omitted)).

156. *Id.*

157. *Id.* at 7.

158. Order Setting Aside Conviction and Sentence, *Stubbs v. State*, (Lincoln Cty. Cir. Ct. June 27, 2012) (No. 2011-387-LSLT), http://www.coxwelllaw.com/files/stubbs_van_ce_order.pdf [perma.cc/5JU8-WERH].

159. *Leigh Stubbs*, *supra* note 109; *Tammy Vance*, *supra* note 109.

identification testimony that had led to their convictions.¹⁶⁰ Under oath, he asserted that he no longer believed that bite mark identification was reliable and went so far as to contend that he did not “think it should be used in court.”¹⁶¹ Dr. West concluded his testimony as follows: “I think you should use DNA, throw bite marks out. . . . When I testified in [Ms. Stubbs’s and Ms. Vance’s] case, I believed in the uniqueness of human bite marks. I no longer believe in that.”¹⁶²

III. BITE MARK IDENTIFICATION CASELAW

A. *Pre-Daubert Bite Mark Cases*

As leading evidence treatises recognize and applicable case law illustrates, American jurisdictions routinely admit bite mark identification evidence.¹⁶³ The first reported case involving the admissibility of such evidence, *Doyle v. State*,¹⁶⁴ was decided by the Texas Court of Criminal Appeals in 1954.¹⁶⁵ *Doyle* centered around a grocery store burglary that resulted in the heist of thirteen silver dollars and two bottles of whiskey.¹⁶⁶

160. Deposition of Michael West at 37–38, *Stubbs v. State*, No. 2011-387-LS-LT (Feb. 11, 2012) (on file with the authors) (asserting that if “I was asked to testify in this case again, I would say I don’t believe it’s a system that’s reliable enough to be used in court”).

161. *Id.* at 37–38.

162. *Id.*

163. Clifford S. Fishman & Anne T. McKenna, *Admissibility of Bite Mark Testimony: Overview*, 7 JONES ON EVIDENCE § 53:90 (2017) (citing Marjorie A. Shields, *Admissibility and Sufficiency of Bite Mark Evidence as Basis for Identification of Accused*, 1 A.L.R. 6th 657, 657 (2005)); see also Gary Edmond et al., *Admissibility Compared: The Reception of Incrimination Expert Evidence*, 3 U. DENV. CRIM. L. REV. 31, 47 (2013) (explaining that “[b]ite mark evidence has almost always been found admissible by U.S. courts”); Mark Page et al., *Forensic Identification Science Evidence Since Daubert: Part I—A Quantitative Analysis of the Exclusion of Forensic Identification Science Evidence*, 56 J. FORENSIC SCI. 1180, 1183 (2011) (concluding that bite mark evidence is admitted without restriction in 83 percent of the cases in which it was challenged).

164. 263 S.W.2d 779 (Tex. Crim. App. 1954).

165. *Id.* While *Doyle* was the earliest recorded case involving the admissibility of bite mark evidence in the United States, it is well-documented that bite mark evidence was introduced in an 1870 Ohio murder trial, *Ohio v. Robinson*. See Larry J. Pierce et al., *The Case of Ohio v. Robinson: An 1870 Bite Mark Case*, 11 AM. J. FORENSIC MED. & PATHOLOGY 171 (1990). Interestingly, Robinson, who was accused of murdering his mistress, was acquitted by a jury notwithstanding the state’s experts’ claims that his dentition “matched” the bite marks discovered on the victim’s body. *Id.* at 174–76. Robinson’s experts cast considerable doubt on the scientific reliability of the state’s bite mark evidence during the trial. *Id.* at 175–76. Defense expert Dr. Howe opined that “[i]t is not possible for the human teeth to reprint themselves accurately on the human arm” and Dr. Bushnell went so far as to testify that “you can fit the front five teeth of any mouth into the marks of five front teeth of any other mouth.” *Id.* at 175.

166. *Doyle*, 263 S.W.2d at 779.

While investigating the scene of the burglary, the sheriff “found, among other things . . . a large piece of cheese bearing pronounced teeth marks” on the meat counter.¹⁶⁷ Such discovery prompted the sheriff to travel to the jail where the appellant, Mr. Doyle, was being held, and request that he bite into an unadulterated slice of cheese.¹⁶⁸ Mr. Doyle so complied.¹⁶⁹

The sheriff then transported the two pieces of cheese—the one from the scene of the burglary and the other that Mr. Doyle had indented at the jail—to a *firearms examiner* in Austin, Texas.¹⁷⁰ The examiner “testified that he had photographed both [pieces of cheese] and had made plaster of paris impressions of each and gave his opinion from caliper measurements that both pieces of cheese had been bitten by the same set of teeth.”¹⁷¹ A local dentist, Dr. Kemp, also testified that he had examined the plaster casts and photographs and concluded that “all were made of the same set of teeth.”¹⁷²

Mr. Doyle was convicted of the burglary and appealed.¹⁷³ Unfortunately, he limited his challenge of the bite mark evidence to a procedural claim and failed to raise a scientific validity argument.¹⁷⁴ The court affirmed his conviction in a perfunctory one-and-a-half page opinion.¹⁷⁵

Twenty years after deciding *Doyle*, the Texas Court of Criminal Appeals revisited bite mark identification evidence in *Patterson v. State*.¹⁷⁶ *Patterson* involved a gruesome murder during which the victim’s breasts had been severed from her body and her left breast had been bitten by her assailant.¹⁷⁷ During trial, numerous experts opined on the identification of those bite marks¹⁷⁸ and, as has become notoriously common in bite mark cases, their opinions were wildly divergent.¹⁷⁹

167. *Id.*

168. *Id.*

169. *Id.*

170. *Id.*

171. *Id.*

172. *Id.*

173. *Id.*

174. *Id.*

175. *Id.* at 780.

176. *Patterson v. State*, 509 S.W.2d 857 (Tex. Crim. App. 1974).

177. *Id.* at 861.

178. *Id.* at 862.

179. See, e.g., FAIGMAN ET AL., *supra* note 19, § 35:3 (collecting cases and explaining that “[o]ne frequently observed phenomenon in cases involving the source of a given bitemark is for there to be forensic odontologists testifying to contrary opinions. This occurs both for opinions about the identity of the maker of a bitemark, and also on the question of whether or not a wound was caused by a bite.”); Pretty & Sweet, *Scientific Basis*, *supra* note 40, at 90 (concluding that “[t]he question of

State expert Dr. Hoffman testified that the “wound on the left breast was a human bite mark,”¹⁸⁰ that he had “placed a mold of [the] appellant’s teeth on the [victim’s] wound and the mold fit the wound,” and that “the biting of [a] human” was indicative of “the worst of sadist killers.”¹⁸¹ Dr. Hoffman also advanced the scientifically unfounded claim¹⁸² that bite marks were as unique to an individual as fingerprints.¹⁸³ Dr. Bertz, who also testified for the State, made a second cast of Kenneth Patterson’s teeth and concluded “that the wound had to have been made by five teeth just like the Defendant’s.”¹⁸⁴

Defense expert Dr. Beaver disagreed. Not only did Dr. Beaver testify that he was unable to match the breast bite mark mold to Mr. Patterson’s teeth, he reported that he was able to match the mold to one of his other patients.¹⁸⁵ A second defense expert, Dr. Biggs, testified that “the distance between the marks on the breast could not be accurately measured,” “the method of measurement used by the State’s witnesses was not scientifically precise,” the “identification of teeth marks is not as reliable as fingerprints, even if all thirty-two teeth are compared,” and “five teeth are not enough to identify someone.”¹⁸⁶

Mr. Patterson expressly argued on appeal that the State’s bite mark evidence was inadmissible due to its lack of scientific reliability. The court summarily rejected Mr. Patterson’s challenge, relying on *Doyle* without any analysis.¹⁸⁷ As dental expert Dr. C. Michael Bowers has explained, the *Doyle* and *Patterson* courts ignored the “void in scientific support for bitemark identifications reliability,” which he contends “reflect[s] . . . the persistent U.S. judiciary’s avoidance of scientific validation in certain forensic disciplines.”¹⁸⁸

bitemark uniqueness remains unanswered”).

180. *Patterson*, 509 S.W.2d at 862.

181. *Id.* at 861.

182. NAS REPORT, *supra* note 12, at 107–08 (concluding that “[m]uch forensic evidence—including, for example, bite marks . . . is introduced in criminal trials without any meaningful scientific validation, determination of error rates, or reliability testing to explain the limits of the discipline”) (internal citations omitted)).

183. *Patterson*, 509 S.W.2d at 862. Dr. Hoffman inexplicably went on to “admit[] that there might be other persons whose teeth would match the bitemarks.” *Id.*

184. *Id.*

185. *Id.*

186. *Id.*

187. *Id.* at 863.

188. Bowers, *supra* note 39, at S105.

One year after *Patterson*, a California appellate court decided what has become the seminal American bite mark case,¹⁸⁹ *People v. Marx*.¹⁹⁰ The *Marx* murder investigation centered around an alleged human bite mark discovered on the elderly victim's nose.¹⁹¹ The State's dental experts compared impressions of that bite mark to casts of Walter Marx's teeth and all three testified that Mr. Marx's dentition matched the victim's nose wound.¹⁹² Mr. Marx was convicted at the close of a bench trial.¹⁹³

On appeal, Mr. Marx challenged the admission of the bite mark identification testimony on the grounds that the evidence was not generally accepted in the field of forensic odontology under California's modified version of the *Frye*¹⁹⁴ test.¹⁹⁵ The court "[c]onceded[] [that] there is no established science of identifying persons from bite marks"¹⁹⁶ and "[t]here was no evidence of systematic, orderly experimentation in the area."¹⁹⁷ It nevertheless went on to hold that no such scientific validity was necessary because the *Frye* general acceptance test does not apply to bite mark identification evidence.¹⁹⁸

The *Marx* Court reached that result by resorting to the following propositional logic:

189. See Saks et al., *supra* note 13, at 545 (2016) ("*Marx* became the paradoxical seed from which most, if not all, subsequent decisions about admissibility of bitemark expert testimony grew.").

190. 126 Cal. Rptr. 350 (Cal Ct. App. 1975).

191. *Marx*, 126 Cal. Rptr. at 352; see also Adrienne Hale, *The Admissibility of Bite Mark Evidence*, 51 S. CAL. L. REV. 309 (1978).

192. *Marx*, 126 Cal. Rptr. at 352–56; see also *id.* at 353 (explaining that "[t]he three prosecution experts were: Reidar Sognaes, a dentist and professor at UCLA medicine school; Gerald Vale, a dentist and lawyer and chief of forensic dentistry with the Los Angeles Coroner's office; and Gerald Felando, a dentist in private practice").

193. *Id.* at 350.

194. *Frye v. United States*, 293 F. 1013, 1014 (D.C. Ct. App. 1923) (explaining that expert testimony is admissible where the proponent of the evidence establishes that the expert's theory and methodology are generally accepted in the relevant scientific community). California adopted a modified version of the *Frye* test in *People v. Kelly*, 549 P.2d 1240 (Cal. 1976). In *Kelly*, the court adopted a three-part test for the admissibility of novel scientific evidence. *Id.* At 1244. First, the reliability of the method must be established by an expert who can demonstrate that the method is generally accepted within the relevant community. *Id.* Next, the expert must be qualified to give an opinion on the at-issue subject. *Id.* Finally, the proponent must demonstrate that the correct scientific procedures were used in the particular case. *Id.* This test became known as the *Kelly/Frye* test.

195. *Id.* at 355; see also *id.* at 357 (noting how *Marx* also challenged the admission of the bite mark identification testimony as "trial by mathematics" in violation of *People v. Collins*, 438 P.2d 33 (Cal. 1976), which the court rejected (internal quotation marks omitted)).

196. *Marx*, 126 Cal. Rptr. at 353.

197. *Id.* at 354.

198. *Id.* at 355.

- *Frye* only applies to “scientific hypotheses not capable of proof or disproof in court.”¹⁹⁹
- The at-issue expert bite mark matching evidence, which included “models, photographs, X-rays and dozens of slides of the victim’s wounds and [the] defendant’s teeth,” was presented to the trier of fact during the bench trial and, as such, was independently verifiable by the trial court by deployment of its “common sense.”²⁰⁰
- *Frye*, therefore, does not apply to bite mark evidence.²⁰¹

This reasoning is highly problematic for at least two reasons. First, the court did not—because it could not—point to any authority in support of its contention that novel feature comparison forensic expert evidence, such as bite mark identification testimony, is *Frye*-exempt.²⁰² The very purpose of expert opinion testimony is to assist the trier of fact to understand evidence about which the expert’s specialized knowledge exceeds that of the average lay person.²⁰³ As a result, *Marx*’s holding that *Frye* does not apply to bite mark analysis because the jury can visually assess the evidence and, presumably, second-guess the expert testimony, undermines the notion that bite mark identification expert opinion testimony is ever admissible. The court’s non-sensical *Frye*-limitation maneuver in *Marx*²⁰⁴ spearheaded what has become an unfortunate trend in the criminal courts, which is to simply ignore the admissibility rules applicable to expert evidence in order to side-step any serious scientific evaluation of the proven-unreliable “matching” or comparison forensic disciplines.²⁰⁵

199. *Id.* at 355–56.

