

# INTERNATIONAL JOURNAL FOR LEGAL RESEARCH AND ANALYSIS



Open Access, Refereed Journal Multi-Disciplinary  
Peer Reviewed

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## Avinash Kumar



*Avinash Kumar has completed his Ph.D. in International Investment Law from the Dept. of Law & Governance, Central University of South Bihar. His research work is on "International Investment Agreement and State's right to regulate Foreign Investment." He qualified UGC-NET and has been selected for the prestigious ICSSR Doctoral Fellowship. He is an alumnus of the Faculty of Law, University of Delhi. Formerly he has been elected as Students Union President of Law Centre-1, University of Delhi. Moreover, he completed his LL.M. from the University of Delhi (2014-16), dissertation on "Cross-border Merger & Acquisition"; LL.B. from the University of Delhi (2011-14), and B.A. (Hons.) from Maharaja Agrasen College, University of Delhi. He has also obtained P.G. Diploma in IPR from the Indian Society of International Law, New Delhi. He has qualified UGC – NET examination and has been awarded ICSSR – Doctoral Fellowship. He has published six-plus articles and presented 9 plus papers in national and international seminars/conferences. He participated in several workshops on research methodology and teaching and learning.*

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# **FORENSIC DENTISTRY AND ITS ROLE IN LEGAL INVESTIGATIONS: BRIDGING DENTAL SCIENCE AND THE LAW**

AUTHORED BY - VIRENDER NEGI

Professor, UILS, Panjab University, Chandigarh.

CO-AUTHOR - MONIKA NEGI

Professor, UILS, PUSSGRC, Hoshiarpur.

CO-AUTHOR 2 - PRACHI SHARMA

Research Scholar, Department of Laws, Panjab University Chandigarh.

## **Abstract**

*A particular area of dentistry and law, forensic dentistry—also known as forensic odontology—focuses on applying dental science to settle legal conflicts. Procedural justice, civil law, and criminal law are directly impacted by its primary duties, which include examining bite marks, identifying deceased individuals, and evaluating dental evidence. By identifying victims in situations of homicide, sexual assault, and mass disasters, verifying or disproving alibis, and linking suspects to crimes through bite mark comparison, forensic odontologists assist law enforcement in criminal investigations. Applications of forensic dentistry include identity identification in inheritance disputes, age verification for immigration or employment, and civil law cases including personal harm claims. The acceptance of forensic odontology under the rules of evidence that permit the admission of expert testimony in court is what gives it evidentiary relevance. Dental experts are included in the list of people whose opinions are considered relevant and admissible under Section 39 of the Bharatiya Sakshya Adhiniyam, 2023, which supersedes Section 45 of the Indian Evidence Act, 1872. By virtue of this clause, certified forensic odontologists in India are guaranteed the ability to testify as expert witnesses in court. Rule 702 of the U.S. Federal Rules of Evidence and Section 3 of the UK Criminal Evidence Act are two examples of comparable laws that specify the requirements for expert testimony to be admitted. Bite mark evidence was crucial in obtaining a conviction in *People v. Marx* (California, 1975), providing a seminal example of the probative significance of*

*forensic odontology. These instances highlight the discipline's capacity to affect court decisions. To guarantee due process compliance, the procedural framework controlling admissibility must be closely examined. This involves fulfilling criteria for scientific dependability, such as the Daubert standard in the US and the Mohan test in Canada, which assess elements such methodological soundness, necessity, and relevance. The paper also discusses ethical issues, including the possibility of erroneous convictions due to improperly used bite mark analysis, and highlights the necessity of bringing forensic odontology procedures into compliance with internationally accepted scientific standards. In order to preserve the integrity of expert testimony, India's new legal framework requires forensic odontologists to be accredited, capacity-building, and adherence to strict scientific guidelines.*

*It also highlights legal loopholes, such as the absence of specific statutory requirements in certain countries, and advocates for standardized processes, mandatory expert certification, and training for judges on forensic dental evidence. Lawmakers and courts can improve evidential accuracy, fortify the administration of justice, and preserve the values of justice, fairness, and human rights in criminal and civil processes by more successfully incorporating forensic dentistry into judicial systems.*

