

**How to Cite:**

Rokade, S. P., & Shrivastava, G. (2022). An efficacy of forensic technology in crime investigation and administration of justice: Narco analysis and DNA mapping. *International Journal of Health Sciences*, 6(S3), 6312–6326. <https://doi.org/10.53730/ijhs.v6nS3.7397>

## **An efficacy of forensic technology in crime investigation and administration of justice: Narco analysis and DNA mapping**

**Mrs. Sangita Padmakar Rokade**

Himalayan University Arunachal Pradesh

**Geeta Shrivastava**

Himalayan University Arunachal Pradesh

**Abstract**--There have been significant advances in the forensic sciences (Narco analysis DNA mapping, polygraph, brain mapping, and new scientific instrumentation) over the last twenty-five years. However, more research is required to determine the contribution of these developments to the importance and purpose of scientific evidence in criminal case processing and prosecution. New forensic technologies have been examined in targeted research, but no studies have assessed the whole variety of scientific evidence that is available at crime scenes and its successful investigation and administration of justice. The legal system and law enforcement agencies alike are increasingly turning to forensic science for help in investigating crimes and securing convictions. However, in the Indian judiciary setting, the utility of forensic science has yet to be demonstrated in terms of the labor required and the outcomes of cases. Research in this field has tended to concentrate more on science and technology than on how individuals might effectively use forensic services/science to achieve acceptable justice results. The findings given are the result of a thorough investigation by the researcher. This document includes an overview of the research project's rationale and goals, as well as an explanation of the present state of the project's work. Because of the importance of forensic evidence in investigations and court proceedings, service providers might benefit from understanding how it is utilized and interpreted. The efficient use of forensic evidence might be improved by the outcomes of this study. The ineffective use of forensic science in the criminal justice system is hindered by a lack of empirical study on the usefulness of numerous forensic evidence types.

**Keywords**---narco analysis DNA mapping, polygraph, brain mapping, forensic, judicial system.

## Introduction

Crime takes on various guises and methods as civilization progresses, getting more sophisticated with each passing day. DNA fingerprinting, lie-detector tests, brain mapping, and Narco-analysis testing are all examples of current scientific procedures that must be used in the investigation and legal processes. When traditional types of crime have taken on enormous proportions, these strategies are just as essential\*. To put it simply, Narco Analysis is a diagnostic and psychotherapy procedure that employs psychotropic medicines, primarily barbiturates, to generate a stupor in which mental components with strong accompanying emotions may be exploited by the therapist. Horselley invented the term "Narco Analysis" to describe the study of drug use. Since its first documented usage in 1922, criminal Narco analysis has been scrutinized, and the findings have been nothing short of dismal†. In India, the term "Narco analysis" was not widely used until recently. A variety of Indian investigative agencies have used it as a novel investigative approach in recent years, and it has been widely reported.

DNA profiling is a new technology. Determining the analysis of genetic elements that are unique to the individual is the goal of genetic identification testing. Even though 99.9% of the human genome's DNA sequences are similar, just a few sequence changes allow us to identify one person from another‡. Different sequences are often used to identify individuals. DNA fingerprinting, DNA profiling, and DNA typing are some of the methods used in identification testing. Even though these tests have distinct technical distinctions, the phrases have been employed interchangeably across the industry. Forensic science, such as Narco analysis and DNA profiling, has completely altered the way criminals are found. During the last two decades, investigative processes have evolved as a result of the rapid advancements in forensic scientific technology§. Since it is mostly thanks to forensic science that crimes and perpetrators are identified, it plays a significant role in the judicial system. There have been times in the past when courts have seen it as insufficient or unreliable since it is a burgeoning field that needs much knowledge, abilities, and experience. Nevertheless, it is impossible to ignore the importance it plays in securing convictions\*\*.

---

\* Qureshi, Sumera, Ram Prakash, and Subhash Chandra Gupta. "Role of DNA Profiling in Criminal Investigation Based Leading Case Laws." (2021).

† Sabhapathi, Vaishnavi. "Critical Analysis of Truth Serum Test in India." *Freedom of Speech* (2018): 59-65.

‡ Shali, Sonia Kaul. "Applicability of Forensic Science in Criminal Justice System in India with Special Emphasis on Crime Scene Investigation." *Medico-Legal Desire Media and Publications, Medico-Legal Reporter, Inaugural Issue* (2018).

§ Garad, Askar Mohammed Ali. "Rise of Digital Forensics and its Impact on Criminal Justice: A Study of Tools and Techniques Involved." (2020).

\*\* Mack, Mrs Shubhi, and Ishita Chatterjee. "Role of Forensic Evidence in Criminal Justice Delivery System in India." *Nveo-Natural Volatiles & Essential Oils Journal| NVEO* (2021): 5765-5770.

