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STUDY ON THE USE OF DNA EVIDENCE IN CRIMINAL JUSTICE SYSTEM

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ABSTRACT

Law enforcement faces challenges in preventing illicit misuse of scientific technology, even though it has transformed daily life. Forensic science, particularly DNA technology, is extensively utilised in modern criminal investigations. This investigation examines the way the Criminal Justice System (CJS) in India has implemented DNA evidence over the years. This study employs a doctrinal approach that synthesises academic sources' findings to investigate the use of DNA in criminal cases, from the collection of DNA at crime sites to the resolution of paternity issues. Although DNA evidence is undeniably valuable, there are still uncertainties regarding its impact on the right to privacy and a fair trial, as well as statistical reliability and sample contamination. This study recommends a middle ground strategy to completely realise the potential of DNA while simultaneously safeguarding individual rights. The CJS of India will be strengthened to withstand the challenges of the present day and to ensure that judicial decisions are equitable.

Keywords: *DNA evidence, Crime, Criminal Justice, Forensics.*

INTRODUCTION

Life for the average person has changed drastically due to technological advancements in science. Along with the good things about these technological improvements in terms of lifestyle and infrastructure, they have also made it harder for law enforcement to stop criminals from abusing these tools to do their crimes. Substantial scientific evidence is provided by the scientific examination of the exhibits. Forensic science refers to the scientific methods used in criminal investigations. In numerous cases, these technological developments were discovered to significantly affect the fair administration of justice. But the CJS can undergo a radical transformation with the prudent application of technology. Many innocent people were spared

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from conviction due to the use of forensics, as is seen from the literature.[1]

There are a lot of new opportunities in forensic genetics since deoxyribonucleic acid (DNA) was discovered. In legal proceedings, DNA evidence has proven to be an effective investigative tool in determining guilt or innocence. The lack of clear legal justifications for the use of DNA technology in routine acts of jurisdiction has given rise to a new concern regarding the DNA evidence's legal standing in India. There are a few laws that cover it now, but India has been trying to pass new ones since 2003. This article discusses the new problems that have arisen because of using scientific knowledge to the CJS, including the necessity of a DNA prosecution bill and additional changes to the current legislation.[2]

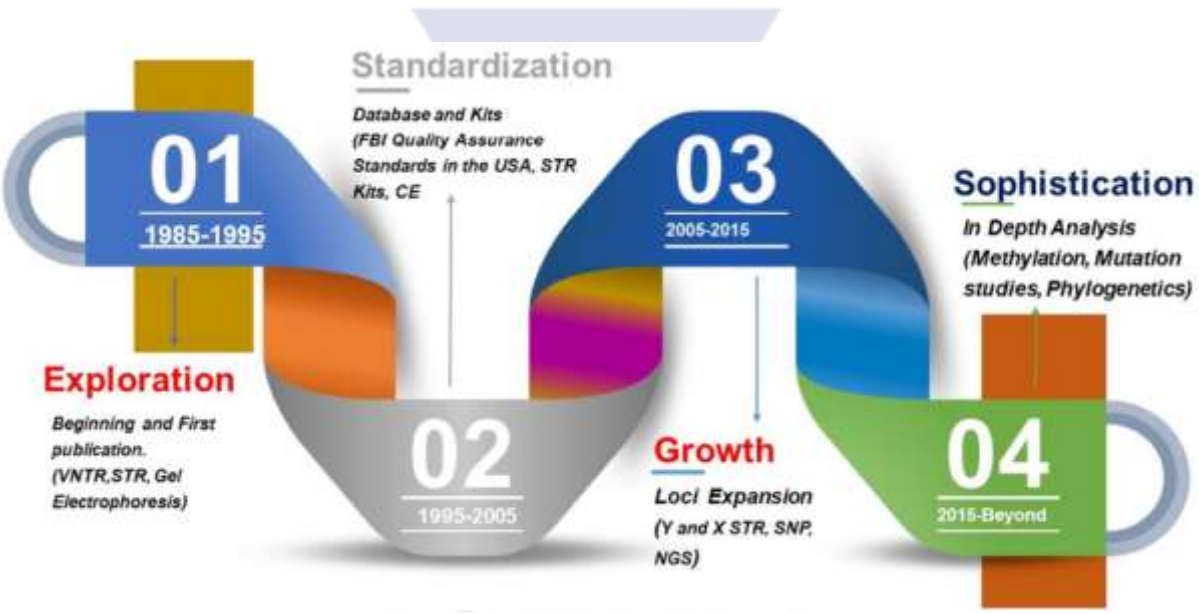

Figure 1: Timeline of developments in DNA technology: an overview. (Kumar et al., 2016)

