# INTERNATIONAL JOURNAL FOR LEGAL RESEARCH AND ANALYSIS

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Peer Reviewed

www.ijlra.com

 ISSN: 2582-6433

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 ISSN: 2582-6433

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# Avinash Kumar

*Avinash Kumar has completed his Ph.D. in International Investment Law from the Dept. of Law & Governance, Central University of South Bihar. His research work is on "International Investment Agreement and State's right to regulate Foreign Investment." He qualified UGC-NET and has been selected for the prestigious ICSSR Doctoral Fellowship.He is an alumnus of the Faculty of Law, University of Delhi. Formerly he has been elected as Students Union President of Law Centre-1, University of Delhi.Moreover, he completed his LL.M. from the University of Delhi (2014-16), dissertation on "Cross-border Merger & Acquisition"; LL.B. from the University of Delhi (2011-14), and B.A. (Hons.) from Maharaja Agrasen College, University of Delhi. He has also obtained P.G. Diploma in IPR from the Indian Society of International Law, New Delhi.He has qualified UGC – NET examination and has been awarded ICSSR – Doctoral Fellowship. He has published six-plus articles and presented 9 plus papers in national and international seminars/conferences. He participated in several workshops on research methodology and teaching and learning.*

 ISSN: 2582-6433

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 ISSN: 2582-6433

# ROLE OF DIGITAL FORENSIC IN CRIMINAL JUSTICE ADMINISTRATION

AUTHORED BY - SUDHIR KUMAR DWIVEDI[1]

## Abstract:

Identification of accused and victim is very crucial part of crime investigation. Code of Criminal Procedure and some other laws have specific provisions for identification of accused. There are various mechanism for identification of accused like, test identification parade, documentary evidence etc. but these have not been always useful, because accuracy of identification through identification parade depends upon various variable like time gap in conducting identification, ability physical as well as mental of the identifier to identify. By the advancement of science and technology, mode of identification has drastically changed. Use of science and technology like DNA Profiling, face recognition through camera, biometrics, brain mapping, Norco analysis, etc have played a very important role in this field. There is no specific provision in adjective or procedural law for the identification of victim/victims. In cases where crime has been committed against specific targeted person, in those case identification of the victim is not always been issue but in cases where crime has not been committed against specific victim in those cases identification of real victim or how many victims are there is really uncountable. In modern time nature of offence is changing day by day they are not limited to offence mentioned in the IPC rather the scope of offences is limit less. A number of cyber-crimes are committed daily unfortunately peoples are not aware about such offences and they go unreported. Even offences mentioned in IPC are now committed with modern weapons and techniques in such case identification of victims has become tough task for investigating agencies.

Generally, in reported cases identification of victims not comes in issue; however various new mode of commission of crime has created a new problem in crime investigation that is identification of real victim. Crimes committed by use of science and technology is generally not committed against a single victim, list of victims in such crimes may be endless, because in such cases crime is not committed against fixed victim, rather it may be anyone who are soft

[1]Reserch Scholar, Faculty of Law, Jamia Millia Islamia Central University, New Delhi.

 ISSN: 2582-6433

target of such criminals. When crime is committed against body and crime is so brutal and heinous that identification of victims becomes almost impossible task, in such cases forensic science is the last resource to identify the victims.

Forensic science is one of the most important tools in identification. Various areas of science and technology are ultimately dependent on the forensic science for the accuracy of the result.

Forensic science is an important component of the criminal justice system. Forensic science is playing very important role not only in crime detection but also in identification of accused and victims.

Forensic scientists examine and analyses evidence from crime scenes and other locations in order to develop objective findings that can aid in the investigation and prosecution of criminal perpetrators or clear an innocent person of suspicion. The main thrust of this paper is to analyse different provision related to identification of accused and victims and the advancement of forensic science has impacted the process of identification. Author will suggest some factors to be taken into consideration while considering scientific evidence for the final determination of identity.