## **Background Forensic Science and DNA evidence**

Forensics is founded on a wide range of scientific subjects, particularly mechanics, geology, as well as physiology, both of which are engaged with the identification, recognition, as well as analysis of forensic evidence<sup>††</sup>. This has become a critical element of the legal system since it combines a broad range of science with organizations that have started related to criminal and civil law facts. Among the most current as well as trustworthy tools for inquiry in forensic science seems to be DNA analysis. DNA is an initial for "sugar moiety DNA molecules." It is a natural matter present in all living tissue which creates a different genetic signature<sup>‡‡</sup>. DNA might well be collected from various sources, including blood, pollen, tissue, teeth, and so forth. DNA profiling is a scientific treasure that benefits humankind beyond discrimination. The growth of DNA testing first from laboratory to digital forensics; the conscience to use for legal or courtroom reasons, particularly engaged the scientific as well as jurisprudence age and mankind from such a scientific standpoint, the technique of DNA testing emerged in humble origins<sup>§§</sup>.

## **Narco Analysis**

Long before the advent of different advanced instruments, the method of inquiry and interrogating in India was becoming obsolete, with policemen mostly dependent on techniques that should not be permitted in some kind of a civil country<sup>\*\*\*</sup>. A criminal investigation has, to a somewhat extent, responded to the advance of technology in other aspects of life. Narco-analysis is however one technique that can be helpful in this regard. Narco analysis is indeed a public statement by the defendant employing scientific instruments which will be used as testimony towards someone.

The Evidence Act, which is the principal statute governing the acceptance of evidence in a court of law, is silent on Narco metrics, however, opponents have long claimed that such a test contradicts the constitutional freedoms provided to all persons by the Convention<sup>†††</sup>. Many political experts and constitutional lawyers contend that perhaps the Narco-analysis method violates the right to self-incrimination provided by Article 20 (3) of both the Convention<sup>†††</sup>.

---

<sup>††</sup> Kathane, Prachi, et al. "The development, status, and future of forensics in India." *Forensic Science International: Reports* 3 (2021): 100215.

<sup>‡‡</sup> Singh, Yogender, and Pratima Devi Ranga. "Importance of Forensic Science in Crime Investigation." *Indian Journal of Forensic Medicine & Toxicology* 15.3 (2021).

<sup>§§</sup> Anand, Bhavya, and Lalima Das. "Forensic Criminology: A Revolutionary Parameter for Legal Fraternity." *Supremo Amicus* 28 (2022): 173.

<sup>\*\*\*</sup> Mishra, Praveen. "Narco-Analysis in Criminal Investigation and Trial: A Conspectus." *Indian JL & Just.* 11 (2020): 76.

<sup>†††</sup> Sarkar, S., & Singh, S. Narco Analysis Test: Admissible OR Not? Available at SSRN 3687775. (2018)

<sup>†††</sup> Kaur, Jagpreet. "Changing dimensions of right against self-incrimination: an analytical study." *Revista de Drept Constituțional* 01 (2021): 32-42.

## Polygraph

Some other major scientific instrument during investigations is the polygraph. The polygraph often is characterized as both a recording device but is sometimes referred to as psycho-physiological identification<sup>§§§</sup>. It is a device that analyses and monitors physical responses of both the human body such as the participant's pulse rate, heartbeat, ventilation system, and electrocardiogram ( e.g. while the subject is asked a question about the event as well as responses to them. Every one of the physical effects induced by the sympathetic nervous system throughout the inquiry is assessed by polygraph testing. Because autonomic adjustments are more than an individual's immediate control, cardiac autonomic responses changes occur when the person tries to lie under oath<sup>\*\*\*\*</sup>. A polygraph seems to be a device that measures the tracking of multiple different vibrations, such as pulmonary venous pulse waves, and even the apex beat of both the heart, all at the same period. A "Lie Detector," as per the Research & Tech Wikipedia, is a technology method to monitor an instinctive physical response that all individuals exhibit while speaking but never when stating the truth<sup>††††</sup>.

## Literature Reviews

DNA testing aka Deoxyribonucleic Acid is a sophisticated method of determining a person's identification. Both civil and criminal cases have benefited from the use of DNA technology. DNA testing has been employed in criminal proceedings when supporting evidence and Disaster Victim Identification is necessary<sup>††††</sup>. Additionally, DNA may be utilized as a powerful tool to identify offenders if biological proof is necessary. Genetic, blood connection, child care, and kinship may all be determined using DNA testing in civil cases. To investigate a crime, DNA may be utilized in two ways. When a suspect is apprehended and his or her DNA sample is matched to evidence gathered at the site of the crime, the case is considered closed. Comparing and evaluating suspects with legal access to crime scenes may be made easier by using DNA evidence as a helpful evidentiary aid. There are several ways that DNA technology aids in an impartial trial by excluding persons standing at the scene of a crime who have no connection to the crime and hence aren't eligible to testify in court since their DNA does not match that of the biological evidence gathered there. Even though it does not directly mention DNA testing, Section 53 of the Criminal Procedure Code of 1973 gives an investigating officer the authority to examine an accused using scientific methods<sup>§§§§</sup>. For inquiry, police may collect a suspect's semen, blood, and urine samples. It

---

<sup>§§§</sup> Subramaniam, Karthik. "A Study on the Development of the Admissibility of Polygraph Tests in India." *Available at SSRN 3733636* (2020).

