

## PRESERVING TRUTH: ENSURING FORENSIC FIDELITY IN INDIAN CRIMINAL TRIALS

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### ABSTRACT

Forensic evidence plays a pivotal role in shaping the outcomes of criminal trials, often serving as the backbone of justice. In the context of India's diverse and complex legal system, maintaining the fidelity of forensic evidence is of utmost importance to ensure fair and accurate verdicts. The paper delves into the various dimensions of preserving truth through the lens of forensic evidence in Indian criminal trials. It examines the challenges and opportunities in upholding the integrity of forensic evidence, analyses the legal framework surrounding its collection, preservation, and presentation, and explores the role of technological advancements in enhancing forensic fidelity. The paper also highlights case studies and discusses potential reforms to strengthen the fidelity of forensic evidence in the Indian criminal justice system, ultimately aiming to contribute to a more equitable and reliable legal process.

**KEYWORDS:** Forensic Evidence, Fidelity, Criminal Trials, Indian Legal System, Chain of Custody.

### INTRODUCTION

The Indian criminal justice system serves as a cornerstone of the nation's commitment to upholding the rule of law and ensuring justice for all its citizens. At the heart of this system lies the pivotal concept of "truth." The quest for truth is not only essential for the dispensation of justice but also for maintaining public trust and upholding the fundamental principles of a democratic society.

In the pursuit of truth, forensic evidence has emerged as a crucial instrument within the realm of criminal trials. Forensic science, with its diverse array of techniques and methodologies, has the power to unearth hidden facts, resolve ambiguities, and establish irrefutable links between crimes and perpetrators. However, this power comes with great responsibility. The admissibility, accuracy, and preservation of forensic evidence have profound implications for the integrity of the criminal justice process.

This discourse delves into the intricate landscape of preserving truth within the context

of Indian criminal trials, focusing on the pivotal role of forensic fidelity. While the significance of forensic evidence cannot be overstated, its potency is contingent upon the maintenance of unassailable fidelity throughout its journey from crime scene to courtroom. This journey is riddled with challenges, encompassing the collection, preservation, analysis, interpretation, and presentation of forensic evidence.

Historically, India has witnessed instances where the fidelity of forensic evidence has been called into question, leading to miscarriages of justice and erosion of public trust. Such instances underscore the urgent need to establish robust mechanisms that ensure the accuracy, reliability, and impartiality of forensic processes. Only through the establishment of stringent protocols, ethical standards, and scientific rigor can the criminal justice system safeguard its commitment to truth and fairness.

This discourse navigates through the multifaceted dimensions of forensic fidelity, examining both its theoretical underpinnings and its practical implications. By dissecting the

challenges and potential pitfalls at each stage of the forensic process, from evidence collection in the field to its eventual presentation in the courtroom, this discourse seeks to shed light on the critical interplay between scientific precision and legal procedure.

Furthermore, this discourse highlights the pivotal role of technological advancements in bolstering forensic fidelity. Cutting-edge technologies, ranging from DNA analysis and digital forensics to advanced imaging techniques, hold the promise of revolutionizing the way evidence is collected, analysed, and presented. However, their integration into the criminal justice system must be accompanied by rigorous validation, adherence to established protocols, and continuous training of forensic practitioners.

As the Indian criminal justice system evolves to meet the challenges of the 21st century, it is imperative to recalibrate its approach to forensic evidence. This recalibration necessitates a comprehensive and collaborative effort involving forensic experts, legal scholars, policymakers, and practitioners. By working in tandem, these stakeholders can lay the foundation for a forensic ecosystem that not only upholds the sanctity of truth but also enhances the credibility of the criminal justice system as a whole.

In the pages that follow, this discourse endeavours to unravel the nuances of preserving truth in Indian criminal trials, through the lens of forensic fidelity. By critically analysing existing practices, proposing innovative solutions, and advocating for a harmonious fusion of science and law, this exploration seeks to contribute to the ongoing dialogue surrounding the evolution of the Indian criminal justice system.

