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Chain of Custody of Forensic Evidence in Criminal Investigation: Legal and Practical Challenges in India

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Chain of Custody (CoC) is a fundamental aspect of any criminal investigation that details the collection, preservation, handling, and documentation of evidence from the crime scene to the courtroom. This paper aims to elaborate on the chain of custody involved with forensic evidence across India, with a special focus on the use of DNA and biological samples, fingerprint evidence, weapons, and other scientific evidence. It also sets out the legal framework and the role of investigating and forensic authorities, while also highlighting the risks in actual practice, such as contamination, poor sealing, delay in collection, failure to document, security and storage lapses, etc. This paper finally aims to highlight the importance of ensuring the integrity of evidence and to identify best practices for improving the handling of evidence in India.

Keywords: *chain of custody, forensic evidence, forensic science, evidence integrity, evidence preservation.*

INTRODUCTION

In any case, whether civil or criminal, the evidence that is validated and presented before the court has a part to play in the decision of the case. To keep the evidence in its best form, the term 'chain of custody' is brought to light. Chain of Custody, in layman's terms, means the order or

sequence of procedures that has to be followed by any evidence that is collected by the police in order to maintain its authenticity. It is the duty of the prosecutor to produce and establish the correct chain of custody in court. The defence, on the other hand, tries to find a flaw in the chain of custody.¹

A criminal investigation is a procedure by which the police gather, secure, and scrutinise evidence with the purpose of determining the facts about a criminal offence. It may consist of objects, biological samples, documents, weapons, electronic devices, images, forensic samples, and other items relating to the crime. Having said that, the process does not end when evidence is gathered; it is necessary to keep it safe, identifiable, and consistent from the moment it is collected to the moment it is presented in court.

Chain of custody is the process of maintaining and recording the handling of evidence from the time the evidence is first collected until its presentation as evidence in a legal proceeding. It provides a paper trail that shows the seizure, custody, control, transfer, analysis, and disposition of evidence. The chain of custody records who collected evidence, who has handled or transferred evidence, where evidence has been stored, when evidence was examined, and the state in which the evidence was maintained. The purpose of maintaining the chain of custody is to show that the evidence offered in court is the same as the evidence initially collected in the course of investigation.

The need for chain of custody has grown with the evolution of modern criminal investigation. Modern investigations rely not only on physical evidence, but also scientific and electronic evidence. Evidence such as DNA samples, bloodstains, weapons, fingerprints, mobile phones, CCTV footage, computer hard drives and other computer or electronic evidence can be of crucial importance in a criminal investigation. This evidence may also be vulnerable if not correctly handled, packaged, sealed, transported, stored, and recorded, and in relation to electronic evidence, issues such as preservation of original data, forensic imaging, access to electronic devices, and the integrity of digital evidence should also be considered.

The evidentiary landscape in India has evolved with the adoption of the Bharatiya Sakshya Adhiniyam, 2023 (the Bharatiya Evidence Act, 1872 has been repealed) and the Bharatiya

¹ Priyal Jain, 'Chain of custody' (*iPleaders*, 25 June 2022) <<https://blog.ipleaders.in/chain-of-custody/#Introduction>> accessed 12 August 2026

Nagarik Suraksha Sanhita, 2023 (the Code of Criminal Procedure, 1973 has been repealed) in India, which provides the current procedural scheme for crime investigation and proceedings. The need for scientific investigation and evidence collection and preservation has thus become pivotal to ensuring the veracity of evidence. Evidence can be reliable not only by virtue of its nature but also by virtue of the manner in which it is collected and preserved.

The six primary elements of the chain of custody are key to successful case filing, but it can be a complex process. The evidence can change many hands during an investigation, from the investigating officer to the forensic investigators to the lab team and others who are approved to hold the items. Errors with labelling and sealing, documenting, transportation, and storage can introduce doubts about the character and origin of the evidence.

But a break or unexplained break in the chain of custody would not always result in evidence being inadmissible in all cases. The court has to consider what the nature of the evidence was, what the nature of the irregularity alleged was, and the overall strength of the prosecution case. It would be safe to conclude that, in criminal trials, the chain of custody is likely to be linked directly with the authenticity, integrity, and probative value of the material used.

This research paper analyses the chain of custody of evidence in a criminal investigation in India, its legal importance and its different phases, the duties of the investigating and the forensic authorities, the practical challenges in maintaining a chain of custody, the handling of breaks/gaps in the chain of custody, and how the chain of custody lends strength to the evidence tendered before criminal courts. This paper examines the link between the crime scene and the courtroom, with the ultimate objective of ensuring the effective transmission of evidence through proper handling, preservation, and documentation.