<sup>\*\*\*\*</sup> Buchiya, Ms. Laxmi Khimji. "Use of Polygraph and Narcoanalysis Tests in India: A Legal Perspective." (2019).

<sup>††††</sup> Mallow, Muzaffar Syah. "The Admissibility of Polygraph Test as Evidence." *Proceedings of Socioint* 2020.7th (2020).

<sup>††††</sup> Anand, Bhavya, and Lalima Das. "Forensic Criminology: A Revolutionary Parameter for Legal Fraternity." *Supremo Amicus* 28 (2022): 173.

<sup>§§§§</sup> Saini, Rahul. "Punishments and Judicial Response-A Critical Review." *Jus Corpus LJ* 2 (2021): 486.

demonstrates that DNA technology may be used to gather important evidence against the criminal.

In India, Narco analysis is becoming more and more commonplace in investigations, court hearings, and labs. Although this presents several major scientific, legal, and ethical concerns. All of these issues must be addressed immediately for efficient use of Narco-analysis. In India, the word "Narco analysis" is becoming more and more frequent, to the point of worry<sup>\*\*\*\*</sup>. It refers to the use of barbiturates or other medicines to induce a sleep-like condition to conduct psychotherapy on a person. Cases like the *Nithari murderers* which is the case of *Surendra Koli vs State Of U.P. Ors*<sup>††††</sup> and *Mumbai train bombers which is the case of Mohammed Ajmal Mohammad Amir Kasab @ Abu Mujahid V. State Of Maharashtra*<sup>####</sup>, in which the barbiturate sodium pentothal was used to sedate the accused, have occurred often<sup>§§§§</sup>. Using Narco analysis tests raises basic issues in the realms of both the law and human rights. There are legitimate concerns about the legality of using this approach as investigative assistance, such as the intrusion on an individual's civil freedoms and privacy. According to many, the Indian investigating agencies' implementation of the test is a clear breach of Article 20(3) of the Constitution<sup>\*\*\*\*\*</sup>. A confession based on hypnosis goes against the adage *Nemo Tenetur se Ipsum Accusare* that is, the court should reject it if the confession is based on any bodily or moral coercion<sup>†††††</sup>. Its acceptability as a scientific tool in investigations and its final admissibility in court as forensic evidence is, therefore, the primary issues.

## Research Gap

Research is a one-of-a-kind approach to express something in new ways, recreate existing ideas in new ways, or find a new notion. Every researcher distinguishes himself by their research. As a result, the research gap serves as a bridge for the extension of previously unexplored concepts. In this research, the researcher has analyzed so many other governments and private originated papers to find out the gaps, and the gaps are following such as;

- Lack of information about the modern use of DNA profiling and Narco Analysis in other papers.
- No evidence about the implementation of polygraph and brain mapping concepts.
- Lack of information about the other investigation profiles like fingerprint analysis, hair analysis, etc.
- No systematic procedure for writing.

---

\*\*\*\* Kha, G. F., and Sheeba Ahad. "Role of forensic science in criminal investigation: admissibility in Indian legal system and future perspective." *Int J Adv Sci Eng* 7 (2018): 1124-1134.

†††† CRIMINAL (CAPITAL) APPEAL NO. 1475 OF 2009

#### Criminal Appeal Nos. 1899-1900 Of 2011 Etc.

§§§§ Aishwarya, S. "Evidentiary Value of Narco-Analysis." *Supremo Amicus* 6 (2018): 343

\*\*\*\*\* Kannan, D. "Evolution of Criminal Jurisprudence on Interpretation of Art. 20 (3) of Constitution of India held by Indian Judiciary." (2019).

††††† Konečná, Zuzana. "Zásada nemo tenetur se ipsum accusare." (2021).

## **Research Question**

- What is the use and implementation of Narco analysis tests in the modern investigation process of the forensic department?
- How do the results of forensic technology through DNA Mapping impact on investigations and prosecutions process in India?
- What should be the futuristic perspective of the forensic department from the technological point of view to develop the criminal investigation?

## **Importance of the study**

The paper is important because it will examine the goals outlined below in a critical manner. The goal of this work is to bridge the knowledge gap between the fields of Narco analysis and genetic mapping. Here, the researcher will look at how Forensic science may be used to help solve crimes, and how society can benefit from its use. Additionally, this research examines how forensic science serves as an intermediary between medical and legal experts. The purpose of this study is to trace the history of the Narco Analysis Test in India's criminal justice system from its inception to the present day.