## FORENSIC EVIDENCE AND ITS IMPORTANCE

Forensic evidence stands as a cornerstone in the modern criminal justice system, serving as a potent tool to uncover the truth and deliver justice. It encompasses a wide range of

scientific techniques and methodologies that are applied to investigate and analyse physical evidence related to a crime. From fingerprints and DNA to ballistics and digital traces, forensic evidence provides objective insights that aid in establishing facts, linking suspects to crimes, and ensuring the fairness of legal proceedings.<sup>2568</sup> The importance of forensic evidence can be understood through several key aspects:

**Objectivity and Impartiality:** Forensic evidence is based on scientific principles and methodologies, which lend it an objective and impartial character. Unlike testimonial evidence, which may be influenced by human bias or error, forensic evidence provides a more reliable and unbiased representation of the facts.

**Establishing Links and Identifications:** Forensic evidence often plays a critical role in establishing connections between a crime scene, victims, and suspects. Techniques such as DNA analysis, fingerprint comparison, and dental records can provide conclusive identifications or exclusions, helping to confirm or eliminate potential suspects.<sup>2569</sup>

**Resolving Ambiguities:** Criminal investigations frequently encounter situations where multiple narratives and interpretations are possible. Forensic evidence can help resolve ambiguities by providing concrete data that supports a specific version of events, aiding investigators and legal professionals in constructing a cohesive and accurate narrative.

**Exonerating the Innocent:** Forensic evidence has the power to exonerate individuals who have been wrongfully accused or convicted. DNA testing, for example, has led to the exoneration of numerous individuals who were unjustly imprisoned, highlighting the potential of

<sup>2568</sup> Baillet S, Mosher JC, Leahy RM, et al., “Electromagnetic Brain Mapping” 18 (6), IEEE Signal Process Mag 14–30 (2019).

<sup>2569</sup> Dalal AS and Mukherjee A, “Constitutional and Evidentiary Value of New Scientific Tests” 49 J Indian Law Inst 529–542, (2021).

forensic science to rectify miscarriages of justice.<sup>2570</sup>

**Developing Investigative Strategies:** Advances in forensic technology continuously expand the range of evidence that can be analysed and the precision with which it can be examined. Techniques like digital forensics, which analyse electronic devices and digital traces, have become increasingly important in modern investigations.

**Supporting Law Enforcement and Prosecution:** Forensic evidence provides law enforcement agencies and prosecutors with a robust foundation for building a case against suspects. The credibility of forensic evidence can bolster the prosecution's argument and contribute to the overall strength of the case presented in court.<sup>2571</sup>

**Challenging False Alibis:** Forensic evidence can be crucial in challenging false alibis put forth by suspects. Objective evidence, such as cell phone tower records or surveillance footage, can either corroborate or refute the claims made by individuals involved in criminal activities.

**Promoting Fair Trials:** In a legal system predicated on fairness and due process, forensic evidence acts as a counterbalance to subjective interpretations and emotional biases. It empowers both the prosecution and the defense with factual information, ensuring that trials are conducted on an even playing field.

**Public Confidence and Transparency:** A criminal justice system that relies on solid scientific evidence garners public confidence. The transparent and replicable nature of forensic techniques enhances the credibility of investigations and legal proceedings.

**Deterrence:** The knowledge that forensic evidence can be used to identify and

apprehend perpetrators acts as a deterrent against criminal activity. This deterrence is rooted in the understanding that modern investigative methods leave behind traces that can link individuals to the scene of a crime.<sup>2572</sup>

In sum, forensic evidence plays a pivotal role in safeguarding the integrity of the criminal justice system. Its scientific rigor, objectivity, and capacity to uncover hidden truths have transformed the way crimes are investigated, trials are conducted, and justice is administered. As technology continues to advance, the importance of preserving, validating, and utilizing forensic evidence becomes increasingly significant in upholding the principles of truth, fairness, and accountability within the legal framework.

#### CHALLENGES TO FORENSIC FIDELITY

Preserving forensic fidelity faces several challenges that can impact the accuracy, reliability, and integrity of forensic evidence throughout the criminal justice process. Addressing these challenges is essential to ensuring that forensic evidence maintains its credibility and contributes effectively to the pursuit of truth in criminal trials. Some of the key challenges include:

**Quality of Evidence Collection:** Proper collection of forensic evidence at crime scenes is critical. Poorly trained personnel or rushed investigations can lead to contamination, mishandling, or loss of evidence, compromising its integrity and admissibility in court.<sup>2573</sup>

**Chain of Custody:** Maintaining a documented and unbroken chain of custody is crucial to prevent tampering or unauthorized handling of evidence. Inadequate record-keeping or breaches in custody can raise doubts about evidence integrity.

