



LAWFOYER INTERNATIONAL JOURNAL OF DOCTRINAL LEGAL RESEARCH

[ISSN: 2583-7753]

Volume 4 | Issue 3

2026

DOI: <https://doi.org/10.70183/lijdlr.2026.v04.301>

© 2026 LawFoyer International Journal of Doctrinal Legal Research

Follow this and additional research works at: www.lijdlr.com

Under the Platform of LawFoyer – www.lawfoyer.in

After careful consideration, the editorial board of LawFoyer International Journal of Doctrinal Legal Research has decided to publish this submission as part of the publication.

In case of any suggestions or complaints, kindly contact (info.lijdlr@gmail.com)

To submit your Manuscript for Publication in the LawFoyer International Journal of Doctrinal Legal Research, To submit your Manuscript [Click here](#)

ROLE OF FORENSIC SCIENCE IN CRIMINAL INVESTIGATION IN INDIA

Priya Anand¹

I. ABSTRACT

The word forensic means the connection to the law and courts as it is connected with several branches which help to find suspects and accused persons related to crime. Forensic science not only control the crime but completely provide support in criminal investigation to provide the fair justice in Indian legal system, the forensic science has been used from decades that is from colonial period of British, but it still required implementation as it faces so many problems. The bharatiya sakshya adhiniyam, 2023 and bharatiya nagrik suraksha sanhita, 2023 studies the admissibility and legal use of evidence, the code explains the few of the important forensic methods like dna profiling or testing, comparison of fingerprints, cyber cell, toxicology, ballistic, and digital data and they are supposing to solve the crime case. The studies evaluate not only benefits but the problems faced by forensic science laboratories in all over India that call upon lack of infrastructure, delay in justice, less trained and experienced experts, and the gaps between the procedures. The courts are completely reliable on the forensic science evidence while sessions or trials are happening. India required better forensic laboratories, uniform procedure for forensic investigation, special training organized for lawyers and judges to understand the forensic methods and procedure, and their strongest judicial system reforms to improve the Indian legal system.

II. KEYWORDS

Forensic Science; Bharatiya Sakshya Adhiniyam, 2023; Bharatiya Nagarik Suraksha Sanhita, 2023; Criminal Investigation; DNA Evidence.

¹ B.A.LL.B (H)/2026/7th semester/ Amity law school/ Amity University, Patna (India).Email: pa400975@gmail.com

III. INTRODUCTION AND RESEARCH PROBLEM

Forensic science and law together have brought an important change in the delivery of justice by enabling courts and investigating agencies to rely on scientific evidence in determining facts. Forensic science assists the judicial system by helping judges and police officers reach conclusions on the basis of material that can be scientifically examined, rather than merely on assumptions, memory, or suspicion. Science and law work together for the benefit of society: science helps to establish facts, while law uses those facts to determine guilt or innocence. Usually, forensic science involves three stages: collection of material such as blood samples, hair, nails, clothing, electronic devices, and weapons; examination of such material in a forensic science laboratory; and reporting of forensic findings before the court.

The research problem arises from the gap between the promise of forensic science and its practical use in criminal investigation in India. Law requires reliable evidence that can be properly examined, but eyewitnesses may forget, become confused, or give false statements, and confessions may also be unreliable in certain circumstances. In this context, forensic science can assist investigation, save time, and reduce uncertainty. However, its effectiveness is often affected by lack of infrastructure, delay in forensic reports, shortage of trained experts, improper preservation of evidence, and absence of uniform procedures. Although the Government of India has established Central Forensic Science Laboratories and other specialised forensic institutions, practical shortcomings continue to affect the use of forensic methods such as toxicology, cyber forensics, DNA examination, and ballistics.

Earlier, the Code of Criminal Procedure, 1973 governed criminal investigation, but it has now been replaced by the Bharatiya Nagarik Suraksha Sanhita, 2023. Similarly, the Indian Evidence Act, 1872 has been replaced by the Bharatiya Sakshya Adhiniyam, 2023. Forensic science therefore remains an important part of modern criminal investigation, particularly where scientific examination is necessary to establish or test facts. This paper examines whether the present legal and institutional framework is sufficient to ensure

the effective, timely, and reliable use of forensic science in the Indian criminal justice system.

