

FORENSIC EVIDENCE AND ITS TECHNOLOGY IN INDIA: LEGAL LANDSCAPE

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ABSTRACT

When considering the relevance of forensic evidence in improving criminal justice in India, one can look to precedents such as **Sushil Mandal v. The State** for a compelling example. In this case, the petitioner sought justice using forensic evidence to identify the decomposed and unrecognizable body of his son. In today's techie world, criminals often employ sophisticated methods to mislead authorities, making forensic evidence a crucial tool for leading investigations into the real culprits. Scientific techniques like fingerprinting, DNA profiling, etc. of forensic science play a pivotal role in criminal investigations in India, bolstering public safety and fostering confidence in the criminal justice system¹ as well as jointly provide to untangling the cause of death and initiating potential interconnections to the accused². This research paper delves into the role and impact of forensic evidence in crime investigations, highlighting the legal provisions that support criminal investigations, the legal framework for the use of forensic evidence in India dealing with forensic science although not explicitly, like certain sections of the Indian Evidence Act, 1872 and the Criminal Procedure Code, 1973 are described along with that the constitutional validity is analyzed in regards to article 20(3) of the constitution³ and the technological advancements accompanying forensic investigations have also been showcased. It also sheds light on the legal challenges faced by forensic evidence while emphasizing its significant influence on the administration of justice.

Keywords: Forensic Proof, Indian Criminal Justice, Scientific Methods, Legal Framework, Digital Footprints, Technological Aspect.

INTRODUCTION

Forensic science is a specialized field of science that acts as a bridge between scientific analysis and criminal justice. This discipline involves the scrupulous examination of crime scenes,

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¹ U. V. and Simranjeet Kaur Gill. "Development of Scientific Techniques in Investigation of Criminal Cases in India." International Journal of Advance Research and Innovation (2022). <https://doi.org/10.51976/ijari.1022207>.

² [Role of forensic science in crime investigation \(lifs.co.in\)](https://lifs.co.in)

³ Anisha Tak. "SCIENTIFIC MECHANISMS IN CRIME INVESTIGATION: A STUDY." THE JOURNAL OF UNIQUE LAWS AND STUDENTS (2021). <https://doi.org/10.59126/v1i3a14>.

collection and preservation of evidence, fingerprint analysis, laboratory investigation, solving digital traces, decoding weapon evidence, expertise in forensic anthropology, reconstructing crimes, providing expert witness testimony, and revitalizing cold cases.

Forensic evidence is the application of science within legal proceedings. The analysis of key data within court proceedings can help to establish the guilt or innocence of possible suspects. These tests tend to be conducted via scientific, medical, or technological means.⁴

Forensic evidence serves as a critical tool for legal authorities to uncover hidden facts and resolve legal issues in cases. Forensic expertise is well-versed with both physical and digital evidence. A special analysis is required to unearth the evidence from the crime scene, victim, witness, or suspects.

The Indian Evidence Act of 1872 was the first law in India that recognized the admissibility of scientific evidence in courts⁵. No doubt forensic evidence serves as a basis for many of the crimes but it is more persuasive in nature as it is non-binding to the courts although it is authentic mainly based on physical laws, which serves a clash-building bone resulting in the ratio decisions of the benches, supported by the judgement of **Madan Gopal vs Naval Dubey**⁶, in this case court held the non-binding feature of the forensic evidence serving as preference over priority. Opinion on technical aspects and material data given by the medical experts is only considered by the court as advice and the court has to form its own opinion⁷. In the **Prem vs Daula**⁸ case, there was a clash between direct evidence and medical evidence, direct evidence (testimony by eye witness) prevailed.

The landmark case of State (NCT of Delhi) vs Navjot Sandhu (2005) was the 1st case in the Indian legal system to recognize the significance of electronic evidence, mobile phone records to be more specific, if found important could be accepted in the court even without the certificate of 65B of the Indian evidence act, 1872 (Now Bharatiya Sakshya Adhiniyam, 2023).