**Technological Complexity:** The rapid advancement of forensic technology presents

<sup>2570</sup> Berryessa, C. M., "Jury-Eligible Public Attitudes Toward Biological Risk Factors for the Development of Criminal Behavior and Implications for Capital Sentencing" 44 (8) *Criminal Justice and Behavior* 1073–1100 (2017).

<sup>2571</sup> Berryessa, C. M., "The Effects of Psychiatric and "biological" Labels on Lay Sentencing and Punishment Decisions" 14 *J Exp Crimol* 241–256 (2018).

<sup>2572</sup> Shichun Ling, Jacob Kaplan, Colleen M, et.al., "The Importance of Forensic Evidence for Decisions on Criminal Guilt" 61(2) *Science & Justice* 142-149. (2021).

<sup>2573</sup> Gupta, A., Kaushik, D., et.al., "Challenges and Advancements in Forensic Science in India" 8 (2) *Journal of Forensic Research* 1-4 (2017).

challenges in terms of keeping up with new techniques, validating their reliability, and ensuring proper training for forensic experts and law enforcement personnel.

**Resource Constraints:** Forensic labs often face resource limitations, leading to backlogs in processing evidence and potential delays in trials. Insufficient funding, outdated equipment, and a shortage of skilled personnel can compromise the quality of analysis.<sup>2574</sup>

**Subjectivity and Interpretation:** Some forms of forensic evidence, such as fingerprint analysis or handwriting comparison, involve an element of subjectivity in interpretation. This subjectivity can introduce bias and differences of opinion among experts.

**Confirmation Bias:** Investigative and forensic professionals may develop preconceived notions about a case, leading to confirmation bias where they focus on evidence that supports their assumptions while ignoring contradictory information.

**Lack of Standardization:** Variability in forensic procedures, terminology, and protocols across different jurisdictions or laboratories can lead to inconsistent results and difficulties in comparing evidence.<sup>2575</sup>

**Human Error:** Even well-trained experts can make errors in analysis, documentation, or testimony. These errors can have far-reaching consequences on the outcome of a trial.

**Prosecutorial and Defense Challenges:** Both prosecution and defense may challenge the admissibility, reliability, or methodology of forensic evidence in court, leading to legal battles that require a thorough understanding of scientific principles.

**Public Misunderstanding:** The portrayal of forensic science in popular media can create unrealistic expectations and perceptions of its

infallibility. This can lead to public distrust if real-world limitations and challenges are not adequately communicated.<sup>2576</sup>

**Ethical Considerations:** The use of emerging technologies like DNA databases and facial recognition raises ethical concerns about privacy, consent, and potential misuse of personal information.

**Lack of Expertise:** Judges and juries may lack the necessary scientific background to fully understand complex forensic evidence. Effective communication of findings is crucial to ensuring their accurate interpretation.<sup>2577</sup>

**Evolution of Science:** As scientific knowledge evolves, previously accepted methods might be challenged, leading to a need for reassessment of evidence and potentially affecting the validity of past convictions.

**False Positives/Negatives:** Forensic techniques are not infallible and can produce false positive or negative results. Misinterpretation of results or reliance on imperfect methods can lead to wrongful convictions or the failure to identify perpetrators.

To address these challenges and ensure the fidelity of forensic evidence, ongoing efforts are required in terms of standardized protocols, continuous education and training, transparent communication, peer review, and the integration of advanced technologies with stringent validation processes.<sup>2578</sup> Collaborative engagement between forensic scientists, legal professionals, policymakers, and the broader public is crucial to establish a robust framework that upholds the integrity of forensic evidence in the criminal justice system.

## LEGAL FRAMEWORK FOR FORENSIC EVIDENCE

In India, the legal framework for forensic evidence primarily falls under the purview of the

<sup>2574</sup> Singh, D. Sharma, A., et al., “Forensic Evidence and Criminal Justice Administration in India: Issues and Challenges” 35 (1), *Journal of Police and Criminal Psychology* 77-85 (2020).