A. Research Objectives

1. To examine the role of forensic science in criminal investigation in India.
2. To examine the relevant provisions of the Bharatiya Sakshya Adhiniyam, 2023 and the Bharatiya Nagarik Suraksha Sanhita, 2023.
3. To identify the major practical and legal challenges faced by forensic science and suggest suitable improvements.

B. Research Questions

1. How does forensic science assist criminal investigation and the administration of justice in India?
2. What are the relevant legal provisions governing forensic evidence under the BSA, 2023 and BNSS, 2023?
3. What are the major challenges affecting the effective use of forensic science in India?

C. Research Methodology

This paper follows a doctrinal and library-based research methodology. It relies on statutory provisions, judicial decisions, and secondary literature relating to forensic science and criminal investigation in India. No empirical or field study has been undertaken.

Forensic science and law together have brought an important change in the delivery of justice. Forensic science assists the judicial system by helping judges and police officers reach conclusions on the basis of scientific evidence. Science and law work together for the benefit of society, where science helps to establish facts and law uses those facts to determine guilt or innocence. Usually, forensic science follows three stages: collection, where scientists collect blood samples, hair, nails, pieces of clothing, electronic devices, and weapons; examination, where the samples are analysed in a forensic science

laboratory; and reporting, where the forensic findings are presented before the court. Law does not rely on emotions or guesses; it requires evidence that can be properly examined. Eyewitnesses may forget, become confused, or give false statements, and confessions may also be unreliable in some circumstances. In this context, forensic science can assist investigation, save time, and reduce uncertainty.

The Government of India has established Central Forensic Science Laboratories and other specialised forensic institutions. Forensic science is multidisciplinary and includes areas such as toxicology, cyber forensics, DNA examination, and ballistics. Earlier, the Code of Criminal Procedure, 1973 governed criminal investigation, but it has now been replaced by the Bharatiya Nagarik Suraksha Sanhita, 2023 (BNSS). Similarly, the Indian Evidence Act, 1872 has been replaced by the Bharatiya Sakshya Adhiniyam, 2023 (BSA). Forensic science therefore remains an important part of modern criminal investigation, particularly where scientific examination is necessary to establish or test facts.

IV. FORENSIC SCIENCE UNDER INDIAN LEGAL SYSTEM

The first Chemical Examiner's Laboratory at Madras (now Chennai) was established in 1849 during the colonial period. It dealt with suspicious substances, toxicology, and chemical examination. A dedicated State Forensic Science Laboratory was later established at Calcutta in 1952. This marked an important development in the use of scientific methods in criminal investigation in India.

Scientific facts are being proven through the experiments done in forensic science laboratory of blood stain, DNA, and fingerprinting comparison, which means they not guessed but they are scientifically proven. Humanly observations and memories can be false because they forget, confuse or they might be lying, but there are accurate fingerprints are available, forensics examination are use because human evidence are not completely trust worth or reliable, as law itself suggest that persons might be under the fear, stress give the false statement, may have poor memory, or might find wrong identity. In offences involving serious bodily harm, homicide, sexual violence, or use of firearms, forensic science becomes important for the examination of bodily material,

clothing, weapons, cartridges, bullets, bloodstains, fingerprints, and other physical or biological evidence.

Ballistic examination is particularly relevant where firearms, bullets, or cartridge cases are recovered, as it may assist in determining whether a particular weapon was used, the direction of firing, the approximate distance of firing, and the number of shots fired. However, this process should not be linked to Section 101 of the Bharatiya Sakshya Adhiniyam, 2023, because that provision concerns evidence as to the meaning of illegible characters, foreign, obsolete, technical, local, and regional expressions, abbreviations, and words used in a peculiar sense.