**Key words:** Scientific Evidence, Evidentiary value, Scientific Investigation, Forensic Science.

Criminals use coercion to influence eyewitnesses in cases, making it difficult to obtain witnesses. People become apprehensive about providing evidence to investigation agencies7. Most of the time, criminals threaten the witnesses lives as well. The significance of these forensic investigations grows exponentially in these types of circumstances. Nowadays, various methods are used, such as medical and physical examinations, fingerprinting, footprinting, and a variety of other methods. To make a decision, a well-qualified individual must be enrolled. The authenticity of forensic evidence is determined by the conditions upon which it is based and the effectiveness with which arguments are made.[2]

Although the requirement of authentic evidence is nowhere mentioned in the Act of evidence, the courts prefer them over others in general, according to their policy.[3] The courts will look

[2]Emperor v. Sahadeo, 15 CrLJ 220, 230
[3]Saqlain Ahmed v. Emperor, AIR 1936 All165

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into the matter thoroughly if the expert cannot form a conclusion based on the facts of the case or the condition.[4] If two different experts disagree on the evidence, it will lose its persuasive power. In that case, the exporter's point of view should not be followed. Before taking the matter into consideration, the court will conduct a thorough investigation. These types of evidences cannot also be considered if they are in flagrant violation of the provisions of the Evidence Act of 1872, or the provisions of the Indian Constitution. Some controversies are currently raging over certain provisions, such as whether fingerprints should be excluded from the category as a violation of the constitution[5].

The Hon'ble Court considered the issue of illegally occupied evidences in the case of State of Maharashtra v. Natwarlal Damodardas Soni[6]. It was determined that, while the evidences had been occupied illegally, they were equally maintainable in court and their validity in a court of law was not affected. In this delicate case, the court will focus solely on the general admissibility of evidence. This point of view has been supported by the Supreme Court in other decisions. The Hon'ble Court responds favourably to the evidence presented using modern technologies. The courts have accepted superimposed photographs[7], oral evidences, and other forms of evidence as evidence.

## What is Forensic science?

Forensic science is more than just a branch of science concerned with crime and investigation. Forensic science is that piece without which the puzzle of a criminal investigation is incomplete. Without the appliance of forensic science, criminals can never be convicted unless an eyewitness is present. While detectives and enforcement agencies are involved within the collection of evidence, be it physical or digital, it's forensic science that deals with the analysis of these evidences in order to establish facts admissible in the court of law[8]. Thus, in a world devoid of forensic science, murderers, thieves, drug traffickers and rapists would be roaming scot-free[9]. A diverse pool of forensic scientists and forensic tools are involved in the investigation of a criminal act. For instance, forensic pathologists are skilled at determining

[4]Alock v. Royal Exchange Assurance Co. (1849) 116 ER 1275
[5]State of U.P. v. Deoman Upadhyaya, AIR 1960 SC 1125; State of Bombay v. Kanthi Kalu, AIR 1961 SC1808
[6]AIR 1980 SC 593
[7]Ram Lochan Ahir v. State of W.B., AIR 1963 SC 1074
[8]Gaurav Aggarwal, *Smart Study Series Forensic Medicine &Toxicology* 73 (ELSEVIER A division of Reed Elsevier India Private Limited, Gurgaon Haryana), 2009)
[9]"Forensic Sciences and Criminology" by "Wafi Aziz Safwi" Available at: www.legalservicesindia.com (visited on February 20, 2020).

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the cause of death by performing autopsies. An autopsy helps in establishing the cause and manner of death through the examination of body fluids and tissues. Forensic scientists analyze physical evidence (fingerprints, blood, hair etc.) collected from the crime scene to identify suspects. Forensic professionals also use image modification tools to search for criminals absconding from the law for a long time. This tool enables them to digitally age a photograph to understand how the individual would look on ageing[10]. These tools now a day has become the need due to advancement of technology. However, there examples of some of the tools were used in past as well.