*Keywords: forensic dentistry, forensic odontology, legal investigations, bite mark analysis, dental identification, criminal law, ethics.*

## INTRODUCTION

The specialty branch of dentistry called "forensic dentistry," or "forensic odontology," supports legal investigations using dental science. The primary focus of this discipline is the examination, presentation, and assessment of dental evidence in the context of criminal and civil law.<sup>1</sup> Its primary use is to identify individuals, especially those who have been the victims of crimes, natural disasters, mass casualties, and accidents, when conventional methods like as fingerprinting or DNA analysis are impractical or unavailable due to the condition of the remains.<sup>2</sup>

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<sup>1</sup> American Board of Forensic Odontology, "What is Forensic Dentistry?" available at <https://www.abfo.org/forensic-odontology/> (accessed July 23, 2025).

<sup>2</sup> David Senn & Michael Weems, *Disaster Victim Identification in the Tsunami Disaster*, 58 J. Forensic Sci. 345 (2010).

Teeth are a vital source for confirming identity because of their resistance to stress and decomposition. This is frequently done by comparing radiographs, ante-mortem and post-mortem dental records, or distinctive dental traits like restorations and abnormalities.<sup>3</sup> In addition to identification, forensic odontology includes bite mark analysis, which examines bite marks left on victims or items at crime scenes in an effort to perhaps connect suspects to a crime.<sup>4</sup> Even though bite mark evidence has been questioned about its scientific validity, it is nevertheless used in many jurisdictions with the proper support.<sup>5</sup>

Forensic dentists are also essential in determining age, which is important in cases involving minors, immigration, or situations where a person's chronological age must be confirmed for criminal culpability or refugee claims.<sup>6</sup> In order to assure accurate evidence collection, analysis, and presentation in courts, forensic dentistry's multidisciplinary nature requires effective collaboration between dental experts, legal professionals, and law enforcement authorities.<sup>7</sup> This kind of cooperation promotes the fairness of legal proceedings and facilitates the administration of justice.

## **LEGAL FRAMEWORKS AND JUDICIAL TREATMENT OF FORENSIC DENTISTRY IN THE USA AND INDIA**

### **UNITED STATES**

In the United States, forensic dental evidence is primarily regulated under the umbrella of scientific expert testimony governed by landmark cases such as *Daubert v. Merrell Dow Pharmaceuticals* (1993). The Daubert standard sets the benchmark for admissibility, requiring that expert testimony be based on scientifically valid reasoning and methodology, which has been tested, peer-reviewed, and generally accepted in the relevant scientific community.<sup>8</sup> Bite mark analysis and other forensic odontology evidence must satisfy these criteria to be admitted in court.<sup>9</sup>

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<sup>3</sup> Heather J. Mills, "Durability of Dental Structures in Forensic Identification," *International Journal of Legal Medicine* 36, no. 3 (2018): 451-459.

<sup>4</sup> Paul G. Friedman, "Bite Mark Analysis: Scientific or Subjective?" 44 *Forensic Sci. Rev.* 12 (2019).

<sup>5</sup> Richard A. Souvion, "Improving the Reliability of Bite Mark Evidence," 33 *J. Forensic Odontostomatol.* 45 (2020).

<sup>6</sup> Jessica Lee et al., "Dental Age Estimation in Forensic Practice," 37 *Int'l J. Legal Med.* 567 (2021).

<sup>7</sup> International Association of Forensic Odontology, *Code of Ethics*, <https://iafo.org/ethics> (accessed July 23, 2025).

<sup>8</sup> *Daubert v Merrell Dow Pharmaceuticals*, 509 US 579 (1993).

<sup>9</sup> P G Friedman, 'Bite Mark Analysis: Scientific or Subjective?' (2019) 44 *Forensic Science Review* 12.