⁴ [What is Forensic Evidence and How Can it Help? - Foresight](#) Jul 6, 2021

⁵ <https://mediumpulse.com/2023/04/29/forensic-law-forensic-science-law-in-india/> MEDIUM PULSE NEWS. Forensic Law Forensic Science Law in India. Date: [April 29, 2023](#)

⁶ Madan Gopal v. Naval Dubey (1992) 3 SCC 204

⁷ Bharati Law Review, April – June, 2018 255 EXPERT EVIDENCE by Ms. Shreya Jain* Ms. Ujaala Jain** <https://docs.manupatra.in/newslines/articles/Upload/68598D7D-344C-41C5-9FFD-89CE870BB3BB.pdf>

⁸ Prem v. Daula, AIR 1997 SC 719: (1997) 9 SCC 754: 1997 SCC (Cri) 754: 1997 Cr LJ 838

The judiciary and law enforcement agencies are faced with the challenges of evolving criminal investigation techniques and the admissibility of digital evidence.⁹

OBJECTIVES

- Learn about the concept of forensic evidence in the legal justice system
- Role and significance of forensic evidence
- The reader will know about the Legal framework and interesting case studies supporting case investigation in India.
- Digital insight into forensic pieces of evidence.
- Study about the legal and regulatory challenges faced by the forensic evidence.

HYPOTHESIS

With evolving laws and increasing awareness, the credibility and acceptance of forensic evidence in courtrooms are on the rise. However, legal challenges and its non-binding nature have kept it from the limelight, despite its reliability as a scientific phenomenon leading to fruitful outcomes.

CRITICAL ROLE & SIGNIFICANCE OF FORENSIC IN VERIFYING EVIDENCE

In a case, *Dharam Deo Yadav v. State of U.P.*¹⁰, the Supreme Court of India has explained the importance of forensic scientific evidence, particularly in more brutal and well-organized crimes.¹¹

The word 'Forensic' is derived from the Latin word 'Forensis' which means 'before the forum.' The term's history dates back to Roman times, during which the criminal charge meant presenting a case before a group of public persons at the forum.¹²

⁹ (Nguyen et al., 2022) Computer Vision and Image Understanding
Volume 223, October 2022, 103525 Computer Vision and Image Understanding Deep learning for deepfakes creation and detection: A survey Author links open overlay panel Thanh Thi Nguyen a,

¹⁰ *Dharam Deo Yadav vs State Of U.P* on 11 April, 2014, 2014 AIR SCW 2253, K.S. Radhakrishnan

¹¹ International Journal of Forensic Science & Pathology (IJFP) ISSN 2332-287X. Forensic scientific evidence: problems and pitfalls in India, V.R.Dinkar, <http://scidoc.org/IJFP.php>

¹² Role of technology in the forensic investigation by the police
December 25, 2020 [Role of technology in the forensic investigation by the police - iPleaders](#)

Forensic evidence, as a scientific phenomenon, is consistently reliable, impartial, and highly accurate. It serves as a foundation for the victims' rights and ensures justice for both the victims and the accused. Forensic evidence is also important in identifying perpetrators of crime and establishing the facts of a case.

In recent years, the widespread utilization of forensic evidence has significantly increased, thanks to the establishment of the first forensic science laboratory CFSL (Central forensic science laboratory) and the establishment of branches across the country. This development has greatly benefited the criminal justice system.

State of Maharashtra v. Praful B. Desai (2003)¹³, the Supreme Court highlighted the importance of fingerprint evidence in criminal cases, stating that it was a valuable tool for identifying suspects and linking them to specific criminal activities. The court also emphasized the need for proper fingerprint analysis techniques to ensure that the evidence was reliable.¹⁴

Widespread technologies used during forensic investigation-

Forensic evidence in India uses many technologies including:

Genetic fingerprinting: Genetic fingerprinting, also known as DNA fingerprinting or DNA profiling is a lab technique that indicates the DNA identity of an individual. It has found extensive application in the following fields: and Juridical Sciences

Forensic: DNA fingerprinting compares DNA samples from suspects to some evidence related to the commission of a particular offense, indicating if the suspect actually committed it.

To confirm paternity: DNA fingerprinting has been proven helpful in establishing paternity.

Immigration: DNA fingerprinting can prove immigration eligibility.

Genealogy and medical research: DNA fingerprinting is done in these fields to advance.

