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Judicial Interpretation of Forensics in Cases Involving Circumstantial Evidence: A Doctrinal Study

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Abstract

This paper analyses circumstantial evidence concerning its definition, history, classification, principles, and its ability to be accepted. Noteworthy aspects encompass the "Last Scene Theory" and instances where evidence alone has sufficed to validate conviction. Remaining portions of the study look into the scope of forensic evidence and its various subdivisions, its development over time. Furthermore, the study analyses how forensics affects the outcomes of more advanced crimes such as sexual crimes, cybercrimes, and homicides. The study emphasizes the legislative framework governing the use of forensic and circumstantial evidence in India. Another core focus of the study is the doctrinal scrutiny centering forensic evidence, how courts use forensic evidence as links in a circumstantial chain, analyse their compositions, and link them to a given context. Other regions were also consulted to provide a third eye view of how similar evidence issues are treated in evidentiary law. The research relies on practical examples to illustrate how courts approach the use of forensic evidence within circumstantial frameworks. The study concludes with the evaluation of how these interpretations apply toward the achievement of justice while mapping the emerging trends, which have been identified as gaps, such as becoming overly reliant on scientific evidence. It proposes remedial measures to seamlessly integrate forensic science with legal requirements, fostering a more prudent and restrained approach to judicial discretion.

Keywords: Circumstantial Evidence, Forensic Science, Judicial Interpretation, Criminal Justice, Doctrinal Research Methodology

Introduction

When it comes to solving a crime, the more accurate evidence one gathers, the closer one is to the truth. The truth in most criminal cases has to do with a lot of circumstantial evidence, which requires the court to use reasoning and logic to

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piece together the covered facts as a story. Forensic science serves as a key component to assist the court in closing knowledge gaps created by the absence of direct evidence.

Forensic evidence refers to DNA specimens, fingerprints, ballistics, and even digital hacks. The coding or recording of any information makes it perfect proof of any crime. Exposing evidence takes investigation or trial one step ahead of witch hunting, as the evidence has to be checked for compatibility in reality. This research carries out a doctrinal study on the interpretation given by the courts to circumstantial forensic evidence. It looks into the development of legal regimes related to circumstantial and forensic evidence, evaluates the legal system, and scrutinizes the judicial practices within these borders. It also examines other systems for comparative analysis and appraises the strengths and weaknesses of forensic evidence in certain jurisdictions, along with its impact on future adjudication. With these steps, it aims to enhance the understanding of the standards of evidence that are required to ensure the litigants receive justice unobstructed by partiality.

Research Methodology

This research paper follows a doctrinal approach to gather relevant information, focusing on a detailed, analytical, and critical study of the subject. The research is primarily based on secondary sources that offer valuable insights and perspectives from existing literature. Sources including legal textbooks, judicial decisions, legal journals and online articles and publications.

Circumstantial Evidence

A. Meaning

Section 3 of the Act[3] explains the term ‘evidence’ as comprising two main types firstly, Oral evidence, which includes any statements made by witnesses in court that relate to the facts being investigated and are either allowed or required by the court. Secondly documentary evidence, that includes electronic records, presented before the court for review.

Circumstantial evidence pertains to a set of facts distinct from the fact in issue, yet through experience, these facts have been found so closely

[3] Indian Evidence Act 1872, s 3.

linked in a cause-and-effect relationship with the fact in issue that they lead to a reasonable and satisfactory inference. For example, if footprints are discovered in the sand, it may be inferred that a living being has passed that way. Furthermore, the shape and pattern of footprints can assist in identifying whether they were made by a human, bird, or animal. The Indian Evidence Act provides a comprehensive explanation of the concept of circumstantial evidence. Circumstantial evidence involves facts surrounding the incident rather than the incident itself. Consider a scenario where person A is accused of murdering person B. At trial, if a witness, C, testifies that he saw A stab B, such testimony constitutes direct evidence, as it pertains directly to the act in question. However, if C states that he saw A fleeing the scene where B's body was later discovered, holding a knife stained with blood, this constitutes circumstantial evidence. In the latter case, C is not speaking directly to the act of murder but to a surrounding circumstance that may support the inference of A's guilt. The Indian Evidence Act permits and recognizes the evidentiary value of such relevant circumstances, thereby legitimizing the use of circumstantial evidence in legal proceedings.[4]

B. Evolution

Indian courts, over the years, have crafted several rules aimed at the use and assessment of such evidence. In *Hanumant Govind Nargundkar v. State of Madhya Pradesh*[5], the Supreme Court stressed that each chain of events must individually be corroborated, and cumulatively, the circumstances should lead to only one outcome: that the accused is guilty, beyond any reasonable doubt. Where any part of the chain is lacking or insufficient, the court is obliged to grant the accused the benefit of doubt. In *Sharad Birdhichand Sarda v. State of Maharashtra*[6], the Supreme Court reaffirmed that courts must exercise great caution when relying solely on circumstantial evidence. The Court emphasized that the chain of events must be so complete that it excludes any reasonable alternative except the guilt of the accused. A conviction cannot be sustained unless the evidence clearly eliminates all other possible explanations. In *C. Chenga Reddy v. State of A.P.*[7], the Court held that in cases relying on

[4] Vepa P Sarathi, *Law of Evidence* (6th edn, Eastern Book Company)
[5] AIR 1952 SC 343 (SC).
[6] AIR 1984 SC 1622 (SC).
[7] AIR 1996 SC 1257 (SC).

circumstantial evidence, all the circumstances must, when taken together, clearly indicate the guilt of the accused. Each piece of evidence must align with this conclusion and leave no possibility for any other reasonable explanation. The Supreme Court recognized the critical role forensic evidence plays in supporting circumstantial findings in the case of *State of U.P. v. Dr. Ravindra Prakash Mittal*[8], strengthening the overall validity and impartiality of the evidentiary framework.

