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Misconceptions of a Match: DNA Evidence

In criminal trials around the nation, DNA evidence is more important than ever in convicting the guilty and clearing the falsely accused or convicted. The ability of victim assistance providers to comprehend the possible significance of DNA evidence in their clients' situations is more important as a result of this expanded responsibility. “DNA testing has become an established part of the criminal justice process, and the admissibility of the test results in the courtroom has become routine”¹ As a result of the use of forensic techniques in court, our nation is becoming better at deciding cases involving both civil and criminal cases. The Indian courts use forensic evidence, including DNA profiling, postpartum reports from medical professionals, toxicology, deontology, ballistics, and fingerprint tracing, among other methods, to uncover the truth. This essay addresses cases and pertinent laws pertaining to the main topics in forensic science, including court-ordered DNA testing, the use of DNA evidence to identify offenders and victims in criminal cases, and the limitations of DNA profiling.

What Is DNA?

DNA, or deoxyribonucleic acid, is the building block for the human body; virtually every cell contains DNA. The DNA in people's blood is the same as the DNA in their saliva, skin tissue, hair, and bone. Importantly, DNA does not change throughout a person's life. Deoxyribonucleic acid, or DNA, is the building block of the human body and is present in almost all cells. People's saliva, skin, hair, and bones all contain the same DNA. This includes people's blood. Crucially, a person's DNA remains unchanged throughout their lifetime. “It is a lengthy, double-stranded molecule that resembles a double helix or a twisted rope ladder. The ladder's sides are made up

¹ Singh, S. C. (2011). DNA PROFILING AND THE FORENSIC USE OF DNA EVIDENCE IN CRIMINAL PROCEEDINGS. *Journal of the Indian Law Institute*, 53(2), 195–226. <http://www.jstor.org/stable/43953503>

of alternating units of phosphate and deoxyribose sugar, and its connectors are made of the bases adenine (A), thymine (T), guanine (G), and cytosine (C). Since bases are the building blocks of DNA and amino acids make up most of it, understanding the genetic blueprint is possible.”² No two people are genetically identical, with the exception of identical twins.

Admissibility

There is no particular law in India that can give the court, the investigative authorities, or the parties to cases using DNA evidence precise instructions on how to proceed. Furthermore, the Code of Criminal Procedure, 1973 and the Indian Evidence Act, 1872 do not have any special provisions for handling matters pertaining to science, technology, or forensic science. The absence of such a provision makes it extremely difficult for an investigating officer to gather evidence that uses contemporary methods to establish the guilty plea. A police officer may enlist the aid of a medical professional in good faith in order to further their investigation, as permitted under Section 53 of the Code of Criminal Procedure 1973.

However, it prevents a complainant from gathering samples of blood, semen, etc. in order to file a criminal complaint against the defendant.

The advent of DNA technology has presented a significant obstacle to certain legal and fundamental rights of individuals, including their "right to privacy" and "right against self-incrimination." And this is the main explanation for why judges occasionally refuse to accept DNA technology-based evidence. The right to privacy is now covered by Article 21 of the Indian Constitution, which guarantees the right to life and personal liberty, while Article 20(3) preserves the right to self-incrimination, which forbids a defendant in a criminal prosecution from testifying against himself or presenting evidence that could prove his guilt.

The right against self-incrimination may be violated by DNA collection since an individual cannot be made to testify against their will. However, the courts have now determined via a number of rulings that the use of such technology does not infringe the right to self-incrimination. Getting samples from the accused does not infringe on any such rights. The goal of a DNA test is to determine paternity; this does not violate the right against self-incrimination, according to the ruling in the case of *Malappa Malingaraya v. State of Karnataka*. The ruling

² Pandey H., Tiwari A. (2017) Evidential Value of DNA: A Judicial Approach. *Bharati Law Review*

was made with the straightforward justification that in India, the right to self-incrimination only applies to testimonial evidence—not to material or scientific evidence.

