

Identification of DNA for the Proceedings of Criminal Investigation

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Abstract

While forensic DNA analysis is most often employed to catch criminals in the act, it is also utilized in civil disputes to determine paternity when it is in question. The most common situations in which paternity is contested are those involving affiliation orders, divorce, and doubts about the child's authenticity. Criminal investigations' reliance on DNA evidence has increased in recent years. DNA testing has aided law enforcement in less-developed countries in identifying culprits and solving particularly heinous crimes like rape, murder, and murder with rape. The science of DNA identification and its use in criminal investigations, trials, appeals, and post-conviction processes are the focus of this study. It covers the primary advantages and disadvantages of DNA identification and its expanding importance in the Indian criminal justice system. It is our sincere wish that the problems plaguing DNA technology will be resolved soon.

Keywords: *Criminal Investigation, Identification, Evidence, Forensic, High Courts.*

1. INTRODUCTION

Crimes are being done with greater planning and efficiency today. Additionally, brand-new criminal behaviors are always emerging. Authorities rely on systematic and scientific investigation procedures to deal with cases of this nature effectively. Since the groundbreaking work of Professor Sir Alec Jeffrey at Lichester University, London in 1985, DNA technology has become one of the investigative instruments at investigators' disposal. Before the 1980s, DNA was exclusively studied and utilized for academic purposes. It has recently become an important tool in the field of forensic science. Within the confines of the legal system, forensic science provides guidelines for both civil and criminal investigations, as well as providing precise information on all the factors involved in the identification of offenders. The development of DNA technology has elevated forensic science from a supporting role in the legal system to that of a pivotal one.

DNA testing is becoming more and more important in the criminal justice system to maintain reliability and impartiality. Multiple methods exist for using DNA evidence to solve crimes. The DNA profile derived from the crime scene evidence may be compared to the DNA profile of the suspects to rule out the innocent or corroborate the guilt of the perpetrator. Evidence from a crime scene can be used to identify a perpetrator by comparing their DNA to the suspect database. Besides its application in criminal investigations, DNA testing has also proven useful in settling civil cases involving paternity, immigration, and the fraudulent selling of plant and animal goods. Many fascinating developments and technical breakthroughs have occurred in recent decades. Forensic DNA testing has expanded to include mitochondrial DNA, Y-STRs, and single-nucleotide polymorphisms. The invention of DNA-chips based on nanotechnology is another step toward increasing the speed and accuracy of DNA analysis.

British biologist Alec Jeffrey pioneered DNA profiling (sometimes known as "DNA fingerprinting,") in 1984. It was initially used to help convict Colin Pitchfork, who had previously raped and killed two females, in 1983 and 1987. There have been and will be further advances in DNA profiling technology since then. It has become an indispensable tool in the administration of justice for both criminal and civil matters, as well as a standard procedure in any forensic laboratory. DNA is currently the gold standard in forensic science because to numerous validation studies and challenges in the judicial system.

2. APPLICATION OF DNA ANALYSIS TECHNIQUE

DNA technology is becoming increasingly crucial in maintaining justice and fairness in the criminal justice system. All throughout the globe, media outlets publish articles hailing the successful application of DNA to solve crime. Thanks to scientific progress, law enforcement today has a better chance than ever before of positively identifying people they believe are responsible for a crime. Within the last five years, DNA testing and other forms of forensic testing have completely altered the way crimes are investigated. Deoxyribonucleic acid, or DNA as it is commonly abbreviated, is being utilized more and more frequently by the legal system to establish guilt or innocence. As DNA testing has advanced, it has given law enforcement a potent weapon for solving crimes of the distant past—but only if the evidence has been properly kept.

Incorporating DNA analysis into the judicial process safeguards impartiality as a matter of fact, DNA technology has been incredibly helpful in solving crimes. It may be used to a variety of applications, including:

Identification of convicts in sexual assault cases

Genomic evidence is extremely helpful in sexual assault instances. DNA technology is used right away to compare the biological evidence gathered at the scene of the rape or taken from the victim's body with evidence gathered from the perpetrator. The comparative results may shed light on whether or not the suspect is responsible for the rape. More certainty can be established if the suspect is found to be guilty of rape.

Identification of convicts in murder cases

DNA analysis can reveal the true murderer in a case involving a homicide. Biological evidence, such as blood, hair, and body fluids, may be left at the scene of a murder by the suspect. Bloodstained items, such as a weapon, a sword, or even the victim's own garments, may be taken from the accused's possession. All of these physical items are helpful for DNA analysis, which can help establish guilt by proving the suspect was there at the scene.

Identification of paternity and maternity of the child

Every human being gets their unique genetic make-up from their parents. If there is any doubt about the parentage of a kid, a simple comparison of DNA samples taken from the alleged father and the alleged mother with the DNA sample taken from the child can settle the matter conclusively.

Identification of mutilated remains

The DNA evidence was utilised to determine the identities of the deceased suspect and the victim in the 1992 Rajiv Gandhi assassination case in India. It was also utilized to positively identify victims of the 2002 Hindu-Muslim riots in Gujarat by using DNA evidence found in mass graves. It was also used to positively identify people killed in the 2001 terrorist attacks on the World Trade Center and the Pentagon in the United States of America.

General identification of criminals

When investigating a crime, police may make many arrests on the assumption that any one of them may have done the act. In such a case, the authorities can utilise DNA technology to match biological evidence retrieved from the crime scene or the victim with that of potential suspects. Although DNA technology is mostly used to catch criminals, it can also be used to clear an innocent person of any wrongdoing.