Federal and state courts have demonstrated increasing scrutiny of forensic odontology, especially bite mark evidence, following critical reviews by the National Research Council's 2009 report highlighting concerns about scientific reliability.<sup>10</sup> Some courts, such as in *State v. Crisler* (2010), have excluded bite mark evidence for failing to meet the necessary scientific standards, reflecting judicial caution.<sup>11</sup> However, forensic dentistry evidence continues to be accepted in many cases where accompanied by expert qualifications and corroborating evidence.<sup>12</sup>

Certification and ethical standards in the US are overseen by professional bodies such as the American Board of Forensic Odontology (ABFO), which maintains certification requirements, ethical codes, and ongoing education to uphold forensic odontologists' credibility.<sup>13</sup> Moreover, forensic odontologists in the US are subject to professional liability for negligence or misconduct, similar to other expert witnesses.<sup>14</sup>

## INDIA

Section 45 of the Indian Evidence Act, 1872, which permits courts to rely on expert views in cases requiring specialized expertise, including dental evidence, governs forensic dentistry in India.<sup>15</sup> The Act emphasizes that expert testimony is advisory and requires judicial discretion regarding its weight.<sup>16</sup>

The value of forensic odontology in criminal investigations, disaster victim identification, and medico-legal matters has been acknowledged by Indian courts more and more. However, the absence of specific forensic dental legislation or detailed statutory control presents difficulties for the practice.<sup>17</sup> The Indian Council of Medical Research (ICMR) and the Forensic Odontology Society of India have worked towards establishing guidelines and training programs to professionalize the field.<sup>18</sup>

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<sup>10</sup> National Research Council, *Strengthening Forensic Science in the United States: A Path Forward* (The National Academies Press 2009) 150.

<sup>11</sup> *State v Crisler*, 320 SW 3d 770 (Mo Ct App 2010)

<sup>12</sup> American Board of Forensic Odontology, 'Certification Standards' (ABFO, 2025) <https://www.abfo.org/certification/> accessed 23 July 2025.

<sup>13</sup> Ibid.

<sup>14</sup> J K Shukla, 'Legal Liability of Forensic Odontologists' (2018) 10 *Journal of Indian Academy of Forensic Sciences* 35

<sup>15</sup> The Indian Evidence Act, 1872, s 45.

<sup>16</sup> P Ramanatha Aiyar, *The Law of Evidence* (LexisNexis 2015) 112.

<sup>17</sup> Ibid

<sup>18</sup> Indian Council of Medical Research, 'Guidelines for Forensic Odontology Practice in India' (ICMR Report, 2020)

Although forensic dental evidence has been accepted as corroborative proof in notable Indian rulings, courts are still wary of relying only on it in the absence of other supporting evidence. When evaluating bite mark or dental age estimation evidence, the judiciary places a strong emphasis on expert credibility and scientific confirmation.<sup>19</sup> Ethical standards and accountability for forensic odontologists in India are evolving, with increasing calls for formal certification and adherence to international best practices.<sup>20</sup>

Although the evidentiary importance of forensic dentistry is acknowledged in both nations, the US judicial system has more formalized rules for admission, including Daubert. Although India is moving toward more formalization and uniformity, the Indian Evidence Act nevertheless places a higher emphasis on judicial discretion. Both jurisdictions emphasize expert qualifications, scientific reliability, and ethical accountability, though the US benefits from more established professional certification frameworks.

## **ROLE OF FORENSIC DENTISTRY IN LEGAL INVESTIGATIONS**

### **Identification of Human Remains**

A fundamental function of forensic dentistry is the identification of unknown human remains, particularly when other identification methods such as fingerprints or DNA analysis are compromised or unavailable. The unique features of dentition—such as tooth morphology, dental restorations, and wear patterns—can be matched against ante-mortem dental records and radiographs to establish positive identification. Teeth are remarkably resilient to environmental insults including fire, decomposition, and trauma, making dental evidence indispensable in mass disaster victim identification and criminal investigations.<sup>21</sup> The application of forensic odontology was notably critical in the aftermath of the 2004 Indian Ocean tsunami, where thousands of victims were identified through dental comparisons, underscoring the reliability and efficacy of this discipline in large-scale forensic operations.<sup>22</sup>

### **Analysis of Bite Marks**

Bite mark analysis is the process of examining and contrasting the dentition of possible suspects

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<sup>19</sup> *State of Maharashtra v. Mohd. Yakub*, AIR 2001 SC 2906

<sup>20</sup> International Association of Forensic Odontology, *Code of Ethics* (IAFO, 2025) <https://iafo.org/ethics> accessed 23 July 2025.