UNDERSTANDING

The chain of custody is a legal doctrine that states that every transfer or movement of an object must be carefully documented, kept in chronological order, and maintained at all times. The chain of custody must include relevant information such as the individual's initials or name of

the collector, date of collection, all subsequent handlers, agency and case numbers, name of the victim or suspect, and a brief description of the object.²

The reason for documenting the chain of custody is crucial to protect the integrity and admissibility of evidence.² In providing a clear path of the evidence collection, transportation, and storage, the chain of custody guarantees: first, that the evidence seen by the court is the same thing retrieved from the scene of the crime; and second, that during each transfer the evidence has not been substantially altered. To prevent the prosecution from using contaminated evidence, the chain of custody safeguards against the admission of such evidence.

WHAT IS CHAIN OF CUSTODY?

Chain of custody is a legal phrase that consists of the sequential order in which the articles of proof are to be guarded for the successful investigation of the case. It is necessary to prove in court that the evidence is being handled through the proper chain of custody, so that the evidence can be accepted in a court of law. The chain of custody can inform who collected the evidence from the crime scene (or somewhere else), who handled it, who examined and transferred the evidence, and where the evidence was stored.

Evidence can move through a number of stages, and the evidence may be received by different people, such as when an investigating officer takes an item of evidence from the crime scene and gives it to another officer or a forensic laboratory for analysis. Evidence may be retained and will, in turn, be produced to court. Throughout all the stages, there should be good documentation that records: when the evidence was received, by whom, where it was stored, and when it was moved and for what. This provides a chain of evidence.³

All cases have a chain of custody, and it begins at the scene of the crime and ends when the evidence is produced before the court. Chain of custody exists to prevent tampering with the evidence and to make every step clear about the collection, holding, and storage of the evidence to prevent it from being manipulated by the police officers or others. The utmost care is needed to keep detailed records from the minute a piece of evidence is collected until its appearance

² *Ibid*

³ Anushka Jain, 'Securing the Links: A Framework for Chain of Custody in Indian Courts' (*SCC Online*, 30 November 2024) <<https://www.scconline.com/blog/post/2024/11/30/securing-the-links-a-framework-for-chain-of-custody-in-indian-courts/>> accessed 12 August 2026

before the court, as the moment any details are missed, the evidence instantly becomes questionable and unpresentable in court, which definitely will affect the court decision. If the chain of custody is broken, the evidence also does not serve the purpose of justice.

The evidence custodian or the persons in charge of the evidence should always keep in mind to whom the evidence belongs, when the evidence was collected, the period of custodianship, safekeeping, and how the evidence has been handed over from one custodian to another, so that, when the chain is broken, any evidence can be easily identified, pointing to the one who manipulated the evidence and can be identified after the court proceedings. The chain of custody safeguards the evidence and prevents any tampering of the evidence.

ABOUT THE FORENSIC INVESTIGATION

In India, blue-collar crimes like theft, robbery, breaking, assault, and arson are considered 'police cases'. But these crimes are all about how forensic science helps prove where and when a crime happened, connect physical evidence to the accused, check previous movements, and disprove alibis, using fingerprints, DNA, ballistics, and reconstruction. In the face of issues around infrastructure, resources, and capacity, forensic tools have, in the past, served as the deciding factor in Indian courts to bring justice in cold cases, sexual crimes, gang rapes, and even petty thefts.

The Bharatiya Nyaya Suraksha Sanhita, 2023 ('BNSS') orders a forensic expert at the scene of the crime to collect forensic evidence. The Court is also competent to direct collection of samples of signature or handwriting. Furthermore, a Government scientific expert is also allowed to present his report before a Court of Law in the absence of his oral testimony.

Legal Framework: Admissibility of Forensic Evidence: Sometimes, the person who performed the forensic examination also adduces evidence by defending his report on such evidence before the Court of Law. Indian Evidence Act, 1872 allows the use of the opinion of experts with particular special knowledge, such as foreign law, science, etc., concerning the inquired question of law relating to forensics. A similar provision is to be seen in the Bharatiya Sakshya Adhiniyam, 2023.

In criminal cases, forensic specialists are often asked to give their opinion on technical matters beyond the experience of judges and lawyers. For instance: Do the two fingerprints match? Does the DNA analysis of the suspect or victim match the evidence?

The experts draft a forensic report and submit the report before the court along with the evidence for the prosecution or defence. The expert should be present for cross-examination. The Supreme Court of India has laid down that an expert's opinion by itself cannot bring conviction but should be supported by evidence.