The Value of DNA Evidence

Since no two people have exactly the same DNA, aside from identical twins, DNA is a very useful tool for research. As a result, DNA evidence gathered from a crime scene has the ability to identify a suspect or rule them out of further investigation. For instance, biological evidence from a sexual assault may include hair, skin cells, semen, or blood left on the victim's body or in other areas of the crime scene. When DNA is properly gathered, it can be compared to known samples to identify a suspect and pinpoint the crime site. To effectively use DNA as evidence, it may also be necessary to gather and examine samples for elimination in order to pinpoint the DNA's precise source.

“Increasingly accepted during the past twenty years, DNA technology is now widely used by police, prosecutors, defence counsels and courts throughout the world. DNA testing can make a virtually positive identification when the two samples match. It exonerates the innocent and helps to convict the guilty. These DNA profiles have revolutionised criminal investigations and become powerful tools in the identification of individuals in criminal and paternity cases.”³

Anyone who was granted legal access to the crime site and who might have left biological evidence can have their elimination samples obtained. To account for all of the DNA found on the victim or at the crime scene, it might be necessary, for example, to acquire an elimination sample from each person who had consensual sexual relations with the victim within 72 hours of the alleged assault when conducting an investigation into a rape case. The results may become clearer if DNA profiles from the evidence and the elimination samples are compared.

³ Singh, S. C. (2011). DNA PROFILING AND THE FORENSIC USE OF DNA EVIDENCE IN CRIMINAL PROCEEDINGS. *Journal of the Indian Law Institute*, 53(2), 195–226. <http://www.jstor.org/stable/43953503>

As regards its usage in criminal cases, DNA tests are useful in these situations for the reasons listed below. First of all, it helps identify the criminals favorably, which is especially helpful in cases of sexual assault and homicide where identifying the offenders is frequently a key concern. The identification of the remains of violent crime victims comes in second. Two well-known cases—*Santosh Kumar Singh v. State*, which established the appellant's act of rape, and *Surendra Koli v. State of U.P.* show that DNA testing is the most appropriate method for achieving these goals (to identify dead bodies of victims).

Evidence Collection

Important considerations for locating, gathering, transferring, and preserving DNA evidence should be known by victim services providers, crime scene technicians, nurse examiners, and other medical professionals. DNA evidence may not be gathered, may become tainted, or may deteriorate if it is not initially detected at the crime scene or on the victim. Sexual assault victims should not shower, change clothes, or wash any portion of their body following the assault in order to aid with collecting. Semen, saliva, and skin cells are examples of evidence that can be discovered in the mouth, anal, vaginal, or under fingernails, on clothes or bedding, and beneath nails. A doctor or sexual assault nurse examiner should gather any evidence found on or within the body of the victim.

As soon as possible after the assault, a medical checkup should be performed to treat any injuries, check for STDs, and gather forensic evidence such hair and nail clippings. Exams are typically performed on the mouth, anus, vagina, and other bodily regions that may have come into touch with the attacker. In order to provide a control standard, the examiner should additionally obtain a reference sample of the victim's blood or saliva. If hair analysis is needed, reference samples of the victim's head and pubic hair may also be taken. To identify a potential suspect or suspects, known DNA from the victim is compared to additional DNA evidence discovered at the crime scene using a control standard.

Given the sensitive nature of DNA evidence, victim service providers should always contact crime laboratory personnel or evidence technicians when procedural collection questions arise.

Interpreting DNA Test Results

In DNA testing, there are three possible outcome types: inclusion, exclusion, and inconclusive. It is critical that victim support providers are able to define these terms and discuss their ramifications.

Inclusion. A person is "included" as a potential source of evidence when their DNA profile matches that of the crime scene evidence, whether they are a suspect or victim. The number of loci (places on the DNA strand) that are analyzed and the frequency or rarity of the resulting DNA profile in the general population, however, determine the strength of inclusion.

Omission. A person is "excluded" as a donor if their DNA profile differs from that of the crime scene evidence and that of the victim or suspect. But exclusion does not equate to innocence. If no semen was discovered at the crime site, a perpetrator wearing a condom, for instance, may not be considered a suspect in a rape case; but, further evidence discovered at the scene could lead to the identification of that same individual as a suspect.