## **Research Objectives**

- To understand the implementing process of DNA methylation and identify the procedure and implementation of the Narco analysis in forensic science.
- To signify the futuristic approach of the forensic department within the aspect of DNA profiling and Narco analysis.
- To discuss that Forensic science reports and testimony have their greatest impact at the time of sentencing.

## **Scope and Limitation**

The major limitation of the paper is that this paper is limited to the research for problems and perspectives on the efficacy of Narco analysis and DNA mapping in India. For any research, whether it is primary or secondary the limitations are the relevant part that the researcher takes care of. While approaching the audience through the research work, the researcher needs to pay attention to every single one to avoid making mistakes. As this is a secondary research paper, the researcher had to invest more time in the data collection methods as the researcher had to go through so many research articles and journals, and news publications that had relevance to the research topic. The other biggest limitation is that the results are not statistically significant thus the findings could not be scientifically used for interpretation.

## **Research Methodology**

### **Research Method**

Research methods and design are an important aspect of the research process because they allow the researcher to utilize a methodology or procedure to obtain solutions or answers to the research question that can then be interpreted

further. This paper is quite descriptive as it explains every answer to the research question#####. There is a strategy in place for the researcher to deal with the problem revealed in the study. The research study will be conducted using the interpretivism paradigm since it will examine the views and viewpoints of a wide range of people in society. Qualitative research should be used for this study since it will examine theoretical variables and assess the many aspects of the research question.

### **Source of research**

This research relies on secondary sources for its data. The researcher uses the illustrative approach, which builds a cause-and-effect relationship, to investigate current hypotheses. From e-books to journals to Google Items to news articles to publications and more, we've sourced our data.

### **Research Approach**

The research approach is a method as well as process typically comprising various ideas as well as specific techniques used for data collecting, evaluation, as well as presentation §§§§§§. In a nutshell, it is reliant on the nature of the topic of interest getting addressed. The investigation method is typically split into two categories: information gathering technique as well as data analysis or argumentation technique. As an outcome, in this academic research, the scientist used the secondary methodology, which is qualitative research. The research assumptions that were used to determine data collection methods are thoroughly examined in the study plan. Obtaining and evaluating relevant data on the subject of the study is an important part of the research methodology. The descriptive method is used in qualitative research to answer a particular research topic\*\*\*\*\*.

### **Analysis of Study**

*Question 1: What is the use and implementation of Narco analysis tests in the modern investigation process of the forensic department?*

A specialist performs a narco analysis test. GABA (a neurotransmitter inhibitor) is a substance that naturally exists in the human system. Truth drug attaches to GABA and forms a compound at the B site that puts more pressure on the permeability of chloride ions further into the neutral membrane. Truth medicines cut to boost the activity of GABA in the brain, therefore lowering neuronal processes in the brain, resulting in sleepiness, culminating in the phase of impulsive behavior+++++. Three grams of the drug are mixed in 3000ml of distilled

---

#####Mohajan, Haradhan Kumar. "Qualitative research methodology in social sciences and related subjects." *Journal of Economic Development, Environment and People* 7.1 (2018): 23-48.

§§§§§§ Pandey, Prabhat, and Meenu Mishra Pandey. *Research methodology tools and techniques*. Bridge Center, (2021).

\*\*\*\*\* Cr, Kothari. "Research methodology methods and techniques." (2020).

+++++ Banerjee, Sayani, et al. "Natural products altering GABAergic transmission." *Pharmacognosy-Medicinal Plants*. IntechOpen, (2021).

water, and this solution, together with 10 percent dextrose, is delivered continuously into the subject's antecubital vein for three hours with the assistance of an expert anesthetic. It is administered at 0.5–1.0 ml per minute under normal settings until the individual gets sedated. The medicine depresses the central nervous system (CNS), slowing the heart rate and reducing blood pressure. Whenever a human's speech gets slurred and he or she behaves cooperatively and becomes chattier, this could put pressure on him or her to be subject to the control of the patient. The evaluator relieves himself by using his fingertips to assess the individual's eye-muscles<sup>#####</sup>. The needle is left in the subject's vein because different persons require varying amounts of the medication and also because more drug supply is required for a continuous narcotic state. It is important to ensure that just a little amount of medicine is supplied to keep the person semi-awake & prevent him from falling into a deep sleep rate. In this hypnotic condition, questions are posed and replies are captured on sound/video. Narco testing can be used for the following functions:

- For Medical Applications- Narco testing has been utilized in psychiatric instances to diagnose handicaps. Narco analysis is employed in the medical area for three reasons<sup>#####</sup>:
  - to restore voice to mute people,
  - to revive memories in cases of amnesia, as well as
  - To reveal repressed or suppressed thinking or conflicts.
- In criminal investigation.—Narco-analysis is currently getting employed in forensics as well. "In India, Narco testing is a valuable & non-invasive resource for investigations & detection of crimes, so if applied in a scientific method may be extremely effective for questioning of Suspects," says Dr. S.L. Vaya, Deputy Director of DFS, Gandhi Nagar, and Gujarat<sup>\*\*\*\*\*</sup>. It is utilized for investigating reasons in the criminal justice process. Narco analysis tests must be utilized only when substantial societal decisions are required. Narco analysis is typically employed in situations of terrorism, gang violence, serial homicides, Paternity, and cases when no proof is accessible, among other things.