C. *Types*[9]

1. Physical Clues: These are tangible items that can be seen, touched, collected, and examined during an investigation. Such physical clues help establish a link between the crime scene and the individuals involved.

2. Behavioural Clues: Behavioural clues involve nervousness, inconsistent behaviour, or attempts to hide or destroy evidence. These clues may not directly prove guilt but can strengthen the overall circumstantial evidence.

3. Documentary Clues: Documents materials such as financial records, emails, text messages, photographs, or other forms of written communication can reveal motives, relationships, or timelines.

4. Witness Statements and Testimonies: Individuals who observed events or were close to the situation can offer accounts that either support or challenge other pieces of evidence. Their testimonies can help establish timelines, explain behaviours, or corroborate other facts, contributing to a fuller understanding of the case.

D. *Principles*

In *Sharad Birdhichand Sarda v. State of Maharashtra*[10], the Supreme Court upheld the principles given in *Hanumant v. State of M.P.*[11]. These five principles, commonly known as the “Panchsheel” of circumstantial

[8] AIR 1992 SC 2100.
[9] Diksha Dubey and Mayank Mehta, 'The Significance of Circumstantial Evidence: Clues and Tell-Tale Signs in Legal Proceedings' (2023) 2(4) *Journal of Legal Research and Juridical Sciences* 413 https://jlrjs.com/wp-content/uploads/2023/07/42.-Diksha-Dubey.pdf, last accessed on 19th November 2025.
[10] *Sharad Sarda* (n 4)
[11] *Hanumant* (n 3)

proof, provide a crucial framework for handling such cases. According to the Court, the circumstances from which the inference of guilt is drawn must be fully established. These facts must be consistent solely with the hypothesis of the accused's guilt and should not be explainable on any other reasonable basis. Moreover, the circumstances must be of a conclusive nature and strongly point toward the guilt of the accused. They must also exclude every possible explanation other than the one being sought to be proved. Finally, the chain of evidence must be so complete that it leaves no reasonable ground for assuming the innocence of the accused, thereby showing that, in all human probability, the offence was committed by the accused.[12]

E. Admissibility

For circumstantial evidence to be accepted in court, it must meet certain key requirements. Firstly, it must be relevant, meaning it should directly relate to the case and assist the judge in determining the guilt or innocence of the accused. Secondly, it must have probative value, which refers to its ability to affect the likelihood of a fact being true or false the stronger the probative value, the more persuasive and admissible the evidence becomes. Thirdly, the evidence must be reliable, supported by credible sources such as expert testimony or scientifically verified methods. Finally, the court must evaluate whether the evidence could unfairly prejudice the accused. If the risk of bias outweighs its value in proving the case, the court may exclude the evidence to maintain a fair trial.[13]

F. Last Scene Theory[14]

In *Kusuma Ankama Rao v. State of A.P.*[15], the Supreme Court, upholding the rulings in *State of U.P. v. Satish*[16] and *Rajesh Reddy v. State of A.P.*[17], laid down the application of the last-seen theory. The Court stressed that even in such cases, corroborative evidence is necessary before drawing a conclusion. In *Krishnan v. State of Tamil Nadu*,[18], the deceased was last

[12] Batuk Lal, *the Law of Evidence* (Central Law Agency 2022).
[13] Dubey and Mehta (n 7)
[14] Lal (n 10)
[15] AIR 2008 SC 2819.
[16] (2005) 3 SCC 114.
[17] (2006) 10 SCC 172.
[18] AIR 2014 SC 2548.

seen in the village at a temple. His body was taken from the bore well by the fire service personnel after more than seven days. There was no positive material on record to show that the deceased was last seen together with the accused and the intervening period of seven days. The conviction was held to be proper. In a murder case, in the absence of proof of other circumstances, the only circumstance of last seen together and absence of a satisfactory explanation cannot be the basis of conviction. The last seen together and the absence of a satisfactory explanation would provide additional links to contemplate the claim, where other links have been satisfactorily made out, and the circumstances point to the guilt of the accused. *Anjan Kumar Sanna v. State of Assam*[19] as well as *State of Goa v. Sanjay Thakran*[20] case.