Inconclusive. Inconclusive outcomes suggest that DNA testing is unable to confirm or deny an individual's role as the source of biological evidence. Many factors can lead to inconclusive results, such as inadequate DNA quality or quantity for interpretable results or a mixing of DNA from multiple individuals in the evidential sample (e.g., sample collected from a victim of a gang rape). Additional testing may be required, and results should be interpreted in light of other available evidence in the case, as is the case with any DNA test results.

Victim Identification

In the criminal justice system, DNA profiling has proven useful in solving unsolved cases, connecting offenders to victims, and identifying victims in several instances. Many times, the victims are killed with the intention of concealing the identity of the perpetrator, and because of drawn-out investigation processes, it can be challenging to link the victim's body remains with the found remains.

DNA profiling turns out to be a liability in these kinds of cases. It also helps to further establish

the accused's guilt or innocence, but tampering with the DNA evidence could take the case in the wrong direction, leaving the courts with no choice but to grant the accused the benefit of the doubt.

Santosh Kumar Singh v. State often known as the Priyadarshini Mattoo case, is a prime example of this.

The largest obstacle the prosecution encountered during the trial was the tampering of evidence in addition to the poor investigation. The decisive factor was that the DNA test confirmed the rape, but once more, it was manipulated with throughout the inquiry, giving the accused the benefit of the doubt. The Trial Court cleared the accused despite a plethora of evidence that supported the Prosecution, ruling that the CBI had failed on multiple points, including failing to disclose to the court that the evidence it had gathered was falsified on the accused's behalf. Additionally, the DNA test was conducted according to protocol, denying the court a chance to review it in court.

Limitations of DNA profiling

Courts have occasionally rejected DNA profiling evidence because it presents significant risks to an individual's legal rights, including the right to privacy and the prohibition against self-incrimination. Furthermore, the correct and appropriate collection, preservation, and documenting of DNA evidence are essential to its admission in court and can reassure the judge that the evidence presented is trustworthy.

DNA profiling is a crucial tool in forensic science and criminal investigations, but it has several limitations. The success of DNA profiling depends on the quality and quantity of the DNA sample obtained from the crime scene. Degraded or contaminated samples can yield unreliable results. In cases where DNA from multiple individuals is present in a single sample, separating and accurately interpreting the DNA profiles can be challenging. Partial profiles may not provide enough information for definitive identification, making it difficult to link suspects to the crime. DNA databases can be valuable tools for matching DNA profiles to known offenders, but their

effectiveness is limited by the size and diversity of the database. Privacy concerns arise from the collection and storage of DNA samples, particularly regarding potential misuse or unauthorized access to genetic information. Safeguards must be in place to protect individuals' privacy rights and prevent misuse of DNA data. Ethical considerations related to genetic discrimination are also important, and there is a need to balance the benefits of DNA profiling with the potential risks and ethical implications associated with its use. Human error in sample collection, processing, analysis, and interpretation can lead to inaccuracies or mistakes in DNA profiling results. Population substructure can affect the accuracy of DNA profiling, particularly when comparing DNA samples from individuals of diverse ethnic or racial backgrounds. Overall, DNA profiling is a valuable tool in forensic science, but it is essential to recognize its limitations and employ best practices to ensure the accurate and ethical use of DNA evidence in legal contexts.

In India, there is currently no particular legislation that can give the court, the investigating agencies, or the parties to cases containing DNA evidence instructions on how to proceed.

What defenses are available against a positive DNA match?