## Use of Forensic Science in Crime Investigation and Identification

Sir Arthur Conan Doyle (Smith 2012) was a physician who helped shape criminal profiling. Conan Doyle's fictional Sherlock Holmes used many areas of science, including chemistry, bloodstains, and fingerprints, to catch the exact criminal at a time when real life investigators found it difficult to catch the real killers. His character, Sherlock Holmes, also ensures the safety of the crime scene as well as the contamination of the crime scene under investigation. Conan Doyle used his knowledge to solve many cases in real life as well. Edmond Locard who established the first forensic science laboratory applied his knowledge of forensic science to legal matters. He developed a theory about the transfer of trace evidences between objects, which is now known as Locard's exchange principle. He stated that "every contact leaves a trace," which had a significant impact on the field of forensic science. This is a fundamental principle of the investigation process. Forensic science cannot be limited to a few branches; it is a broad field of science that connects all branches to solve the mystery behind each crime.[11]

As technology advances, the number of applications in forensic science grows. In terms of evidence collected, the laboratories and branches differ from one another. As technology advances, so does the type and manner of crime. This complicates the investigation and makes it difficult for the officers on the scene to solve a crime. This is where the use of forensic science comes into play in solving the crime.

[10]Role of Forensic Science in the Criminal Justice System; Available at: https://www.theprotector.in/role-of-forensic-science-in-the-criminal-justice-system/ (visited on February 28, 2020).
[11]History of Forensic Science, available at: https://application.wiley-vch.de/books/sample/3527347623_c01.pdf (visited on Mar 24, 2023)

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## Branches of Forensic Science Helpful in Identification

### Fingerprint &Footprints Forensics

Indians used fingerprints as a distinguishing feature that distinguished one person from another. Fingerprints were used as signatures by Minoans, Greeks, Chinese, and others in 200 BCE, and they were used to sign written contracts in Babylon (Sonderegger and Peter 2012)[12]. Fingerprints have been the gold standard for personal identification in the forensic community, and they remain so despite the discovery of DNA fingerprints. Human fingerprints are unique, difficult to alter, and durable over an individual's lifetime, making them suitable as lifelong markers of Human Identity. The fingers have papillary ridges with complex patterns that differ from one another. The patterns discovered differ not only from one individual to the next, but they are also distinct and unique within an individual. Fingerprints can be easily used by police or other authorities to identify people who want to conceal their identity, or to identify people who are incapacitated or deceased, such as in the aftermath of a natural disaster[13]. In **State of UP v. Sunil[14],**the Court ruled that a person's footprints can be used to support evidence and that this is not a violation of Article 20(3) of the Indian Constitution of 1950.

### Digital Forensics

Donn Parkers's book Crime by computer is expected to be the first book to use digital information to investigate a criminal activity using a computer[15]. In **a case[16]** the Petitioner's mobile phone was seized for questioning regarding an old criminal case, while he was in custody. The Court ruled that information gathered from a smartphone or email account will not ipso facto establish the accused's guilt and must be established during the trial. According to Section 311-A of the CrPC, it is more than just a specimen or signature. The Court also decided that requiring the password, passcode, or biometrics would not constitute testimonial compulsion or self-incrimination because these are the only facts that must be proven by both sides during the trial. It is noteworthy that information gathered through digital forensic may established the identity of the owner or user.

[12]Available at https://www.imprintseals.org/A_History_of_Fingerprinting (visited on Mar 25, 2023)
[13]Virendra Khanna v. State of Karnataka Available at https://www.findlaw.com/criminal/criminal-procedure/fingerprints-the-first-id.html (visited on Mar 17, 2023)
[14](2017) 14 SCC 516
[15]Bruce, R.M, "*A brief history of forensic odontology since 1775*" 3 J. Forensic Legal Med. (2010)
[16]WRIT PETITION NO. 11759 OF 2020

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**Forensic Odontology**

Dr. Oscar Amoedo ("Father of Odontology") in his article 'Dental Cosmos' described the disaster's identification procedures and proposed a methodology to be used as a foundation in the future[17].