Research Methodology

In this research paper, doctrinal approach is used to gather data from secondary sources. Journals, papers, internet sources, and research articles are used to gather and analyse the data. The sources have contributed to a better understanding of DNA evidence and its function in enhancing the criminal justice system in India. The article's research materials include scholarly articles, journals, and online resources that discuss the significance of DNA evidence in India's criminal

[1] Srivastava, A., Harshey, A., Das, T., Kumar, A., Yadav, M. M., & Shrivastava, P. (2022). Impact of DNA evidence in criminal justice system: Indian legislative perspectives. *Egyptian Journal of Forensic Sciences/Egyptian Journal of Forensic Sciences*, *12*(1). https://doi.org/10.1186/s41935-022-00309-y

[2] Kumar, S., Verma, A. K., Singh, P., & Singh, R. (2016). Current scenario of forensic DNA databases in or outside India and their relative risk. *Egyptian Journal of Forensic Sciences/Egyptian Journal of Forensic Sciences*, *6*(1), 1–5. https://doi.org/10.1016/j.ejfs.2015.03.002

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justice system, as well as the evolution of DNA technology and its function in determining guilt in various seminal cases.

Understanding DNA Evidence

When it comes to solving crimes, DNA evidence has always been essential. This evidence can be retrieved from any kind of bodily cell that is unintentionally left behind at the site of the crime. To identify the criminal, forensic specialists must examine the scene, gather evidence, extract the DNA, and run a DNA profiling study. These pieces of evidence are so detailed that they can establish guilt or innocence, or even the involvement of an accused in a crime.

In situations involving murder or sexual assault, DNA evidence is typically utilised for the purpose of convict identification. As seen in the Priyadarshini Mattoo case[3], it is possible to establish guilt or innocence in cases of sexual assault or rape by comparing semen samples taken from the victim's body with those of the accused. As was seen in the 19924 Rajiv Gandhi assassination, where DNA analysis positively identified the prime minister's and the perpetrator's remains despite extensive trauma sustained in the explosion, it can also be used to identify victims or accused based on mangled portions.

Establishing a child's biological parents is another common use of DNA evidence. A person's DNA is their unique composition that they inherit from their parents, as previously said. The bond between a parent and child can thus be depicted using it. A paternity dispute involving support payments under Section 125[4] of CrPC was at the heart of the case Gautama Khaddu v. State of West Bengal[5].

It was in the case of Colin Pitchfork[6] in Leicestershire that DNA profiling was initially used. Two women were victims of sexual assault and subsequent murder in the years 1983 and 1986. On the suspicion that the two murders were carried out in a similar fashion, the authorities requested that Sir Alec Jeffreys, the creator of the DNA profiling technology, analyse the samples taken from the victims' bodies using this approach. It was determined that one person had committed both killings since the semen samples taken from the victims' bodies were found to be identical. In addition, Richard Buckland, the primary suspect, was found not guilty of the murder according to

[3] Santosh Kumar Singh v. State through CBI (2010) 9 SCC 747.
[4] Section 125 in The Code of Criminal Procedure, 1973
[5] AIR 1993 SC 2295.
[6] R v Pitchfork [2009] EWCA Crim 963

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the results. After DNA evidence cleared his name, he was the first to be released from prison. After that, everyone in that area was asked to give samples for testing, which, although looking at 5,000 samples, turned out to be useless. Following this, a witness related overhearing a discussion in which a man claimed to have given a sample on behalf of his friend Colin Pitchfork. Colin Pitchfork was ultimately found guilty of the murders of the two ladies when his DNA matched that found on the victims' bodies.[7]

Importance of DNA evidence in criminal trials in India

Under the Indian Evidence Act[8], all Indian state and jurisdictional entities consistently follow the rules. It includes uniform regulations for criminal and civil proceedings. Although all trials are governed by the same regulations, the requirements for the burden of proof may differ between civil and criminal cases. When it comes to criminal jurisdiction, the Indian legal system follows the principle of onus probandi. Until proven guilty beyond a reasonable doubt, the accused is presumed innocent. The inclusion of the idea of Onus Probandi[9] in the Indian Evidence Act has severely limited the use of forensic evidence.

For adjudicating criminal procedures in India, two fundamental procedural statutes are the Criminal Procedure Code[10] and the Indian Evidence Act[11]. From the commission of the crime to the finding of guilt or innocence, the whole process is covered by the CrPC[12]. After reviewing the evidence presented in court, judicial magistrates reach a final verdict after carefully considering all relevant factors. Only evidence submitted by the prosecution or the defendant is eligible to be used under the Indian Evidence Act. The Act specifies which forms of evidence can be used in criminal proceedings. According to Section 45[13], expert opinions are considered evidence, and Section 46[14] specifies that pertinent facts that support or contradict expert judgements should be evaluated.