G. Sole base for Conviction

The validity of a case built solely on circumstantial evidence presents a complex set of challenges for the justice system. A key issue lies in how such evidence is interpreted and the conclusions that are drawn from it. While logical reasoning is crucial, different perspectives can lead to varying conclusions, increasing the risk of misrepresentation. Additionally, circumstantial evidence often supports more than one interpretation; when both guilt and innocence can be inferred from the same facts, the benefit of the doubt must go to the defendant. Courts also take into account the overall weight of all the evidence presented. When a case relies entirely on circumstantial evidence without any substantive support, its strength may be significantly undermined. The principle of 'beyond a reasonable doubt' reinforces the presumption of innocence, requiring courts and juries to exercise greater caution in cases lacking direct evidence. Judicial scrutiny is therefore intense in such cases, as defence attorneys may contest both the interpretation and sufficiency of the evidence. Most critically, an overreliance on circumstantial evidence increases the risk of wrongful convictions, since it may lack the clarity and certainty typically offered by direct proof.[21]

[19] AIR 2017 SC 2617, 2620.
[20] AIR 2007 SC 61.
[21] Shivam Gill and Tisha Chauhan, 'Unveiling the Role of Circumstantial Evidence in Criminal Cases: Critical Analysis of Indian Judicial System' (2023) 6(1) *Indian Journal of Law and Legal Research* 1976 https://3fdef50c-add3-4615-a675-

Forensic Evidence

A. Definition

The word "forensic" comes from the Latin term "forensis," which means "of or before the forum." Forensic science, or forensic evidence, refers to any information or material obtained through scientific or technological methods that has been collected, preserved, and analysed to assist in legal investigations. It serves the purpose of establishing facts, identifying perpetrators, and exonerating the innocent in a court of law. It does not only solve crimes; it helps in the judicial process. This sort of evidence is derived through the application of specific forensic methods and is used in court to sustain both criminal and civil cases. Forensic investigation, commonly known as forensic science, involves applying scientific methods to criminal and civil law. It covers a wide range of scientific disciplines, including Anthropology, Biology, Chemistry, Engineering, Genetics, Medicine, Pathology, Phonetics, Psychiatry, and Toxicology. Forensic science is also known as criminalistics. Criminalistics specifically focuses on the scientific collection and examination of physical evidence in criminal cases. Today, forensic evidence plays a vital role in the justice system and is obtained through forensic investigations.

B. Types of Forensic Evidence

Different types of forensic evidence serve different purposes within investigations. These are mentioned below:

1. Biological Evidence: These consist of samples such as blood, saliva, hair, and other body fluids or tissues. DNA analysis, a valuable method within this category, identifies individuals and determines genetic relationships.

2. Physical Evidence: Techniques like fingerprint analysis, ballistics, and tool mark examination fall within this category.

a91741bcb5c0.usrfiles.com/ugd/3fdef5_04ca220d21b648799c60485d5d11aebc.pdf, last accessed on 17th November 2025.

3. Trace Evidence: This is tiny but important evidence, usually microscopic, like fibres, hair, glass, or paint. Trace evidence analysis serves to link suspects which are overlooked crime scenes, and victims.

4. Digital Evidence: This type of evidence in the digital world includes information obtained from electronic devices such as computers, smartphones, or internet platforms. In simple word, the investigation of devices remotely through the internet. Digital forensics aims at retrieving and examining digital evidence to discover cybercrimes or other associated activities.

Additionally, the other types of forensic evidence that can be pursued now-days, these are:

5. Entomology: it deals with insects regarding crimes, for determining time of death. It also aids in detecting drugs, poisons, crime location, and wound timing by identifying and collecting insect evidence from scenes of murder, rape, abuse, suicide, and contraband trafficking.

6. Dentistry: It holds great legal importance for several reasons, one of which is that teeth are highly resistant to damage from fire, accidents, and explosions.

7. Cheiloscopy (lip prints): Lip prints vary with mouth position clear grooves appear in closed mouths, while open mouths show unclear patterns. Like fingerprints, lip prints are permanent, unique, and can be classified for identification.

8. Autopsies: An autopsy refers to a post-mortem inspection of a corpse upon death. There are usually three kinds of autopsies. Medico-Legal Autopsy or Forensic or Coroner's autopsies, Clinical or Pathological autopsies, and Anatomical or scholarly autopsies.

C. Historical Development

The evolution of forensic science is quite fascinating. It goes back to the time when ancient civilizations like India used to employ medical expertise while solving crimes. The origin of the forensic science date is backed to ancient times when elementary forensic methods were employed in investigations. Explanation of forensics techniques

commenced back in the 19th century with the introduction of fingerprinting and toxicology. The history of forensic science has been substantial growth, following developments in technology, methods, and sciences, over the countries. Further evolution of forensics took place in the 20th century with the advancement of DNA profiling, ballistics and digital forensics restoring forensic evidence to its rightful place as the foundation of modern criminal justice. Today, forensic science plays a vital role in solving complex criminal cases and is an essential part of modern investigations.