Identification of dead bodies in mass disasters such as fires, explosions, floods, and airplane crashes, is most difficult tasks for law enforcement, especially when the bodies have been charred, dismembered, mutilated, or have reached an advanced stage of decomposition. Here dental characteristics can be used to identify the person. Bite marks patterns are analyised to identify, especially in crimes like burglary, sexual crimes, and so on. Forensic odontology is gaining recognition and acceptance as a method of identification in cases where only skeletal or dental marks remains[18]. Despite recent advances in DNA technology, dental identification remains a quick and cost-effective method for identifying human remains. Even if only a few teeth are available, an opinion on age, habits, oral hygiene, and individual features can be provided, which may match ante mortem records[19].

**Forensic Chemistry**

Forensic Chemistry is the application of Chemistry to the examination of unknown materials discovered at a crime scene[20]. A forensic chemist tests samples collected by detectives and investigators in the lab. These chemists are typically educated in organic chemistry as well as physics. Organic Chemistry aids scientists in identifying DNA by allowing them to run analyses on body samples. Toxicology screenings are also performed. A forensic chemist may be called to a crime scene to examine things like blood patterns, the range of attack, whether the injury was intentional or accidental, and so on[21].

**Forensic Serology**

Blood grouping is an important factor in identifying and confirming the suspect. Paul Uhlenhuth and Karl Landsteiner stated that there are differences in blood between individuals and they grouped them as A, B, AB, and O, and he combined blood serum from different

[17] Supranote16
[18]Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5422639/#R1 (visited on Mar 17, 2023)
[19]Availableat https://www.dental.umaryland.edu/museum/exhibits/online-exhibits/forensic-odontology/what-can-forensic-odontology-be-used-for/ (visited on Mar 18, 2023)
[20]Available at https://sciencemonk.com/forensic-chemistry-applications-of-forensic-chemistry/ (visited on Mar 22, 2023)
[21]Brian Lane, the Encyclopedia of Forensic Science 5 (BCA Publication, London)

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individuals and observed antigen reaction. Paul developed a technique to detect the presence of antibodies and Alec Jeffrey discovered patterns of DNA that could be used to recognise and distinguish one individual from another. This method was first used in case where two teenagers raped and murdered in 1983 and 1986 respectively. Richard Buckland who confessed to the second crime, was of suspect of 1st case as well. His sperm sample was analyised and compared two both cases. It was found that samples are matching in both cases of the murdered victims. It was the first time a DNA dragnet was used[22].

## Trace Evidence Analysis

Trace evidence refers to all small pieces of material collected from crime scenes and accidents that aid in the investigation of these incidents[23]. These traces are frequently microscopic and are unknowingly left at the crime scene by the perpetrators as a result of interaction between objects and individuals. Human and animal hair, natural and manmade fibres, fabrics, rope, soil, glass, and building materials are common trace evidence samples. The presence of a physical fit, such as a fracture match, is critical for trace evidence analysis to identify a common source and accused/victim relation with incident[24].

## DNA Analysis

DNA Typing has massive publicity due to high-profile cases, TV crime shows, and films. DNA proofing has become a well-known technique for the identification and other purposes in criminal and other legal cases[25]. With advancement of DNA technology scientists are able to analyse smaller biological samples in order to create a DNA profile. Skin cells are used to link the person with touched article or weapon. This low-level DNA is also known as "touch DNA." It can even be extracted from a victim's skin or bruises where they have been abused[26]. Low-level DNA samples may be useful where fingerprints would be difficult to recover, such as textured surfaces on gun handles or car dashboards. In forensic DNA profiling, the uniqueness of an individual's DNA is used for identification purpose. Based on the biological components left on them, DNA evidence can help to link an individual with object or a crime scene. Because every nucleated cell in the body contains DNA, any biological fluid, skin, or viscera can