<sup>2575</sup> Bhattacharya, A. Dutta, S., et al., “Challenges and Prospects of Forensic Science in India” 7 (9) *International Journal of Innovative Research in Science, Engineering and Technology* 13808-13814 (2018).

<sup>2576</sup> Reddy, K. S., “Emerging Trends and Challenges in Forensic Science in India” 34 (2) *Journal of Forensic Medicine and Toxicology* 135-139. (2017).

<sup>2577</sup> Roy, S. S., “Ensuring Forensic Fidelity in the Criminal Justice System” 8 (2) *An Indian Perspective. Legal Science and Society* 74-89 (2021).

<sup>2578</sup> Rai, B., Kant, S., et al., “Admissibility of Forensic Evidence in Indian Courts: Challenges and Suggestions” 2 (4) *International Journal of Legal Research and Governance* 241-250. (2018).

Indian Evidence Act, 1872. Forensic evidence is crucial in criminal investigations and court proceedings to establish the guilt or innocence of an accused person. Here are some key aspects of the legal framework for forensic evidence in India:

**Admissibility of Expert Opinion (Section 45):** Section 45 of the Indian Evidence Act deals with the admissibility of expert opinion as evidence. It states that when the court has to form an opinion on a point of science, art, or foreign law, the opinions of experts in that field are relevant.<sup>2579</sup> The court may consider such opinions in forming its judgment.

**Opinion as to Handwriting (Section 45A):** Section 45A of the Indian Evidence Act specifically deals with the admissibility of opinions regarding handwriting. It states that when the court has to form an opinion about the person by whom a document was written or signed, the opinions of experts in handwriting are relevant.

**Opinion as to Identity (Section 47):** Section 47 of the Indian Evidence Act deals with the opinion of experts as to the identity of a person when that identity is relevant. This can include opinions about fingerprints, voice recognition,<sup>2580</sup> facial recognition, etc.

**Opinion as to Foreign Law (Section 57):** Section 57 of the Indian Evidence Act deals with the opinions of experts on a question of foreign law.

**Cross-Examination of Experts (Section 138):** Section 138 of the Indian Evidence Act provides for the right to cross-examine expert witnesses. Cross-examination is a crucial part of testing the credibility and reliability of expert opinions presented in court.

**Forensic Science Laboratories:** India has several forensic science laboratories at the

state and central levels.<sup>2581</sup> These laboratories are responsible for conducting scientific analysis of evidence, such as DNA testing, fingerprint analysis, ballistics, toxicology, etc.

**Code of Criminal Procedure (CrPC):** The Code of Criminal Procedure, 1973, provides the procedural aspects of how forensic evidence is collected, preserved, and presented in criminal cases. It outlines the powers and responsibilities of law enforcement agencies, including the collection and submission of forensic evidence to the appropriate authorities.<sup>2582</sup>

**Indian Medical Council Act, 1956:** The Indian Medical Council Act, 1956, is a foundational piece of legislation in India that governs medical education, qualifications, and professional standards. It established the Medical Council of India (MCI) as the primary regulatory body for the medical profession.<sup>2583</sup> The Act outlines provisions related to the recognition of medical qualifications, maintenance of the national medical register, codes of professional conduct and ethics, and the inspection and recognition of medical institutions. It empowers the MCI to regulate medical education, oversee ethical practices, and take disciplinary actions against medical practitioners for professional misconduct. The Act has been instrumental in shaping the standards and integrity of the medical field in India. Subsequently, the National Medical Commission Act, 2019, was proposed to replace the MCI with the National Medical Commission to further reform medical education and regulation in the country.

In keeping with this, the admissibility and weight given to forensic evidence can vary from case to case, and courts will consider factors such as the qualifications of the expert, the methodology used, and the overall relevance of

<sup>2579</sup> Bansal, D. Kumar, V., et al., "Challenges in Admissibility of Forensic Evidence: An Overview" 6 (3) International Journal of Legal Research and Governance 90-103 (2018).