D. Aspects of Admissibility

Admissibility of forensic evidence at trial hinges on reliability of forensic evidence, relevance, and handling. Courts determine factors of credibility, and the central is scientific validity; accepted techniques are the priority. Chain of custody is necessary to avoid tampering at the time of collection, storage, and analysis. Forensic pathologists apply autopsy reports and bloodstain pattern analysis to establish cause of death in homicides. Toxicology and DNA connect suspects to victims in rape cases. Computer forensics provides proof to demonstrate hacking and fraud in cybercrime cases. Terrorism and organized crime cases utilize financial forensics, ballistics, and explosives analysis to uncover and trace criminal networks. Expert testimony plays a crucial role in the admissibility of forensic evidence, as only qualified experts are authorized to present such testimony in court. Legal provisions differ from country to country with rules that allow for the use of forensic evidence in court.

LEGAL FRAMEWORKS

The use of forensic science in criminal investigations has become an indispensable tool for modern justice systems, particularly in cases relying on circumstantial evidence. Understanding the legal frameworks that guide the use of forensic science is essential for assessing how effectively such evidence supports convictions based on inference rather than direct testimony.

A. Indian Evidence Act, 1872

Section 6 of the Act[22] does not explicitly refer to circumstantial evidence, it is often invoked to admit such evidence when it is closely linked to the facts in issue. It can be used to corroborate direct evidence or to strengthen other facts presented in the case. As held in *Syed Samsudeen v. State*[23], circumstantial evidence that supports the prosecution's case or helps establish a chain of events leading to the alleged crime is considered relevant under Section 6.

Section 45 of the Act[24] considers the opinion of experts, including forensic experts, relevant under specific situations. According to this section this section allows experts to express their opinions based on handwriting analysis, fingerprint identification, or DNA profiling to confirm the genuineness and relevance of forensic evidence. According to Sec 73[25] any person is compelled to give his/her fingerprints on orders from the court. The Supreme Court has given special mention that this section isn't a violation of their fundamental rights.

The court's ability to draw logical inferences under Section 114[26] plays a significant role in criminal trials, especially when circumstantial evidence is involved. However, these inferences must be supported by the totality of evidence presented during the trial. While presumptions can guide judicial reasoning, the final determination of guilt or innocence must rest on a comprehensive and holistic assessment of all the evidence on record[27].

B. The Code of Criminal Procedure (Crpc)

Crpc is the foundation of procedural criminal laws regulating criminal investigations and trials in India. Precisely, Sections 53 and 54[28] specifically refer to the examination of accused individuals. Section 53 provides for the right of conducting medical examination of the accused, including forensic examinations. This allows the police to procure vital forensic evidence from the accused, like bodily fluids or samples, for

[22] Indian Evidence Act 1872, s 6.
[23] Crl RC No 1130 of 2009 (SCC Online).
[24] Indian Evidence Act 1872, s 45.
[25] Indian Evidence Act 1872, s 73.
[26] Indian Evidence Act 1872, s 114.
[27] Lal (n 10)
[28] Code of Criminal Procedure 1973, ss 53–54.

analysis. Section 293[29] allows admissibility of forensic reports, such as autopsies or chemical analyses, as primary evidence if properly attested by authorized experts and legally compliant[30].

C. Indian Penal Code, 1860

Sections 272 to 278, 284, and 328[31] has talked about poisoning. In addition to general outline of poisons, corrosive materials, adulterants, chemicals and medico-legal aspects, there are Acts such as**:** The Poison Act (1990), Drugs and Cosmetics Act (1940) etc. [32]

D. Information Technology Act, 2000

The Information Technology Act, 2000, and its amendments include provisions for admissibility and legal covering digital evidence. In today's age, digital evidence is of utmost significance, particularly in cases of cybercrimes, data theft, or electronic transactions. The Act provides a legal setting for collecting and using digital evidence so that it can be accepted by courts and used effectively in investigations and court proceedings. It provides legal standards to manage digital evidence securely, without compromising its integrity and authenticity.[33]

E. National DNA Profiling Bill

With regard to DNA evidence, the National DNA Profiling Bill seeks to control its use and handling in criminal investigations. In this manner, it hopes to increase the reliability and consistency of forensic investigations, thus supporting an efficient criminal justice system.[34]

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[29] Code of Criminal Procedure 1973, s 293.
[30] National Research Council, *Strengthening Forensic Science in the United States: A Path Forward* (National Academies Press 2009).
[31] Indian Penal Code 1860, ss 272–278, 284, 328.
[32] Lakshmi Prasanna Bolem and Kama Sai SVM, 'Forensic Evidence: Types and Its Admissibility' (2021) 3(2) *Law Audience Journal* 86 https://www.lawaudience.com/wp-content/uploads/2021/11/Forensic-Evidence-Types-and-Its-Admissibility.pdf, last accessed on 17th Novemver, 2025.
[33] Dharmendra Satyanarayan Chawla, 'The Role of Forensic Evidence in Criminal Investigations in India' (2023) *International Journal for Research in Applied Science & Engineering Technology (IJRASET)* Paper ID: IJRASET56099.
[34] Express News Service, 'What Is the DNA Bill?' *The Indian Express* (18 July 2023) https://indianexpress.com/article/explained/what-is-the-dna-bill-8857810/, last accessed on 16th November, 2025.