Animal and plant populations: DNA fingerprinting is used to study populations of animals and plants. Gently extracts DNA from a sample that can be of blood, hair, skin cells etc

¹³ AIR 2003 SUPREME COURT 2053.

¹⁴ ROLE OF FORENSIC IN THE INDIAN CRIMINAL JUSTICE SYSTEM , 19/07/2023 know your law By jiten <https://lawwiser.com/videos/role-of-forensic-in-the-indian-criminal-justice-system/>, Avani Shukla of LawWiser

Fingerprint analysis: This is the oldest and most reliable form of forensic evidence.

Ballistic Fingerprint analysis is defined as the process of making an identification through a comparison between an unidentified fingerprint found at the crime scene and a known fingerprint. It is, in a way, a kind of biometrics that traces human identification based on physical characteristics.

How does it work

A trained evaluator compares shapes, patterns and the number of ridges and furrows in the fingerprints. They make use of a loupe magnifying the print, and a ridge counter to count the ridges.

How accurate it is

Fingerprints are unique to every person, even identical twins. Fingerprints cannot be altered unless destroyed or intentionally altered.

How it's applied

Experts match individuals to an object or crime using fingerprint analysis.

Who does it

Law enforcement agencies and crime labs usually do it, but sometimes private companies get involved evidence: This is used to determine whether or not firearms were utilized in a crime.

Digital forensics: Recovered and investigated material from digital devices are becoming highly important in the new age of cybercrime.

DIGITAL FORENSIC LEGAL SPACE

Digital forensics is a branch of forensic science, that focuses on identifying, acquiring, processing, analysing, and reporting on data stored electronically.

Digital forensics, also known as digital forensic science, has a connection to browsing and investigating data or materials in digital technology and retrieving data from digital context, involving computers, smartphones, supplementary or remote storage, unmanned aerial systems, etc.

Its fundamental function for the legal system in particular in criminal investigations: Evidence collection.

Evidence presentation- Digital forensic specialists will also process and present the evidence in actionable intelligence for attorneys and special investigators.

Evidence admissibility- Digital forensics specialists will utilize sound forensic science to be sure evidence is admissible in court, including clear and true chain of custody forms.

Incident response- Digital forensics aids in the incident response stage in mitigating diagnosis and eliminating cyber threats.

Electronic discovery- In civil cases, digital forensic specialists can assist with e-discovery by analyzing the digital or electronic trails created from unauthorized network intrusion.

Digital forensics is a critical asset in law enforcement investigations as most criminal acts involve electronic evidence. Digital forensics experts must also consider technological advancements such as cloud technology and necessary adjustments moving forward to survive.

Toxicology: Examines bodily fluids to detect poisons and other substances.

Toxicology is a science branch concerned with substances and situations, which might prove harmful to living organisms, such as humans, animals, as well as the environment in which they dwell. It is an interdisciplinary science since it draws upon biology, chemistry, pharmacology, and medicine.

Toxicology impacts public health because it determines which substances can be used in medicine, construction, and air or water quality control. The measurement and analysis by a toxicologist would help determine the level of threat such substances can pose to humans and public exposure to danger, often unknown.

Toxicology falls into many categories, including:

Forensic Toxicology: the application of toxicology to legal matters for the assistance of courts in judgment.

Clinical Toxicology: A specialist subdivision of medical toxicology

As such, toxicology is an esteemed science, which happens to be one of the oldest disciplines. As early humans would have to learn which plants were safe enough to consume, and which should be altogether avoided

Legal framework for forensic evidence in India-

- **Legal acceptability of forensic evidence through these sections-**

Indian Evidence Act, 1872	The Bharatiya Sakshya Adhiniyam, 2023 (BSA), will be enforced from 1st June, 2024.
Sec 45 & 46	Sec 39 &40
<p>‘Expert’s opinion’-</p> <ul style="list-style-type: none"> • The court will consider the input of the experts as it deems necessary. • The court relies on the report submitted by the experts, which has undergone all necessary procedures, ensuring its reliability. • The legal significance of electronic evidence as evaluated by expert opinion in court. • The expert's opinion will be given priority over the court's perspective. 	