The appropriate evidentiary basis for ballistic or other scientific opinion is Section 39 of the Bharatiya Sakshya Adhiniyam, 2023, which deals with expert opinion, read with Section 329 of the Bharatiya Nagarik Suraksha Sanhita, 2023, which permits reports of certain Government scientific experts to be used as evidence in inquiry, trial, or other proceedings.

V. ANALYSIS OF CRIME SCENE

Crime scene analysis is the systematic study of the place where an offence has occurred in order to identify, collect, preserve, and interpret relevant physical and digital evidence. The crime scene is often the first point at which scientific investigation begins, and any mistake at this stage may affect the reliability of the entire case. Forensic experts examine the scene for material such as bloodstains, fingerprints, hair, fibres, weapons, cartridge cases, broken glass, soil, clothing, documents, electronic devices, and other trace evidence. Photographs, videography, sketches, notes, and proper documentation are necessary to record the original condition of the scene before evidence is moved or disturbed.

The collection of evidence must be carried out through a proper chain of custody. Each article should be sealed, labelled, packed separately, and documented so that it can later be shown that the material produced before the court is the same material recovered from the crime scene. Improper handling may lead to contamination, loss of evidentiary value,

or challenge before the court. In offences involving violence, the position of the body, blood patterns, injury marks, fingerprints, weapon marks, and surrounding objects may assist in reconstructing the sequence of events. In cases involving digital communication, devices such as mobile phones, laptops, CCTV systems, storage media, emails, and social media accounts may also become part of the crime scene and require careful preservation. Crime scene analysis therefore connects investigation with legal proof. DNA comparison, toxicology, fingerprint analysis, ballistics, cyber forensics, and other scientific techniques help investigators test whether a suspect, victim, weapon, or object is connected with the offence. However, forensic science is not useful merely because evidence is collected; it becomes useful only when collection, preservation, examination, and reporting are carried out in a reliable and legally acceptable manner.

A. Examination of Evidence

The examination of evidence is the laboratory and expert-based process through which material collected during investigation is scientifically tested. Fingerprint examination remains one of the most common forensic methods because fingerprints are generally unique to each individual. Latent fingerprints recovered from weapons, doors, glass, documents, vehicles, or other surfaces may be compared with the fingerprints of suspects. Such comparison can help establish whether a person was present at or connected with the crime scene, although the result must still be assessed along with other evidence.

Digital forensic examination has become increasingly important because many offences now involve mobile phones, laptops, CCTV footage, emails, online transactions, social media accounts, internet history, deleted messages, call records, and location data. Digital evidence must be carefully extracted and preserved because it can be altered, deleted, or manipulated. Cyber forensic experts may assist investigators by recovering deleted files, identifying communication patterns, tracing online activity, and preserving electronic records in a form that can be presented before the court.

Ballistic examination is relevant in firearm-related offences. When a firearm is discharged, it may leave distinctive marks on bullets and cartridge cases. Experts may compare these marks with a suspected firearm to determine whether a particular weapon was used. Ballistics may also help in understanding the direction of firing, approximate distance, number of shots, and the manner in which the weapon may have been used. Similarly, toxicology assists in cases involving poisoning, intoxication, drugs, alcohol, or suspicious death by examining blood, viscera, urine, or other biological material.

Forensic anthropology and medical examination are important where the body is decomposed, burnt, mutilated, or otherwise difficult to identify. Examination of bones and human remains may assist in determining age, sex, stature, identity, injuries, and possible cause of death. DNA profiling may also help in identifying unknown bodies, establishing biological relationships, or connecting biological material with a victim or accused. These methods show that forensic evidence is not limited to one branch of science; rather, it is a multidisciplinary tool that assists investigation and adjudication.

However, the value of forensic examination depends on the quality of samples, proper documentation, expert competence, and reliable methodology. If evidence is contaminated, delayed, wrongly labelled, or examined without proper scientific standards, its evidentiary value may be weakened. Therefore, the court must consider forensic reports with due attention to the method adopted, the expert's qualification, the chain of custody, and the consistency of the report with other evidence in the case.