200. *Id.* at 356.

201. *Id.*

202. *Id.* at 355–56.

203. FED. R. EVID. 702 (“A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if . . . the expert’s scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue.”); FAIGMAN ET AL., *supra* note 19, at § 35:5 (noting that “expert opinion testimony is permitted precisely because it is believed that the expert’s understanding exceeds the jury’s, and the expert can tell the jury truths that the jury could not otherwise grasp”); Victor E. Schwartz & Cary Silverman, *The Draining of Daubert and the Recidivism of Junk Science in Federal and State Courts*, 35 HOFSTRA L. REV. 217, 220 (2006) (“The content of expert testimony is, by definition, outside the realm of an ordinary juror’s scope of knowledge.”).

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

205. *See, e.g.*, Robert A. De La Cruz, *Forensic Dentistry and the Law: Is Bite Mark Evidence Here to Stay?*, 24 AM. CRIM. L. REV. 983, 993 (1987) (explaining that “[t]he modern trend appears to ignore

Second, the court did not—because it could not—point to any authority in support of its determination that laypeople are capable of evaluating whether a bite mark is consistent with a defendant’s dentition.²⁰⁶ Such a claim was particularly remarkable given that the prevailing view at the time that *Marx* was decided was that bite mark identification was well-beyond the purview of forensic dentists let alone lay people.²⁰⁷ In fact, *Marx* “presented what three forensic dentists . . . thought was a *justifiable exception* to the rule among forensic dentists that crime scene bite marks could not be trusted to yield accurate source identifications.”²⁰⁸ This is because

[t]he teeth that made the bite mark were highly unusual and the bite mark was exceptionally well defined and three dimensional (because nasal skin is stretched tautly over underlying bone and cartilage, nasal tissue is firmer than the tissue of other body parts where bite marks are found, such as breasts). The witnesses characterized these bite impressions as the clearest they had ever seen, either personally or in the literature.²⁰⁹

The *Marx* court expressly acknowledged as much, explaining that the prosecution’s dental experts were excited because they had stumbled upon the rare case where bite mark identification methodology could potentially produce a reliable result.²¹⁰

Notwithstanding the uniqueness of the bite marks at issue in *Marx*,²¹¹ the case “came to be read as a global warrant to admit bite mark identification evidence whenever a person displaying apparent credentials chose to testify to an identification.”²¹² The cases that closely followed and relied on *Marx* also went to great lengths to extoll the “superior trustworthiness of the scientific bite mark approach.”²¹³ Several courts

or circumvent *Frye* if the test’s requirements are not met”).

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

207. *Id.*; see also FAIGMAN ET AL., *supra* note 19, at § 35:4 (“[T]he courts began admitting expert testimony on bitemarks at a point of time in which many prominent forensic odontologists still doubted whether the necessary knowledge existed to permit them to make such identifications accurately.”).

208. *Saks et al.*, *supra* note 13, at 543 (emphasis added).

209. *Id.* at 544 (citing Gerry L. Vale et al., *Unusual Three-Dimensional Bite Mark Evidence in a Homicide Case*, 21 J. FORENSIC SCI. 642 (1976)).

210. *Marx*, 126 Cal. Rptr. at 353 (noting that “the testimony of the three prosecution experts reflects their enthusiastic response to a rare opportunity to develop or extend forensic dentistry into the area of bite mark identification”).

211. Paul C. Giannelli, *Bite Mark Analysis*, 43 NO. 6 CRIM. LAW BULL. 930, 943 (2007) (explaining that “the precedential value of *Marx* is undercut, at least to a certain degree, because the case involved an exceptional three-dimensional bite mark”).

212. *Risinger*, *supra* note 3, at 138.

213. *People v. Slone*, 76 Cal. App. 3d 611, 624 (Cal. Ct. App. 1978); see also *State v. Sager*, 600

began to take judicial notice of the generally scientific validity of bite mark evidence.²¹⁴ And, just four years after *Marx* was decided, a California court of appeals expressly held that bite mark identification evidence was admissible under *Frye* because it “had gained general acceptance in the scientific community of dentistry.”²¹⁵ As a result, “*Marx* came to stand for the very proposition that the experts in the case, and their field, had up to that point explicitly, collectively rejected.”²¹⁶ With regard to the courts’ inexplicable deference to bite mark identification evidence, the leading treatise on scientific evidence perhaps sums it up best: “most remarkable, rather than the field convincing the courts of the sufficiency of its knowledge and skills, admission by the courts seems to have convinced the forensic odontology community that, despite their doubts, they were indeed able to perform bitemark identifications after all.”²¹⁷

B. *Bite Mark Identification Evidence Under Daubert*

Congress enacted the Federal Rules of Evidence in 1975.²¹⁸ The Rules’ failure to make any mention of the *Frye* general acceptance test,²¹⁹ however, instigated considerable debate in the federal courts and among legal scholars regarding the appropriate standard applicable to the admission of expert evidence.²²⁰ The Federal Rules’ omission of any reference to *Frye* has been characterized as their “most controversial and important unresolved question.”²²¹ It also played a central role in the United States Supreme Court’s watershed 1993 decision, *Daubert v. Merrell Dow*

S.W.2d 541, 569 (Mo. Ct. App. 1980) (characterizing bite mark evidence as “an exact science”).

214. See, e.g., *State v. Richards*, 804 P.2d 109, 112 (Ariz. Ct. App. 1990) (ruling that “bite mark evidence is admissible without a preliminary determination of reliability”); *Spence v. State*, 795 S.W.2d 743, 752 (Tex. Crim. App. 1990); *State v. Armstrong*, 369 S.E.2d 870, 877 (W. Va. 1988); *People v. Middleton*, 429 N.E.2d 100, 101 (N.Y. 1981).

215. *Slone*, 76 Cal. App. 3d at 625.

216. Saks et al., *supra* note 13, at 545.

217. FAIGMAN ET AL., *supra* note 19, at § 35:4.

218. Paul C. Giannelli, *Daubert: Interpreting the Federal Rules of Evidence*, 15 CARDOZO L. REV. 1999, 2000 (1994) (explaining that “neither *Frye* nor the admissibility of novel scientific evidence were addressed in the legislative history of the Federal Rules . . . mentioned in the advisory committee notes, the congressional committee reports, or the extensive hearings on the Federal Rules”) (internal citations omitted).

219. Leslie A. Lunney, *Protecting Juries from Themselves: Restricting the Admission of Expert Testimony in Toxic Tort Cases*, 48 SMU L. REV. 103, 105 (1994).

220. See Giannelli, *supra* note 218, at 1999–2000.

221. Edward R. Becker & Aviva Orenstein, *The Federal Rules of Evidence After Sixteen Years—The Effect of “Plain Meaning” Jurisprudence, the Need for an Advisory Committee on the Rules of Evidence, and Suggestions for Selective Revision of the Rules*, 60 GEO. WASH. L. REV. 857, 863 (1992).

Pharmaceuticals.²²² In determining that *Frye* had been superseded by Federal Rule of Evidence 702 in *Daubert*, the Court explained:

Given the Rules' permissive backdrop and their inclusion of a specific rule on expert testimony that does not mention "general acceptance," the assertion that the Rules somehow assimilated *Frye* is unconvincing. *Frye* made "general acceptance" the exclusive test for admitting expert scientific testimony. That austere standard, absent from, and incompatible with, the Federal Rules of Evidence, should not be applied in federal trials.²²³

The Court went on to hold that Federal Rule of Evidence 702 obliges trial courts to act as "gatekeepers" to "ensure that any and all scientific testimony or evidence admitted is not only relevant, but reliable."²²⁴ *Daubert* effectively shifted the responsibility for assessing the reliability and validity of expert evidence from the expert's relevant scientific peers to trial court judges.²²⁵ In so doing, the Supreme Court directed trial courts to fulfill their gatekeeping function by engaging in a "flexible," multi-factor analysis, which evaluates the following: (1) whether the at-issue theory or technique can be or has been tested; (2) whether it has been subject to peer review and publication; (3) its known or potential error rate; (4) its controlling standards and methodologies; and (5) its degree of acceptance within the relevant scientific community.²²⁶ *Daubert* emphasizes that these factors are "neither exclusive or dispositive."²²⁷

The open question after *Daubert* was whether its reliability test was limited to "scientific" expert evidence or extended to "technical" and "other specialized" knowledge. In *Kumho Tire Co., Ltd. v. Carmichael*,²²⁸ the court rejected the former, more narrow reading of *Daubert* because "it would prove difficult, if not impossible, for judges to administer evidentiary rules under which a 'gatekeeping' obligation depended upon a distinction between 'scientific' knowledge and 'technical' or 'other specialized' knowledge [given that] there is no clear line that divides the one from the

222. *Daubert v. Merrell Dow Pharma., Inc.*, 509 U.S. 579 (1993).

223. *Id.* at 589.

224. *Id.*

225. Erica Beecher-Monas, *Blinded by Science: How Judges Avoid the Science in Scientific Evidence*, 71 TEMP. L. REV. 55, 56 (1998) [hereinafter Beecher-Monas, *Blinded by Science*] (contending that "*Daubert*'s requirement that judges actually think about the validity of the evidence before them is a vast improvement over merely deferring to the experts and hoping the jury can sort out the charlatans from the pundits").

226. *Daubert*, 509 U.S. at 59–94.

227. FED. R. EVID. 702 advisory committee's note to 2000 amendment.

228. 526 U.S. 137 (1999).

others.”²²⁹ The *Kumho* Court also took aim at the numerous, pre-*Daubert* rulings holding that patently unreliable forensic disciplines, like bite mark identification analysis, satisfied the *Frye* general acceptance test, pointedly stating that *Daubert*’s general acceptance factor does not “help show that an expert’s testimony is reliable where the discipline itself lacks reliability, as, for example, do theories grounded in any so-called generally accepted principles of astrology or necromancy.”²³⁰

In 2000, Congress adopted amendments to Federal Rule of Evidence 702 to incorporate the holdings of *Daubert* and *Kumho Tire*.²³¹ The advisory committee notes to those amendments go out of their way to make clear that “the Rule as amended provides that *all types of expert testimony* present questions of admissibility for the trial court in deciding whether the evidence is reliable and helpful.”²³² States began adopting *Daubert* shortly after the case was decided and, today, *Daubert* is overwhelmingly controlling on the issue of expert evidence admissibility in the states.²³³

There has been considerable speculation since *Daubert* concerning whether its reliability standard would work a radical change on the admissibility of expert testimony.²³⁴ And, insofar as the admission of civil toxic tort and products liability expert evidence is concerned, *Daubert* has produced a devastating difference.²³⁵ Professors Edward Cheng and

229. *Id.* at 148.

230. *Id.*

231. FED. R. EVID. 702.

232. FED. R. EVID. 702 advisory committee’s note to 2000 amendment (emphasis added).

233. See Michael Morgenstern, *Daubert v. Frye – A State-by-State Comparison*, EXPERT INST. (Apr. 3, 2017), <https://www.theexpertinstitute.com/daubert-v-frye-a-state-by-state-comparison/> [<https://perma.cc/T8KC-HS5T>].

234. See, e.g., Andrew W. Jurs & Scott DeVito, *The Stricter Standard: An Empirical Assessment of Daubert’s Effect on Civil Defendants*, 62 CATH. U. L. REV. 675, 677 (2013) (conceding that “[t]he question of whether *Daubert* . . . adopted a more lenient or more stringent standard for testing the reliability of expert evidence has dogged academics, practitioners, and researchers for twenty years”).