The defence of chain of custody of forensic evidence also holds significant place. The Hon'ble High Court of Punjab and Haryana has held, "The chain of custody of forensic evidence should be clean right from the time of collection of such evidence to examination of such evidence.

FORENSIC EVIDENCE AND THE COURTS: STRIKING THE BULLSEYE!

Sunil Sharma v State: In the famous Tandoor murder case, the victim's body could be identified with the help of blood-stained clothes and DNA profile. The conviction of the accused could be made purely based on forensic investigations, first of its kind in India.⁴

Vishal Yadav v State of UP: Only a charred piece of palm was left, but a DNA profile was used to establish individual identity, and the conviction was affirmed.⁵

Sister Abhaya (Kottayam, 1995): A nun's body was thrown into a well. Using polygraph, brain mapping, and narco-analysis, police booked two priests. The case thrust forensic experiments into a legal arena.⁶

Aarushi Talwar Case (2008): Double murder of a teenager and servants. Forensic lab comparisons, contamination, and inconsistencies in evidence collection and handling. The case involved narco-analysis, DNA analysis, blood analysis, and fingerprint analysis; all pointed towards an open-and-shut case, but in the end the Hon'ble High Court of Allahabad acquitted the parents of the children in 2017.⁷

⁴ *State v Sushil Sharma* (2006) 12 SCC 421

⁵ *Vishal Yadav v State of UP* (2012) 8 SCC 263

⁶ *Jomon Puthen Purackal and Anr v Union of India and Ors* (1997) CriLJ 828

⁷ Ku Sanghpushpa Bhatpahari et al., 'The Role & Admissibility of Forensic Evidence in the Indian Criminal Justice System' (2024) Presentation Paper

CATEGORIES OF FORENSIC SCIENCE

The Indian criminal justice system recognises a variety of forensic evidence types, each with its own set of investigative techniques and legal considerations.

Biological Evidence or Medical Forensics: WHAT IS BOD? Biological Evidence: Biological evidence (sometimes called BOD) is any sample of biological material (e.g. hair).

Any physical evidence such as tissue, bones, teeth, blood, semen, and saliva that will yield DNA. Profiling: Advancements and Applications. It is a common tool in forensic investigation because DNA profiling has become common, although it is worth noting that it has forensic applications. Degree of reliability. Improvements in the field of DNA, for instance, STR (Short Tandem Repeat) analysis and mitochondrial DNA profiling, are increasing the accuracy of.. Matching samples to persons. The DNA evidence is essential for comparison. The accused in connection with the crime was generally held to be admissible as evidence of the circumstances of the offence.

Blood Typing and Serological Analysis: Blood typing can be used to rule out suspects with a different blood type. At a crime scene. Serological investigation is the additional looking at the proteins and enzymes. Comprehensive genetic information is obtained from bodily fluids, which is more detailed than in... Definitive, as DNA profiling, but it can still be useful for investigative purposes. Biological evidence such as semen and hair samples may be crucial in sexual assault cases. This helps determine the identity of the offender and prove lack of consent.

Postmortem Reports: Autopsy reports, referred to as postmortem reports, are essential documents in Forensics. They give a comprehensive report on the results of an A.2. Reporting crime scene. Steps in B.3: Perform pest control using pesticides. C.3. Determine whether a pest control service needs to be called D.3. These examinations are important in So ascertaining the cause and manner of death as natural, so ascertaining the cause and manner of death as natural, the others.

Or deliberate, or accidental. An autopsy can detect a range of pathologies, some of which may not: accidental acts of violence, or accidental. Have made themselves known before passing. It is a post-mortem procedure, where a full examination of the body, contents, such as the And with toxicological testing among the contents, such as the.

Contents may include: in...with toxicological testing. within the contents, such as the...among the contents, such as the Continue reading including the internal organs, and may also include toxicological testing to identify by including the contents, such as the Contents may include: following, together with toxicological testing to within the contents, such as the including the content material, such because the Continue reading: including the contents, such because the. Including the internal organs, and will also include toxicological testing to distinguish. Any chemicals, medicines, or poisons that may be in the body. The results in autopsy Reports are important for establishing timelines in crime investigations.

PHYSICAL EVIDENCE

Physical evidence includes any material items that can be physically or chemically analysed.

Fingerprinting Methods and Efficacy: Probably the oldest forensic method is fingerprint analysis. India's fingerprint - the Henry Classification System- is a unique contribution in use worldwide.