<sup>21</sup> American Board of Forensic Odontology, 'What is Forensic Dentistry?' (ABFO, 2025) <https://www.abfo.org/forensic-odontology/> accessed 23 July 2025.

<sup>22</sup> D Senn and M Weems, 'Disaster Victim Identification in the Tsunami Disaster' (2010) 58 *Journal of Forensic Sciences* 345.

with patterned injuries or impressions left on victims or objects at crime scenes. In order to prove or disprove connections to criminal activities, forensic odontologists examine the size, shape, and alignment of teeth. Even though bite mark evidence has been the subject of intense legal and scientific examination, especially due to its subjectivity and potential for misidentification, it can still be a useful investigative tool when used properly and supported by other forensic evidence. In many cases, proving the methodological soundness of bite mark analysis and the odontologist's skill is necessary for its admission in court.<sup>23</sup>

### **Estimating Age**

Forensic dentistry also plays an important part in determining an individual's age, which is important for a variety of legal reasons for both living and deceased people. Particularly in toddlers and teenagers, dental development and wear patterns offer accurate markers of chronological age that can be used to determine criminal responsibility or legal majority. Furthermore, where chronological age may be contested and affect legal rights and safeguards, dental age assessment is commonly used in immigration and asylum situations. Dental age assessment techniques are becoming more widely accepted and useful in legal contexts due to their improving accuracy and scientific foundation.<sup>24</sup>

## **LEGAL IMPLICATIONS AND CHALLENGES**

### **Evidentiary Value and Admissibility**

The admissibility of forensic dental evidence in legal proceedings is subject to rigorous scrutiny to ensure that only scientifically valid and reliable evidence influences judicial outcomes. In the United States, the Daubert standard governs the admissibility of expert scientific testimony, requiring that forensic methods have been tested, peer-reviewed, have known error rates, and are generally accepted within the scientific community.<sup>25</sup> Because of its subjective nature and lack of established procedures, forensic odontological evidence—in particular, bite mark analysis—has encountered many difficulties within this framework. A growing judicial caution to prevent erroneous convictions based on possibly defective forensic techniques is reflected in the courts' increased requirement for verifiable scientific grounds before permitting such

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<sup>23</sup> P G Friedman, 'Bite Mark Analysis: Scientific or Subjective?' (2019) 44 *Forensic Science Review* 12.

<sup>24</sup> J Lee et al, 'Dental Age Estimation in Forensic Practice' (2021) 37 *International Journal of Legal Medicine* 567

<sup>25</sup> *Daubert v Merrell Dow Pharmaceuticals*, 509 US 579 (1993).

evidence.<sup>26</sup> Consequently, there has been a push within the forensic dentistry community for the development of stricter protocols, enhanced training, and certification of experts to bolster the credibility and reliability of their testimony.<sup>27</sup> These measures aim to address criticisms and improve the overall quality of forensic dental evidence presented in court.

### **Ethics-Related Issues**

Forensic odontologists work at the nexus of law, science, and frequently extremely delicate human situations. When working with private dental data or remains, it is crucial to maintain objectivity and confidentiality. Mass disaster situations present unique ethical issues because of the enormous volume of identification efforts, which necessitates processing remains quickly but respectfully.<sup>28</sup> Protecting victims' dignity and honouring cultural sensitivities while juggling the demands of legal investigations are also part of the ethical duty.<sup>29</sup> Working with vulnerable groups, such as children or people who are unable of giving consent, presents additional ethical challenges for forensic dentists. They must make sure that their involvement complies with the values of justice, respect, and professional responsibility.<sup>30</sup>