235. See Keith A. Findley, *Judicial Gatekeeping of Suspect Evidence: Due Process and Evidentiary Rules in the Age of Innocence*, 47 GA. L. REV. 723, 755 (2013) (“The empirical record suggests that the perceived problem with junk science in civil litigation has indeed been the primary focus of *Daubert* gatekeeping. Several studies of the impact of *Daubert* have concluded that it has had a significant impact on limiting flawed expert testimony in civil cases but almost no impact in criminal cases, at least with regard to evidence proffered by the prosecution.”); Paul C. Giannelli, *The Supreme Court’s “Criminal” Daubert Cases*, 33 SETON HALL L. REV. 1071, 1096 (2003) (opining that “*Daubert* has had a far more significant impact in civil litigation than in criminal litigation”); Andrew W. Jurs & Scott DeVito, *Et Tu, Plaintiffs? An Empirical Analysis of Daubert’s Effect on Plaintiffs, and Why Gatekeeping Standards Matter (A Lot)*, 66 ARK. L. REV. 975, 984 (2013); Risinger, *supra* note 3, at 99 (explaining that “as to proffers of asserted expert testimony, civil defendants win their *Daubert* reliability challenges to plaintiffs’ proffers most of the time, and that criminal defendants virtually always lose their reliability challenges to government proffers”); Joseph Sanders, *Applying Daubert Inconsistently? Proof of Individual Causation in Toxic Tort*

Albert Yoon summarized *Daubert*'s effects on federal civil plaintiffs as follows:

In federal courts . . . *Daubert* has become a potent weapon of tort reform by causing judges to scrutinize scientific evidence more closely. Tort reform efforts often focus on medical malpractice, products liability, and toxic torts—all cases in which scientific evidence is likely to play a decisive or at least highly influential role. The resulting effects of *Daubert* have been decidedly pro-defendant. In the civil context, *Daubert* has empowered defendants to exclude certain types of scientific evidence, substantially improving their chances of obtaining summary judgment and thereby avoiding what are perceived to be unpredictable and often plaintiff-friendly juries.²³⁶

Indeed, legal scholars contend that *Daubert* has raised the admissibility bar so high in civil proceedings that “proving causation in many toxic tort cases is well nigh impossible”²³⁷ and, consequently, “[t]he current state of *Daubert* drug litigation is intolerable.”²³⁸ Worse yet, a recent empirical study concludes that *Daubert* has had a disparate impact on African-American civil plaintiffs, “leading to their disproportionate exclusion from federal court.”²³⁹

By contrast, there is no evidence to suggest that *Daubert* has operated to limit the admissibility of faulty forensic evidence in criminal cases.²⁴⁰ Since *Daubert* was decided, criminal trial courts have continued to admit bite mark identification evidence without ever subjecting the underlying methodology to the *Daubert* criteria to ensure that it is reliable.²⁴¹ Rather than scrutinizing bite mark identification testimony for scientific soundness, which it could not withstand, courts often simply take judicial notice of such evidence on the basis that every other court in the country

and Forensic Cases, 75 BROOK. L. REV. 1367, 1374 (2010) (acknowledging that “[i]n no area [of the law] has the *Daubert* revolution had a greater effect than in [civil] toxic torts. The number of cases in which expert causation testimony has been excluded must by now run into the thousands.”).

236. Edward K. Cheng & Albert H. Yoon, *Does Frye or Daubert Matter? A Study of Scientific Admissibility Standards*, 91 VA. L. REV. 471, 472–73 (2005).

237. Margaret A. Berger & Aaron D. Twerski, *Uncertainty and Informed Choice: Unmasking Daubert*, 104 MICH. L. REV. 257, 267 (2005).

238. *Id.* at 288.

239. Andrew W. Jurs & Scott DeVito, *A Tale of Two Dauberts: Discriminatory Effects of Scientific Reliability Screening*, 79 OHIO STATE L.J. 1107, 1109–10 (2018) (declaring that “the *Daubert* admissibility standard impacts filings exactly like a method of tort reform, but only for claimants of color”).

240. See, e.g., Jennifer L. Groscup et al., *The Effects of Daubert on the Admissibility of Expert Testimony in State and Federal Criminal Cases*, 8 PSYCHOL. PUB. POL'Y & L. 339, 342–44 (2002).

241. Beecher-Monas, *Blinded by Science*, *supra* note 225, at 74 n.126.

had admitted the same.²⁴² Expressly abdicating their *Daubert* gatekeeping duties, courts appear “to be relying on the acceptance by the courts rather than . . . experts.”²⁴³ In the context of criminal bite mark identification evidence, a sizable group of renowned experts has flatly concluded that “*Daubert* . . . appears to have changed nothing.”²⁴⁴

One rationale advanced to explain this phenomenon is the general reluctance of judges to diverge from legal precedent. For example, where, as in *Marx*, one court “makes the mistake of incorrectly admitting a specific type of evidence as ‘scientific,’ . . . other courts . . . will [likely] follow the precedent without re-examining the scientific reliability of the method.”²⁴⁵ An even more disturbing possibility is that judges may be unwilling to face up to their own admissibility errors. As Professor Sangero posits, “even when (genuine) scientists find in their research that certain allegedly ‘scientific’ types of evidence are not grounded in science and are unreliable and invalid, many judges, who are used to basing convictions on such evidence, have difficulty accepting this as it would mean conceding their own past mistakes.”²⁴⁶ Whatever the motivation, no American criminal trial court has ever excluded bite mark identification evidence under *Daubert*.²⁴⁷

C. State Legislative Interventions: Changed Science Laws & Writs

“[R]elief from a conviction premised on expert evidence that was, but is no longer, viewed as valid by the scientific community is exceedingly rare.”²⁴⁸

As explained above, post-conviction petitioners who have raised reliability challenges to bite mark identification evidence have received a poor reception from the courts. Those who have had their convictions overturned have not managed to do so because courts were willing to revisit the reliability of bite mark evidence on post-conviction review. Instead, those petitioners were granted new hearings on the basis of either newly discovered exculpatory DNA evidence or some other trial error,

242. *Id.*

243. *Id.* at 74.

244. Saks et al., *supra* note 13, at 546.

245. Boaz Sangero, *Safety from Flawed Forensic Sciences Evidence*, 34 GA. ST. U. L. REV. 1129, 1137 (2018).

246. *Id.*

247. Saks et al., *supra* note 13, at 541 (stating that “[d]espite the lack of empirical evidence to support its claims, to date no court in the United States has excluded [bite mark identification] expert evidence for failing to meet the requisite legal standard for admission of expert testimony”).

248. Jennifer E. Laurin, *Criminal Law’s Science Lag: How Criminal Justice Meets Changed Scientific Understanding*, 93 TEX. L. REV. 1751, 1753–54 (2015).

such as a prosecutorial *Brady* violation²⁴⁹ or ineffective assistance of counsel.²⁵⁰ Professor Laurin characterizes this dynamic as the “criminal law’s science lag,” explaining that “even as scientific understanding evolves, criminal justice outcomes whose epistemic bona fides depend on the reliability of that science remain rooted in discredited knowledge.”²⁵¹

The courts’ ongoing refusal to grant relief to individuals convicted because of faulty forensic evidence has provoked at least a handful of states into action.²⁵² The Texas²⁵³ and California²⁵⁴ legislatures, for example, have recently enacted so-called “changed-science writs,”²⁵⁵ which permit incarcerated individuals to challenge convictions obtained as a result of now-discredited “science,” such as bite mark identification evidence.²⁵⁶ The Texas statute permits an incarcerated individual to petition for a writ of habeas corpus so long as “relevant [and admissible] scientific evidence is currently available and was not available at the time of the convicted person’s trial because [it] was not ascertainable through the exercise of reasonable diligence . . . before the date of or during the convicted person’s trial.”²⁵⁷

California created a habeas writ virtually identical to the one adopted by Texas and then went one step further.²⁵⁸ The California law also

249. *Brady v. Maryland*, 373 U.S. 83, 87 (1963); *see also* *United States v. Bagley*, 473 U.S. 667, 682 (1985) (holding that *Brady* evidence is material “if there is a reasonable probability that, had the evidence been disclosed to the defense, the result of the proceeding would have been different”).

250. *Strickland v. Washington*, 466 U.S. 668, 685–65, 693–94 (1984) (holding that in order to establish ineffective assistance of counsel a defendant must satisfy a two-part test; specifically, the defendant must show that: (1) counsel’s performance was so deficient that it violated the Sixth Amendment right to counsel and (2) there is a reasonable probability that the outcome would have been different but for counsel’s ineffective performance).

251. Laurin, *supra* note 248, at 1754.

252. Including TX, CA, WY, and CT by statute and MI by court.

253. TEX. CODE CRIM. PROC. ANN. art. 11.073 (West 2019).

254. CAL. PENAL CODE § 1473 (West 2019).

255. Laurin, *supra* note 248, at 1776 (positing that “changed-science writs like Texas’s present an opportunity to override aspects of generally applicable postconviction doctrines that uniquely impinge on new science claims”).

256. Simon A. Cole, *Changed Science Statutes: Can Courts Accommodate Accelerating Forensic Scientific and Technological Change?*, 57 JURIMETRICS 443, 443 (2017) (explaining that “[i]n the past several years, the nation’s two most populous states have passed new statutes specifically intended to address the issue of rapidly changing scientific and technological knowledge, perhaps signaling a national trend” and adopting Professor Laurin’s “changed science” terminology to refer to these legal and judicial developments).

257. TEX. CODE CRIM. PROC. ANN. art. 11.073(A); *see also* Laurin, *supra* note 248, at 1775 (noting that the Texas’s statute’s “critical significance was to remove the requirement in Texas that constitutional violations or actual innocence be proved to obtain postconviction relief; it thus created a science-specific claim”).

258. CAL. PENAL CODE § 1473(b)(3)(A) (permitting a convicted individual to petition for a writ of

permits an incarcerated individual to petition for a writ to challenge material and probative false evidence that was introduced at trial.²⁵⁹ It defines “false evidence” as inclusive of “opinions of experts that have either been repudiated by the expert who originally provided the opinion at a hearing or trial or that have been undermined by later scientific research or technological advances.”²⁶⁰ The instigation for this route to post-conviction relief centers around William Richards’s wrongful conviction proceedings in the California state courts.

San Bernardino County charged William Richards with the first-degree murder of his wife, Pamela Richards, in 1993.²⁶¹ During his fourth trial,²⁶² the State presented an entirely circumstantial case, which hinged on the bite mark identification testimony provided by the prosecution’s dental expert, forensic odontologist Dr. Norman Sperber.²⁶³ Dr. Sperber opined that he had located a human bite mark on the victim’s right hand that matched Mr. Richards’s dentition.²⁶⁴ He further claimed that Mr. Richards’s “unusual dentition occurred in only 2 percent or less of the general population.”²⁶⁵ Mr. Richards’s dental expert, Dr. Gregory S. Golden, testified that “in a brief review of 15 ‘study models’ of teeth in his office, he found five models that were ‘consistent with’ the mark” on the victim’s hand and therefore, opined that “the bite-mark evidence was inconclusive and should be disregarded.”²⁶⁶ The jury nonetheless convicted Richards and a California court of appeals affirmed.²⁶⁷

habeas corpus to present “[n]ew evidence . . . that is credible, material, presented without substantial delay, and of such decisive force and value that it would have more likely than not changed the outcome at trial”).

259. *Id.* § 1473(b)(1) (permitting a convicted individual to petition for a writ of habeas corpus to contest, among other things, “[f]alse evidence that is substantially material or probative on the issue of guilt or punishment [that] was introduced against a person at a hearing or trial relating to his or her incarceration”).

260. *Id.* § 1473(e)(1).

261. *In re Richards (Richards I)*, 289 P.3d 860 (Cal. 2012).

262. William Richards, *Other Murder Cases with False or Misleading Forensic Evidence*, NAT’L REGISTRY EXONERATIONS, <https://www.law.umich.edu/special/exoneration/Pages/casedetail.aspx?caseid=5398> [<https://perma.cc/WPZ6-AVED>] (explaining that “Williams went to trial four times in San Bernardino County Superior Court before he was convicted. The first trial resulted in mistrial when the jury was unable to reach a unanimous verdict. The second trial ended in a mistrial during jury selection. The third trial resulted in a mistrial when the jury again was unable to reach a unanimous verdict.”).

263. *Id.*; see also *Richards I*, 289 P.3d at 863.

264. *Richards I*, 289 P.3d at 863, 865–66.

265. *Id.* at 863.

266. *Id.* at 866.

267. *Id.* at 863.

