

**IN THE COURT OF COMMON PLEAS OF WESTMORELAND COUNTY,
CRIMINAL DIVISION**

COMMONWEALTH OF PENNSYLVANIA)	
Respondent,)	
v.)	Case No. 482 Crim. 1991
)	
JOHN KUNCO)	
Petitioner)	
)	

AFFADAVIT OF CHARLES MICHAEL BOWERS DDS, JD

Personally appeared before me, the undersigned authority, the witness named Charles Michael Bowers who being first duly sworn, deposed and said:

1. My name is Charles Michael Bowers. I am over the age of eighteen and the information set forth in this Affidavit is based on my personal knowledge and belief.
2. I am a Dentist with a practice in Ventura, California. I am also a licensed California attorney. I have been a Deputy Medical Examiner for the Ventura County Coroner's Office since 1988. I am a Diplomate of the American Board of Forensic Odontology (ABFO), a Fellow of the American Academy of Forensic Sciences, and a certified Senior Crime Scene Analyst with the International Association for Identification. I have qualified as an expert in the field of forensic dentistry in the courts of California, Texas and Arizona. Many of these cases where I have testified involved bite mark evidence.
3. I have authored the following books:

- a. Bowers, CM, FORENSIC DENTISTRY: AN INVESTIGATOR'S HANDBOOK, Elsevier Publishing, Academic Press, 2004. Hard cover. 2009 edition in press.
 - b. Bowers, CM, with Raymond Johansen, DIGITAL ANALYSIS OF BITE MARK EVIDENCE, Forensic Imaging Services Publishing, Santa Barbara California, 2003. Paperback.
 - c. Bowers, CM, Editor, with Gary L. Bell, American Society of Forensic Odontology, MANUAL OF FORENSIC ODONTOLOGY, 3rd Edition. Published November 1995, reprinted 1998, 2000, 2001. Paperback.
4. I have authored numerous scholarly and research articles regarding bite mark evidence in general and bite mark identification in particular. *See* Ex. 1.
 5. I have been requested by John Kunco's attorney, Craig Cooley and the Innocence Project, to review the bite mark photographs and testimony presented during the trial of *Commonwealth v. Kunco*, Case No. 482 Crim. 1991.
 6. Mr. Cooley also asked me to review Dr. Sobel's and David's trial testimony and offer an opinion as to whether their testimony is still valid in light of the National Academy of Science's recently released report entitled *Strengthening Forensic Science in the United States: A Path Forward* (NAS Report).
 7. I reviewed the following photographs and transparencies:
 - a. Commonwealth Exhibit #18;
 - b. Commonwealth Exhibit #21;
 - c. Commonwealth Exhibit #22;
 - d. Commonwealth Exhibit #23;

- e. Unmarked color photograph of bite mark on Donna Seaman's shoulder;
8. I reviewed the following reports:
 - a. Dr. David Sobel's July 8, 1991 pre-trial report; and
 - b. Dr. Thomas David's July 8, 1991 pre-trial report;
 9. I reviewed the following testimony:
 - a. Dr. David Sobel's trial testimony; and
 - b. Dr. Thomas David's trial testimony;
 10. I reviewed the procedural history of Mr. Kunco's case, including his instant and previous state post-conviction petitions.
 11. Drs. David Sobel's and David's pre-trial reports and trial testimony are based on the aforementioned photographs and transparencies.
 12. I reviewed the NAS Report.
 13. Upon reviewing the aforementioned photographs of the bite mark on the victim's shoulder, it is my opinion that there is insufficient detail in the photographs to render an opinion as to whether a known bite mark created the unknown bite pattern. This is particularly so for Commonwealth Exhibit #23—the black-and-white (UV-lighting) photograph taken by Drs. Sobel and David on May 19, 1991, more than five months after the bite mark was originally inflicted. While I have no doubt the marks or bruising exposed by the UV-lighting reveal a human bite mark, there is insufficient detail in these marks to conclude that a known biter inflicted the human bite mark. Any bite mark identification(s) premised on these photographs are inherently unreliable and should not be trusted.