The fields of forensic identification (DNA testing), forensic entomology, forensic dentistry, forensic pathology, and forensic toxicology are all part of the forensic science toolbox when it

[7] Titus, N. G. S. (2023). The role and importance of DNA evidence in the Indian criminal justice system. *Indian Journal of Forensic Medicine and Toxicology*, *17*(4), 30–35. https://doi.org/10.37506/ijfmt.v17i4.19937
[8] Indian Evidence Act, 1872
[9] https://getlegalbuddies.com/blog/onus-probandi-legal-concept-explained/
[10] The Code Of Criminal Procedure, 1973
[11] Indian Evidence Act, 1872
[12] The Code Of Criminal Procedure, 1973
[13] Section 45 in The Indian Evidence Act, 1872
[14] Section 46 in The Indian Evidence Act, 1872

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comes to criminal cases. To look at specific parts of DNA, scientists use the STR approach. It helps to differentiate between various DNA profiles. Mitochondrial DNA analysis (mtDNA) looks at the genetic profile that's been taken out of things like hair, bones, and teeth; Y chromosome 10 research is used to add genetic markers and track several male donors.[15]

As a subfield of forensic science, entomology helps determine how and why people die. This specific gadget pinpoints the exact spots where the incident occurred, checks for the presence of harmful substances or drugs, and determines whether there was medical negligence that led to the victim's death. The field of forensic odontology focuses on the analysis of bite marks and teeth. Bite mark crimes can be better understood with its help in identifying the age and features of the perpetrator. Bite mark analysis is a challenging method for identifying the abuser in child abuse situations. (Singh & Singh, 2019)

In the 1975 Kerala case of Vasu versus Santha[16], a blood test of the accused proved the children's validity. Particular protection is accorded to the verification of legitimacy status in India. Cases involving the legal status of a child are subject to the strictest scrutiny by the courts. A child's legitimacy cannot be established only by proof of a mother's adultery. While deciding on the kid's legitimacy, the level of evidence must be considered. In the Vasu case, the blood test proved that Vasu was really Santha's biological father. The court found Vasu to be financially liable to his wife for the care and upbringing of their children after reviewing the findings of the blood tests.
In the 1995 Delhi Tandoor Murder Case[17], alleged killer Shushil Sharma shot and killed his wife Naina Sahni three times in the chest and head. The fact that Sushil thought she was seeing Matloob Karim led him to murder her. After killing Naina, Sushil wrapped her corpse and took it to the Bagiya eatery. The accused chopped up the corpse and set fire to the parts in the outdoor tandoor oven of the eatery. Nevertheless, the burning possession was halted after the local policeman issued a caution due to smoke and odours. Aside from Sushil's bloodstained clothes, the authorities also found the revolver he used. They also compared the bloodstains on the deceased person's head and neck to blood samples taken from Sahni's parents. The body was positively identified as belonging to Naina Sahni by DNA testing, bloodstains on the clothing, and Sahni's parents. The court found Sushil guilty and sentenced him to death after DNA testing established a match between Naina's blood and that found on Sahni's parents' clothing and the body. The death

[15] Forensic Architecture, & Weizman, E. (2017). *VIOLENCE AT THE THRESHOLD OF DETECTABILITY*. ZONE BOOKS. https://law.unimelb.edu.au/__data/assets/pdf_file/0004/3109117/5.-Weizman-Forensic-Architecture-2017.pdf
[16] Vasu V/s. Santha, 1975 ker L.T. 533
[17] State vs Sushil Sharma on 19 February, 2007

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sentence was then changed to life in prison after further appeals.[18]

Sister Abhaya's corpse was found outside the kitchen area of the church where she lived in the 1995 murder case in Kerala[19]. A member of St. Joseph's Congregation for women under the Knanaya Catholic diocese of Kottayam, Sister Abhaya was a 19-year-old woman. Up at the crack of dawn, she would get ready for her test. Despite her customary early morning study session, she made a diversion to the dormitory to fetch water on the fateful day. Her body was later recovered from a well outside the kitchen after she was reported missing. The girl was fatally hacked to death with an axe, according to forensic investigations that included narco-analysis, polygraph testing, and brain fingerprinting. The murder of Abhaya was brought against two fathers under Sections 302[20], 201[21], and 34[22] of the Indian Penal Code. The importance of forensic evidence in reaching fair and effective lawsuit settlements is highlighted by case analysis. Forensic evidence is becoming increasingly important in legal procedures, and this must be taken into account.