Mr. Richards then petitioned the San Bernardino County Superior Court for post-conviction review, contending, among other things, that newly discovered DNA evidence excluded him as the perpetrator of the crime and “that his murder conviction was based on false evidence given at trial by” Dr. Sperber.²⁶⁸ In support of his petition, Mr. Richards presented a sworn declaration in which Dr. Sperber *recanted his trial testimony*.²⁶⁹ Specifically, Dr. Sperber swore that his “testimony regarding the statistical frequency of [Richards’s] dentition was not based on scientific data” and that “he was no longer certain that the lesion on [the victim’s] hand was a bite mark.”²⁷⁰ Mr. Richards also presented declarations from several other dental experts, all of whom concluded that Dr. Sperber had testified falsely at Mr. Richards’s trial.²⁷¹

The San Bernardino County Superior Court granted Mr. Richards a post-conviction evidentiary hearing. At the conclusion of the same, Judge Brian McCarville determined that the evidence presented required the Superior Court to reverse Mr. Richards’s conviction:

Taking the evidence as to the . . . DNA and the bite mark . . . , the Court finds that the entire prosecution case has been undermined, and that Richards has established his burden of proof to show that the evidence before me points unerringly to innocence. Not only does the bite mark evidence appear to be questionable, it puts Richards as being excluded. And . . . the DNA evidence establishes that someone other than Richards and the victim was at the crime scene.²⁷²

The San Bernardino County district attorney, however, appealed that decision, which a California court of appeals overturned.²⁷³ According to the court of appeals, the bite mark identification evidence that Mr. Richards presented in support of his petition did not constitute “new evidence” because it was not inconsistent with the bite mark identification evidence presented at trial²⁷⁴ and, to the extent that Mr. Richards’s petition presented new evidence, it “failed to undermine the prosecution’s entire case and point unerringly to his innocence.”²⁷⁵ Mr. Richards appealed.

268. *Id.*

269. *Id.*

270. *Id.*

271. *Id.*

272. *William Richards*, CAL. INNOCENCE PROJECT, <https://californiainnocenceproject.org/read-their-stories/william-richards/> [<https://perma.cc/M5S7-CMWP>].

273. *In re Richards*, No. E049135, 2010 WL 4681260, at *1 (Cal. Ct. App. Nov. 19, 2010), *aff’d*, *Richards I*, 289 P.3d at 860–61.

274. *Id.* at *12–13.

275. *Id.* at *16.

The Supreme Court of California affirmed the lower court's reinstatement of Mr. Richards's conviction.²⁷⁶ In a 4–3 decision, the high court determined that Dr. Sperber's expert opinion testimony did not qualify as "false evidence" under the State's habeas statute.²⁷⁷ It reasoned that the false evidence standard applies exclusively to an expert's "objectively untrue" opinion, which is one that is incorrect pursuant to scientific advances in the field.²⁷⁸ The court then extended that logic to conclude that the false evidence standard did not and could not apply to an expert's "subjective" trial opinion—notwithstanding that expert's later recantation of that opinion and conceded relevant scientific advancements in the field.²⁷⁹ In deriding the *Richards* ruling as the worst opinion of the year, the *California Lawyer* aptly observed that the court created a "shadowy distinction" between expert and lay testimony and "create[d] a substantial obstacle to correcting . . . the second-most-common factor contributing to wrongful convictions: erroneous scientific evidence - in identifying 'hair, bullets, handwriting, footprints, bite marks and even venerated fingerprints.'"²⁸⁰

The *California Lawyer*, however, was not isolated in its outrage about the State Supreme Court's decision. The California legislature responded to the opinion by enacting the Bill Richards Bill, which amended the state habeas statute to clarify that subjective expert opinion testimony *can* constitute false evidence and that convicted individuals may raise false evidence claims concerning such testimony during their post-conviction proceedings.²⁸¹ In 2016, Mr. Richards's conviction finally was reversed

276. *Richards I*, 289 P.3d at 876.

277. *Id.* at 870–73.

278. *Id.* at 871 (explaining that "[w]hen . . . there has been a generally accepted and relevant advance in the witness's field of expertise, or when a widely accepted new technology has allowed experts to reach an objectively more accurate conclusion, a strong reason may exist for valuing a later opinion over an earlier opinion. If, and only if, a preponderance of the evidence shows that an expert opinion stated at trial was objectively untrue, the false evidence standard applies").

279. *Id.* at 870 (contending that "[w]hen an expert witness gives an opinion at trial and later simply has second thoughts about the matter, without any significant advance having occurred in the witness's field of expertise or in the available technology, it would not be accurate to say that the witness's opinion at trial was *false*. Rather, in that situation there would be no reason to value the later opinion over the earlier. Therefore, one does not establish false evidence merely by presenting evidence that an expert witness has recanted the opinion testimony given at trial") (emphasis in original); *id.* at 871–73.

280. Gerald F. Uelmen, *New Balance at the California Supreme Court*, CAL. LAWYER (Aug. 2013), <https://ww2.callawyer.com/Clstory.cfm?eid=930177> [<https://perma.cc/6XBG-Z9SP>]; see also Jordan Smith, *California Supreme Court Overturns Murder Conviction Based on Flawed Bite-Mark Evidence*, INTERCEPT (May 27, 2016), <https://theintercept.com/2016/05/27/california-supreme-court-overturns-bill-richardss-murder-conviction-based-on-flawed-bite-mark-evidence/> [<https://perma.cc/M5TV-DBUY>].

281. Maurice Possley, *William Richards*, NAT'L REGISTRY OF EXONERATIONS,

by a unanimous Supreme Court of California, which determined that Dr. Sperber's bite mark identification trial testimony was false and materially impacted Mr. Richards's conviction under the amended California habeas statute.²⁸² All told, Mr. Richards spent nearly two decades in prison for a crime that he did not commit.

Much like California, Texas amended its habeas statute to include a changed science writ. The Texas legislature did so in response to a state court of last resort decision refusing to reverse an individual's conviction on post-conviction review despite significant evidence undermining the scientific testimony that the State presented at trial.²⁸³ Neal Hampton Robbins was convicted of the capital murder of his girlfriend's seventeen-month old child and sentenced to life, which the Beaumont Court of Appeals and the Texas Court of Criminal Appeals each affirmed on direct appeal.²⁸⁴ Robbins thereafter petitioned for habeas relief.

At the time of trial, "[t]he State's case [against Mr. Robbins] largely depended on the expert opinion of Dr. Patricia Moore, the medical examiner who performed the autopsy and who testified that [the victim] died from asphyxia due to the compression of her chest and abdomen."²⁸⁵ Dr. Moore, however, later recanted her trial testimony and cause and manner of death determination.²⁸⁶ In addition, she agreed to amend the victim's death certificate to reflect both the cause and manner of death as "undetermined."²⁸⁷

Mr. Robbins's petition for post-conviction review centered around Dr. Moore's recantation of her cause and manner of death trial testimony.²⁸⁸ The trial court that reviewed Mr. Robbins's petition recommended that the Texas Court of Criminal Appeals grant Mr. Robbins a new trial on due process and impartial jury grounds.²⁸⁹ In a 5–4 decision, however, the Texas Court of Criminal Appeals rejected that recommendation on the basis that Robbins had failed to prove that Dr. Moore's cause and manner of death trial testimony either comported with the State habeas statute's

<http://www.law.umich.edu/special/exoneration/Pages/casedetail.aspx?caseid=4929>
[<https://perma.cc/WPZ6-AVED>].

282. *In re Richards*, 371 P.3d at 207–11.

283. Cole, *supra* note 256, at 446 (explaining that "the most interesting similarity between the [California and Texas] statutes is that both were apparently passed by their respective legislatures in reaction to specific cases in which the states' courts of last resort deemed themselves legally unable to provide postconviction relief to applicants who alleged that the integrity of their convictions had been undermined by subsequent scientific developments").

284. *Ex Parte Robbins (Robbins I)*, 360 S.W.3d 446, 452–53 (Tex. Crim. App. 2011).

285. *Id.* at 448.

286. *Id.* at 454.

287. *Id.* at 453.

288. *Id.* at 457.

289. *Id.*

definition of “false evidence”²⁹⁰ or “unquestionably establishe[d] his innocence.”²⁹¹

Two years later, the Texas legislature amended its habeas statute to incorporate a changed science writ.²⁹² Mr. Robbins’s attorney testified during the Texas legislature’s science writ hearings, and *Robbins* “has been credited with changing the legislature’s—and some District Attorneys’—minds on the necessity of the statute.”²⁹³ The Texas Court of Criminal Appeals subsequently granted Mr. Robbins’s petition for a new trial.²⁹⁴

Not long thereafter, the Texas Court of Criminal Appeals received its first petition for habeas relief pursuant to the State’s recently-enacted changed science writ involving bite mark identification testimony.²⁹⁵ Steven Mark Chaney was convicted of first-degree murder and sentenced to life in prison subsequent to a jury trial in 1987.²⁹⁶ During the trial, the state called two forensic odontologists, each of whom testified that a human bite mark located on the victim’s forearm matched Mr. Chaney’s dentition.²⁹⁷

The State’s first dental expert, Dr. James Hale, expressly testified that “there was only a ‘[o]ne to a million’ chance that someone other than Chaney bit [the victim] because the mark was a ‘perfect match’ with ‘no discrepancies’ and ‘no inconsistencies.’”²⁹⁸ The State’s second dental expert, Dr. Homer Campbell, opined that he was confident to a “reasonable degree of dental certainty” that Mr. Chaney had bitten the victim.²⁹⁹ The bite mark identification evidence “was the State’s strongest evidence” in its circumstantial case against Mr. Chaney “according to its own closing arguments.”³⁰⁰

290. *Id.* at 457–58.

291. *Id.* at 458.

292. Act of June 13, 2013, ch. 410, 2013 Tex. Gen. Laws 1196 (codified at TEX. CODE CRIM. PROC. ANN. art. 11.073 (West 2019)).

293. Cole, *supra* note 256, at 447.

294. *Ex Parte Robbins (Robbins II)*, 478 S.W.3d 678, 680 (Tex. Crim. App. 2014); *see also* Terri Langford, *Court Clears Way for New Trial in Toddler’s Death*, TEX. TRIB. (Jan. 27, 2016), <https://www.texastribune.org/2016/01/27/texas-highest-court-rules-expanded-junk-science-la/> [<https://perma.cc/MVB7-5QH4>].

295. *Ex Parte Chaney*, 563 S.W.3d 239, 239–40 (Tex. Crim. App. 2018).

296. *Id.* at 244.

297. *Id.* at 250–51.

298. *Id.* at 250.

299. *Id.* at 251.

300. *Id.*; *see also id.* at 253 (explaining that “[t]he State spent almost all its second summation discussing the bitemark evidence,” and “[t]he prosecutor emphasized [Dr.] Hale’s testimony that ‘only one in a million could have possibility made that bite mark’ before asking the jury ‘[w]hat more do you need?’”).

In addition to his petition for post-conviction review, Mr. Chaney submitted a complaint to the Texas Forensic Science Commission asking it to exercise its statutory mandate to investigate and report on the integrity and reliability of the bite mark identification evidence used in criminal proceedings.³⁰¹ Responsive to that request, the Commission formed a Bite Mark Investigation Panel. The Panel reviewed the scientific literature and research studies concerning the reliability of bite mark identification, held a variety of hearings, during which it heard from “an impressive list of experts in the field of forensic odontology,” and, ultimately, made recommendations to the full Commission.³⁰² The Commission issued an April 12, 2016 report regarding its bite mark identification evidence investigation, in which it summarized its findings as follows:

First, there is no scientific basis for stating that a particular patterned injury can be associated to an individual’s dentition. Any testimony describing human dentition as “like a fingerprint” or incorporating similar analogies lacks scientific support. Second, there is no scientific basis for assigning probability or statistical weight to an association, regardless of whether such probability or weight is expressed numerically (e.g., 1 in a million) or using some form of verbal scale (e.g., highly likely/unlikely). Though these types of claims were once thought to be acceptable and have been admitted into evidence in criminal cases in and outside of Texas, it is now clear *they have no place in our criminal justice system* because they lack any credible supporting data.³⁰³

In 2018, the Texas Court of Criminal Appeals granted Mr. Chaney a new trial on post-conviction review conceding, among other things, that Mr. Chaney presented new scientific evidence that undermined the bite mark identification testimony presented at his 1987 trial³⁰⁴ and that the trial court had convicted him on the basis of false bite mark identification evidence.³⁰⁵ In reaching those conclusions, the court adopted several significant findings of fact regarding the reliability of bite mark identification testimony.³⁰⁶ Chief among those was the court’s finding that “no scientific evidence has been produced to support the basis of

301. TFSC BITEMARK REPORT, *supra* note 53, at ex. I.

302. *Id.* at 8–11.

303. *Id.* at 11–12 (emphasis added).

304. *Chaney*, 563 S.W.3d at 254–63.

305. *Id.* at 263–65.