Two main types of suspects are subjected to a Narco analytical test:

- When the accused freely volunteers to be interrogated as well as cooperates with the investigator.
- When the accused is ordered by the court to do the testing<sup>+++++++</sup>.

The benefit of Narco testing is that it can save innocent people from prosecution as well as eliminate the employment of 3rd-degree procedures. Furthermore, it

---

##### Kha, G. F., and Sheeba Ahad. "Role of forensic science in criminal investigation: admissibility in Indian legal system and future perspective." *Int J Adv Sci Eng* 7 (2018): 1124-1134.

##### Rohatgi, Shipra, and Aastha Gupta. "Psychological Evaluations: An Indoor Game of Criminal Minds." *Crime Scene Management within Forensic Science*. Springer, Singapore, (2022). 323-356.

\*\*\*\*\* Pushpa, K. S. "A forensic Science and Methods of Criminal Investigation: An Analysis and Judicial Recognition in India." *Editorial Board* 9.4 (2020): 92.

+++++++ Savithri, K. K., and Priyanka Kacker. "A Systematic Review on Experiential Knowledge of Witnesses Using Beos Profiling." (2022).

has been employed as a time-saving technology in criminal matters with the assistance of Narco data analyzed by an efficient and experienced psychiatrist.

*Question 2: How do the results of forensic technology through DNA Mapping impact on investigations and prosecutions process in India?*

As a result of the use of forensic technologies, India's courts are becoming better at adjudicating both civil and criminal cases. DNA evidence has become a "gold standard" in forensic science due to its solid scientific foundation and practical applicability in a large number of criminal cases<sup>\*\*\*\*\*</sup>. Forensic evidence, such as fingerprints, postpartum reports by medical professionals, serology, toxicology, deontology, ballistics, and DNA profiling, is being used by the Indian court in the search for the truth. Sections 53 and 54 of the Code of Criminal Procedure, 1973 impliedly provided for DNA testing before the 2005 modification, and they were routinely employed in resolving difficult criminal cases<sup>\*\*\*\*\*</sup>. It's under this section that a police officer may ask a licensed medical professional to examine an accused individual to gather evidence about whether or not they've committed a crime. Upon the request of the arrested individual, Section 54 of the Criminal Procedure Code, 1973 allows the person to be examined by a licensed medical professional<sup>\*\*\*\*\*</sup>.

Section 45 of the Indian Evidence Act has been used in several convictions in India when DNA evidence has been accepted <sup>\*\*\*\*\*</sup>. Drawing blood for civil proceedings without the consent of the party is undesirable, but drawing blood for the detection of rape, where the investigating agency has to prove its case beyond a reasonable doubt, cannot be considered a violation of Article 20(3) of the Constitution of the Republic of India. Section 53 of the Criminal Procedure Code (CrPC) gives criminal courts the authority to employ force while conducting forensic examinations<sup>\*\*\*\*\*</sup>. Furthermore, Section 54 CrPC allows the accused to submit a medical assessment to establish their innocence <sup>\*\*\*\*\*</sup>. In legal conflicts, the importance of free and informed consent cannot be overstated. To ensure that a blood sample was properly obtained, the court in *Rohit Shekhar v. Narayan Dutt Tiwari*<sup>\*\*\*\*\*</sup> mandated that the proper force be used <sup>\*\*\*\*\*</sup>. Using

---

<sup>\*\*\*\*\*</sup> Biju, Athaliah, Kate Hambly, and Avani Joshi. "The Complexity of Forensic Science in Criminal Investigations: Is there a Gold Standard?" *Voices of Forensic Science* 1.1 (2021): 7-26.

<sup>\*\*\*\*\*</sup> Ram, Natalie. "Investigative Genetic Genealogy and the Problem of Familial Forensic Identification." *Consumer Genetic Technologies: Ethical and Legal Considerations* (I. Glenn Cohen, Nita Farahany, Henry T. Greely, and Carmel Shachar, eds., Cambridge Univ. Press) (forthcoming 2021). (2021).

<sup>\*\*\*\*\*</sup> Campbell, Liz, and Mike Redmayne. *The criminal process*. Oxford University Press, USA, (2019).

<sup>\*\*\*\*\*</sup> Goswami, G. K., and Siddhartha Goswami. "Three decades of DNA evidence: judicial perspective and future challenges in India." *DNA Fingerprinting: Advancements and Future Endeavors*. Springer, Singapore, (2018). 181-205.

<sup>\*\*\*\*\*</sup> Srivastava, Ankit, Abhimanyu Harshey, and Pankaj Shrivastava. "Legal Aspects of Forensic DNA Typing." *Forensic DNA Typing: Principles, Applications, and Advancements*. Springer, Singapore, 2020. 607-628.