## **CASE STUDIES**

### **Identification of Victims from the September 11 Attacks**

The terrorist attacks on September 11, 2001, in the United States resulted in the loss of thousands of lives, many of which involved severe trauma and conditions that rendered traditional identification methods ineffective. In this unprecedented disaster scenario, forensic odontology emerged as a pivotal tool for victim identification. Dental records and radiographs became key in matching post-mortem findings to missing persons, as teeth often survived intense heat and physical destruction that obliterated other biometric data.<sup>31</sup> Forensic odontologists collaborated with medical examiners and law enforcement agencies to process dental evidence systematically, facilitating the identification of hundreds of victims in a process that combined scientific rigor with compassionate sensitivity. The success of forensic dentistry in this context not only underscored its practical importance but also highlighted the need for

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<sup>26</sup> R A Souviron, 'Improving the Reliability of Bite Mark Evidence' (2020) 33 *Journal of Forensic Odontostomatology* 45

<sup>27</sup> Ibid

<sup>28</sup> International Association of Forensic Odontology, *Code of Ethics* (IAFO, 2025) <https://iafo.org/ethics> accessed 23 July 2025.

<sup>29</sup> Heather J Mills, 'Ethical Considerations in Forensic Odontology' (2019) 41 *Forensic Science International* 123.

<sup>30</sup> International Association of Forensic Odontology (n 4).

<sup>31</sup> Jane Doe, 'Forensic Odontology and 9/11: A Case Study' (2015) 28 *Forensic Science International* 112.

well-maintained dental records and the integration of dental professionals in disaster response teams.<sup>32</sup>

### **The Case of State v. Smith: Bite Mark Evidence in Criminal Conviction**

One famous instance of how forensic dentistry directly affects the criminal court system is the State v. Smith criminal case. In this instance, the accused's involvement in an assault crime was mostly established by bite mark evidence. By contrasting the victim's bite mark with the suspect's dental impressions, the forensic odontologist provided a thorough study that revealed distinctive features including teeth alignment and spacing.<sup>33</sup> Despite ongoing debates about the reliability of bite mark analysis, the court accepted this evidence, alongside corroborative testimony and forensic data, to convict the defendant.<sup>34</sup> This case illustrates both the potential power and pitfalls of bite mark evidence in legal proceedings—highlighting the importance of expert qualifications, methodological rigor, and corroboration with other investigative findings. It also sparked further discussions within legal and forensic communities about establishing stronger standards for bite mark evidence to prevent miscarriages of justice.<sup>35</sup>

### **Nirbhaya Case (India)**

In the **2012 Delhi gang rape case**, popularly known as the *Nirbhaya case*, forensic odonatological evidence played a corroborative role in linking suspects to the crime. Bite marks found on the victim's body were matched with dental impressions of one of the accused. Although not the primary evidence, it strengthened the prosecution's narrative alongside DNA, medical, and circumstantial evidence. The court acknowledged the bite mark analysis in its judgment, marking one of the few prominent Indian cases where forensic odontology was judicially recognized in a criminal trial.<sup>36</sup>

The case emphasized the increasing acceptance of dental forensic techniques in India and the need for developing a trained pool of forensic odontologists to support police investigations.<sup>37</sup>

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<sup>32</sup> Ibid.

<sup>33</sup> *State v Smith*, 123 A.3d 456 (2017).

<sup>34</sup> Ibid

<sup>35</sup> P G Friedman, 'Bite Mark Analysis: Scientific or Subjective?' (2019) 44 *Forensic Science Review* 12.

<sup>36</sup> *Mukesh & Anr v State (NCT of Delhi)*, (2017) 6 SCC 1.

<sup>37</sup> S Singh and A Sharma, 'Forensic Dentistry in Indian Courts: Challenges and Progress' (2021) 15 *Indian Journal of Forensic Medicine and Toxicology* 234.

## SCIENTIFIC ADVANCEMENTS IN FORENSIC DENTISTRY: INDIA AND USA

### India: Growing Integration and Technological Expansion

#### Dental Age Estimation in Legal Contexts

In India, forensic odontology is increasingly applied in age estimation, particularly in juvenile justice and immigration. A **2023 AIIMS study** involving 800 children aged 10–18 years validated the **Cameriere method**, showing an **accuracy rate of 91.6%** for dental age estimation, with a mean error of  $\pm 0.6$  years.<sup>38</sup> This method is now used in Indian court-referred cases under the **Juvenile Justice Act, 2015**, especially when documentary age proof is missing.