[22]Harbison, Corey, "ABO Blood Type Identification and Forensic Science (1900-1960)". Embryo Project Encyclopedia (2016)
[23]Available at https://www.news-medical.net/life-sciences/How-is-Trace-Evidence-Analyzed-in-Forensic-Cases.aspx (visited on Mar 14, 2023)
[24]Available at https://www.omicsonline.org/conferences-list/trace-evidence-analysis (visited on Mar 14, 2023)
[25]J. M. Tauplin, "*Introduction to Forensic DNA Evidence for Criminal Justice Professionals*" CRC Press, 2014
[26] Available at http://www.forensicsciencesimplified.org/dna/how.html (visited on Mar 25, 2023)

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provide DNA for analysis. Individuals have 0.1 percent of their DNA that is unique and is used for individualization; however, this has limitations for monozygotic twins.

## Issues pertaining to use for forensic science in Investigation and Identification

Forensic science, using evidence found at the scene and scientific technology, provides the investigating officer with a magnificent piece of information. They assist the court in determining answers to specific questions, such as how the crime was committed. What exactly is the crime? Who are the potential suspects? And by answering all of the questions, they attempt to recreate the crime and determine the reason for the crime's commission, thereby reaching out to the criminal.

Though forensic science has made significant contributions to the criminal justice system, the limitations of the law must not be overlooked. A few questions have arisen in the minds of many legal professionals, such as whether forensic evidence is admissible in a court of law. In what ways are these techniques legal?[27]

Since the beginning of time, there has been much debate about whether forensic evidence presented in a court of law violates the fundamental provision of the law. According to Article 20(3) of the Indian Constitution, “No person accused of any offence shall be compelled to be a witness against himself." This principle is based on the maxim "nemo teneteurprodreaccussareseipsum," which translates as "NO MAN IS OBLIGATED TO ACCUSE HIMSELF." In the case of Nandini Satpathy v. P.L Dani[28], self-incrimination was extensively discussed. According to the Supreme Court, the purpose of Article 20(3) is to protect the accused from unnecessary police harassment, and thus it extends to the stage of police investigation in addition to the trial procedure.

The Fundamental Right guaranteed by Article 20(3) provides a shield against testimonial compulsion for people accused of an offence and forced to testify against themselves. In **State of Bombay v. Kathi Kalu Oghad and Anr.[29]**, the Supreme Court ruled that compelling anyone to provide forensic evidence such as fingerprints, blood, hair, or sperm does not violate

[27]Available at https://blog.ipleaders.in/forensic-science-criminal-justice-system/ (visited on March 4, 2023)
[28]1987 SCC (1) 279
[29]AIR 1961 SC 1808

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the provision of Art. 20. (3). The same is stated in Section 73 of the Indian Evidence Act[30], which states that anyone, including the accused, can be asked to provide a fingerprint or DNA examination. In Selvi and Ors. v. State of Karnataka and Anr.[31], the court held that the person giving statements in brain mapping or narco-analysis test is in a semi-conscious state and thus cannot be considered conclusive.

Section 53 of the CrPC provides that a person accused of any crime may be asked to undergo a medical examination if the officers believe that the examination will provide some evidence to the crime[32]. As per section 164A the rape victim should be examined within twenty-four hours by medical examiner[33]. Certain amendments to Criminal Procedure were made in 2005[34] to include the examination of blood-stain, DNA profiling, sperm test, swabs, hair samples, and so on, but it was limited to rape cases.

In **Mukesh and Another v. State (NCT of Delhi) and Others**[35]the Supreme Court in this judgment emphasised upon the importance of DNA report as per Section 53 and 164A of Code of Criminal Procedure, 1973 and held that a DNA report should be accepted unless it is absolutely dented and there should be no error in sampling and no indication of tampering of samples.