14. Bite marks must be thoroughly analyzed before any comparison is made to a suspect's teeth. That means measurements, angles, and other features should be exhaustively studied before the teeth of any suspect(s) are viewed. This provides a modicum of control where the determinations of the forensic value of the bite mark are established prior to the dentist comparing the suspect's bite pattern. In Mr. Kunco's case, due to the insufficient detail in the markings, Drs. Sobel and David could not have accurately determined these measurements. Indeed, while Dr. David testified at length about the measurements of Mr. Kunco's teeth, what is noticeably absent from his testimony are measurements regarding the actual bite mark on Donna Seaman's shoulder. Thus, the absence of these measurements renders Drs. Sobel's and David's trial opinions inherently unreliable.

15. I reviewed Drs. Sobel's and David's pre-trial reports.

- a. In his July 8, 1991 report, Dr. Sobel concluded: "Within a reasonable medical certainty, the bite mark on the back shoulder area of Donna Seaman was made by the teeth of John Kunco."
- b. In his July 8, 1991 report, Dr. David concluded: "After careful consideration it is my opinion... to a reasonable degree of dental certainty that the bite mark found on the victim was produced by the teeth of John Kunco."

16. I reviewed Drs. Sobel's trial testimony.

- a. At trial, Dr. Sobel testified: "I could say that within a reasonable dental certainty, that the bite on the left back shoulder area of Donna Seaman *was*

in fact inflicted by the teeth of John Kunco ... I felt comfortable about this decision because there were no inconsistencies that I could come up with at all and everything fit perfectly[.]” NT at 187. Dr. Sobel added that he had “no doubt” that the Kunco inflicted the bite mark and that, next to fingerprinting, *id.* at 188 (emphasis added), “[d]ental identification... is the most accurate form of identification of an individual.” *Id.* Dr. Sobel also stated that because “dental identification is based on class and individual characteristics of an individual’s teeth... *I’d say we can be very certain that if all these characteristics match, that it is uniquely related to an individual.* The size relationships, the shape of the teeth... the fractured portions of a tooth, the worn areas, all of these taken together create a fingerprint picture of the individual.” *Id.* at 188-89. At the conclusion of his testimony, when the prosecutor asked Dr. Sobel whether his opinion was that the bite mark originated from Kunco, he replied: “The bite mark originated from the teeth of John Kunco.” *Id.* at 189 (emphasis added).

17. I reviewed Dr. David’s trial testimony.

- a. At trial, Dr. David testified that Kunco had “a relatively unique set of teeth,” *id.* at 245, and that there was a “remarkable consistency” between Kunco’s bite pattern and the bite mark on Seaman’s shoulder. *Id.* at 249. Dr. David also described the consistency between Kunco’s bite pattern and the bite mark as “very consistent,” *id.* at 262, and “incredibly remarkable.” *Id.* at 250. Dr. David offered the following opinion

regarding the bite mark's origin: "It is my opinion, to a reasonable degree of dental certainty, that the mark in question is indeed a human bite mark. It is also my opinion, to a reasonable degree of dental certainty, *that the bite mark was made by the teeth of the defendant, John Kunco.*" *Id.* at 265 (emphasis added).

18. It is important to recognize what Drs. Sobel and David are claiming; they claimed that they could examine an unknown bite mark—a five-month-old bite mark in this case—and determine whether a known biter (or bite pattern) inflicted the unknown bite mark. In short, they claimed to be able to *individualize* a known biter (or bite pattern) to an unknown bite mark to the exclusion of all other biters (or bite patterns) in the world.
19. As a practicing, board-certified forensic dentist who wishes to see that the forensic dentistry field become more in tune with science and the scientific method, it is obvious that Drs. Sobel's and David's testimony is no longer valid in light of the NAS Report's conclusions and findings regarding bite mark identification. The NAS, which I believe is the most prominent, objective, and impartial scientific organization in the United States—if not the world, thoroughly reviewed and studied the bite mark literature and research for two years. Upon completing its review, the NAS concluded that for to a variety of reasons, which I will address, forensic dentists *currently* cannot individualize a known bite pattern to an unknown bite mark.
 - a. For instance, the NAS Report stated: "Often in criminal prosecutions... forensic evidence is offered to support conclusions about

‘individualization’ (sometimes referred to as ‘matching’ a specimen to a particular individual or other source)... With the exception of nuclear DNA analysis... 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.” *Id.* at S-5.

- b. The NAS Report also stated: “Bite mark testimony has been criticized basically on the same grounds as testimony by questioned document examiners and microscopic hair examiners. The *committee received no evidence of an existing scientific basis for identifying an individual to the exclusion of all others.*” NAS Report, at 5-37 (emphasis added).