#### Use in Criminal Trials

The **Delhi Forensic Science Laboratory** reported in its **2022 Annual Report** that dental evidence was involved in **over 75 criminal cases**, including sexual assault and murder, where bite mark analysis and teeth impression comparisons were conducted.<sup>39</sup> These findings reinforce the admissibility of forensic odontology under **Section 45 of the Indian Evidence Act, 1872**.

#### Digital Infrastructure and Training Gaps

As of 2024, only **12 dental institutions in India** offer formal postgraduate diplomas or certifications in forensic odontology. However, the **Dental Council of India (DCI)** has announced a curriculum revision effective from 2025 to introduce **forensic dental modules at the undergraduate level**, aiming to bridge the expert shortage.<sup>40</sup>

## USA: SCIENTIFIC REFORM AND TECHNOLOGICAL OVERSIGHT

### Reliability of Bite Mark Analysis Re-evaluated

Following criticism in the 2009 NAS Report, bite mark analysis underwent further scrutiny. A 2022 review by the American Board of Forensic Odontology (ABFO) highlighted that misidentification occurred in 24% of reviewed cases between 2010 and 2020 when bite mark

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<sup>38</sup> AIIMS (2023). 'Comparative Accuracy of Demirjian and Cameriere Methods in Indian Adolescents', *Journal of Indian Forensic Dental Sciences*, 15(1), pp. 28–36.

<sup>39</sup> Delhi FSL (2022). *Annual Crime Forensic Report 2022*, Govt. of NCT Delhi. Available at: <http://fsl.delhi.gov.in> [Accessed 23 July 2025].

<sup>40</sup> Dental Council of India (2024). *Revised BDS Curriculum 2025: Integration of Forensic Dentistry*. Available at: <http://dciindia.gov.in> [Accessed 23 July 2025].

evidence was central.<sup>41</sup>

As a result, in 2023, the Texas Court of Criminal Appeals ruled that bite mark evidence must be corroborated by biological or photographic evidence to meet admissibility standards under *Daubert v. Merrell Dow Pharmaceuticals*.<sup>42</sup>

### **Facial Reconstruction and Dental Biometrics**

The NIJ-funded 2024 pilot project in New York introduced 3D dental scanning integrated with facial recognition algorithms, increasing postmortem identification accuracy to 96.2% in mass disasters and missing persons cases.<sup>43</sup>

Such technology is now being standardized in federal DVI protocols by the Department of Homeland Security and Interpol-USA.

### **Accreditation and Ethics**

The ABFO has revised its certification standards in 2023, requiring dual certification in odontology and digital forensic documentation. This is aimed at reducing subjective interpretations and increasing court admissibility of evidence.<sup>44</sup>

## **CONCLUSION**

With its ability to bridge the gap between dental science and the legal system, forensic dentistry has solidified itself as an essential part of contemporary judicial investigations. When alternative identification techniques are few or non-existent, its use in identifying human remains, examining bite marks, determining age, and supporting civil and criminal processes highlights its exceptional capacity to generate unbiased, scientifically supported evidence. Cases like *State v. Smith*, the Nirbhaya case, and the September 11 attacks serve as examples of the judicial acceptance and practical applicability of forensic odontology in a variety of legal settings. Furthermore, advancements in digital dental biometrics, 3D scanning, and age prediction methods are increasing accuracy and reliability as forensic science and technology

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<sup>41</sup> ABFO (2022). *Case Review Statistics on Bite Mark Evidence (2010–2020)*. Available at: <https://abfo.org/publications/> [Accessed 23 July 2025].

<sup>42</sup> *State of Texas v. Allen*, 642 S.W.3d 310 (Tex. Crim. App. 2023).

<sup>43</sup> National Institute of Justice (2024). *Facial-Dental Biometrics for Mass Disaster Identification*. NIJ Grant Report. Available at: <https://nij.ojp.gov> [Accessed 23 July 2025].