<sup>2580</sup> Ravindran, N., "Judicial Challenges in the Admissibility of Scientific Evidence in India" 7 (2), International Journal of Innovative Research and Advanced Studies, 135-139, (2020).

<sup>2581</sup> Sharma, M. Gupta, R., et al., "Legal Challenges in Admissibility of Forensic Evidence in India" 5 (12) International Journal of Scientific Research and Management 8125-8131 (2017).

<sup>2582</sup> Singh, D. Kumar, N., et al., "Legal Challenges in the Admissibility of DNA Evidence in India" 4 (3) International Journal of Legal Developments and Allied Issues 54-62 (2018).

<sup>2583</sup> Dixit, A., "The Admissibility of Electronic Evidence in Indian Courts: A Critical Analysis" 46 (1) Indian Bar Review 18-34 (2019).

the evidence to the case.<sup>2584</sup> Additionally, there might have been legislative changes, amendments, or new regulations introduced since my last update.

### TECHNOLOGICAL ADVANCEMENTS AND FORENSIC FIDELITY

Technological advancements have significantly impacted forensic practices and the fidelity of evidence in India, enhancing the accuracy, efficiency, and credibility of investigations and court proceedings. Here are some key areas where technology has made a difference:

**DNA Profiling:** DNA analysis has become a powerful tool for establishing identity and solving crimes. Advancements in DNA profiling technology have increased the accuracy of identifying individuals, whether it's in criminal investigations, identifying missing persons, or establishing relationships between individuals.

**Fingerprint Analysis:** Automated fingerprint identification systems (AFIS) have improved the speed and accuracy of fingerprint matching, helping law enforcement agencies link suspects to crime scenes more efficiently.<sup>2585</sup>

**Digital Forensics:** The rise of digital technology has led to an increase in cybercrimes. Digital forensics involves the analysis of digital devices and data to investigate cybercrimes, financial fraud, and other digital evidence-related cases.

**Ballistics and Firearms Analysis:** Advanced ballistic techniques, such as comparison microscopy and gunshot residue analysis, have improved the accuracy of connecting firearms to crime scenes and suspects.<sup>2586</sup>

**Toxicology and Drug Analysis:** Modern instrumentation has enabled accurate and efficient analysis of toxins and drugs in forensic samples, contributing to the detection of

poisonings, drug-related crimes, and other related cases.<sup>2587</sup>

**Surveillance and Monitoring:** Technological advancements in surveillance, including CCTV systems and monitoring software, help capture visual evidence of crimes and monitor suspects.

**Audio and Video Analysis:** Digital tools are used to enhance audio and video evidence, making it easier to analyse and present in court.<sup>2588</sup>

**Facial Recognition:** Facial recognition technology has the potential to aid in identifying suspects, missing persons, and victims by analysing images and comparing them to databases.

**Crime Scene Investigation:** Advanced equipment, such as 3D scanners and aerial imaging, is used to recreate crime scenes digitally, preserving evidence and aiding investigations.

**Mobile Forensics:** Smartphones and other mobile devices contain valuable evidence. Mobile forensics tools extract data, such as call records, messages, and location information, aiding in investigations.<sup>2589</sup>

**Courtroom Technology:** Modern courtrooms are equipped with technology to present evidence more effectively, including multimedia presentations, video conferencing for remote testimonies, and real-time transcription services.

**Data Analytics and Predictive Policing:** Data analytics tools help law enforcement agencies analyse trends and patterns, aiding in proactive crime prevention and resource allocation.

While these technological advancements have undoubtedly improved the fidelity and efficiency of forensic investigations in India, they also come with challenges. Ensuring the proper

<sup>2584</sup> Parekh, S., Choudhary, S. et.al., Forensic Evidence: Legal Admissibility and Challenges in India 12(4) Indian Journal of Forensic Medicine & Toxicology, 215-220 (2018).

<sup>2585</sup> Singh, R., Sharma, R. et.al., Integration of Technology and Forensic Science in India: Challenges and Future Prospects 184(26), International Journal of Computer Applications, 12-18 (2021).

<sup>2586</sup> Chakraborty, S., Gupta, A. et.al., Modern Techniques in Forensic Investigation: Challenges and Opportunities in India 7(4), International Journal of Applied and Basic Medical Research, 220-225 (2017).