<sup>\*\*\*\*\*</sup> Sanjuktha, D. "DNA Profilinf & Privacy." *Supremo Amicus* 9 (2019): 82. (2019).

<sup>\*\*\*\*\*</sup> (2012) 12 SCC 554

DNA profiling in criminal cases has helped solve cold cases and connect crimes to specific individuals, but it has also helped identify victims in several instances. Because of the time, it takes to conduct thorough investigations, it might be difficult to link recovered body parts to their rightful owners in many situations when the victims' identities are being kept secret.

DNA profiling is a hindrance in such cases. The DNA evidence also helps to prove the guilt or innocence of the accused, but it may take the case in the wrong way, leaving judges no choice but to give the guilty the benefit of the doubt. A good example of this is the *Priyadarshini Mattoo case*, also known as *Santosh Kumar Singh v State via CBI*#####. DNA tests are now being accepted as evidence on a much broader scale by the courts#####. However, it must be kept in mind that each DNA case is unique and the findings are heavily dependent on the settings and scenarios in which it is presented#####. It's worth noting that, despite the tremendous expansion of regular DNA testing in our nation, there are no established rules, guidelines, or anything like that for DNA testing in the Indian criminal justice system#####.

*Question 3: What should be the futuristic perspective of the forensic department from the technological point of view?*

Crime is now accessible at the touch of a button because of advances in technology. Fingerprints, on the other hand, may be used to assist solve a crime. Using a wide range of disciplines, including biology, sociology, criminology, genetics, fluid analysis, handwriting analysis, computer science, and more, forensic science is a powerful instrument for criminal investigations and the administration of justice#####. The breakthroughs in forensic techniques are the potential of making a huge impact in the future. Forensic science today isn't perfect, but advances in the field are on the horizon. DNA testing will have a significant impact on the criminal justice system.

Investigations must begin with the use of current technology and forensic science. The collection of tangible evidence by crime scene personnel is essential for the preservation of crime scenes. Increasing the number of CFLs and FSLs in our nation will ensure that investigators have the best possible forensic support.##### Accused people's rights may be protected by the application of forensic science in court. To influence public opinion, forensic scientists might

---

##### Patel, Asmita. "Critical analysis of DNA profiling in India: constitutional challenges and the way ahead." *Revista de Drept Constituțional* 01 (2021): 50-56.

##### (2010) 9 SCC 747

##### Yadav, Raksha. "Redhanded 20 Criminal Cases That Shook India." (2021): 5

##### Singh, Arun Kumar, and Ameesha Singh. "The Legal Aspects of Forensic Science with Reference to Crime Scene Investigation." *IUP Law Review* 9.1 (2019).

##### Patel, Asmita. "Critical analysis of DNA profiling in India: constitutional challenges and the way ahead." *Revista de Drept Constituțional* 01 (2021): 50-56.

##### Kathane, Prachi, et al. "The development, status, and future of forensics in India." *Forensic Science International: Reports* 3 (2021): 100215.

##### Kha, G. F., and Sheeba Ahad. "Role of forensic science in criminal investigation: admissibility in Indian legal system and future perspective." *Int J Adv Sci Eng* 7 (2018): 1124-1134.

play an important role. With the help of appropriate regulatory frameworks and legislative regulations, governments are in a position to make use of forensic specialists' expertise for the dual purposes of safeguarding the innocent and punishing the guilty\*\*\*\*\*.

It is clear from the explanation above those forensic technologies, like as DNA and Narco analysis, will play an increasingly important role in criminal investigations in the future ++++++. There may come a day in the future when DNA, computers, and artificial intelligence can reveal everything about a suspicious location or person without the need for an eyewitness. Future advancements in artificial intelligence and other forensics fields may be able to precisely determine who should be suspected and who should not be+++++. Even though these developments will serve as a guide for criminal investigators, there are still numerous obstacles to overcome. A procedure's correctness can only be determined by specialists, as the judges themselves lack in-depth scientific training. The court takes a conservative stance because of these problems+++++. Forensic science may be a powerful tool in criminal investigations if investigators and judges alike recognize its value and accept its reliability as an investigative technique.

## Results

Crime investigations and prosecutions in India have become more dependent on the use of technology. Technology in crime detection has been highlighted by the Committees on Criminal Justice Reform as a way to assist improves the efficiency of the system's operation. Since the introduction of forensic technology in criminal investigation and prosecution, suitable legislation has been amended regularly. Both the substance and presentation of evidence in criminal trials are limited by evidentiary rules during a trial\*\*\*\*\*. In addition to ensuring the smooth functioning of a criminal trial, evidence standards safeguard the right of a defendant to a fair trial. Forensic evidence, on the other hand, is evidence that has been gathered through the scientific process. Evidence such as DNA and fingerprints are often used in criminal trials by both parties.