Trace Evidence: Fibres, Paint, and Other Materials: Can lead a suspect to a crime by comparing the body of evidence; analysis can be used to connect. Materials recovered from them to those at the crime scene. This would encompass fibres, paint, Glass, and soil. The presentation of trace evidence was viewed in the Nithari case (Noida serial murders), where forensic tests on hair and dress fibres were key to the investigation.

Digital Forensics: Digital forensics involves the recovery and investigation of data found in electronic devices, an area of growing importance in the digital age

Cybercrime Investigations: Cybercrime is on the rise, and digital forensics is now the focus of Computer and Network Forensics. This involves examining, collecting, and protecting evidence from personal computers and networks. (computer forensics, cyber forensics) The

Pune Citibank Mphasis Call Centre fraud case is an example where digital forensic evidence was crucial in tracking down the perpetrators.

Data Recovery and Analysis: Data recovery can restore files that have been deleted, damaged, or encrypted. The Knowledge Base should not replace the normal support workflow. You will no longer have customers using the alternative if asked. The information. It's just through the analysis of these files that we can glimpse into the 7 hours ago.

Psychological Forensics: Psychological forensics explores the mental state of individuals, offering insights into their behaviour and potential for committing crimes. Central to successful prosecution and conviction is the research and study of behaviours in offenders who commit crimes using computer technology. This is especially important when crime involves computer technology such as the internet.

Profiling and Behavioural Evidence: Behavioural profiling profiles a criminal's action patterns to project their attributes and subsequent actions. This strategy was used in which the collector practised.

Lie Detector Techniques: Although not definitive proof of lying, lie detector tests can achieve the same. Noted that the polygraph is an investigative aid and not a decisive tool for establishing the truth, but it is permissible to use polygraph tests to aid investigations. The Supreme Court in *Selvi & Ors. v State of Karnataka* has held that involuntary administration of lie detector tests violates the right against self-incrimination.

LEGAL PROVISIONS

Forensic science has emerged as an essential element of an efficacious criminal justice system. Indian scenario has recognised and incorporated the aspects of forensic practices and techniques in the existing legal framework through statutory provisions.⁸

Constitution of India –

⁸ Muskan Kumari, 'FORENSIC SCIENCE IN CRIMINAL JUSTICE : LEGAL AND ETHICAL CHALLENGES IN INDIA' (*Record of Law*, 03 December 2025) <<https://recordoflaw.in/forensic-science-in-criminal-justice-legal-andethical-challenges-in-india/>> accessed 12 August 2026

The Indian Constitution, which is the apex law of India, offers the basic rules that govern the implementation of forensic science in the criminal justice system. Although forensic science as a term is not used in the Indian Constitution, several provisions, collectively, ensure that justice, equity, and the rule of law are ensured through scientific principles.

Article 20 - Protection in Respect of Conviction for Crimes: Article 20(3) enables us to choose not to be a witness against ourselves by ensuring that 'no person accused of an offence shall be compelled to be a witness against himself'.⁹ This provision has an exception, though, when it comes to blood, fingerprints, and any other scientific or forensic evidence; we don't have to worry about incriminating ourselves in such circumstances. The Supreme Court clarified this in the case of *State of Bombay v Kathi Kalu Oghad* (1961).¹⁰

Article 21 - Right to Life and Personal Liberty: The article states that no person shall be deprived of life or personal liberty except in accordance with the procedure established by law.¹¹ The Supreme Court has implied the procedure of investigation and trial for the right to life and liberty, which also presumes the application of the latest scientific techniques for accuracy and fairness in criminal trials. The case *Selvi v State of Karnataka* (2010)¹² established that narco-analysis and brain mapping without the consent of the person infringe individual liberty and that scientific evidence must be based on voluntary participation and legal standards of justice.

Article 39A[4] - Equal Justice and Free Legal Aid:¹³ Article 39A provides the foundation for equal justice and free legal aid. The integration of forensic science serves this purpose by providing unbiased evidence, reducing reliance on confessions or witness bias, and ensuring equitable justice for everyone, irrespective of their social or economic status.

Article 51A(h) - Fundamental Duty to Develop Scientific Temper:¹⁴ To endeavour to promote scientific temper, humanism and the spirit of inquiry and reform; 17. To encourage and work for the spread of literacy, spread of education and promote investigation and reform. This Article also lends support to forensic science being adopted in courts.