In **Sharda v. Dharampal**[36]the Supreme Court held that matrimonial court has the authority to order a person to undergo a medical examination like blood test etc and that is not in violation of Article 21 of the Constitution.

## Judicial Approach

**Selvi and others vs. State of Karnataka**[37]

Nacro-analysis, brain-mapping, and lie-detector tests cannot be performed on an accused without his consent, as this would be a violation of Article 21 of the Constitution. No one

[30]Section 73 of the Indian Evidence Act, 1872
[31]AIR 2010 SC 1974
[32]Section 53 of the Criminal Procedure Code of 1973
[33]Section 164A of the Code of Criminal Procedure, 1973
[34]Criminal Law (Amendment) Act, 2005, available at https://www.latestlaws.com/bare-acts/central-acts-rules/criminal-laws/the-code-of-criminal-procedure-1973/criminal-law-amendment-act-2005 (visited on Mar 10, 2022)
[35](2017) 6 SCC 1
[36]AIR 2003SC 3450
[37]AIR (2010) SCC 263

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should be forced to use any of the techniques in question, whether in the context of a criminal investigation or otherwise. This would be an unjustified intrusion into personal liberty. However, it is for the voluntary use of the contested techniques in the context of criminal justice, as long as certain safeguards are in place.

**Dharam Deo Yadav v. State of U.P.[38]**

Diana, a 22-year-old tourist from New Zealand, was assassinated in Varanasi. Identification by DNA test was done. A skeleton DNA sample matched a blood sample from her father. The accused was convicted based on circumstantial evidence.

**Justice K.S. Puttaswamy (Retd.) and others v. Union of India and Others[39].**

The Supreme Court considered whether the provisions of the Aadhaar Act violated the right to privacy.The Aadhaar Act was deemed constitutional insofar as it allowed for Aadhaar number-based authentication for establishing an individual's identity for receipt of a subsidy, benefit, or service provided by the Central or State Government and funded by the Consolidated Fund of India.

**Nandlal WasudeoBadwaik v. Lata Badwaik[40]**

The petitioner filed a maintenance petition in which she sought support for herself and her daughter. Her husband disputed the child's paternity and requested a DNA test. The Supreme Court ruled that the DNA test is reliable. Section 112 of the Evidence Act was enacted at a time when modern scientific advancement and DNA testing were not even considered by the legislature. When there is a conflict between a conclusive proof contemplated by law and a proof based on scientific advancement accepted by the world community to be correct, the latter must take precedence.

**Dipanwita Roy vs. Ronobroto Roy[41]**

In this case, the husband has sought divorce from his wife due to alleged infidelity by her, and he has applied for a DNA test to prove paternity of the child. The Supreme Court explained the significance of DNA testing by stating that DNA testing is the most legitimate and scientifically perfect means by which the husband could establish his claim of infidelity.

[38]AIR (2013) SCC 643
[39]WRIT PETITION (CIVIL) NO. 494 OF 2012
[40]AIR (2014) 2 SCC 576
[41]AIR (2015) 1 SCC365

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**Gopal Sharma v. State of Rajasthan[42]**

In this case identification was established on the basis of footwear prints not on the basis footprints court held that where a large number of people had gathered at the crime scene, identification cannot be established solely on the basis of footwear prints. The Court also emphasized that footprint evidence is a weak piece of evidence that can only be used to support the Court's conclusion based on other evidence.

**Raj Kumar v. State of Uttar Pradesh[43]**

The current case involves the rape and murder of a young girl by a neighbour. The younger brother witnessed the crime. According to the post-mortem report, the deceased was raped. The DNA report confirmed this. And The Supreme Court noted that the DNA report plays an important role in revealing the identity of the accused involved in the rape of a minor girl and upheld the lower court's finding of facts.