306. *Id.* at 255–57.

individualization of a bite mark to the exclusion of all other potential sources in an open population.”³⁰⁷

IV. BITE MARK IDENTIFICATION REGULATION

The adoption of changed science writs by America’s two most populous states—Texas and California—is a welcome development and long-overdue legislative criminal justice reform aimed at expanding the scope of criminal defendants’ challenges to the admission of faulty forensic science during their habeas proceedings. Those writs, however, are only available in two jurisdictions thus far and both limit an incarcerated individual’s right to invoke changed science to post-conviction review. As a result, changed science writs are only available after the accused has been convicted, exhausted his or her direct appeals, and served years in prison. Moreover, trial courts have entirely abdicated their *Daubert* gatekeeping mandate with regard to forensic odontology expert evidence and continue to admit unreliable bite mark identification testimony with little scrutiny. Given the current state of legislative and judicial affairs, we are compelled to consider whether any potential remedies lie in the regulatory administration of forensic odontology and its practitioners. We initiate that inquiry below with an overview of the nature, authority, and historical conduct of the relevant regulatory actors.

A. National Forensic Odontology Regulation and Oversight

Two national organizations are charged with the regulation and oversight of forensic odontology in the United States. The first is the American Board of Forensic Odontologists (ABFO). Founded in 1976, the ABFO is responsible for certifying member forensic odontologists or “Diplomates.”³⁰⁸ The organization’s self-proclaimed mission is “to establish, enhance, and revise as necessary, standards of qualifications for those who practice forensic odontology, and to certify as qualified specialists those voluntary applicants who comply with the requirements of the Board.”³⁰⁹ Interestingly, the ABFO concedes that it “was created to provide qualified experts to advance the acceptance of forensic dentistry in criminal law.”³¹⁰

307. *Id.* at 255–56.

308. AM. BOARD FORENSIC ODONTOLOGY, A BRIEF HISTORY 1–2 (2012), <http://www.abfo.org/wp-content/uploads/2012/11/2-Brief-History-ABFO.pdf> [<https://perma.cc/DS58-R35N>].

309. *Mission Statement*, AM. BOARD FORENSIC ODONTOLOGY, www.abfo.org [<https://perma.cc/4NUY-588M>].

310. Mary G. Leary, *Proof of Identification of Bite Marks*, in 75 AMERICAN JURISPRUDENCE PROOF

The second oversight organization is the American Academy of Forensic Science (AAFS). AAFS, which was established in 1948 and serves as the ABFO's parent organization, also regulates the practice of forensic odontology.³¹¹ The AAFS is a professional society "devoted to the improvement, administration, and achievement of justice through the application of *science* to legal processes."³¹² AAFS membership prerequisites include a baccalaureate degree and either active engagement in a forensic science field or a significant contribution to the forensic science literature.³¹³ The AAFS, which is the largest forensic science organization in the United States, also recognizes approved forensic disciplines, such as odontology, as AAFS component "sections."³¹⁴

A spin-off of the AAFS, the Forensic Specialties Accreditation Board (FSAB),³¹⁵ is the national entity tasked with the evaluation and accreditation of forensic discipline certifying organizations, including the ABFO.³¹⁶ The FSAB re-accredited the ABFO as an organization qualified to provide credentials and certify forensic odontologists in 2018.³¹⁷ In so

OF FACTS § 10 374 (3d ed. 2003). The ABFO's sister organization, the American Society of Forensic Odontologists (ASFO), is exclusively educational in nature and neither certifies nor regulates forensic odontologists. *See* AM. BD. OF FORENSIC ODONTOLOGY, A BRIEF HISTORY, *supra* note 308, at 1 (providing that "[t]he ASFO was founded to allow anyone interested in forensic odontology to meet and further his or her knowledge in this area. Today, it is an important organization serving forensic odontology through its education programs and publications available to all.").

311. AM. BD. OF FORENSIC ODONTOLOGY, A BRIEF HISTORY, *supra* note 308, at 1.

312. Leary, *supra* note 310, at 375 (emphasis added); *About AAFS*, AM. ACAD. FORENSIC SCIS., <https://www.aafs.org/about-aafs/#aafs-history> [<https://perma.cc/KWQ4-LGXZ>].

313. *Basic Membership Requirements*, AM. ACAD. FORENSIC SCIS., <https://www.aafs.org/home-page/membership/student-affiliate-trainee-affiliate-or-associate-member/aafs-basic-membership-requirements/> [<https://perma.cc/R7AB-3PXU>].

314. *Sections*, AM. ACAD. FORENSIC SCIS., <https://www.aafs.org/about-aafs/sections/> [<https://perma.cc/EEE3-9CWV>].

315. *History*, FORENSIC SPECIALTIES ACCREDITATION BOARD, <http://www.thefsab.org> [<https://perma.cc/DZ3Q-8H78>] (documenting the creation of FSAB by the AAFS Professional Oversight Committee and the AAFS Mini-Task Force on Criteria for Specialist Certifying Boards prior to the FSAB becoming an independent organization in 2000).

316. Mike Bowers, *Bite Mark Matchers Now Under Scrutiny by the Forensic Specialties Accreditation Board*, FORENSICS & L. FOCUS @CSIDDS (Aug. 31, 2016), <https://csidds.com/2016/08/31/bite-mark-matchers-now-under-scrutiny-by-the-forensic-specialties-accreditation-board/> [<https://perma.cc/6K38-VJGV>] (noting the mission statement of the FSAB declares that the organization "was established to advance the reliability and validity of forensic evidence in the administration of justice through the accreditation of qualified organizations that credential and certify individual forensic specialists").

317. *Accreditation Program*, FORENSIC SPECIALTIES ACCREDITATION BOARD, <http://www.thefsab.org/> [<https://perma.cc/3X3Q-MSQ4>] (indicating the American Board of Forensic Odontology received "[r]e-accreditation effective Mar-01-2018 through Feb-28-2023"); *see also* Mike Bowers, *If Bitemark Identifiers Are Flawed, Why Did the AAFS Just Recertify Them?*, FORENSICS & L. FOCUS @CSIDDS (Mar. 27, 2018), <https://csidds.com/2018/03/27/if-bitemark->

doing, the FSAB affirmatively decided to continue to legitimize the practice of bite mark identification analysis. The FSAB also ensured that forensic odontology remains a nationally recognized and validated field of forensic science at least until the ABFO's certifying capacity is ripe for renewal and reconsideration in 2023. In other words, and notwithstanding the scientific community's widespread condemnation of bite mark evidence as junk science, the FSAB has given the ABFO its stamp of approval to continue to certify forensic odontologists as bite mark identification analysts.

The ABFO and AAFS each have adopted a professional code of ethics and created ethics oversight committees, which are empowered to investigate complaints against—and then discipline—member forensic odontologists.³¹⁸ In fact, the ABFO's "General Provisions Concerning Certification" expressly state that the Board has the power to either suspend or revoke a member's certification for "[u]nethical conduct or any other conduct, which . . . brings the specialty of Forensic Odontology into disrepute."³¹⁹ The AAFS code of ethics espouses similarly broad jurisdiction over the conduct of its members, each of whom it precludes from "materially misrepresent[ing] his or her education, training, experience, *area of expertise*, . . . membership status within the Academy . . . [or] *data or scientific principles upon which his or her conclusion or professional opinion is based*."³²⁰ As a result, the ABFO and the AAFS has the authority and capacity to regulate their respective forensic odontologist members and ensure that said members adhere to their respective code of ethics.³²¹

The ABFO and AAFS ethics committees, however, have done little to stymie the tide of flawed bite mark identification testimony proffered by forensic odontologists at trial for at least three reasons. First, the organizations' ethics codes suffer from a considerably circumscribed scope of applicability insofar as they only apply to member forensic odontologists. Second, the ABFO and AAFS ethics committees have

identifiers-are-flawed-why-did-the-aafs-just-recertify-them/ [https://perma.cc/ZB4Z-UHZ9].

318. AM. BOARD FORENSIC ODONTOLOGY, DIPLOMATES REFERENCE MANUAL, art. II, at 10–14 (Feb. 2018), <http://abfo.org/wp-content/uploads/2012/08/ABFO-DRM-Section-2-Bylaws-Feb-2018.pdf> [https://perma.cc/4CFW-SW9C]; AM. ACAD. FORENSIC SCIS., BYLAWS, art. II, § 1 (Feb. 20, 2019), [hereinafter AM. ACAD. FORENSIC SCIS.] <https://www.aafs.org/wp-content/uploads/MASTER-BYLAWS.pdf> [https://perma.cc/825V-E27D].

319. AM. BD. FORENSIC ODONTOLOGY, GENERAL PROVISIONS CONCERNING CERTIFICATION § 2(d), <http://abfo.org/wp-content/uploads/2012/11/3.-General-Provisions-Concerning-Certification-v.-Feb-2017.pdf> [https://perma.cc/XC66-ULFB].

320. AM. ACAD. FORENSIC SCIS., BYLAWS, *supra* note 318, art. II, §§ 1(b)–(c) (emphasis added).

321. *Id.* at art. II, § 1; AM. BOARD FORENSIC ODONTOLOGY, DIPLOMATES REFERENCE MANUAL, *supra* note 318, art. II, §§ 1–3.

failed to rigorously enforce their respective ethics codes. Finally, to the extent that the ethics committees do investigate suspect forensic odontology-related conduct, those proceedings are cloaked in secrecy and, therefore, not subject to either external notice or public scrutiny. Each of these concerning limitations on the ABFO and AAFS ethics-related regulatory effectiveness is examined, in turn, below.

1. *Voluntary Membership and Certification*

Forensic odontologists are neither required to obtain and maintain AAFS membership nor ABFO certification.³²² Membership in both organizations is entirely voluntary and—unsurprisingly—non-certified, non-member forensic odontologists are not required to abide by either organization’s code of professional ethics. The non-mandatory nature of AAFS and ABFO membership confines the application of ethical oversight to member odontologists and incentivizes a member who is under investigation by either authority to avoid an adverse outcome by simply abandoning his or her membership.

2. *Weak and Immaterial Enforcement*

The assertion that the ABFO has been lackluster in enforcing its professional ethics oversight mandate is a gross understatement. The only ABFO member who has ever been suspended in the organization’s forty-two year history is Dr. Michael West, purveyor of proven-false bite mark identification testimony and proponent of lesbian vampire theory.³²³ Moreover, no member ever has been de-certified to date.³²⁴ The ABFO has even refused to investigate or discipline forensic odontologists who provided faulty bite mark identification evidence in cases where the defendant was later exonerated as a result of exculpatory DNA evidence.³²⁵

322. TFSC BITEMARK REPORT, *supra* note 53, at 14 (explaining that “[t]here is no ISO-accrediting body . . . that offers an accreditation program in bitemark comparison”).

323. Tucker Carrington, *Mississippi Innocence: The Convictions and Exonerations of Levon Brooks and Kennedy Brewer and the Failure of the American Promise*, 28 GEO. J. LEGAL ETHICS 123, 160–61 (2015) (explaining that “[t]he ABFO’s conclusions [as to Dr. West] were . . . unanimous: after determining that among other things that he had materially misrepresented evidence, it recommended that West be suspended for a year”).

324. *Experts Deride Bite Marks as Unreliable in Court*, USA TODAY (June 16, 2013, 2:39 PM), <https://www.usatoday.com/story/news/nation/2013/06/16/bite-marks-court/2428511/> [<https://perma.cc/T3SJ-5WHR>] (“Only one member of the American Board of Forensic Odontology has ever been suspended, none has ever been decertified, and some dentists still on the board have been involved in some of the most high-profile and egregious exonerations on record. Even Dr. Michael West, whose testimony is considered pivotal in the wrongful convictions or imprisonment of at least four men, was not thrown off the board. West was suspended and ended up stepping down.”).

325. *Id.*

Worse yet, the ABFO's infrequent intervention appears to have little effect on forensic fraud. The AFBO's ethics investigation and suspension of Dr. West had no ascertainable impact on his career as an expert witness.³²⁶ During his one-year suspension, Dr. West continued to testify and served as a bite mark expert in *seven separate trials*.³²⁷ For example, Dr. West's bite mark identification testimony in Kennedy Brewer's trial was largely responsible for his wrongful conviction.³²⁸ At the time Dr. West gave the false and damning testimony that convicted Brewer, he had resigned from the AAFS to avoid expulsion from that organization and was on suspension from the ABFO.³²⁹

Dr. West, in fact, conceded while testifying in Mr. Brewer's case that he had resigned from the AAFS before it took action to revoke his membership.³³⁰ Indeed, the AAFS specifically recommended such expulsion on the basis of its finding that Dr. West had "engaged in a pattern of activities in disregard for generally accepted professional standards" and had testified beyond the scope of his expertise.³³¹ Incredibly, Dr. West and Mississippi prosecutor Forrest Allgood "chalked . . . up" Dr. West's significant ongoing ethical problems during the Brewer trial as "West being a scientist ahead of his time, surrounded by professional jealousy."³³² Moreover, the Mississippi Supreme Court upheld the trial court's admission

326. Carrington, *supra* note 323, at 161 (explaining that, notwithstanding Dr. West's significant ethics-related troubles, "Mississippi courts welcomed [Dr.] West's testimony").