Immigration purposes

In circumstances when a permanent resident or citizen of the United States (PR or CIT) wants to sponsor a relative for admission to the United States, DNA testing is sometimes used to establish familial ties. In such circumstances, DNA testing between the sponsor and their relatives is necessary to establish the link (paternity test, maternity test, and family relationship test). DNA testing helps identify fraudulent overseas applicants so that they can be denied entry to the United States. DNA testing is widely used in the developed world to help with the immigration process.

As a result, DNA technology has shown to be of great benefit in the criminal justice system and is widely employed today. DNA is the primary evidence used to associate a perpetrator with a crime scene. Because of its scientific precision, infallibility, impartiality, and neutrality, DNA is also seen as a potent tool in the fight against criminal activity.

3. STEPS INVOLVED IN ANALYZING DNA EVIDENCE

Regardless of the specific type of DNA testing being conducted, a series of standard procedures are always followed. Common steps are as follows:

1. DNA testing involves four steps: 1. isolating DNA from an evidence sample containing DNA of unknown origin, and usually later, isolating DNA from a sample (e.g. blood) from a known individual;
2. processing the DNA so that test results may be obtained;
3. determining the DNA test results (or types), from specific regions of the DNA; and
4. comparing and interpreting test results from the unknown and know samples to determine whether the know sample is more likely to be from the suspect;

DNA analysis can be performed on any age-appropriate, dried or frozen biological specimen that has sufficient evidence.

4. INDIAN PERSPECTIVE ON ADMISSIBILITY OF DNA IN INDIAN LEGAL SYSTEM

DNA evidence has been increasingly important in India's criminal investigations in recent years. DNA analysis has aided the police in identifying suspects and solving previously unsolvable cases. However, DNA testing has shown that many of those wrongfully convicted were actually innocent.

There were 47 rulings issued by the Supreme Court and other Indian High Courts in 2011 where DNA evidence was a key factor.

Table 1: Name of the courts

SI No.	Name of Court	Frequency	Percent
1.	Delhi	11	23.4
2.	Bombay	8	17.0
3.	Kolkata	3	6.4
4.	Madras	6	12.8
5.	Andhra Pradesh	4	8.5
6.	Jabalpur	1	2.1
7.	Guhati	3	6.4
8.	Supreme Court	2	4.3
9.	Chhattisgarh	1	2.1
10.	Punjab & Haryana	4	8.5
11.	Uttar Pradesh	1	2.1
12.	Utrakhand	1	2.1
13.	Kerla	1	2.1
14.	Himachal Pradesh	1	2.1
	Total	47	100.0

Table 1 summarises the rulings handed down by the various Indian High Courts in 2011. The majority of the judgments (23.4% of all judgments) are handed down by the Delhi High Court, while just 2.1% are handed down by the other six Indian High Courts combined.

Table 2: Decisions given by various Benches of India

SI No.	Decision Given by Bench	Frequency	Percent
1.	Nagpur	1	14.3
2.	Agartala	2	28.6
3.	Aurangabad	1	14.3

4.	Ernakulam	1	14.3
5.	Madurai	2	28.6
	Total	7	100.0

Table 2 reveals that the Agartal and Madurai Benches have issued the majority of the rulings (57.2%), while the Nagpur, Aurangabad, and Ernakulam sections have issued just 42.8%.

Table 3: Type of cases

SI No.	Type of Cases	Frequency	Percent
1.	Murder	2	4.7
2.	Rape	3	7.0
3.	Rape with murder	1	2.3
4.	Identification of dead body	3	7.0
5.	Identification of person	17	39.5
6.	Disputed Paternity	15	34.9
7.	Disputed Maternity	2	4.7
	Total	43	100.0

Table 3 demonstrates that 74.4% of homicide investigations involved determining the identity of the victim or resolving a dispute over paternity, compared to 4.7% for homicide and 2.3% for rape with murder.

Table 4: Nature of identified samples

SI No.	Type of Cases	Frequency	Percent
1.	Blood	20	50.0
2.	Semen	1	3.0
3.	Hair	1	3.0
4.	Teeth	1	3.0
5.	Vaginal Swabs	1	3.0
6.	Semen and Vaginal Swabs	2	5.0
7.	Bone	6	14.0
8.	Femur Bone	1	3.0
9.	Blood and Semen	2	5.0
10.	Blood and Bone	2	5.0
11.	Sweat and Blood	1	2.0
12.	Dead body	1	2.0
13.	Other	1	2.0
	Total	40	100.0

The data in the table above shows that blood samples were used to trace DNA in 50% of the cases, blood and bone samples in 5%, and hair and teeth in 3%.

Table 5: Plaintiff

Sl. No.	Plaintiff	Frequency	Percent
1.	State	31	66.0
2.	Male	5	10.6
3.	Female	8	17.0
4.	Institution	2	4.3
5.	Police	1	2.1
	Total	47	100.0

The analysis indicated that in situations where DNA evidence was the primary piece of evidence, the plaintiff was from the state in 66% of cases and the police played a role in only 2.1% of cases.

5. CONCLUSION

Historically, prosecutions have relied on statements made by eyewitnesses, but these statements are subject to modification at any time for a variety of reasons. Crime has emerged as a significant problem for modern civilization, and criminals' methods have gotten increasingly complex as a result of the decline in the availability of conventional forms of evidence. As of late, DNA evidence has been accepted by the courts more frequently than ever before. It is important to keep in mind, however, that the circumstances surrounding each DNA case are different. Despite the increasing prevalence of DNA testing in our nation, the Indian Criminal Justice System does not have any established criteria, protocols, etc. for conducting such analyses.

6. REFERENCES

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