⁹ Constitution of India 1950, art 20(3)

¹⁰ *State of Bombay v Kathi Kalu Oghad and Ors* AIR 1961 SC 1808

¹¹ Constitution of India 1950, art 21

¹² *Selvi and Ors v State of Karnataka and Anr* AIR 2010 SC 1974

¹³ Constitution of India 1950, art 39A

¹⁴ *Ibid* art 51A(h)

The Bharatiya Nagarik Suraksha Sanhita 2023: The Bharatiya Nagarik Suraksha Sanhita, 2023 (BNSS)¹⁵ has replaced the old Code of Criminal Procedure, 1973 (CrPC) to transform the criminal justice system of India. The focus is on scientific investigation, technology incorporation, and transparency in criminal procedures.

Here are a few provisions under BNSS that promote the application of forensic science in criminal investigations:

Section 176(6): Mandatory Forensic Investigation: Obligatory Forensic Examination.¹⁶ For crimes in which the punishment is over seven years in jail, the forensic investigation is to be conducted. It ensures the crime scene is recorded and evidence is collected under the observation of forensic experts. This provision introduces science-based evidence, which increases the worth of the investigation.

Section 349: Collection of Specimens: In this section, under the order of a Judicial Magistrate, a person can be compelled to give fingerprints, handwriting, or voice samples, or biological samples like DNA, for investigation.¹⁷ This demand can be made on anyone, including the accused, even before his arrest, if the magistrate provides the reasons for it in writing. This order is reasonable as Article 20(3) of the Constitution ensures the right of an accused against self-incrimination.

Section 532: Admissibility of Expert and Forensic Reports: This section allows forensic reports and scientific reports as evidence in the court of law without the physical presence of the expert unless it is needed for examination, and the report can be used without the court's presence, thus helping to speed up the legal process.

CRIMINAL JUSTICE SYSTEM REFORMS IN FORENSIC SCIENCE

Standardised Procedures: To ensure reliability and consistency, the same accreditation requirements and procedures should apply to each forensic laboratory.

¹⁵ Bharatiya Nagarik Suraksha Sanhita 2023

¹⁶ *Ibid* s 176(6)

¹⁷ *Ibid* s 349

Infrastructure Development: Upgrading forensic labs with modern technology and expanding regional facilities can minimise delays and enhance efficiency.

Training and Capacity Building: Handling of forensic evidence in trials should be aided by professional training of police, prosecutors, and judges.

Legal and Policy Changes: A comprehensive law on forensic science should be enacted to govern evidence collection, accountability of experts, and professional behaviour.

Secure the Chain of Custody: Use digital tracking mechanisms to preserve the integrity of the forensic evidence.

Advancing Research and Partnerships: Conducting research and establishing collaborations with academic institutions may improve forensic accuracy and foster innovation.

CONCLUSION

One of the most critical elements of a criminal investigation is the chain of custody of evidence. Although the evidence at a crime scene is vital to an investigation, the manner in which it is gathered, stored, and transported is equally important, along with the way it is examined by professionals and introduced before the court during trial. Evidence may even change hands during the legal process between individuals, as well as institutions. Consequently, a thorough record must be maintained of the handling of every individual piece of evidence, so that it may be shown that the evidence produced before the court is the same as the evidence that was originally collected.

The significance of chain of custody is even more evident in relation to forensic evidence. The adage 'science is science', as discussed at the outset, rings true for evidence. In contemporary criminal investigation, where we see the use of DNA, blood and other biological specimens, fingerprints, physical evidence, ballistic evidence, trace evidence and digital evidence (among other types of evidence), the scientific examination can be and generally is very precise.

Such forensic evidence can be a strong link to each of the victim, accused, and crime scene; still, it is also vulnerable to contamination, modification, substitution, and mishandling.

A scientific test may be completely sound, even under rigorous scrutiny, but may not stand up if there are gaps in the chain of custody. When properly studied and defined, the rigorous scientific examination can be very helpful; otherwise, the line of examination is meaningless unless we are assured the material has been properly identified and kept.

Another development in the Indian criminal justice system has been the evolution of the Bharatiya Nagarik Suraksha Sanhita 2023 and the Bharatiya Sakshya Adhiniyam 2023. These have reflected the important role played by scientific and technological methods and tools for the investigation and presentation of evidence. However, legal provisions alone do not assist in maintaining the chain of custody, which plays a vital role in the domain of evidence collection and preservation. Its effective maintenance is largely dependent upon the care and cooperation of every individual involved in the chain.

A major problem discussed in this paper was the potential for a lapse in the chain of custody to occur at various points. At the crime scene, evidence could be contaminated by incorrect packaging or collection; at the centre itself, improper preservation or storage could change its state; at the forensic laboratory, misidentification or mishandling of evidence by personnel could occur.