327. Transcript of Proceedings at 473–74, *Vance v. State*, 799 So. 2d 100 (Miss. Ct. App. 2001) (No. 00-362-MS(1&2)); *see also* Balko, *History of Bite Mark Evidence*, *supra* note 29.

328. Balko, *History of Bite Mark Evidence*, *supra* note 29; *see also* *Brewer v. State*, 819 So. 2d 1169 (Miss. 2002).

329. Carrington, *supra* note 323, at 160–61; *see also* Radley Balko, *Killed on a Technicality*, REASON (Sept. 7, 2010, 4:30 PM), <https://reason.com/archives/2010/09/07/killed-on-a-technicality> [<https://perma.cc/QWH8-2MWP>] (explaining that "West, who once claimed he could trace the tooth marks in a half-eaten bologna sandwich at a crime scene to a defendant while excluding everyone else on the planet, has had to resign from two professional forensics organizations due to his habit of giving testimony unsupported by science").

330. Angela J. Davis, *Film Review: "Mississippi Innocence and the Prosecutor's Guilt"*, 25 GEO. J. LEGAL ETHICS 989, 1001–02 (2012) (citing Transcript of Record at 689–94, *Brewer v. State*, No. 94-162-CR1 (C.C.S.D. Miss. 1995)).

331. *Id.* at 1001 (citing Transcript of Record, *supra* note 330, at 702–03); *see also id.* at 1002 (documenting that "[t]he AAFS recommended that he be expelled after finding that Dr. West 'engaged in a pattern of activities in disregard for generally accepted professional standards' and that he misrepresented data").

332. Carrington, *supra* note 323, at 161. Years after Mr. Brewer's trial and his subsequent exculpatory DNA exoneration, Forrest Allgood continued to defend Dr. West, stating that "Dr. West was, at the time, one of the foremost names in forensic odontology He enjoyed an international reputation and was lecturing in London and China It was not 'junk' science." Forrest Allgood, *District Attorney Offers Comments on Brewer, Brooks Cases*, MACON BEACON, at 7 (Aug. 7, 2008).

of Dr. West as an expert during Brewer's trial on direct appeal and expressly opined that Dr. West's "organizational difficulties—taken in context—do not adversely reflect upon or affect [his] qualifications."³³³ Ultimately, Dr. West's multiple ethics investigations and national membership status issues had no marked effect on his ability to testify as a qualified bite mark expert in Mississippi.

3. *Lack of Transparency*

In addition to being infrequent, ineffective, and easily evaded, AAFS and ABFO member ethics proceedings are cloaked in considerable secrecy. Both organizations' bylaws pertaining to ethics complaints shield members under ethics investigation from any requirement to disclose those proceedings to prosecutors, clients, or courts under the guise of "confidentiality."³³⁴ The high level of confidentiality that the AAFS and ABFO ethics rules apply to ethics investigations, however, is worth reconsidering for at least two reasons.

First, the non-transparent nature of these proceedings violates the basic norms that attend to public accreditation and certification. Publicly-vested certifications and accreditations bestow on individuals considerable authority not extended to the uncredentialed masses. Among other benefits, credentialed professionals are entitled to testify well beyond the scope of lay witnesses in their areas of certified expertise at trial. This is of particular import in the context of impressively certified medical professionals, such as doctors, psychiatrists, and forensic odontologists, who literally cradle a capital defendant's life in their hands when presenting their highly persuasive expert opinion testimony. As the American Dental Association has espoused, the very purpose of certification and accreditation is to promote public accountability.³³⁵

333. *Brewer v. State*, 725 So. 2d 106, 126 (Miss. 1998) (asserting that "[t]he record evidence shows that Dr. West possessed the knowledge, skill, experience, training and education necessary to qualify as an expert in forensic odontology. The problems he encountered in *Maxwell* and *Keko* went to the weight and credibility to be assigned his testimony by the jury—not his qualifications").

334. AM. ACAD. FORENSIC SCIS., BYLAWS, *supra* note 318, at art. IV, § 10 (exempting files of the Ethics Committee from disclosure to the Academy's Administrative Office as well as from the standard applied to the Academy archives, files, books and records to be "open for inspection and examination by any member of the Board of Directors" and accessible to Section Officers); AM. BD. FORENSIC ODONTOLOGY, DIPLOMATES REFERENCE MANUAL, *supra* note 318, at art. II, § 7(a) (providing that "[a]ny member of the Ethics Committee or the Board of Directors divulging confidential information on any past or present ethical inquiries other than written statements of the Board of Directors could be subject to charges in violation of the Code of Ethics").

335. *Definitions and Purposes of Accreditation*, AM. DENTAL ASS'N, COMM'N ON DENTAL ACCREDITATION, <https://www.ada.org/en/coda/policies-and-guidelines/training-resources/new-site-visitor-training/unit-1-accreditation/definitions-and-purposes-of-accreditation> [<https://perma.cc/G7JP-KNSJ>]; see generally L. Gregory Pawlson et al., *The Role of Accreditation in*

As it turns out, secrecy in the context of an ABFO ethics investigation operated to protect at least one bad actor at the expense of a criminal defendant during his capital murder trial. During Tammy Vance's and Leigh Stubbs's trial, defense counsel asked Dr. West why he had failed to disclose to either the court or the prosecutor that he was under an ABFO ethics investigation while testifying in Anthony Keko's Louisiana capital murder trial as the State's bite mark expert.³³⁶ Dr. West, in response, invoked his duty to comply with the ABFO ethics investigation confidentiality rules to justify his failure to report his ABFO investigation to either the trial judge or the district attorney.³³⁷

Fortunately for Mr. Keko, who was convicted of capital murder as the result of Dr. West's bite mark testimony, the Louisiana courts were not persuaded by Dr. West's reliance on the ABFO confidentiality bylaws. In fact, when Mr. Keko's trial judge learned that Dr. West had failed to disclose his pending ABFO ethics investigation while testifying against Mr. Keko, he ordered Mr. Keko's release from prison and granted him a new trial.³³⁸ Mr. Keko, who was exonerated in January 1993, then filed a wrongful conviction lawsuit in federal district court against Dr. West, which the parties ultimately resolved in a confidential settlement.³³⁹

Second, investigatory confidentiality enables the ABFO and AAFS to deny rudimentary due process to members who are under investigation. This is particularly problematic for members who are targets of retaliatory investigations due to their public criticism of forensic odontology. In fact, the extraordinary secrecy of these investigations arguably encourages the filing of an unsubstantiated claim against a member perceived as a threat to the field. Two such recent AAFS ethics proceedings targeting well-known bite mark evidence critics provide a window into this disturbing phenomenon.

Dr. C. Michael Bowers is a forensic odontologist, forensic pathologist, dentist, and lawyer, who currently practices dentistry in Ventura County,

an Era of Market-Driven Accountability, 11 AM. J. MANAGED CARE 290, 290 (2005) (explaining that “[a]ccreditation has been widely used to promote accountability in healthcare”).

336. Transcript of Proceedings, *supra* note 326, at 493–94.

337. *Id.* at 494–95.

338. *Keko v. Hingle*, No. Civ. A. 98–2198, 1999 WL 508406, at *1 (E.D. La. Jul. 8, 1999) (“After serving two years and one month of his sentence, Keko was released from jail and granted a new trial based on the court’s determination that the prosecution had withheld information regarding the qualifications of its chief witness, Dr. West. . . . On January 13, 1998, the State dismissed all charges against Keko.”).

339. *Id.*; see also Maurice Possley, *Anthony Keko*, NAT’L REGISTRY OF EXONERATIONS, <http://www.law.umich.edu/special/exoneration/Pages/casedetail.aspx?caseid=4203> [<https://perma.cc/YAX8-UW6G>] (noting that “Keko filed a wrongful conviction lawsuit against West that was settled for an undisclosed amount”).

California and serves as Clinical Associate Professor at the University of California Herman Ostrow School of Dentistry.³⁴⁰ Dr. Bowers was a member in good standing of the ABFO from 1989 until he resigned from the organization in 2011.³⁴¹ He is also a former member of the editorial board of the AAFS flagship publication, the *Journal of Forensic Science*.³⁴²

Dr. Bowers was an early critic of bite mark evidence and is famous for saying things like, “I’ve watched over and over as [bite mark experts] take the witness stand and give testimony that isn’t just false and misleading, but that has put innocent people in prison . . . It’s such a corruption of justice.”³⁴³ Dr. Bowers’s public criticism of bite mark identification testimony and work on behalf of those wrongfully convicted as a result of faulty bite mark evidence provoked ABFO hostility.³⁴⁴ In October 2013, Dr. Bowers published a book of essays, *Forensic Testimony: Science, Law and Expert Evidence*, criticizing certain forms of pattern-matching evidence.³⁴⁵ Two weeks later, the ABFO’s President, Peter Loomis, filed a complaint against Dr. Bowers with the AAFS ethics committee.³⁴⁶

The gist of Mr. Loomis’s complaint was that “Bowers [was] a ‘hired gun’ willing to change his mind in exchange for pay.”³⁴⁷ The AAFS’s confidentiality rules, however, shrouded the particularities of Mr. Loomis’s allegations from public scrutiny. In fact, when *Washington Post* journalist Radley Balko reached out to Loomis about the Bowers’s matter, Mr. Loomis told Mr. Balko that “AAFS bylaws prohibited him from discussing any ethics proceedings, so he could neither confirm nor deny

340. John Hobbs, *The Dental Detective*, UNIV. S. CAL., <https://dentistry.usc.edu/2015/07/09/the-dental-detective/> [<https://perma.cc/KN48-CX2C>]; *Press Room: C. Michael Bowers*, UNIV. S. CAL., <https://pressroom.usc.edu/c-michael-bowers/> [<https://perma.cc/E2LS-P2QN>].

341. Radley Balko, *Attack of the Bite Mark Matchers*, WASH. POST (Feb. 18, 2015), https://www.washingtonpost.com/news/the-watch/wp/2015/02/18/attack-of-the-bite-mark-matchers-2/?utm_term=.22c5d4b327c4 [<https://perma.cc/QZS3-WX24>].

342. *Id.*

343. Radley Balko, *How the Flawed ‘Science’ of Bite Mark Analysis Has Sent Innocent People to Prison*, WASH. POST (Feb. 13, 2015), https://www.washingtonpost.com/news/the-watch/wp/2015/02/13/how-the-flawed-science-of-bite-mark-analysis-has-sent-innocent-people-to-jail/?utm_term=.a3dcf481a077 [<https://perma.cc/JV87-ZNRK>].

344. ROBIN T. BOWEN, *ETHICS AND THE PRACTICE OF FORENSIC SCIENCE* 235–38 (2d ed. 2018).

345. C. MICHAEL BOWERS, *FORENSIC TESTIMONY: SCIENCE, LAW AND EXPERT EVIDENCE* (2014); see also Balko, *Attack of the Bite Mark Matchers*, *supra* note 341 (noting “[t]he book was an honorable mention for a PROSE Award in law and legal studies”).

346. Balko, *Attack of the Bite Mark Matchers*, *supra* note 341 (reporting that “[t]he complaint . . . came as Bowers has been preparing to testify as an expert witness in two lawsuits against bite mark analysts brought by people who had been convicted by bite mark testimony and were exonerated after serving long terms in prison” and “a month after the high-profile exoneration of Gerald Richardson”).