An important turning point in Indian judicial history occurred in the case of Kunhiraman vs. Manoj[23]. "The evidence of the expert is admissible under sec. 45 of the Indian Evidence Act," the Chief Judicial Magistrate (CJM) cited the DNA expert's conclusion in this case. Accordingly, under Section 51[24] of the Indian Evidence Act, the basis upon which the conclusion is reached is also significant. I fail to see any reason to reject PW4's findings because he is a molecular biology expert and because it is so compelling. If the opinion of a fingerprint expert or a chemical analyzer is considered credible, then the opinion of PW4, who is an expert in cellular and molecular biology, is likewise acceptable. The child's biological father was determined to be Mr. Kunhiraman. The Kerala High Court heard an appeal of this decision and affirmed it.[25]

In the case of Kantidev vs. Poshiram[26], which had a paternity dispute as well, the court made it plain that "The result of a genuine DNA test is said to be scientifically accurate." That, however, is insufficient to evade the conclusiveness of Section 112[27] of the Act; for example, even if a

[18] Kapila, P., & Aulakh, R. (2018). DOMESTIC VIOLENCE: AN APPRAISAL OF INITIATIVES IN INDIA [Journal-article]. *International Journal of Research in Social Sciences*, *8*(4), 512–515. https://www.ijmra.us/project%20doc/2018/IJRSS_APRIL2018/IJMRA-13604.pdf
[19] Sr. Sephy vs Union Of India on 1 January, 2009
[20] Section 302 in The Indian Penal Code, 1860
[21] Section 201 in The Indian Penal Code, 1860
[22] Section 34 in The Indian Penal Code, 1860
[23] Kunhiraman vs Manoj on 27 February, 1991
[24] Section 51 in The Indian Evidence Act, 1872
[25] Supra note 1
[26] Smt. Kamti Devi & Anr vs Poshi Ram Respondent, Appeal (civil) 3860 of 2001.
[27] Section 112 in The Indian Evidence Act, 1872

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husband and wife were cohabitating at the moment of conception, a DNA test might still prove that the kid was not born to the husband. The husband may find it difficult to accept paternity of a child who is not his biological offspring. If the mother and her husband were cohabitating when the child was conceived, the law protects the child from being bastardised even in this scenario. So, using the definitions of access and non-access given above, we can answer the question of how strong the evidence of non-access needs to be to refute the certainty.[28]

Limitations of DNA Evidence

Although DNA technology's use in the criminal justice system is an absolute need, there are many who are critical of this innovative tool. There is still no clear answer as to whether or not DNA evidence violates the Indian and American constitutional guarantees of a fair trial and the right against incrimination. The statistical probabilities are another source of worry. Some have questioned whether it is possible to convict someone based on likelihood alone, regardless of how remote the possibility that two individuals will share a profile may be. Even if science were perfect, the outcome of a scientific forensic examination would still be subject to human error and the possibility of evidence manipulation or tampering.[29]

DNA evidence cannot prove the perpetrator's mens rea, but it can show whether they were present or participated in the crime. But it helps with investigations by ruling out potential suspects, which is particularly useful given the ways in which crimes are being committed. Also, it's not dependable to rely on DNA data that has been contaminated due to poor sample quality, damage from processing, or exposure to biological stimuli. The supplied samples must be stored meticulously to avoid contamination from the crime scene, which is a crucial part of DNA profiling.[30]

CONCLUSION

A major step forward has been the use of DNA technology into India's Criminal Justice System, which provides accurate means of identifying offenders and guaranteeing justice. The lack of specific legislative rules is a major concern, even if it has been successful in resolving criminal cases. The importance of a thorough DNA profiling bill and changes to improve the regulatory

[28] Verma, S. K., & Goswami, G. K. (2014). DNA evidence: Current perspective and future challenges in India. *Forensic Science International*, *241*, 183–189. https://doi.org/10.1016/j.forsciint.2014.05.016
[29] Sanmiha, L., & Yokesh, M. (2018). A Study On Role Of Dna Technology In Criminal Investigation [Journal-article]. *International Journal of Pure and Applied Mathematics*, *120–120*(5), 4433–4453. https://acadpubl.eu/hub/2018-120-5/4/366.pdf
[30] Supra note 7

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environment for forensic procedures is highlighted by this research. This research has underlined the crucial importance of DNA in determining guilt or innocence, resolving paternity disputes, and improving judicial certainty through doctrinal analysis and case studies. Privacy, fair trial rights, and forensic evidence dependability are still issues that need to be carefully considered and implemented with a balanced approach.Going ahead, lawmakers, solicitors and forensic science professionals must work together to create and pass strong laws that tackle these issues. In addition to strengthening DNA evidence's legitimacy and admissibility, these measures would maintain constitutional norms and guarantee fair outcomes in India's pursuit of justice. Ultimately, DNA technology has great potential to improve criminal investigations. However, for it to be fully used, lawmakers must take aggressive steps to protect individuals' rights and ensure that the criminal justice system remains fair.

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