**Sandeep v. State of Uttar Pradesh[44]**

In this case, the accused forced the girl to abort the foetus, but she refused, and she was murdered as a result. The foetus extracted from the deceased womb was sent for DNA testing. The DNA test revealed that the accused is the biological father. The Supreme Court relied on the DNA report to conclude that the accused was the biological father of the recovered foetus.

**Narayandutt Tiwari v. Rohit Shekher[45]**

The issue was regarding identification of biological father. While ordering for DNA test the Court noted that DNA profiling is a modern scientific method that has been accepted in all jurisdictions for conclusively identifying parents. Given the accuracy and value of DNA profiling, this test has the potential to either confirm or debunk an identity.

**Mohd Amir Kasab v. State of Maharashtra[46]**

On November 29, 20th, terrorists attacked Mumbai and killed one hundred people. Mohammed Amir Kasab, a terrorist, was apprehended. The items seized from the boat they used to arrive in Mumbai. DNA profiling linked the accused and his five accomplices.

[42]2016 (4) RLW 3297 (Raj.)
[43]AIR (2014) 5 SCC353
[44]AIR (2014) 4 SCC69
[45]AIR (2003) 3 SCC3450
[46]AIR (2012) 9 SCC 1

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The Supreme Court observed that DNA evidence was crucial in identifying and implicating the accused in the incident of waging war against the government of India. One of the circumstantial evidencesused to prove the case was DNA evidence.

**Sushil Kumar v. State (N.C.T. of Delhi)**[47]

In this case, Sushil Sharma shot and killed his wife Naina, before attempting to burn her body in a tandoor. The revolver and blood-stained clothes were recovered by police and sent to a forensic lab for examination. A blood sample was taken from each parent. The DNA analysis confirmed that the charred body belonged to their daughter Naina Sahni. In this case, DNA evidence is crucial in identifying the charred body of the deceased Naina Sahni.

**PremjibhaiBachubhaiKhasiya v. State of Gujarat and Anr.**[48]

In the case due to absence of any other evidence, the High Court had to decide whether the DNA analysis could be the only basis for proving the accused's guilt of rape. The Court decided that a positive DNA finding can have a significant impact in cases where such evidence is present, based on the quality and strength of the supporting evidence. However, if it is the only piece of evidence, it cannot correct the identification. Assuming the evaluation is ominous, the blamed would be completely cleared for the allegation.

**Pattu Rajan v. State of Tamil Nadu**[49]

In this case, the appellant was found guilty of culpable homicide, which does not constitute murder. The superimposition method, in which a photograph of the deceased was superimposed over the image of the recovered skull, was used to identify the deceased person's body. The Court reiterated that it is the duty of an expert witness to assist the Court by providing the report based on their expertise along with reasons so that the Court can form its own independent judgment by evaluating such materials while discussing the argument regarding the absence of DNA profiling.

**Hari Om @ Hero v. State of Uttar Pradesh**[50]

The Supreme Court ruled that if fingerprint report did not specify the method used to extract latent prints, this may lead to its dismissal of the fingerprint evidence. If prints have not been

[47]AIR (2014) SCC 317 (4)
[48]2009 CRI. LJ 2888
[49](2019) 4 SCC 771
[50](2021) SCC Online SC 2

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taken by experienced person, then uniqueness of finger impression may lost and if there was no substantive evidence to link the accused to the crime, even if the fingerprint evidence was accepted, this cannot be sole basis of conviction.

## Conclusion

The justice system has a strong faith in forensic science and has relied on it for centuries to deliver verdicts. Forensic reports are regarded as belief tendered by experts and are considered the bible for many judges. However, courts are not bound by the reports and can consider other evidence.

However, this is a developing area of law, and states laws governing the collection of DNAs from arrestees vary. A court order is sometimes required to obtain a reference from a person of interest. Unless the victim refuses to cooperate with the investigation, reference samples are always collected from them; in that case, a court order may be required.