347. *Id.*

the existence of any complaint.”³⁴⁸ Mr. Loomis “also expressed concern about the fact that [Mr. Balko] had obtained a copy of his complaint and cautioned [Mr. Balko] about publishing it.”³⁴⁹ The AAFS confidentiality bylaws, of course, apparently did not proscribe Mr. Loomis from telling Mr. Balko that “if, in theory, he had filed a complaint against Bowers, anyone who read it would be thoroughly convinced of Bowers’s guilt.”³⁵⁰

Initially, the AAFS ethics committee chairman responsible for reviewing Loomis’s complaint against Dr. Bowers was Haskell Pitluck, a retired judge who had served as the ABFO’s legal counsel.³⁵¹ Pitluck denied Dr. Bowers’s request that he recuse himself due to his obvious conflict of interest.³⁵² Pitluck then found probable cause for Loomis’s complaint against Dr. Bowers, which permitted the ethics investigation to proceed.³⁵³

By the time that Dr. Bowers’s hearing was scheduled, Ken Melson had replaced Pitluck as chairman of the AAFS ethics committee.³⁵⁴ At that point, things seemed to go from bad to worse for Dr. Bowers. Melson denied every one of Dr. Bowers’s pre-hearing discovery requests, including Dr. Bowers’s entreaty that his hearing be videotaped, transcribed, and made available to the public.³⁵⁵ Dr. Bowers’s attorney filed a complaint about the AAFS’s refusal to give his client pre-hearing notice about, among other things, the format of the proceedings and the evidence against him.³⁵⁶ Dr. Bowers, however, received no response to that complaint from either Melson or the committee.³⁵⁷ Unsurprisingly under the circumstances, the AAFS ethics committee ruled against Dr. Bowers and recommended that he be expelled from the AAFS.³⁵⁸

Under the AAFS bylaws, however, the ethics committee does not have the last word on such matters. Instead, the ethics committee is required to submit its recommendation to the AAFS board of directors for a final decision.³⁵⁹ Fortuitously, the board of directors declined to adopt the

348. *Id.*

349. *Id.*

350. *Id.*

351. BOWEN, *supra* note 344, at 236 (explaining that Judge Pitluck served as a non-voting member of the ABFO’s ethics committee and even had an ABFO award named after him for individuals who “served the AFO community in an exemplary fashion”).

352. *Id.*

353. *Id.*

354. Balko, *Attack of the Bite Mark Matchers*, *supra* note 341.

355. *Id.*

356. *Id.*

357. *Id.*

358. *Id.*

359. AM. ACAD. FORENSIC SCIS., BYLAWS, *supra* note 318, at art. II § 3.

ethics committee's recommendation to expel Dr. Bowers and dismissed the complaint.³⁶⁰

Dr. Bowers, however, is not the only well-known critic of forensic odontology that has been forced to face a retaliatory and non-transparent AAFS ethics inquiry. The AAFS is currently investigating an ethics complaint filed by the ABFO against Dr. Iain Pretty, who is a Professor of Public Health Dentistry and the co-director of the Colgate Palmolive Dental Health Unit at the University of Manchester School of Dentistry.³⁶¹ In addition to other work criticizing the reliability of bite mark evidence, Dr. Pretty submitted a study to the Texas Forensic Science Commission in 2016 entitled *Construct Validity Bitemark Assessments Using the ABFO Bitemark Decision* as part of the Commission's proceedings that resulted in its recommended moratorium on the admission of bite mark evidence.³⁶² The study, which was characterized by the Commission as "tremendous[ly] concern[ing]," demonstrated wide discrepancy in bite mark expert determinations, exposing, for example, that ABFO-certified forensic odontologists only agreed unanimously in four of one hundred cases "*on the basic question of whether the patterned injury was a human bitemark.*"³⁶³ Perhaps coincidentally, Dr. Pretty also testified in support of Dr. Bowers during Dr. Bowers's AAFS ethics hearing.³⁶⁴

The authors are not privy to any additional pertinent information concerning the ABFO's pending complaint against Dr. Pretty at this time because the AAFS investigation, including the complaint and other relevant documents, are protected from public disclosure by the organization's confidentiality bylaws. It is beginning to appear, however, that ABFO members, who continue without consequence to provide unreliable bite mark identification testimony in court, have no qualms about filing confidential ethics complaints against AAFS members who are critical of their testimony. Consequently, it is beyond time for the AAFS to revisit its

360. Balko, *Attack of the Bite Mark Matchers*, *supra* note 341.

361. Professor Iain A. Pretty, UNIV. MANCHESTER, <https://www.research.manchester.ac.uk/portal/iain.a.pretty.html> [<https://perma.cc/AEX5-T2TR>].

362. *In a Landmark Decision, Texas Forensic Science Commission Issues Moratorium on the Use of Bite Mark Evidence*, INNOCENCE PROJECT (Feb. 12, 2016), <https://www.innocenceproject.org/in-a-landmark-decision-texas-forensic-science-commission-issues-moratorium-on-the-use-of-bite-mark-evidence/> [<https://perma.cc/WXD7-4FLQ>] (explaining that "Dr. Iain Pretty conducted a study of board certified forensic dentists where they asked to analyze photographs of 100 injuries, and in most cases, the practitioners were unable agree on which injuries were even bite marks"); TFSC BITEMARK REPORT, *supra* note 53, at 12–13 (providing that "one recent study by [Dr.] Iain Pretty . . . was of tremendous concern to the Commission" and summarizing the results of the same); *id.* at ex. B (study presentation to the Commission).

363. TFSC BITEMARK REPORT, *supra* note 53, at 12–13 (emphasis in original).

364. Balko, *Attack of the Bite Mark Matchers*, *supra* note 341.

confidentiality bylaws that encourage the submission of such promiscuous complaints and that shield their content from public review.

B. State Forensic Evidence Boards and Commissions

As detailed in the previous section, the practice of forensic odontology lacks any meaningful mandatory and transparent oversight at the national level. In this regard, odontology is by no means unique among the forensic disciplines. The NAS Report acknowledged that “most forensic science disciplines have no mandatory certification programs” or standardized protocols, which it characterized as “a continuing and serious threat to the quality and credibility of forensic science practice.”³⁶⁵ The egregious lack of meaningful—and compulsory—regulation of the forensic science disciplines on the national level has instigated at least a handful of states to create their own forensic science oversight entities.³⁶⁶

There are numerous reasons to be skeptical whether state forensic evidence boards and commissions are capable of filling the regulatory black hole that engulfs forensic odontology. The overwhelming majority of state forensic science boards are composed of non-objective, self-interested actors, including forensic scientists, law enforcement officials, and prosecutors.³⁶⁷ Many do not require forensic analyst certification and most have limited investigatory power.³⁶⁸ The most significant limiting principle with regard to state forensic evidence board regulation of forensic odontology are those boards’ scope of oversight, which is often limited to state forensic science laboratories and DNA methodologies.³⁶⁹ In fact, research reveals that exactly none of these state evidence boards have any express regulatory authority over the practice of forensic odontology.

The ubiquitous exclusion of forensic odontology from the enumerated fields of forensic science that state boards and commissions regulate was highlighted by the Texas State Forensic Commission in its investigation of the validity of bite mark identification evidence in the context of Steven Chaney’s wrongful conviction. As discussed above, Chaney’s attorneys filed a complaint in 2015 with the Texas Commission concerning the flawed bite mark identification evidence that had been admitted during his

365. NAS REPORT, *supra* note 11, at 6.

366. Ryan M. Goldstein, *Improving Forensic Science Through State Oversight*, 90 TEX. L. REV. 225, 241 (2011) (listing New York, Arizona, Minnesota, Missouri, Montana, New Mexico, Rhode Island, and Washington as states that have created forensic science oversight boards since 1994).

367. *Id.* at 240.

368. *Id.* at 240–41.

369. *Id.* at 235 (explaining that “for the most part . . . states have avoided questions concerning the validity of non-DNA forensic science”).

trial and led to his conviction.³⁷⁰ Under Texas law, unaccredited forensic analysts were precluded from testifying in criminal cases.³⁷¹ This provision created a “key threshold question” for the Commission, that is, “whether bitemark comparison is subject to the accreditation requirement.”³⁷² As the Commission explained:

Neither the statute nor the administrative rules . . . mention forensic odontology specifically. The term “forensic analysis” undoubtedly includes bitemark comparison, but no national accreditation body recognized under Texas law . . . offers accreditation in bitemark comparison. Accreditation by one of these nationally recognized bodies is mandatory for entities seeking to be accredited under Texas law.³⁷³

The Commission went on to observe the obvious, which is that bite mark identification evidence was inadmissible in Texas as a matter of law because it failed to meet the state’s statutory accreditation requirement.³⁷⁴ Because Texas courts nonetheless admitted bite mark identification evidence and Texas had granted the Commission the broad authority to “investigate allegations of professional negligence and misconduct for forensic disciplines that are *not currently subject to accreditation*,” the Commission went on to conduct a thorough investigation of bite mark evidence.³⁷⁵ It ultimately recommended a moratorium on the admission of bite mark evidence in Texas due to the methodology’s lack of standardized identification criteria and validated proficiency testing.³⁷⁶

C. *State Boards of Dental Practice*

At first glance, it might seem curious that even the handful of state forensic science boards and commissions that have the authority to regulate the forensic disciplines lack any oversight mandate as to forensic odontology. This state of affairs is even more peculiar given the paucity of national oversight and regulation of the field and its practitioners by the AAFS, ABFO, and FSAB. In this connection, it is important to remember that certified forensic odontologists are, by definition, dentists. The ABFO membership eligibility bylaws expressly require candidates to “have earned a doctoral degree in dentistry from an accredited college of

370. TFSC BITEMARK REPORT, *supra* note 53, at 7–8.

371. TEX. CODE CRIM. PROC. ANN. art. 38.35(d)(1) (West 2019).

372. TFSC BITEMARK REPORT, *supra* note 53, at 3.

373. *Id.* at 3.

374. *Id.* at 3–4.

375. *Id.* at 4–5.

376. *Id.* at 15–17.

university.”³⁷⁷ The AAFS also limits its Odontology Section membership to individuals with a dental doctoral degree.³⁷⁸

In addition to having earned a doctoral degree in dentistry, the overwhelming majority of forensic odontologists maintain an active dental practice and, as such, are state-licensed dentists.³⁷⁹ While less than a dozen American states have established forensic science boards and commissions,³⁸⁰ every state and territory in the United States has created is a professional licensing board that is charged with determining what falls within the acceptable bounds of dental practice and has the power to discipline individuals who practice outside those parameters.³⁸¹ And, as several legal scholars have contented, state professional licensing boards, including state boards of dental practice, have the authority to police improper testimony provided by their licensees in legal proceedings.³⁸² Moreover, state dental boards are obligated to protect the public from dental licensees who insist on providing unreliable and scientifically debunked testimony.³⁸³

377. AM. BD. OF FORENSIC ODONTOLOGY, DIPLOMATES REFERENCE MANUAL, *supra* note 318, art. I § 1(d).

378. *Individual Section Requirements: Odontology*, AM. ACAD. FORENSIC SCIS., <https://www.aafs.org/home-page/membership/student-affiliate-trainee-affiliate-or-associate-member/individual-section-requirements/> [<https://perma.cc/2P9J-7ZAG>] (providing expressly that, in order to be eligible for membership in the section of odontology, an “[a]pplicant must have earned a dental degree (DDS, DMD, or equivalent)”).

379. Radley Balko, *The Path Forward on Bite Mark Matching—And the Rearview Mirror*, WASH. POST (Feb. 20, 2015), https://www.washingtonpost.com/news/the-watch/wp/2015/02/20/the-path-forward-on-bite-mark-matching-and-the-rearview-mirror/?utm_term=.8aeb4b0c0d17 [<https://perma.cc/LN5Y-Z2WQ>] (quoting Arizona State University criminal law Professor Michael Saks for the proposition that “[m]ost people in forensic odontology are practicing dentists, or academics. They don’t make their living doing bite mark analysis”).

380. Goldstein, *supra* note 366, at 241.

381. Jennifer S. Bard, *Diagnosis Dangerous: Why State Licensing Boards Should Step in to Prevent Mental Health Practitioners from Speculating Beyond the Scope of Professional Standards*, 2015 UTAH L. REV. 929, 948 (2015) (explaining that “[i]n the United States, the right to regulate professionals is reserved to the individual state where the professional works” under the Tenth Amendment to the United States Constitution and that “[s]tates . . . delegate this power to licensing boards made up of professionals”).

382. *See, e.g., id.* at 947 (explaining that professional state licensing boards have the “power to determine what is and is not within the boundaries of acceptable professional practice”); Jennifer A. Turner, *Going After the “Hired Guns”: Is Improper Expert Witness Testimony Unprofessional Conduct or the Negligent Practice of Medicine?*, 33 PEPP. L. REV. 275, 277 (2006) (concluding that “medical boards may properly discipline physicians who provide improper testimony in medical malpractice suits” and defining improper testimony as “as testimony not based on generally accepted theories about medical science”); Russell M. Pelton, *Medical Societies’ Self-Policing of Unprofessional Expert Testimony*, 13 ANNALS HEALTH L. 549, 550 (2004) (positing that “the medical profession has not only the self-interest, but also the responsibility to discipline its members who testify irresponsibly as expert witnesses”).