Forensic science now plays a critical role in both the prevention and detection of criminal activity. It is the primary goal of the criminal justice system to ensure that justice is served fairly. Forensic evidence is unquestionably more reliable

---

\*\*\*\*\* Goswami, G. K., and Siddhartha Goswami. "Three decades of DNA evidence: judicial perspective and future challenges in India." *DNA Fingerprinting: Advancements and Future Endeavors*. Springer, Singapore, (2018). 181-205.

+++++ Nagi, Ravleen, et al. "An overview of the application of intelligent systems in forensic investigations." *Journal of Dental and Orofacial Research* 16.1 (2020): 51-57.

+++++ Rana, Ajay Kumar, and S. Manhas. "The future of forensic biology." *Journal of Biomedicine* 3 (2018): 13-18.

+++++ Qureshi, Sumera, Ram Prakash, and Subhash Chandra Gupta. "Role of DNA Profiling in Criminal Investigation Based Leading Case Laws." (2021).

\*\*\*\*\* Banerjee, Shivangi. "Importance of Forensic Science in Law with reference to Crime Scene Investigation." *Available at SSRN 3883967* (2021).



- An act governing forensic science and the circumstances in which it is used is required, just like any other piece of legislation.
- Various forensic procedures should be made known to the general public and citizens of this nation.
- Forensic procedures should be taught to judges, lawyers, and advocates for them to comprehend their value. There must be a way to make a demand and safeguard an innocent at the same time

## References

1. Qureshi, Sumera, Ram Prakash, and Subhash Chandra Gupta. "Role of DNA Profiling in Criminal Investigation Based Leading Case Laws ." (2021).
2. Sabhapathi, Vaishnavi. "Critical Analysis of Truth Serum Test in India." *Freedom of Speech* (2018): 59-65.
3. Shali, Sonia Kaul. "Applicability of Forensic Science in Criminal Justice System in India with Special Emphasis on Crime Scene Investigation." *Medico-Legal Desire Media and Publications, Medico-Legal Reporter, Inaugural Issue* (2018).
4. Garad, Askar Mohammed Ali. "Rise of Digital Forensics and its Impact on Criminal Justice: A Study of Tools and Techniques Involved." (2020)
5. Mack, Mrs Shubhi, and Ishita Chatterjee. "Role of Forensic Evidence in Criminal Justice Delivery System in India." *Nveo-Natural Volatiles & Essential Oils Journal | Nveo* (2021): 5765-5770.
6. Kathane, Prachi, et al. "The development, status and future of forensics in India." *Forensic Science International: Reports* 3 (2021): 100215.
7. Singh, Yogender, and Pratima Devi Ranga. "Importance of Forensic Science in Crime Investigation." *Indian Journal of Forensic Medicine & Toxicology* 15.3 (2021).
8. Anand, Bhavya, and Lalima Das. "Forensic Criminology: A Revolutionary Parameter for Legal Fraternity." *Supremo Amicus* 28 (2022): 173.
9. Mishra, Praveen. "Narco-Analysis in Criminal Investigation and Trial: A Conspectus." *Indian JL & Just.* 11 (2020): 76.
10. Sarkar, S., & Singh, S. Narco Analysis Test: Admissible OR Not? *Available at SSRN 3687775.* (2018)
11. Kaur, Jagpreet. "Changing dimensions of right against self-incrimination: an analytical study." *Revista de Drept Constituțional* 01 (2021): 32-42.
12. Subramaniam, Karthik. "A Study on the Development of the Admissibility of Polygraph Tests in India." *Available at SSRN 3733636* (2020).
13. Buchiya, Ms Laxmi Khimji. "Use of Polygraph and Narcoanalysis Tests in India: A Legal Perspective." (2019).
14. Mallow, Muzaffar Syah. "The Admissibility of Polygraph Test as Evidence." *Proceedings of SOCIOINT 2020.7th* (2020).
15. Anand, Bhavya, and Lalima Das. "Forensic Criminology: A Revolutionary Parameter for Legal Fraternity." *Supremo Amicus* 28 (2022): 173.
16. Saini, Rahul. "Punishments and Judicial Response-A Critical Review." *Jus Corpus LJ* 2 (2021): 486.
17. Kha, G. F., and Sheeba Ahad. "Role of forensic science in criminal investigation: admissibility in Indian legal system and future perspective." *Int J Adv Sci Eng* 7 (2018): 1124-1134.
18. CRIMINAL (CAPITAL) APPEAL NO. 1475 OF 2009