Interface Between Forensic Science And Circumstantial Evidence

The integration of circumstantial evidence with forensic science represents a crucial advancement in modern legal investigations and court proceedings. Forensic science, defined as the application of scientific principles and techniques to examine physical evidence, often provides valuable information in criminal cases. Circumstantial evidence, on the other hand, consists of facts that may not directly prove a point but, when considered collectively, help form logical conclusions about the matter. When forensic analysis is combined with circumstantial reasoning, it significantly enhances the overall strength of the evidence, aiding the pursuit of truth. Forensic evidence including fingerprints, DNA, ballistics, and toxicology reports often establishes scientific connections between the perpetrator, crime scene, victim, or weapon, serving as substantial proof. When paired with circumstantial evidence, it helps build a clearer narrative that can either confirm or refute allegations. Forensic methods also play a key role in corroborating circumstantial descriptions. Trace evidence such as hair, fibres, and soil can validate or contradict claims about a person's presence at a crime scene, thereby supporting or undermining surrounding circumstantial evidence.

The combination of forensic science and circumstantial logic is especially vital in filling gaps where direct evidence is absent. Forensic data provides objective facts, while circumstantial reasoning pieces together these facts to form a coherent explanation. Expert witnesses have the important task of explaining complex scientific evidence in court, helping judges and juries understand how forensic findings relate to the broader case. The admissibility of circumstantial forensic evidence depends on its relevance, reliability, and the soundness of the scientific methods used. This interplay is illustrated in cases like *State of Punjab v. Bhura Singh*[35], where the Supreme Court upheld a conviction based on eyewitness testimony supported by forensic evidence showing that the murder weapon had recently been fired and gunshot residue was present at the crime scene. Similarly, in rape and murder cases, forensic findings of biological material linking the victim and accused serve as strong corroborative circumstantial evidence. However, courts must remain vigilant against potential human error, poor forensic practices, or biased interpretation, as these risks can lead to miscarriages of justice. Forensic and circumstantial evidence must align consistently and be supported by reliable direct evidence to ensure fairness. The

[35] AIR 2001 SC 3114.

collaboration between forensic science and circumstantial reasoning enriches the justice system by combining precise scientific proof with logical analysis, thereby promoting a more accurate and just application of the law.[36]

Judicial Interpretation

Judicial interpretation plays a critical role in shaping how forensic evidence is understood, evaluated, and applied in cases built on circumstantial evidence. While statutes provide the foundational legal framework, it is the judiciary that breathes life into these provisions by interpreting their scope and application in real-world cases. Followings are some landmark cases:

In *Hanumant v. State of M.P*[37] the Supreme Court cautioned that when a conviction is based solely on circumstantial evidence. The Court held that each circumstance must be firmly established and should point only towards the guilt of the accused. This view was reinforced in Umedbhai *Jadavbhai v. State of Gujarat*[38], where the Court emphasised that in cases relying entirely on circumstantial evidence, all the circumstances put forward must clearly and unmistakably point to the guilt of the accused. If even one link in the chain is missing, it can weaken the prosecution's case. The Court also made it clear that each piece of evidence must be considered together, as a whole, and not in isolation. Similarly, in *Ramawati Devi v. State of Bihar*[39], the Court dealt with the evidentiary value of dying declarations under Section 32 of the Indian Evidence Act. It held that a dying declaration whether written or oral can be crucial when it relates to the cause of death or the circumstances leading to it. While each case must be judged on its facts, a well-supported dying declaration can even serve as the sole basis for conviction if it meets the legal standards of credibility and relevance. The Supreme Court again revisited the principles around circumstantial evidence in *Bodh Raj @ Bodha and Ors v. State of Jammu and Kashmir*[40]. This case reaffirmed that physical evidence is not always necessary; what matters is whether the prosecution can piece together a coherent and complete chain of events that point exclusively to the accused's guilt.

[36] Gill and Chauhan (n 19)
[37] *Hanumant* (n 3)
[38] (1978) 1 SCC 228.
[39] (1983) 1 SCC 211.
[40] (2) SCR 67.

In *Laxman Prasad v. State of Madhya Pradesh*[41], the Court held that if even one crucial link in the chain of circumstantial evidence is found missing or unproven, the conviction cannot stand. The High Court, in such cases, must step in and overturn the judgment to prevent a miscarriage of justice. In *Padala Veera Reddy v. State of Andhra Pradesh*[42], the Supreme Court held that circumstantial evidence must be firmly established, form a complete chain pointing only to the accused's guilt, and be incompatible with any other explanation or the accused's innocence. In the *Priyadarshini Mattoo case*[43], Santosh Kumar Singh was convicted for rape and murder based solely on circumstantial evidence, including DNA. The case shows how strong circumstantial evidence can secure conviction without direct witnesses. In the *Jessica Lal Murder Case*[44], Manu Sharma was ultimately convicted on the basis of strong circumstantial evidence, including forensic analysis and mobile phone records, following an initial acquittal caused by hostile witnesses.