20. Moreover, the NAS Report also concluded that bite mark examiners cannot even opine as to the statistical likelihood of a coincidental match because there is no base rate data regarding the characteristics of teeth and bite patterns.

- a. The NAS Report also stated that while “the majority of odontologists are satisfied that bite marks can demonstrate sufficient detail for positive identification, *no scientific studies support this assessment, and no large population studies have been conducted.*” *Id.* at 5-37 (emphasis added).
- b. The NAS Report also concluded that “[m]ore research is needed to confirm the fundamental basis for the science of bite mark identification. Although forensic odontologists understand the anatomy of teeth and the mechanics of biting and can retrieve sufficient information from bite marks on skin to assist in criminal investigations and provide testimony at

criminal trials, *the scientific basis is insufficient to conclude that bite mark comparisons can result in a conclusive match. Id.* at 5-36 (emphasis added).

- c. Finally, the NAS Report stated: “If a bite mark is compared to a dental cast using the guidelines of the ABFO, and the suspect providing the dental cast cannot be eliminated as a person who could have made the bite, *there is no established science indicating what percentage of the population or subgroup of the population could also have produced the bite.* This follows from the basic problems inherent in bite mark analysis and interpretation.” *Id.* at 5-36 (emphasis added).

21. The NAS Report’s findings and conclusions also invalidate the four fundamental premises (or assumptions) that buttress bite mark identification. The premises are as follows: (1) the dental features of the biting teeth (six upper and six lower teeth) are unique; (2) this uniqueness remains constant throughout a person’s lifetime; (3) these unique dental features can and are transferred and recorded every time the person bites into an impressionable object, such as human skin; and (4) trained forensic dentists can accurately determine whether a mark or wound on a person’s body is a human bite mark and link the bite mark to the one and only person who could have left the distinct bite pattern. *See* C. Michael Bowers, *The Scientific Status of Bitemark Comparisons*, in DAVID L. FAIGMAN, ET AL., *MODERN SCIENTIFIC EVIDENCE: FORENSIC* 483 (2008). All four premises must be valid before bite mark experts can individualize a known bite pattern to an unknown bite mark.

- a. In regards to the first premise—that dental features are unique—the NAS Report concluded that the bite mark community has yet to establish that teeth and bite patterns are in fact unique. For instance, the NAS Report concluded that “[n]o thorough study has been conducted of large populations to establish the uniqueness of bite marks[.]” *Id.* at 5-36.
- b. In regards to the third premise—that the unique dental features of a person’s bite pattern are transferred and recorded every time the person bites into an impressionable object, such as human skin—the NAS Report concluded 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. Also, some practical difficulties, such as distortions in photographs and changes over time in the dentition of suspects, may limit the accuracy of the results.” *Id.* at 5-37.
- c. In regards to the fourth premise—that trained forensic dentists can accurately determine whether a mark or wound on a person’s body is a human bite mark and link the bite mark to the one and only person who could have left the distinct bite pattern—the NAS Report concluded that bite mark identification is a fraught with error, particularly false positives. For instance, the NAS Report concluded: Many examiners claim in testimony that others in their field would come to the exact same conclusions about the evidence they have analyzed. Assertions of a “100 percent match” contradict findings of proficiency tests that find substantial

rates of erroneous results in some disciplines (i.e., voice identification, bite mark analysis).” *Id.* at 1-9 and 1-10. The NAS Report also commented on the “high percentage of false positive matches of bite marks using controlled comparison studies.” *Id.* at 5-36.

22. It must be emphasized that the NAS Report *did not* invalidate bite mark identification entirely. For instance, the NAS Report acknowledged that “[d]espite the inherent weakness in bite mark comparison, it is reasonable to assume that the process can sometimes reliably exclude suspects.” *Id.*, at 5-37. More importantly, the NAS Report did not say that individualizing bite marks will forever be an impossible or unreal dream for forensic dentists. To the contrary, all the NAS Report said, at least with respect to bite mark identification, is that there is *currently* inadequate data, be it base rate data, error rate data, or data regarding the transferability of bite marks, to individualize a known bite pattern to an unknown bite mark or even to offer an opinion as to the statistical likelihood of a coincidental match.