“Even with a positive DNA match, at least five defenses are available. The first two suggest that the match is what is known as a "false positive":

- To lay a foundation for the introduction of any physical evidence, the prosecution must demonstrate an intact chain of custody. With DNA samples, as with any other physical evidence, that custodial chain may be broken. Clerical errors may result in mislabeling of DNA fingerprints. In the worst-case scenario, the crime scene DNA may have been matched to someone else's DNA and simply mislabeled as your client's.
- The machines used to conduct the DNA tests can malfunction. Insufficiently skilled and poorly trained technicians can make mistakes. Even the most carefully crafted step-by-step protocol is worthless if not followed. And a machine malfunction or a human error may result in a false positive DNA match. But the claim that the DNA test was improperly done may be a high-risk defense. If any crime scene DNA is still available, a retest may confirm the match. Before taking the risk, assess the chances of a retest

doing more harm than good. You may be better off being able to suggest possible problems rather than eliminating all doubt as to a positive match.

The next three defenses concede the validity of the DNA match, but they nonetheless seek to discount its probative value:

- The match may be a real match, but your client's DNA may have been planted at the crime scene. In perhaps the most famous DNA case of all time, O.J. Simpson's lawyers effectively used this defense to obtain an acquittal. Convince the jury that the matching DNA sample was planted at the scene and the match becomes irrelevant.
- The DNA match seems real enough, but there may be an innocent explanation. If the victim is the defendant's wife, both the semen and the skin under the fingernails can be explained as perfectly natural and not unexpected. Once again, the DNA match becomes irrelevant as probative evidence of guilt.
- DNA evidence is all about statistics, and with the right ammunition, the defense attorney may be able to argue that a match standing alone is meaningless. How many other individuals have the same DNA profile? Has your client's DNA been compared to that of the relevant subgroup within the population? Has the evidence been presented in an accurate way? Few matters are as susceptible to misinterpretation, misunderstanding, and misstatement as evidence regarding statistical frequencies and probabilities. DNA evidence, like any other evidence, has a context. Notwithstanding newspaper headlines to the contrary, you can't always leap from a positive match between the crime scene DNA and the accused's DNA to the conclusion of guilt."⁴

Defendants have contested the admissibility of DNA results on the grounds that the laboratory failed to follow established protocols, that the laboratory did not accurately type samples on a series of external, blind proficiency tests, or that the laboratory's protocols or procedures were insufficient to reduce the risk of error sufficiently. There hasn't been much tendency for courts to reject evidence for those reasons.

⁴ Epstein, E. S. (2004). Is the DNA Fingerprint an Infallible Piece of Evidence? *Litigation*, 31(1), 25–32.
<http://www.jstor.org/stable/29760459>

DNA Evidence in Unsolved and Postconviction Cases

Instances where prior testing may have yielded equivocal results can now be resolved with the use of advanced DNA technology, such as PCR. This may lead to the exoneration of people who were unfairly convicted or the identification of suspects in cases that were previously unsolvable. It's critical to understand that although retesting or testing may clear a person, exclusionary results may not always indicate genuine innocence. On a case-by-case basis, prosecutors, defense attorneys, the court, and law enforcement should discuss whether testing is necessary.

Conclusion

Although the fundamental scientific concepts of DNA profiling are not in any dispute, questions should nonetheless be raised regarding the suitability of laboratory protocols and the qualifications of the experts testifying. While the scientific community generally agrees that DNA profiling may produce results with a very high probability, there are some issues with the intricate process. Errors and careless handling of the DNA probe can result in misleading results at any stage of the just-described seven-step process, which in certain situations can result in a life sentence or even the death penalty. As such, questions about the suitability of the laboratory techniques and the qualifications of the experts testifying should continue to be allowed.

In forensic analysis, gathering biological evidence continues to be crucial. The expert report may be tainted by sample manipulations or contamination, whether intentional or accidental.

The use of DNA profiling as evidence has strengthened criminal investigations and prosecutions, leading to more consistent courtroom outcomes. The Indian judiciary has acknowledged the scientific validity and trustworthiness of DNA technology, realizing that it can yield vital information that can be used to identify suspects, connect criminals to their crimes, and clear innocent people. Nonetheless, obstacles persist in guaranteeing the appropriate gathering, management, and comprehension of DNA evidence to preserve its authenticity and acceptability in legal proceedings.

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