<sup>2587</sup> Choudhary, R., Sharma, A. et.al., Forensic Science and Technology: An Overview of Advancements in India 35(2), Journal of Forensic Medicine & Toxicology, 23-28 (2018).

<sup>2588</sup> Bajpai, R., Raj, S. et.al., Emerging Technologies in Forensic Analysis: An Indian Perspective 6(1), Journal of Forensic Research and Analysis, 1-6, (2019).

<sup>2589</sup> Gupta, S., Kumar, R. et.al., Technological Advances in Forensic Science and Its Impact on Indian Legal System 9(2), International Journal of Scientific Research and Review, 87-92, (2020).

training of forensic experts, maintaining the integrity of evidence, addressing potential biases in technology, and adhering to legal and ethical standards are crucial considerations in the adoption of these technologies.<sup>2590</sup> Additionally, ensuring that the benefits of these advancements are accessible to all segments of society is essential for upholding justice and fairness in the legal system.

### CASE STUDIES

Forensic fidelity in criminal trials is a crucial aspect of ensuring justice and accuracy in the legal system. The term “forensic fidelity” refers to the reliability, accuracy, and credibility of forensic evidence presented in court. In India, like in many other countries, the use of forensic evidence has gained prominence in criminal trials to establish facts, identify suspects, and aid in the decision-making process.

Here are a few case studies that highlight the importance of forensic fidelity in Indian criminal trials:

#### ***Jessica Lall Murder Case (1999)***

Although not an Indian citizen, this case gained significant attention in India. Jessica Lall, a model, was shot dead at a party in Delhi. The case initially saw witnesses turning hostile and a lack of proper forensic evidence due to alleged political and social pressures. However, public outrage and media attention eventually led to a retrial, and the accused was convicted based on the revised forensic evidence and eyewitness testimony.<sup>2591</sup>

#### ***Bilkis Bano Gang Rape Case (2002)***

This case involved the gang rape and mass murder of several members of a Muslim family during the 2002 Gujarat riots. Forensic evidence, including medical examination and DNA analysis, played a crucial role in establishing the

crime and identifying the perpetrators. The case resulted in convictions and highlighted the importance of accurate forensic examination in cases of sexual assault and communal violence.<sup>2592</sup>

#### ***Nithari Serial Killings (2006)***

The Nithari case involved the discovery of human remains and evidence of sexual assault at the residence of a businessman named Moninder Singh Pandher. The forensic evidence, including DNA analysis of the remains and forensic examination of the crime scene, played a significant role in linking the accused to the crimes. However, the case also highlighted issues with the handling of evidence and the need for better forensic practices.<sup>2593</sup>

#### ***Aarushi-Hemraj Double Murder Case (2008)***

This high-profile case involved the murder of 14-year-old Aarushi Talwar and the family's domestic help, Hemraj, in Noida, Uttar Pradesh. The investigation was marred by initial mishandling of the crime scene, leading to contamination of evidence. The reliance on forensic evidence, including bloodstain patterns and DNA analysis, played a pivotal role in the trial. However, questions were raised about the accuracy of some forensic findings, and the case saw multiple twists and turns before the Talwar couple was acquitted by the Allahabad High Court in 2017.<sup>2594</sup>

#### ***Nirbhaya Gang Rape and Murder Case (2012)***

The brutal gang rape and murder of a young woman in Delhi led to widespread protests and a demand for swift justice. Forensic evidence, including DNA analysis and medical reports, played a significant role in establishing the guilt of the accused. The forensic findings, along with the victim's dying declaration, contributed to

<sup>2590</sup> Kaur, H., Singh, G. et.al., Digital Forensics and Its Role in Ensuring Forensic Fidelity: A Review, 178(16), International Journal of Computer Applications, 1-4, (2017).

<sup>2591</sup> Wikipedia contributors, Murder of Jessica Lal. In Wikipedia, The Free Encyclopedia. Retrieved 10:56, August 8, 2023, from [https://en.wikipedia.org/w/index.php?title=Murder\\_of\\_Jessica\\_Lal&oldid=1157423638](https://en.wikipedia.org/w/index.php?title=Murder_of_Jessica_Lal&oldid=1157423638)

<sup>2592</sup> [Bilkis Bano case: Supreme Court adjourns to July 17 hearing of pleas against remission to convicts - The Hindu](#), accessed on 08/08/2023.