23. The NAS Report has the potential to impact only a small percentage of cases involving forensic odontology. As the NAS Report noted, “[f]orensic odontology... includes several distinct areas of focus: the identification of unknown remains, *bite mark comparison*, the interpretation of oral injury, and dental malpractice.” NAS Report, at 5-35 (emphasis added). Bite mark comparison (or identification) cases represent only a small sub-set of forensic odontology cases and not all bite mark comparison cases involve testimony that claims to have individualized a known bite pattern to an unknown bite mark.

Thus, the NAS Report can only impact, potentially, those cases where a forensic dentist or dentists testified that he or they could individualize a known bite pattern to an unknown bite mark. Mr. Kunco's case, unfortunately, qualifies as such a case.

24. The NAS Report, in many respects, represents the culmination of the seismic shift that has occurred in the bite mark community over the last decade.

a. At the time of Mr. Kunco's trial in 1991 and well before his trial, the bite mark and forensic science community firmly believed that adequately trained forensic dentists could accurately individualize a known bite pattern to an unknown bite mark. The bite mark community held firm to this belief well into the new millennium. Thus, in 1998, when Mr. Kunco received his last state post-conviction evidentiary hearing, the overwhelming majority of the bite mark community still firmly believed that trained forensic dentists could individualize a known bite pattern to an unknown bite mark. On the other hand, a growing segment of the bite mark community during this period began questioning the *techniques* used by forensic dentists to document or expose apparent or latent bite marks. Thus, much of the litigation and controversy during this period focused on these *techniques*, rather than the underlying issue of whether forensic dentists could actually individualize bite marks. For instance, just as Mr. Kunco did in his previous state post-conviction petitions, several prisoners attacked the UV-lighting technique made famous by the now discredited Dr. Michael West. Again, these attacks focused on the *technique* used to

expose latent bite marks and not on the underlying individualization issue. This is understandable because, at the time, there was little dissent regarding the belief that trained forensic dentists could individualize a known bite pattern and an unknown bite mark.

- b. The prevailing view of bite mark identification slowly started to change during the earlier part of this decade when DNA testing began to expose bite mark identification's unreliability. During this period, there were several cases where forensic dentists linked a bite mark to a particular suspect, but subsequent DNA testing conclusively proved that the suspect could not be the assailant. In light of these misidentifications, a *small minority* of the bite mark community (myself included) set out to re-evaluate whether there is adequate empirical data to support bite mark identification's four fundamental premises: (1) uniqueness; (2) permanency; (3) transferability; and (4) accuracy.
- c. The initial research suggested that *none* of these premises were adequately supported by legitimate, impartial, empirical research. More specifically, the research concluded what the NAS Report concluded: the dearth of empirical, peer-reviewed research in this area prevents forensic dentists from individualizing a known bite pattern to an unknown bite mark or opining as to the likelihood of a coincidental match. Regrettably, though, because the research represented a *small minority* of the bite mark community, the bite mark community and courts dismissed the research or gave it little weight and credibility.

- d. Over the last decade, however, the mainstream scientific opinion regarding bite mark identification has slowly changed thanks in part to more research and to numerous additional DNA and non-DNA exonerations involving misidentified bite mark identifications.
- e. The NAS Report's conclusions and findings, however, finally validated what this *small minority* of forensic dentists (myself included) have been preaching for nearly a decade now: given the current state of research in the forensic science and bite mark communities, there is no scientific basis on which forensic dentists can claim that they can individualize a known bite pattern to an unknown bite mark.

25. In many respects, then, the NAS Report constitutes newly-discovered scientific evidence in at least two ways.

- a. First, the NAS Report represents the conclusions of the most prestigious scientific organization in the United States—if not the world. These conclusions were not available until the NAS released the report in February 2009.
- b. Second, the NAS Report finally exposed the emergence of a legitimate and significant dispute within the bite mark community as to whether trained forensic dentists can accurately individualize a known bite pattern to an unknown bite mark. While the empirical research (or lack thereof) plainly supports the NAS Report's (and my) conclusion that forensic dentists cannot individualize bite marks, a segment of the bite mark community nonetheless believes that bite marks can be individualized.

For instance, the NAS Report stated that while “the majority of odontologists are satisfied that bite marks can demonstrate sufficient detail for positive identification, no scientific studies support this assessment, and no large population studies have been conducted.” *Id.* at 5-37 (emphasis added).

26. In my opinion and professional judgment, the NAS Report’s conclusions and findings render Drs. Sobel’s and David’s testimony in John Kunco’s trial invalid.

Further affiant sayeth not.



Charles Michael Bowers, D.D.S.

Dated: August 19, 2009