In *Nitish Katara Murder Case*[45]**,** It was really tough to pinpoint the person guilty, as only a part of the palm along with the finger was not burnt. But with the assistance of forensic science, the DNA test was done and it facilitated the identification and recognition of the body by matching the DNA with the parents. This also assisted the High Court of Delhi in identifying the accused. In *Sushil Mandal vs. The State interviewed by CBI*[46]**,** this case, a bereaved father could not believe that a decomposing body recovered in a lake was that of his missing son. With no obvious indications to recognize the body no clothing or identifying features the father sought a habeas-corpus petition and asked that a CBI investigation be conducted. Science became the method of truth-finding. A DNA test confirmed that the body belonged to the petitioner and his wife, and a skull superimposition test confirmed the identification as well. As much as he resisted the scientific facts, the father was forced to confront them. The Supreme Court relied heavily on these forensic findings, highlighting the pivotal role of science in solving such tragic and intricate cases.

In *KM. Seema Azad vs. State of U.P.*[47] On 22nd April, 2013**,** Shashi murder case is about an unfortunate episode of a law student of Faizabad. Vijay Sen Yadav, a

[41] (1984) 4 SCC 116.
[42] AIR 1990 SC 79.
[43] 2007 Cri LJ 964.
[44] (2010) 6 SCC 1.
[45] *Vishal Yadav v State of Uttar Pradesh* (2014) SCC Online Del 1373.
[46] (2014) SCC Online Mad 7362; (2014) 2 MWN (Cri) 580 (Mad) (1B).
[47] Criminal Appeal No 1055 of 2011 (Allahabad HC, 22 April 2013).

co-accused in the case, was subjected to a narco-analysis test, wherein he disclosed shocking facts. He stated that Shashi had an illicit relation with Anand Sen, who at that time was a sitting BSP MLA, which led to her pregnancy. According to Vijay, Anand ordered him to kill her. During questioning, Vijay also admitted to having been called by Anand later on, admitting he had pushed Shashi into a canal, strangled her himself, and left her body there. This gruesome admission was corroborated by phone records of calls exchanged between Anand and Vijay where Shashi was found.

In *Selvi vs. The State of Karnataka, Anr* [48], the Court of India held that forced administration of forensic methods like polygraph, was unconstitutional if done without the consent of the accused as it is violative of Articles 20(3) and 21.[49] In *Mahmoud vs. State of U.P.*[50], the Supreme Court defined the term expert and said that convicting anybody on the basis of a single expert's opinion would be very perilous. Although relying solely on expert opinion for prosecution may be considered unsafe. In *Magan Bihari Lal v. State of Punjab*[51], the Supreme Court of India overturned and set aside the conviction, ruling that the expert's handwriting identification was insufficient as the sole basis for conviction. According to the Supreme Court, the opinion of an expert should be approached with caution.

How Other Jurisdictions Interpret Forensic Evidence In Circumstantial Contexts

In India, forensic science is crucial for criminal investigations, aiding agencies like the CBI and state police in linking evidence to legal outcomes. Despite tech advancements, issues like outdated labs and staff shortages hinder progress. Solutions include modernization, better training, and technologies like AI and block chain. Globally, forensic evidence is key in cases lacking direct proof, with countries adopting varied approaches to interpreting it in circumstantial contexts.

In the United States, forensic evidence such as DNA or fingerprints is generally categorized as circumstantial because it requires jurors to draw inferences about its meaning. However, American courts do not consider it to be inherently less reliable or inferior to direct evidence. Instead, they often treat such scientific

[48] AIR 2010 SC 1974; (2010) 7 SCC 263.
[49] Constitution of India, arts 20(3) and 21.
[50] AIR 1976 SC 69.
[51] AIR 1977 SC 1091; (1977) 2 SCR 1007.

evidence as highly persuasive, especially when it is properly analysed and presented by credible experts. In the United Kingdom, courts emphasize the collective weight of multiple strands of circumstantial evidence. This approach is likened to a strong cable made of many threads while a single piece of evidence might be insufficient on its own, a combination of consistent and interlinked facts can convincingly establish guilt.

Canadian courts, on the other hand, are notably cautious in their treatment of circumstantial forensic evidence. They mandate that any inference drawn from such evidence must be grounded in common sense and practical human experience, while also logically excluding all reasonable alternatives. Courts in Canada reject guesswork or speculation, adhering to a high standard of proof that ensures fairness to the accused. Scotland takes an even more stringent stance by requiring corroboration of each crucial fact meaning that no single piece of evidence, including forensic findings, can stand alone. Forensic results must be supported by at least one other independent source, such as an eyewitness or a secondary expert analysis. Additionally, Scottish legal doctrines like *Moorov* and *Howden* are used to link related incidents, helping to establish patterns that reinforce the credibility of circumstantial evidence.

In Singapore, the judiciary has demonstrated a strong reliance on circumstantial forensic evidence, even in complex cases such as those involving the absence of a victim's body. Courts have affirmed that a conviction can be secured solely on the strength of forensic clues such as blood traces, digital data, or biological samples so long as the chain of inference is clear, logical, and comprehensive. Collectively, these international perspectives underscore the growing acceptance and critical importance of forensic science in criminal justice systems, while also highlighting the necessity for rigorous legal safeguards to prevent wrongful convictions.[52]

Significance[53]

[52] Ridita Dey, 'Law of Forensic Evidence in India and Abroad: A Comparative Study' (2021) 4(2) *International Journal of Law Management & Humanities* 2879 https://ijlmh.com/paper/law-of-forensic-evidence-in-india-and-abroad-a-comparative-study/, last accessed on 15th November, 2025.