B. Forensic Science Governing Indian Law

The use of forensic science in criminal investigation in India law is governed by *bharatiya sakshya adhiniyam, 2023 (bsa)* and *bharatiya nagrik suraksha sanhita, 2023 (bnss)*, there are legal basis means legally supported and foundation is being provided by law, these are several applications of forensic science, where uses with help of scientific method like cyber cell analysis of fingerprinting for cases of crime. Criminal investigation and trial of court are conducted by the police and judges' criminals. The laws explain the how legal evidences should be collected, tested, and reported before the court and it's up to court whether they approve or reject the evidence. There should be proper heading and

scientific proof mentioned and it's up to the court whether allows the evidence to be utilized during the trial session, though judges and lawyer use the forensic science reports and opinion of experts to give the decision in the court. Scientific evidence is the important part of the criminal investigation and Indian judicial system for the cases to be decided in favor of justice. The scientific proofs help in providing fair judgment and for solving the criminal cases. Where legislative provides support by legal system but the bill is passed by parliament, where they face obstacle from opposition. But forensic science method is completely truth worthy for criminal cases. The problems automatically get reduces by the help of forensic methods which ensures fairness and justice for the judgments.

VI. THE BHARATIYA SAKSHYA ADHINIYAM, 2023

The newly introduced Bharatiya Sakshya Adhiniyam, 2023 is relevant to the law of evidence and explains how evidence should be used and presented before the court. Forensic science plays a crucial role by scientifically examining evidence. Section 39 of the BSA, 2023 deals with expert opinion and allows the court to consider expert opinion on scientific or technical matters.² Usually, such examination may involve DNA profiling, ballistics, anthropology or pathology, and toxicology.

Section 40 deals with facts bearing upon opinions of experts; it is not a general provision dealing with physical objects.³ Section 41 deals with opinion as to handwriting and signature and therefore applies when the court requires expert comparison of handwriting or signatures.⁴ The relevance and reliability of the evidence, together with proper preservation and chain of custody, are important when forensic material is presented before the court. The judge ultimately has to assess the scientific validity of the result, the qualifications of the expert, and the procedure followed during examination.

² The Bharatiya Sakshya Adhiniyam, No. 47 of 2023, § 39, *India Code* (2023).

³ The Bharatiya Sakshya Adhiniyam, No. 47 of 2023, § 40, *India Code* (2023)

⁴ The Bharatiya Sakshya Adhiniyam, No. 47 of 2023, § 41, *India Code* (2023)

VII. BHARATIYA NAGARIK SURAKSHA SANHITA, 2023

The Bharatiya Nagarik Suraksha Sanhita, 2023 (BNSS) replaced the Code of Criminal Procedure, 1973.⁵ It provides the procedural framework for criminal investigation, including the collection and examination of evidence. Evidence collected during investigation should be properly preserved, sealed, labelled, and documented before it is sent for examination or produced before the court. Section 51 deals with the medical examination of an accused person and permits the collection of relevant bodily material in accordance with the law ⁶ . Section 329 provides for the use of reports of specified Government scientific experts as evidence and also permits the court to summon and examine the expert where necessary.⁷ This procedure can help reduce unnecessary delay while preserving the court's power to seek clarification and examine the reliability of the scientific report.

Section 180 of the BNSS concerns the examination of witnesses by the police during investigation⁸. Police officers and forensic experts must work together to preserve the integrity of evidence so that material is not misplaced, destroyed, or tampered with. Scientific evaluation can be complex because it often requires specialised knowledge and advanced technology, particularly in relation to electronic devices and digital data such as social media, mobile phones, laptops, CCTV footage, and emails. Medical examiners may also examine a dead body and prepare a post-mortem report recording the cause of death, time of death, and injuries, where applicable.

VIII. CHALLENGES FACED BY FORENSIC SCIENCE

Forensic science assists police officers and courts in cases involving murder, sexual offences, cybercrime, terrorism, poisoning, firearm use, and suspicious death. However, its effective use in India is affected by several institutional and procedural challenges. The first major challenge is inadequate forensic infrastructure. Although India has Central

⁵ The Bharatiya Nagarik Suraksha Sanhita, No. 46 of 2023, *India Code* (2023).