19. Criminal Appeal Nos. 1899-1900 Of 2011 Etc.
20. Aishwarya, S. "Evidentiary Value of Narco-Analysis." *Supremo Amicus* 6 (2018): 343
21. Kannan, D. "Evolution of Criminal Jurisprudence on Interpretation of Art. 20 (3) of Constitution of India held by Indian Judiciary." (2019).
22. Konečná, Zuzana. "Zásada nemo tenetur se ipsum accusare." (2021).
23. Mohajan, Haradhan Kumar. "Qualitative research methodology in social sciences and related subjects." *Journal of Economic Development, Environment and People* 7.1 (2018): 23-48.
24. Pandey, Prabhat, and Meenu Mishra Pandey. *Research methodology tools and techniques*. Bridge Center, (2021).
25. Cr, Kothari. "Research methodology methods and techniques." (2020).
26. Banerjee, Sayani, et al. "Natural products altering GABAergic transmission." *Pharmacognosy-Medicinal Plants*. IntechOpen, (2021).
27. Kha, G. F., and Sheeba Ahad. "Role of forensic science in criminal investigation: admissibility in Indian legal system and future perspective." *Int J Adv Sci Eng* 7 (2018): 1124-1134.
28. Rohatgi, Shipra, and Aastha Gupta. "Psychological Evaluations: An Indoor Game of Criminal Minds." *Crime Scene Management within Forensic Science*. Springer, Singapore, (2022). 323-356.
29. Pushpa, K. S. "A forensic Science and Methods of Criminal Investigation: An Analysis and Judicial Recognition in India." *Editorial Board* 9.4 (2020): 92.
30. Savithri, K. K., and Priyanka Kacker. "A Systematic Review On Experiential Knowledge Of Witnesses Using Beos Profiling." (2022).
31. Biju, Athaliah, Kate Hambly, and Avani Joshi. "The Complexity of Forensic Science in Criminal Investigations: Is there a Gold Standard?" *Voices of Forensic Science* 1.1 (2021): 7-26.
32. Ram, Natalie. "Investigative Genetic Genealogy and the Problem of Familial Forensic Identification." *Consumer Genetic Technologies: Ethical and Legal Considerations (I. Glenn Cohen, Nita Farahany, Henry T. Greely, and Carmel Shachar, eds., Cambridge Univ. Press)(forthcoming 2021)*. (2021).
33. Campbell, Liz, and Mike Redmayne. *The criminal process*. Oxford University Press, USA, (2019).
34. Goswami, G. K., and Siddhartha Goswami. "Three decades of DNA evidence: judicial perspective and future challenges in India." *DNA Fingerprinting: Advancements and Future Endeavors*. Springer, Singapore, (2018). 181-205.
35. Srivastava, Ankit, Abhimanyu Harshey, and Pankaj Shrivastava. "Legal Aspects of Forensic DNA Typing." *Forensic DNA Typing: Principles, Applications and Advancements*. Springer, Singapore, (2020). 607-628.
36. Sanjuktha, D. "DNA Profiling & Privacy." *Supremo Amicus* 9 (2019): 82. (2019).
37. (2012) 12 SCC 554
38. Patel, Asmita. "Critical analysis of DNA profiling in India: constitutional challenges and the way ahead." *Revista de Drept Constituțional* 01 (2021): 50-56.
39. (2010) 9 SCC 747
40. Yadav, Raksha. "Redhanded 20 Criminal Cases That Shook India." (2021): 5
41. Singh, Arun Kumar, and Ameesha Singh. "The Legal Aspects of Forensic Science with Reference to Crime Scene Investigation." *IUP Law Review* 9.1 (2019).

42. Patel, Asmita. "Critical analysis of DNA profiling in India: constitutional challenges and the way ahead." *Revista de Drept Constituțional* 01 (2021): 50-56.
43. Kathane, Prachi, et al. "The development, status and future of forensics in India." *Forensic Science International: Reports* 3 (2021): 100215.
44. Kha, G. F., and Sheeba Ahad. "Role of forensic science in criminal investigation: admissibility in Indian legal system and future perspective." *Int J Adv Sci Eng* 7 (2018): 1124-1134.
45. Goswami, G. K., and Siddhartha Goswami. "Three decades of DNA evidence: judicial perspective and future challenges in India." *DNA Fingerprinting: Advancements and Future Endeavors*. Springer, Singapore, (2018). 181-205.
46. Nagi, Ravleen, et al. "An overview of application of intelligent systems in forensic investigations." *Journal of Dental and Orofacial Research* 16.1 (2020): 51-57.
47. Rana, Ajay Kumar, and S. Manhas. "The future of forensic biology." *Journal of Biomedicine* 3 (2018): 13-18.
48. Qureshi, Sumera, Ram Prakash, and Subhash Chandra Gupta. "Role of DNA Profiling in Criminal Investigation Based Leading Case Laws." (2021).
49. Banerjee, Shivangi. "Importance of Forensic Science in Law with reference to Crime Scene Investigation." *Available at SSRN 3883967* (2021).
50. Srivastav, Varun Vikas, and Nishtha Kheria. "The Usage of Forensic Science in the Criminal Justice System." *Neolexvision Blogs* (2020).
51. Pokhriyal, Samiksha, And Dr Anil Kumar Dixit. "Role of Forensic Science in Criminal Investigation." (2021).