[53] Arshi Alam, 'Legal Principles Governing Convictions Based on Circumstantial Evidence' (2023) 6(1) *International Journal of Legal Science and Innovation* 1 https://ijlsi.com/wp-content/uploads/Legal-Principles-Governing-Convictions-Based-on-Circumstantial-Evidence.pdf, last accessed on 19th November, 2025.

In *Musheer Khan v. State of M.P.*[54], the Supreme Court affirmed the importance of circumstantial evidence by highlighting its reliance on a chain of events that reasonably lead to the conclusion of the accused's involvement in the crime. The effectiveness of circumstantial evidence lies in its cumulative strength; while individual facts may appear inconclusive on their own, their collective impact can form a compelling narrative pointing toward the guilt of the accused. Similarly, in *BSF v. Iboton Singh*[55], the court emphasized that the strength of circumstantial evidence arises from the coherent picture formed by various interrelated facts. When considered together, these facts can establish guilt beyond a reasonable doubt.

Circumstantial evidence can support direct evidence and strengthen the prosecution's case. Scientific inputs like DNA profiling or ballistic analysis, though indirect, hold strong value by linking the accused to the crime.

Developments

Forensic science has vast potential in India, particularly since crimes are becoming increasingly sophisticated and technology keeps changing. The use of aids such as Artificial Intelligence, machine learning, and higher-order digital forensics can significantly enhance the efficiency and precision of investigations. Growing awareness on the part of judges, lawyers, and police has resulted in increased court-room acceptance of forensic evidence, leading to increased investment in infrastructure and training. Increasing the number of well-equipped forensic labs from region to region can help decrease delays and increase the credibility of findings. The demand is also growing for specialized training and education programs to create a trained workforce to manage current investigative demands. Public-private partnerships provide possibilities to fill resource gaps through cooperative labs and research. Investing in forensic research particularly in newer fields such as cyber, bio, and environmental forensics can provide crime-solving techniques with innovative solutions. Legal and policy changes are also crucial to establish transparent, uniform protocols for evidence handling. In the wake of increasing cybercrime, digital forensic skills are more essential than ever. Global best practices and international collaborations can assist India in making its forensic system better. Ultimately, establishing public confidence through

[54] Musheer Khan @ Badshah Khan & Anr v. State of M.P (2010) SCC Online SC 1180.
[55] Director General, Border Security Force v. Iboton Singh (2007) 1 GLT 903 (SCC Online).

transparency and awareness will promote the wider development of forensic science as a trusted instrument for justice.

Challenges

In criminal law, the burden of proof lies with the prosecution, which must establish the accused's guilt beyond a reasonable doubt, even in cases based solely on circumstantial evidence. Each fact must fit into a complete, unbroken chain that points conclusively to guilt, as emphasized in *State v. Navjot Sandhu*[56]. The prosecution's case must be strong enough to eliminate any reasonable doubt; if a link is missing or an alternative explanation exists, the accused is entitled to the benefit of the doubt. Courts meticulously evaluate circumstantial evidence to ensure all inferences lead solely to guilt, upholding principles of fairness, due process, and the presumption of innocence, as affirmed in *ADM v. Shivakant Shukla*[57]. However, circumstantial evidence also carries the risk of misinterpretation because it relies on inferences rather than direct facts. Courts stress that guilt must be the only reasonable inference from the evidence, requiring a natural, unbroken sequence of facts and dismissal of any reasonable alternative suggesting innocence.[58]

In India, forensic science is an essential tool for solving complex crimes but faces significant challenges that undermine its effectiveness. Many forensic laboratories suffer from inadequate infrastructure, outdated equipment, and insufficient funding, leading to severe delays and backlogs. The shortage of qualified professionals further aggravates the problem, with many lacking proper training in evidence handling and courtroom procedures. A critical issue is the absence of clear, consistent Standard Operating Procedures (SOPs) for evidence collection and preservation. This absence leads to contamination, loss, or mishandling of evidence, thereby undermining its admissibility in court. The problem is even more pronounced in rural areas, where investigators often lack proper training, leading to crucial evidence being rendered inadmissible. Poor coordination among police, forensic labs, and courts further hampers the integrity and utility of forensic evidence.

Delayed forensic reports prolong investigations and trials, eroding public trust in the justice system. Additionally, courts often struggle to fully appreciate scientific

[56] (2005) 11 SCC 600.
[57] (1976) 2 SCC 521.
[58] Alam (n 51).

evidence, frequently relying on eyewitness testimony instead, which can lead to flawed judgments. Ethical concerns, including privacy issues related to DNA testing and misuse of sensitive electronic data, remain inadequately regulated. Moreover, India's forensic system has yet to incorporate advanced technologies like artificial intelligence, machine learning, or block chain, mainly due to cost constraints and limited awareness. Public and judicial perceptions shaped by media often misrepresent forensic capabilities, contributing to unrealistic expectations. The lack of a unified national policy further hinders standardization, regulation, and accountability within forensic science. Bridging these gaps is essential to establishing forensic science as a dependable and effective pillar of India's criminal justice system. Nevertheless, despite these challenges, forensic science continues to play a critical role in modern criminal investigations, contributing significantly to solving complex cases such as homicide, sexual offenses, cybercrime, and terrorism. Addressing these challenges is crucial for forensic science to achieve its full potential as a reliable tool in Indian investigations and judicial proceedings.