The Code Of Criminal Procedure, 1973	the Bharatiya Nagarik Suraksha Sanhita, 2023 (BNSS)
Section 176(3)	Section 176(3)
Both acts allows for the acceptance of forensic evidence collected by investigating officers from crime scenes and observed by forensic experts for offences carrying a sentence of 7 years or more.	
Section 311A	Section 349

Both empower first-class Magistrates to order sample collection for investigations, with BNSS offering a broader scope, including finger impressions and voice samples. Notably, BNSS allows sample collection without prior arrest, providing more flexibility in comparison to CrPC 311A.¹⁵

Section 293

Section 330

Both of these sections determine the authenticity of the forensic evidence, indicating it should be accepted or denied, along with the procedure of presenting it to the court.

However, BNSS 2023 introduces the element of a time limit for admission or denial, along with the provision regarding expert reports.¹⁶

CONSTITUTIONAL VALIDITY

Article 20(3) of the Indian Constitution is about self-incrimination. It is based on the legal maxim '**nemo tenetur prodere accusare seipsum**' which means that no man is bound to accuse himself.¹⁷ The dilemma of whether using one's unconsented fingerprint and DNA analysis for the verifications can disclose the accused to the prosecution will ultimately attack the provisions of Art 20(3), which can be proportionate as the accused or the suspected one giving evidence against himself, this dilemma was overwhelmed by the SC judgement **State of Bombay v. Kathi Kalu Oghad and Anr.**¹⁸ which summarizes that compelling any person against his will to give his biometrical evidence such as DNA, fingerprints, or skin cells shall not violate Article 20(3).

In the case of **Selvi vs. the State of Karnataka**¹⁹, the Supreme Court ruled that compulsory administration of forensic techniques such as polygraphy, was unconstitutional if conducted without the accused's permission, as it violates Articles 20(3) and 21 of the Indian Constitution.²⁰

¹⁵ Forensic, BPR&D, <https://bprd.nic.in/uploads/pdf/202401261016313612262Forensic.pdf>.

¹⁶ Ibid

¹⁷ Validity Of Forensic Evidence In India, By Srishti yadav <https://www.legalserviceindia.com/legal/article-6539-validity-of-forensic-evidence-in-india.html#:~:text=Constitution%20and%20scientific%20evidence%3A&text=The%20Constitution%20doesn't%20permit,at%20present%20or%20in%20future.>

¹⁸ 1961 AIR 1808

¹⁹ 2010 (7) SCC 263.

²⁰ Law of Forensic Evidence in India and Abroad: A Comparative Study, Ridita Dey Show.

JUDICIARY LOOKOUT

Some of the famous judgements where forensic evidences were taken as a basis are as follows-

1 State of Himachal Pradesh vs Jai Lal & others, 1999²¹.

In this case court held that the expert shall not be considered a “witness of facts”, only persuasive in the view of scientific analysis which will assist the court to come in a conclusion of the case and eventually pass the independent judgement on the basis of the scientifically proved observations held by the experts drawn through their methodical conclusion.

This case has defined the credibility of the experts in India, “the credibility of the expert depends on the reasons stated in their reports and the material which forms the basis of their conclusions”. As the Horticulture Officer had not conducted any research in assessing the productivity of apple trees in Himachal Pradesh, the Court held that he did not qualify as an expert under section 45 of the Indian Evidence Act, 1872.²²

1. Rajendra Prahladrao Wasnik v. State of Maharashtra (DNA)²³

In this important judgement, the supreme court of India underscored the necessity of conducting the medical examination followed by the DNA examination of an accused, who has committed rape as well as the victim. The court elucidated that the prosecution case can only be sustained through DNA profiling, it was held that if DNA profiling has not been done in a case or is refrained by the lower court, all the adverse outcomes would be borne by the prosecution.

2. Kanjhawala case (Anjali hit & run case)-

This matter involves the tragic and fatal death of the victim and illuminates the importance of forensic evidence in the criminal justice system of India.

In this instance, forensic experts examined and analysed the evidence of this case through DNA analysis, fingerprints, and other scientific means. This was valuable in establishing a pointed timeline, and "connection with the suspects" etc. for the case to ensure justice.