383. Turner, *supra* note 382, at 279 (arguing that professional licensing boards “should protect the

Given that state dental boards have the authority to discipline dental licensees for providing improper bite mark testimony, the open question is whether they have the will. The answer appears to be no. The authors failed to locate a single case in the public domain where a state board of dental practice either investigated or disciplined a dental licensee for such conduct.

This result is particularly disheartening because, despite the routine refrain that state medical boards are lax at policing their licensees,³⁸⁴ medical boards have disciplined doctors for providing false and improper expert testimony.³⁸⁵ While some might contend that these decisions are outliers, they are, in fact, entirely consistent with the American Medical Association's position that providing medical expert testimony constitutes the practice of medicine.³⁸⁶ By contrast, state dental boards' failure to police improper dental licensee bite mark evidence appears to conflict with the American Dental Association's (ADA) ethics rules and code of conduct relevant to expert testimony and other public statements (ADA Code).³⁸⁷

For example, the ADA Code states that “[d]entists may provide expert testimony when that testimony is essential to a just and fair disposition of a judicial or administrative action”³⁸⁸ and that “[d]entists issuing a public statement with respect to the profession shall have a reasonable basis to believe that the comments made are true.”³⁸⁹ Most broadly, the ADA Principle of Veracity provides as follows:

The dentist has a duty to communicate truthfully. This principle expresses the concept that professionals have a duty to be honest and trustworthy in their dealings with people. Under this principle, the dentist's primary obligations include respecting the

public from incompetent and dishonest” licensees).

384. Frances H. Miller, *Medical Discipline in the Twenty-First Century: Are Purchasers the Answer?*, 60 L. & CONTEMP. PROBS. 31, 41 (1997) (“State medical licensing boards have long had a reputation for doing very little to police the way physicians actually conduct clinical practice.”).

385. See, e.g., *Joseph v. D.C. Board of Med.*, 587 A.2d 1085, 1086 (D.C. 1991) (stating that the issue before the court was an appeal from the District of Columbia Board of Medical Practice's decision to discipline a physician as a result of “false testimony and misrepresentations made by him in his capacity as an expert witness in a medical malpractice case”); see also Fred L. Cohen, *The Expert Medical Witness in Legal Perspective*, 25 J. LEGAL MED. 185, 185–88 (explaining that the Medical Licensing Board of North Carolina revoked Dr. Gary Lustgarden's medical license for “violat[ing] the state's interest in maintaining truthful and competent testimony and represent[ing] unprofessional conduct”).

386. *Code of Medical Ethics Opinion 9.7.1*, AM. MED. ASS'N, CODE MED. ETHICS, <https://www.ama-assn.org/delivering-care/ethics/medical-testimony> [https://perma.cc/BHW3-H4FM].

387. Compare *id.*, with AM. DENTAL ASS'N, PRINCIPLES OF ETHICS AND CODE OF CONDUCT § 4.D, https://www.ada.org/~media/ADA/Member%20Center/Ethics/Code_Of_Ethics_Book_With_Advisory_Opinions_Revised_to_November_2018.pdf?la=en [https://perma.cc/V36E-9GXJ].

388. AM. DENTAL ASS'N, *supra* note 387, § 4.D.

389. *Id.* § 4.C.

position of trust inherent in the dentist-patient relationship, communicating truthfully and without deception, and maintaining intellectual integrity.³⁹⁰

State dental boards' failure to police improper bite mark testimony is also disappointing given their broad definition of what constitutes the practice of dentistry and robust enforcement of the same vis-à-vis non-licensees aimed at excluding potential competitors from the marketplace. The North Carolina Dental Board, for instance, unilaterally ordered all non-dentists in the state to cease and desist offering teeth whitening services on the grounds that the provision of such services constituted the illegal practice of dentistry.³⁹¹ The United State Federal Trade Commission intervened by filing an administrative complaint against the Board on the grounds that such action amounted to an "anticompetitive conspiracy" in violation of federal law.³⁹² The point here is a simple one: the state dental boards owe it to the public to be at least as vigilant in policing the fraudulent behavior of their bite mark expert licensees as they are in regulating their perceived non-licensee competitors.

V. PROPOSED SOLUTIONS

Bite mark identification evidence is responsible for more than thirty wrongful convictions in the United States.³⁹³ The underlying premises and methodologies of bite mark comparison analysis have been proven unreliable and scientifically invalid. Abdicating their *Daubert* gatekeeping mandate, trial courts nonetheless continue to admit bite mark identification testimony based on precedent and without the scrutiny demanded by the rules of evidence. In fact, and as previously mentioned, no federal or state court to date has ever excluded bite mark identification evidence in a criminal trial. We are, therefore, compelled to look beyond the courtroom and the rules of evidence for extra-judicial solutions aimed at limiting the admissibility of faulty forensic evidence in criminal proceedings.

390. *Id.* § 5.

391. Antitrust Law Updates, *North Carolina Dental Board Charged with Improperly Excluding Nondentists*, 187 ANTITRUST COUNSELOR 6, 6 (July 2010).

392. *Id.* at 7.

393. Richard Resch, *Report: Bitemark Analysis Debunked as Pseudoscience*, CRIM. LEGAL NEWS (Jan. 18, 2019), <https://www.criminallegalnews.org/news/2019/jan/18/report-bitemark-analysis-debunked-pseudoscience/> [<https://perma.cc/DER8-NFD7>].

A. *National Forensic Odontology Oversight Organizations*

Our first set of recommendations are targeted at the national forensic science regulatory boards that have jurisdiction over forensic odontology, including the ABFO, AAFS, and FSAB. As a threshold matter, we urge the FSAB, which is the national oversight board responsible for the accreditation of the ABFO, to take seriously its duty to rigorously evaluate the validity of the forensic odontology sub-field of bite mark identification during its 2023 re-accreditation of the organization. Pursuant to its own standards, the FSAB is required to deny the ABFO re-accreditation so long as the ABFO continues to certify individuals in bite mark identification analysis.³⁹⁴

Our proposed recommendations applicable to the AAFS and ABFO parallel our trifecta of criticisms of those national organizations. First, the AAFS and ABFO should lobby state legislatures and relevant regulatory authorities to enact laws or regulations that mandate AAFS membership and ABFO certification as a prerequisite for forensic odontologist expert witnesses. As explained above, the voluntary nature of AAFS membership and ABFO accreditation undermines those entities' ability to robustly regulate its members because it encourages members under investigation to resign from the organizations rather than face consequences. Texas is a good example of a jurisdiction that precludes forensic experts from being admitted in a criminal trial unless they are properly credentialed.³⁹⁵

Second, we implore the ABFO to engage in more robust enforcement of its ethics rules and standards. For example, the ABFO guidelines and standards reject the notion that bite mark evidence can be used for individualization in "open population" cases.³⁹⁶ While the caselaw makes clear that numerous bite mark experts have provided sworn testimony in direct contradiction to this standard, the ABFO has only suspended a single forensic odontologist, Dr. Michael West, in its forty-plus year history.³⁹⁷ And the ABFO has never de-certified or expelled a member.³⁹⁸ We contend that strict enforcement of the ABFO's own rules would both better protect the public and enhance the legitimacy of the ABFO as a regulatory organization in the forensic science community.

394. FORENSIC SPECIALTIES ACCREDITATION BOARD, FORENSIC SPECIALTIES ACCREDITATION BD. STANDARDS § 6 (2019), http://thefsab.org/files/standards_20190301.pdf [<https://perma.cc/ZV4F-L76Z>].

395. TEX. CODE. CRIM. PROC. ANN. art. § 38.35(d)(1) (West 2019).

396. AM. BOARD FORENSIC ODONTOLOGY, GUIDELINES AND STANDARDS, *supra* note 67, at 102 (explaining that "[t]he ABFO does not support a conclusion of 'The Biter' in an open population case").

397. Carrington, *supra* note 323, at 160–61.

398. *Experts Deride Bite Marks as Unreliable in Court*, *supra* note 324.

Finally, we argue that the ABFO and AAFS ought to revamp its ethics rules to enhance the transparency of its member ethics investigations. We specifically recommend that the ABFO and AAFS amend its rules to provide the public access to member ethics complaints and disciplinary hearings. They also ought to amend their bylaws to require the publication of studies they conduct regarding the reliability of bite mark identification evidence. As submitted earlier, the current level of secrecy that attends to ABFO and AAFS investigations violates the basic norms of public accreditation and certification and benefits potential bad actors at the expense of the public. It also operates to undermine basic due process for targeted members and encourages the filing of frivolous, retaliatory complaints.

B. State Forensic Science Boards and Commissions

Our second set of recommendations pertains to state forensic science boards and commissions. With regard to state boards, every American state and territory is already equipped with a state board responsible for the scope of practice of dentistry and the ethical conduct of its dental licensees. As a result, we do not advocate for expansion of state forensic boards powers or authority to encompass the regulation of forensic odontologists. We are of the mind that given that forensic odontologists are dentists and that the boards of dentistry already exist and are comprised of dental experts, dental boards are best equipped to regulate bite mark testimony provided by dental-licensees.

We do, on the other hand, agree that the creation of state forensic science commissions vested with broad powers to investigate forensic analysis professional misconduct is a welcome development. Unfortunately, only ten states and the District of Columbia have created state-based commissions.³⁹⁹ Given the documented evidence that these commissions contribute to forensic improvement through oversight and coordination of the forensic sciences,⁴⁰⁰ we recommend their expansion to all fifty states. Moreover, and to that end, we submit that the Commission, which is largely composed of scientists and academic experts,⁴⁰¹ establishes licensing programs for state-accredited forensic disciplines, and has the authority to investigate allegations of misconduct against forensic practitioners that are not subject to state accreditation,⁴⁰² is worthy of replication.

399. NAT'L INST. JUST., FORENSIC TECH. CTR. OF EXCELLENCE STATE FORENSIC SCIENCE COMM'NS: FINAL REPORT 1 (2016), <http://www.txcourts.gov/media/1440422/nij-report-state-forensic-science-commissions.pdf> [<https://perma.cc/Y9AF-DRY9>].

400. *Id.*

401. TEX. CODE CRIM. PROC. ANN. art. 38.01, § 3.

402. TEX. FORENSIC SCI. COMM'N, *About Us*, TEX. JUD. BRANCH, <http://www.txcourts.gov/fsc/about-us/> [<https://perma.cc/7Y2V-KPDJ>].

C. *State Boards of Dental Practice*

Our third and final recommendation is directed at the state boards of dental practice and is a simple one: do your job. As explained above, dental boards exist in all fifty states and every one of them is responsible for defining what falls within the profession's scope of practice as well as policing those boundaries. Dental boards, therefore, have both the authority and responsibility to protect members of the public from unprofessional conduct on the part of their dental-licensees.

The myriad of wrongful convictions resulting from the false and unreliable testimony of forensic odontology dental licensees, standing alone, pleads for state dental board oversight of bite mark expert testimony. As the North Carolina's dental board's teeth whitening crack down makes clear, state dental boards have defined the scope of practice of dentistry incredibly broadly in order to protect the livelihood of their dental-licensees. It is time that those boards apply those broad scope-of-practice rules to bite mark testimony on behalf of the people who have been victimized by unreliable bite mark identification testimony and spent needless years of their lives in prison for crimes that they did not commit.

CONCLUSION

The scientific value of bite mark identification evidence has been so thoroughly discredited that even once-enthusiastic advocates, such as Dr. Michael West, have disavowed the field. Nonetheless, "no court in America has upheld a challenge to the validity of such evidence and refused to allow a jury to hear about it" to date.⁴⁰³ While the courts' abdication of their gatekeeping role in the context of bite mark evidence is disconcerting and entirely unjustified, there is little point in continuing to implore judicial reform while innocent people waste away in prison for crimes they did not commit.

State boards of dental practice are empowered to self-police the practice of dentistry. There is little question that they have the authority to define the bounds of the practice of dentistry and discipline dental licensees that exceed those boundaries while testifying under oath. Moreover, they have proven exceedingly capable at policing non-licensee competitors.

It is beyond time that the state boards of dental practice fulfill their statutory mandates to protect the public by extending their regulatory vivacity for policing the scope of dental practice misconduct to their own

403. Radley Balko, *Yet Another Bite-Mark Conviction is Unraveling*, WASH. POST (May 21, 2018), https://www.washingtonpost.com/news/the-watch/wp/2018/05/21/yet-another-bite-mark-conviction-is-unraveling/?utm_term=.907945ce4f5c [<https://perma.cc/XA7F-WPBP>].

licensees. Doing otherwise amounts to an abdication of their duty to hold “individual practitioners to accepted standards of care while testifying as experts.”⁴⁰⁴ And to shirk that responsibility when lives literally hang in the balance is unconscionable.

404. Bard, *supra* note 381, at 953–54.