Limitations [59]

Circumstantial evidence, while often valuable, carries inherent limitations that necessitate careful judicial scrutiny. One major concern is the possibility of alternative explanations as highlighted in *State of U.P. v. Ashok Kumar Srivastava*[60]. This principle underscores the risk of subjectivity, as such evidence frequently relies on inferences that may be flawed or misleading, potentially leading to inaccurate conclusions. Furthermore, circumstantial evidence lacks the directness of eyewitness testimony or confessions and instead depends on a chain of facts that must be conclusively proven. In *C. Chenga Reddy v State of A.P.*[61], the Supreme Court underscored that there is also a risk of courts over relying on circumstantial evidence, which may lead to speculative or biased decisions if not carefully assessed. Lastly, misinterpretation or faulty reasoning in evaluating such evidence can result in wrongful conclusions, making it essential for courts to approach circumstantial cases with a high degree of caution and analytical precision.

Suggestion

[59] Dubey and Mehta (n 7)
[60] (1992) 2 SCC 86.
[61] *C Chenga Reddy* (n 5).

The traditional "Five Golden Principles" of circumstantial evidence, though foundational, may need to be re-evaluated to better align with practical realities in contemporary criminal justice. These principles can be reframed to enhance their clarity and utility. Firstly, the relevance of facts must be ensured only those facts directly connected to the case, as per Chapter II of the Indian Evidence Act, should be considered; vague or unrelated information should be excluded. Secondly, the facts must be backed by admissible and credible evidence; assumptions or mere suspicions are not enough. Thirdly, the standard of evidence should align with the definition set out in Section 3 of the Indian Evidence Act to ensure consistency and uniformity in its evaluation. Fourth, the circumstances must be evaluated in a manner that, whether viewed as links in a chain or strands in a rope, they collectively lead unerringly to the guilt of the accused, excluding any reasonable alternative explanation.

To elevate India's forensic science to international standards, several reforms are essential. The first step involves upgrading forensic labs with advanced technologies such as high-end DNA sequencing, AI-assisted analysis, and Automated Fingerprint Identification Systems (AFIS). Expanding regional laboratories would also help reduce delays and backlogs. Standardizing forensic practices and mandating accreditation in accordance with international standards will ensure consistent and reliable results across the country. Further, strengthening education and training through standardized courses and practical programs, especially in technical fields like cyber forensics, is crucial. Legal and judicial reforms must clearly define how forensic evidence should be handled and admitted in court. Judges, police officers, and legal professionals should receive proper training to fully understand the value and interpretation of forensic findings. Increased investment is also necessary to improve infrastructure, research capabilities, and to recruit skilled personnel, with a special focus on emerging areas such as bio-forensics and cybercrime. Encouraging public-private partnerships can foster innovation and optimize resource sharing. Establishing state-level digital forensic units is vital in the fight against growing cyber threats. In addition, India should collaborate with leading international forensic organizations to adopt best practices. Lastly, increasing public awareness about the importance of forensic science in the justice system can help build greater trust and transparency, ultimately contributing to a more effective and fair criminal justice process.

Conclusion

Forensic evidence, when used in cases built on circumstantial proof, plays a crucial role in the delivery of justice. This study has examined how courts interpret and assess different forms of forensic evidence, like physical traces, behavioural clues, and expert analysis, within the context of circumstantial reasoning. While such evidence can be powerful, courts remain cautious, ensuring its relevance and reliability to protect the rights of the accused. The findings highlight that for circumstantial evidence to result in a conviction, the prosecution must prove a complete and unbroken chain of events that points to the guilt of the accused, leaving no room for alternative explanations. Courts must carefully balance the adoption of scientific tools with the preservation of robust legal safeguards. In the end, the judiciary's responsibility is not just to interpret evidence but to ensure that justice is served fairly, guided by due process, the presumption of innocence. These principles remain the foundation of a just and trustworthy legal system.

References

1) *Benedette Cuffari, 2020. What is Bloodstain Pattern Forensic Analysis, Available at https://www.news-medical.net/amp.*

2) *Diva Rai, 2021. Laws relating to Forensic Science Admissibility in Indian Laws. Available at https://blog.ipleaders.in.*

3) *William L. Krinsky, 2019.Forensic Entomology, Available at https://www.sciencedirect.com.*

4) *Ranjan,V.,Sunil,MK.,Kumar,R.,2014.Study of lip prints: A forensic study, Available at https://www.jiamr.in/doi/10.4103/0972-1363.141856.*

5) *Vaishnavi Narreddy, 2020.Laws relating to Forensic Science Admissibility in Indian Laws, Available at https://legaldesire.com.*

6) *Pragya Sharma, Legal Admissibility of Narco Analysis and Polygraph Test in India, Available at https://www.legalserviceindia.com.*