⁶ The Bharatiya Nagarik Suraksha Sanhita, No. 46 of 2023, § 51, *India Code* (2023).

⁷ The Bharatiya Nagarik Suraksha Sanhita, No. 46 of 2023, § 329, *India Code* (2023)

⁸ The Bharatiya Nagarik Suraksha Sanhita, No. 46 of 2023, § 180, *India Code* (2023)

Forensic Science Laboratories, State Forensic Science Laboratories, and Regional Forensic Science Laboratories, the demand for scientific examination has increased substantially because of the growing use of DNA evidence, cyber forensics, toxicology, ballistics, and digital evidence. A Parliamentary Committee report records that there are seven Central Forensic Science Laboratories, 32 State FSLs, and 97 Regional FSLs across States and Union Territories, while DNA facilities in 30 State FSLs and cyber forensic facilities in 13 State FSLs have been enhanced. This shows progress, but also indicates the scale of dependence on forensic institutions across the country.

The second challenge is delay in forensic reports. Delay may occur because laboratories receive large numbers of exhibits, lack sufficient scientific staff, or do not have adequate modern equipment. Such delay can weaken investigation, postpone trial, and affect the rights of both the accused and the victim. The Ministry of Home Affairs has recognised the need to strengthen forensic capacity through the National Forensic Infrastructure Enhancement Scheme, approved in 2024 with a financial outlay of ₹2254.43 crore for the period 2024–25 to 2028–29. The Government has also approved new Central Forensic Science Laboratories and has referred to steps for filling vacancies and engaging forensic experts on a contractual basis.

The third challenge is shortage of trained forensic professionals and insufficient training of investigating officers. Evidence may lose its value if it is not collected, sealed, labelled, transported, or preserved properly. In rural and semi-urban areas, police officers may not always have immediate access to forensic experts or modern forensic tools. Poor coordination between police officers, forensic laboratories, medical officers, prosecutors, and courts can also weaken the prosecution case. Independent policy analysis has identified capacity building, technological upgradation, trained manpower, and quality assurance as key challenges faced by forensic science laboratories.

The fourth challenge concerns standardisation and reliability. India requires uniform procedures for crime scene management, collection of biological samples, digital evidence preservation, ballistic examination, toxicology testing, report writing, and court presentation. If scientific procedures vary widely across laboratories, the credibility of

forensic reports may be questioned. Courts must therefore examine whether the expert followed accepted scientific methods, whether the report is supported by reasons, and whether the evidence has been protected from tampering or contamination.

The fifth challenge relates to privacy and constitutional safeguards. DNA profiling, biometric data, medical examination, and digital forensic investigation may involve sensitive personal information. Therefore, scientific investigation must be balanced with constitutional protections, including personal liberty, privacy, and protection against compelled self-incrimination. Forensic science should strengthen justice, but it should not be used in a manner that violates legal safeguards.

IX. CASE LAWS

1. **State of Uttar Pradesh v. Ram Babu Misra, AIR 1980 SC 791:** The Supreme Court considered the legal limits relating to specimen handwriting and comparison under the Indian Evidence Act, 1872. The case is relevant because handwriting examination is one of the recognised areas of forensic and expert evidence. However, the judgment should be used carefully. It does not mean that every accused person can be compelled in every situation without following legal procedure. Its relevance lies in showing that scientific comparison must be supported by lawful collection of specimens and proper judicial control.
2. **State of Himachal Pradesh v. Jai Lal, (1999) 7 SCC 280:** This case explains the nature of expert evidence.⁹ The Supreme Court observed that expert opinion is relevant because the expert possesses specialised knowledge, skill, experience, training, or education. At the same time, the court is not bound to accept expert opinion mechanically. The court must examine the reasons, methodology, and factual basis of the opinion. This principle is especially important for forensic evidence because a scientific report may influence the outcome of a criminal trial, but it must still be tested for reliability.