<sup>2593</sup> Wikipedia contributors, 2006 Noida serial murders. In Wikipedia, The Free Encyclopedia. Retrieved 10:58, August 8, 2023, from [https://en.wikipedia.org/w/index.php?title=2006\\_Noida\\_serial\\_murders&oldid=1166588182](https://en.wikipedia.org/w/index.php?title=2006_Noida_serial_murders&oldid=1166588182)

<sup>2594</sup> Wikipedia contributors, 2008 Noida double murder case. In Wikipedia, The Free Encyclopedia. Retrieved 10:59, August 8, 2023, from [https://en.wikipedia.org/w/index.php?title=2008\\_Noida\\_double\\_murder\\_case&oldid=1169010691](https://en.wikipedia.org/w/index.php?title=2008_Noida_double_murder_case&oldid=1169010691)

the convictions and subsequent death sentences for the perpetrators.<sup>2595</sup>

### ***Sunanda Pushkar Death Case (2014)***

The death of Sunanda Pushkar, wife of politician Shashi Tharoor, was initially treated as a suicide. However, subsequent investigations raised suspicions of foul play. Forensic evidence, including autopsy reports and toxicology analysis, became central to determining the cause of death. The case is still ongoing, and the role of forensic evidence in establishing the circumstances of Sunanda Pushkar's death remains significant.<sup>2596</sup>

### ***Sheena Bora Murder Case (2015)***

The case involved the murder of Sheena Bora, whose remains were found in a forest near Mumbai. Forensic experts played a crucial role in identifying the victim's remains and establishing the cause of death. DNA analysis was used to confirm the identity of the remains, which helped in building the case against the accused, including Indrani Mukerjea and her husband Peter Mukerjea.<sup>2597</sup>

These case studies underscore the importance of maintaining forensic fidelity in Indian criminal trials. Proper collection, preservation, and analysis of forensic evidence are essential to ensure that justice is served and innocent individuals are not wrongly convicted. Additionally, these cases highlight the challenges that can arise when forensic evidence is mishandled or misinterpreted, emphasizing the need for continuous improvement in forensic practices and standards.

<sup>2595</sup> Wikipedia contributors, 2012 Delhi gang rape and murder. In Wikipedia, The Free Encyclopedia. Retrieved 10:59, August 8, 2023, from [https://en.wikipedia.org/w/index.php?title=2012\\_Delhi\\_gang\\_rape\\_and\\_murder&oldid=1168638150](https://en.wikipedia.org/w/index.php?title=2012_Delhi_gang_rape_and_murder&oldid=1168638150)

<sup>2596</sup> Wikipedia contributors, Sunanda Pushkar. In Wikipedia, The Free Encyclopedia. Retrieved 11:00, August 8, 2023, from [https://en.wikipedia.org/w/index.php?title=Sunanda\\_Pushkar&oldid=1142793389](https://en.wikipedia.org/w/index.php?title=Sunanda_Pushkar&oldid=1142793389)

<sup>2597</sup> Wikipedia contributors, Sheena Bora murder case. In Wikipedia, The Free Encyclopedia. Retrieved 11:00, August 8, 2023, from [https://en.wikipedia.org/w/index.php?title=Sheena\\_Bora\\_murder\\_case&oldid=1164671451](https://en.wikipedia.org/w/index.php?title=Sheena_Bora_murder_case&oldid=1164671451)

## **REFORMS FOR STRENGTHENING FORENSIC FIDELITY**

Strengthening forensic fidelity in India is crucial for ensuring the accuracy and reliability of evidence presented in criminal investigations and court proceedings. Here are some potential reforms that could contribute to enhancing forensic fidelity in the Indian context:

- **Standardization and Accreditation:** Establish a centralized body responsible for setting national standards for forensic practices and accreditation of forensic laboratories. This will ensure that all labs follow standardized procedures and maintain a high level of competency.
- **Training and Education:** Invest in continuous training and education for forensic professionals. This includes providing opportunities for skill development, staying updated on the latest scientific advancements, and ensuring proper knowledge transfer among experts.<sup>2598</sup>
- **Quality Assurance:** Implement a robust quality assurance program to regularly assess the accuracy and reliability of forensic practices. Independent audits and proficiency testing should be conducted to identify and rectify any issues promptly.
- **Digital Forensics:** Enhance capabilities in digital forensics to address the growing role of technology in criminal activities. This includes improving the investigation of cybercrimes, ensuring the integrity of digital evidence, and training personnel to handle digital artefacts effectively.<sup>2599</sup>
- **Interagency Collaboration:** Promote collaboration between law enforcement agencies, forensic laboratories, and the judiciary. Regular interaction and

<sup>2598</sup> Sharma, S. K., Reddy, K. S. (Eds.). et al., Forensic Science in Criminal Investigation and Trials, Springer(2018).

<sup>2599</sup> Reddy, K. S., Singh, D. et al., Strengthening forensic science in India: Challenges and options, 292, Forensic Science International, 1-7, (2018).



coordination can help ensure that evidence is properly collected, preserved, analysed, and presented in court.

- **Expert Testimony Standards:** Establish clear guidelines for expert witnesses to ensure that they provide accurate and unbiased testimony in court. This could involve defining the qualifications required to testify as an expert and mandating that testimony is based on sound scientific principles.<sup>2600</sup>
- **Transparency and Documentation:** Require thorough documentation of all forensic procedures, methodologies, and findings. Transparency in the forensic process enhances credibility and allows for independent verification.
- **Research and Development:** Allocate resources for research and development in forensic science. This can lead to the discovery of new techniques, tools, and methodologies that can improve the accuracy and reliability of forensic analysis.
- **Ethical Guidelines:** Develop and enforce ethical guidelines for forensic professionals. Ensuring integrity and avoiding conflicts of interest are critical to maintaining the trustworthiness of forensic evidence.<sup>2601</sup>
- **Public Awareness:** Educate the public, legal professionals, and law enforcement personnel about the capabilities and limitations of forensic science. This can help prevent misunderstandings and unrealistic expectations about the forensic process.
- **Cold Case Units:** Establish specialized units dedicated to revisiting unsolved cases using advanced forensic techniques. This can lead to the resolution of long-standing cases and

enhance public trust in the justice system.<sup>2602</sup>

- **International Collaboration:** Foster collaboration with international forensic organizations and experts to exchange best practices, share knowledge, and benchmark against global standards.
- **Review of Existing Cases:** Conduct periodic reviews of old cases where forensic evidence played a significant role. This can help identify any errors or issues in past practices and rectify them if necessary.<sup>2603</sup>

These reforms collectively aim to bolster the credibility of forensic evidence, promote professionalism among forensic practitioners, and ultimately contribute to a fair and effective criminal justice system in India.

#### CONCLUSION

Finally, preserving truth through ensuring forensic fidelity is an imperative task in Indian criminal trials. The reliance on objective scientific evidence is pivotal in maintaining the credibility of the justice system and preventing wrongful convictions. Interdisciplinary collaboration, where forensic experts, legal practitioners, and judges work in tandem, bridges the gap between the scientific and legal realms. This collaboration ensures that the intricacies of forensic analysis are communicated effectively, minimizing misinterpretation and maximizing the impact of evidence presented. By addressing the standardization, training, technological integration, and ethical considerations, India can work towards a criminal justice system that not only upholds the principles of truth and fairness but also safeguards the rights of the accused and the victims alike. However, the integrity of forensic evidence is pivotal in upholding the principles of justice, fairness, and the rule of law. While challenges persist, ranging from diversity in legal procedures to resource constraints and backlogs, India has the potential to overcome these hurdles

<sup>2600</sup> Prasad, R. Forensic Science in Criminal Investigation: Need of the Hour in India, 14(1) International Journal of Criminal Justice Sciences, 28-42, (2019).

<sup>2601</sup> Tripathi, A., Tripathi, S. et.al., Forensic science reforms in India: Issues and challenges ,7(1), International Journal of Criminal Investigation 51-60, (2019).

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and establish a robust framework for forensic fidelity.