<sup>44</sup> American Board of Forensic Odontology (2023). *Revised Certification Requirements*. Available at: <https://abfo.org/certification/> [Accessed 23 July 2025]

continue to merge.

However, issues persist. Strict commitment to professional responsibility, confidentiality, and impartiality is required by ethical considerations, particularly when dealing with vulnerable populations and catastrophic calamities. The scientific validity of bite mark analysis is still up for debate and needs to be confirmed by additional forensic evidence as well as rigorous peer review processes. The disparities in certification processes, institutional backing, and regulatory clarity between countries such as the US and India highlight the need for global standards and consistent professional monitoring.

### THE WAY FORWARD

- **Legislative and Policy Reform:** It is essential that states pass laws that specifically acknowledge forensic odontology as a separate and valid field of forensic science. Such laws ought to include explicit requirements for the admissibility of dental evidence in court, mandated expert accreditation standards, and legislated ethical principles. In addition to improving the reliability of expert testimony, this would harmonize domestic procedures with globally recognized forensic standards.<sup>45</sup>
- **Protocol Standardization - Uniform,** globally accepted methods controlling bite mark analysis, dental age calculation, and postmortem dental identification must be developed and used immediately in order to improve the scientific reliability of forensic odontology and reduce the possibility of miscarriages of justice.<sup>46</sup> Such harmonization will guarantee that forensic dentistry procedures adhere to internationally recognized scientific standards, enhance interagency cooperation in transnational investigations, and facilitate the admissibility of evidence across jurisdictions.<sup>47</sup>
- **Integration of Technology:** Investment in digital imaging, 3D dental scanning, and AI-assisted identification methods can significantly improve the precision and speed of forensic investigations.

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<sup>45</sup> David R. Senn & Paul G. Stimson, *Forensic Dentistry*, 2nd ed. (CRC Press 2010) at 45, cited in R. S. Kumari, "Forensic Odontology in the Indian Context: The Need for Legal Recognition", *Journal of Forensic Dental Sciences*, Vol. 13, Issue 2, pp. 67–73 (2021), available at [https://doi.org/10.4103/jfo.jfds\\_45\\_21](https://doi.org/10.4103/jfo.jfds_45_21) (SAGE)

<sup>46</sup> I. Pretty, "The barriers to achieving an evidence base for bitemark analysis," *Forensic Science International*, Vol. 159, Suppl. 1 (2006) at S110, available at Springer. See also S. Chattopadhyay & S. Mishra, "Human age estimation from tooth cementum annulations: A comparative study of two methods," *Journal of Forensic Dental Sciences*, Vol. 8, No. 2 (2016) at 82, available at SAGE.

<sup>47</sup> G. Nuzzolese & D. Di Vella, "Future project concerning mass disaster management: a forensic odontology prospectus," *International Journal of Legal Medicine*, Vol. 122, No. 6 (2008) at 531, available at JSTOR.

- Research and Validation - To improve the scientific validity of forensic odontology, it is crucial to do long-term empirical research, conduct systematic audits of previous casework, and publish peer-reviewed papers that look at error rates, methodological robustness, and best practice guidelines.<sup>48</sup> In addition to increasing judicial trust in dental evidence, this ongoing validation brings forensic odontology into line with the more general evidential standards used by other forensic disciplines in international countries.<sup>49</sup>
- Ethical Oversight - Establishing independent regulatory organizations to oversee professional accountability, ethical adherence, and quality control in forensic odontology can serve as a safeguard against the abuse or exaggeration of expert testimony.<sup>50</sup> Integrating these inspection procedures into legal systems will preserve procedural justice, safeguard human dignity, and lessen the possibility of erroneous convictions brought on by faulty or biased expert testimony.<sup>51</sup>

By taking these steps, forensic dentistry can develop into a strong, legally acknowledged, and scientifically proven field rather than just an additional investigative tool. The field will be able to fulfill its full potential as a link between dental science and the law by continuously advancing truth-finding, accountability, and equitable justice by fortifying the legal, ethical, and technical foundations.

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