²¹ AIR 1999 SUPREME COURT 3318

²² Project 39A, forensic landmark judgements, Standard for expert evidence in India, Author: D.P. Mohapatra, J., NLU Delhi, <https://www.project39a.com/forensics-landmark-judgments>

²³ 2019 (12) SCC 460

It is worth mentioning that thorough and systematic collection and analysis of forensic evidence could determine a judgment for the case. Justice should be determined by established or far-accepted evidence and not presumed situations.

3. Shraddha Walker case²⁴

In the Shraddha Murder case, forensic evidence contributed significantly to the reconstruction of the crime. The use of biological samples of blood, DNA matching, brain-mapping, and lie-detector tests facilitated the gathering of a meaningful and detailed account of the sequence of events with respect to the crime and the suspects. As stated by the Indian Evidence Act, circumstantial evidence has a solid standing in conjunction with the act of bravery in identifying a convict's culpability. This detail further highlights the fact that forensic measures are a crucial step to obtain justice in circumstances that otherwise rely on witness accounts.

4. Paschim Vihar shoe factory fire case²⁵

Forensic evidence is highly valuable in the examination of incidents like the Paschim Vihar shoe factory fire. It assists in determining the cause of the fire, possible negligence or deliberate intent, and assists in bringing reliable testimony in a court of law. The role of forensic evidence is becoming increasingly important in India, as it is useful in obtaining convictions and maintaining the interests of justice in complicated cases, further complicated by the loss of human life and damage to property.

5. State of Madhya Pradesh v. Sitaram Gajraj Singh Rajput and others, 1978²⁶

The Importance of Forensic Evidence for Criminal Trials for 1978 (State of Madhya Pradesh v. Sitaram Gajraj Singh Rajput and others) pronounced the fundamental importance of forensic evidence to criminal trials in India. The Supreme Court stated that forensic evidence can establish firm fact-based evidence of the prosecution's case through relevant scientific testing. The decision also emphasized that forensic evidence should be need-based, relevant, and sufficiently strong to connect the accused with the crime charged. This case reflects the need for fact-based, corroborative forensic evidence to prove the guilt of the accused.

²⁴ 2024 LiveLaw (Del) 309

²⁵ 2023 LiveLaw (Del) 1

²⁶ 1978 MPLJ 197

6. Virendra Khanna vs state of Karnataka, 2021 ²⁷

The significance of the case, Virendra Khanna v. State of Karnataka (2021), lies in its reaffirmation of the legal position concerning the use of forensic evidence in India, specifically indicating the use of polygraph tests. The Supreme Court, in this decision, pointed out that silence in response to the suggestion of a polygraph test being administered does not constitute 'consent' by the accused. This upholds the principles of personal liberty and the right against self-incrimination. This case presents an emphasis on the requirement of specific consent for any form of an examination, as well as the requisite judicial examination for admissibility as forensic evidence before the court processes.

Legal setbacks and regulatory barriers-

- **Underdeveloped and lacks resources-**
- **Lack of awareness-**
- **Insincerity**
- **Non-binding to the courts**
- **Protocols and procures that are not maintainable.**
- **Human errors**

CONCLUSION

In the case of Dharam Dev Yadav v/s State of Uttar Pradesh, the Supreme Court acknowledged the importance of forensic evidence in solving complicated cases. However, in the current case scenario Forensic science in crisis- India lacks the forensic science discipline as there is a lack of information or research being conducted in this field. This deficit of knowledge has an impact on the forensic reports and the public also loses confidence in the crime investigation report.

Obligatory training required- Obligatory training must be provided to investigating officers, public prosecutors, and judges.

²⁷ AIRONLINE 2021 KAR 525

Homogenous technology required- There should be homogenous technology and expertise in different testing forensic laboratories in India.

There should be a requirement of a standard of scientificity- Indian Courts must define the term "science" as mentioned in Section 45 of the IEA. This definition must clearly differentiate between the scientific and non-scientific methodologies.

Forensic evidence is more valuable than general evidence- Forensic evidence is more valuable than the general evidence, which is produced in the court.

Forensic science is greatly essential in the criminal justice system, owing to the provision of scientifically-based information developed from circumstantial evidence.