⁹ State of Himachal Pradesh v. Jai Lal, (1999) 7 S.C.C. 280 (India)

3. **Jalpat Rai v. State of Haryana, (2011) 14 SCC 208:** This case illustrates the role of ballistic examination in firearm-related offences. Where firearms, bullets, or cartridge cases are recovered, ballistic comparison may help determine whether a particular firearm was used. Such evidence may assist in connecting the weapon with the offence and in understanding the circumstances of firing. However, ballistic evidence must be considered along with other evidence, including recovery, witness testimony, medical evidence, and the chain of custody of the firearm and cartridges.¹⁰
4. **State of Uttar Pradesh v. Rajesh Gautam, (2003) 3 SCC 633:** This case is relevant to the use of DNA evidence in criminal investigation. DNA analysis can strongly assist the court in identifying persons, linking biological material with a victim or accused, and testing disputed facts. However, DNA evidence must be collected, preserved, and examined with strict care because contamination or procedural lapses may affect reliability. The case supports the broader proposition that scientific evidence is valuable in criminal adjudication, but it should be assessed with other circumstances and not treated as automatically conclusive.¹¹

X. SUGGESTIONS AND RECOMMENDATIONS

1. Forensic laboratories should be provided with adequate funds, modern equipment, and sufficient trained personnel.
2. Uniform procedures should be developed for the collection, sealing, labelling, transportation, preservation, and examination of forensic evidence.
3. Regular practical training should be provided to police officers, forensic experts, lawyers, and judges so that scientific evidence can be properly collected and understood.
4. Greater attention should be given to reducing delays in forensic reports so that investigations and trials are not unnecessarily prolonged.

¹⁰ Jalpat Rai v. State of Haryana, (2011) 14 S.C.C. 208 (India)

¹¹ State of Uttar Pradesh v. Rajesh Gautam, (2003) 3 S.C.C. 633 (India).

5. Appropriate safeguards should be adopted for DNA, biometric, and digital forensic information, keeping in view privacy and other constitutional protections.

XI. CONCLUSION

Forensic science plays an important role in criminal investigation in India. The Bharatiya Sakshya Adhiniyam, 2023 and the Bharatiya Nagarik Suraksha Sanhita, 2023 provide the legal framework within which scientific evidence is considered and forensic investigation is conducted. Methods such as anthropology, ballistics, DNA profiling, and toxicology can assist investigators and courts in understanding the facts of a case. However, the effectiveness of forensic science depends on proper collection, preservation, examination, and presentation of evidence. Shortages of infrastructure, trained personnel, and timely laboratory services continue to affect the use of forensic evidence.

Forensic science should therefore be used as a reliable aid to investigation and adjudication, rather than being treated as automatically conclusive. Courts must examine the scientific basis of a forensic opinion and consider its reliability along with the other evidence. Improved infrastructure, professional training, uniform procedures, and proper safeguards for forensic and personal data are necessary to strengthen the role of forensic science in the Indian criminal justice system.

XII. BIBLIOGRAPHY

1. *The Bharatiya Sakshya Adhiniyam*, No. 47 of 2023, India Code (2023).
2. *The Bharatiya Nagarik Suraksha Sanhita*, No. 46 of 2023, India Code (2023).
3. *Selvi v. State of Karnataka*, (2010) 7 S.C.C. 263 (India).
4. *State of Uttar Pradesh v. Ram Babu Misra*, A.I.R. 1980 S.C. 791 (India).
5. *State of Himachal Pradesh v. Jai Lal*, (1999) 7 S.C.C. 280 (India).
6. *Jalpat Rai v. State of Haryana*, (2011) 14 S.C.C. 208 (India).
7. *State of Uttar Pradesh v. Rajesh Gautam*, (2003) 3 S.C.C. 633 (India).
8. *Selvi*, supra note

9. *Jai Lal*, supra note

10. *The Bharatiya Sakshya Adhiniyam*, supra note 1, § 39.