



Use and importance of forensic science in criminal justice administration

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Abstract

Forensic substantiation is an order that functions within the parameters of the legal system within countries. The rationale being assistance in conducting criminal investigation and to contribute to courts truthful information upon which they can rely in resolving criminal disputes. The use of technology in crime investigation has been a step forward in the process of progress of criminal justice. Police utilize logical tools and techniques to detect a crime, reconstruct the crime scene, identify the suspected wrongdoer and ascertain critical links; the courts, on the other, take account of these substantial evidences, otherwise fool proof, and resolve with improved accurateness the innocence or guilt of the offender. Law dealing with forensics incorporates values for law enforcement agencies and the courts to have the best use of scientific advancements in the sphere of legal evidence to help the court to reach to exactness while administering justice. The forensic evidences, regardless of being the secondary evidence, are neutral in nature and hence have great corroborative value.

Keywords: Proof, forensic, criminal investigation, law enforcement

Introduction

Medical jurisprudence or it is sometimes called Forensic, legal, or state Medicine may be defined to be that science which teaches the application of every branch of medical knowledge to the purpose of law; hence its limits are on the one hand the requirements of the law and on the other, the whole range of medicine. Anatomy, physiology, medicine, surgery, chemistry physics and botany lend their aid as necessity arises; and in some other cases all these branches of science are required to enable the court of law to reach to a proper conclusion on a contesting question effecting life or property.^[1] Even though medical jurisprudence, forensic medicine and legal medicine are the terms commonly used to denote the branch of medicine which deals the application of the principles and knowledge of medicine to the purpose of law, both civil and criminal, they bear different meanings. Medical jurisprudence embraces all questions which affect the civil or social rights of individuals as well as cases of injuries to persons and brings the medical practitioner in contact with the law. Medical jurisprudence embraces all questions which affects the civil and social rights of individuals, as well as cases of injuries to persons, and brings the medical practitioner in contact with the law. Thus, medical jurisprudence deals with the legal aspect of medical practice, while forensic medicine deals with the application of medical knowledge to the administration of law. Forensic science is in all a very comprehensive term. In its broadest definition, forensic science is the application of science to those criminal and civil laws that are enforced by police agencies and courts.

Forensic science is the science in the service of the law. Analysis of forensic is used in the investigation and prosecution of civil and criminal proceedings. It can help to establish the guilt or innocence of possible suspects^[2].

Forensic science (often shortened to forensics) is the application of a broad spectrum of sciences to answer questions of interest to a legal system. This may be in relation to a crime or a civil action. Besides its relevance to a legal system, more generally forensics encompasses the

accepted scholarly or scientific methodology and norms under which the facts regarding an event, or an artifact, or some other physical item (such as a corpse) are ascertained as being the case. In that regard the concept is related to the notion of authentication, where by an interest outside of a legal form exists in determining whether an object is what it purports to be, or is alleged as being. The word forensic comes from the Latin adjective forensis, meaning "of or before the forum". Forensic science is acting as a bridge between the medical scientists and legal scientists. It's the science that comprises of the matters that provide a common platform to both scientists and legal professionals.

Its purpose is to provide guidance to those conducting criminal investigation and to supply to courts accurate information upon which they can rely in resolving criminal and civil disputes.

An expert in forensic such as a scientist from any technical field will provide analysis of the evidence, witness testimony on examination results, technical support and even training in his or her specialised area.

Forensic evidence is also used to link crimes that are thought to be related to one another. For example, DNA evidence can link one offender to a number of different crimes or crime scenes or exonerate the accused.

Forensic evidence also helps in linking crimes and helping law enforcement authorities to narrow the range of possible suspects and to set up patterns of crimes, used in identifying and prosecuting suspects.

Definition of forensic science and law

Forensic Science is the application of science to the law. Mostly used in criminal cases, forensic scientists deal with search and examination of physical traces used in establishing a suspect of causing a crime at the scene of the crime or of the victim. This would include blood traces or body fluids, clothes and textures from clothing, hair, footwear and if any tools used etc^[3].

Forensic science also includes anything that assists in the collection, preservation and investigation for the purpose of

evidence such as DNA identification, examination of structural design and to identify explosives^[4].

Techniques in forensic science and their usefulness in the administration of criminal justice

Narco-Analysis Test- Narcosis is a state of unconsciousness induced by drugs. Narco-Analysis is a process whereby a subject is put to sleep or put into a drowsy state by means of chemical injection and then interrogated while in this state. This method has been utilized to add to the memory of a witness. During the process of Narco-Analysis test a person has no power to think due to the effect of drugs which is injected into him.

Polygraph or Lie Detector Test: The term 'Polygraph means 'many writings' and refers to a method in which psychological activities are recorded. The principle is that when a person lies he becomes nervous, which in turn causes mental excitation. To cover up the excitement, adrenal glands are stimulated to secrete Adrenalin, which on entering the blood stream, sets up the blood pressure and rate of pulse and respiration. The psychological changes when recorded are jointly called Polygram, which is analysed to find out whether during the lie detection test, the suspect experienced emotional stress with questions asked.

Brain Mapping or P300 Test: This method is also known as 'Brain wave finger printing'. By this technique, the suspect is first interviewed and interrogated to find out if he is concealing any vital information. Sensors are attached to the head and the person is made to sit in front of a computer monitor. The suspect is shown and made to hear certain images and voice. The sensor is attached to head monitors and records electrical activity and P300 waves in the brain, which is produced only if the suspect has link with stimulus. The suspect is not asked any question. This way the brain finger printing matches the information stored in the brain with that of the related crime and crime scene. If the person is innocent, no such P300 wave gets registered during the test. In India, the first Forensic laboratory to use this technique is Forensic laboratory in Bangalore. The Court considers all other proofs available along with the view of the scientific expert, which is just one piece of evidence needed to be taken into consideration and appreciated for its evidentiary value.

This test would not be valid wherein two suspects in an investigation were both present at a crime, but one was a witness and the other a perpetrator. The method can only detect information from their memory that would place both at the scene of the crime and it cannot decide what their roles were, thereby creating a distinct possibility of an innocent eye-witness becoming a suspect of the crime and giving a doubtful chance to the real culprit to create a condition of doubt.

DNA Profiling: One of the most reliable modes of investigation in forensic science is DNA profiling. DNA is the abbreviation of the term, "Deoxyribose Nucleic Acid", an organic substance which is found in every living cell and which gives an individual genetic blue print. DNA is obtained from sources like, blood, semen, bone, saliva etc. DNA was first discovered by Fredrick Miescher in the year 1869 [5]. DNA tests are highly effective because each individual's DNA is unique except the twins. The possibility

of DNA being same is one in three billion. And it is reliable because it cannot be tampered with. DNA test can be used in various cases in order to ascertain the parentage of a child, recognize mutilated dead bodies etc.

Paternity: The Indian Evidence Act, 1872, is against the legitimization of a child and the public policy is that no child should suffer due to lapses on the part of their parents. It is well established that when certain fact is considered as conclusive proof of another fact, the judiciary by and large disables the party in disrupting such proof. The only exclusion occurs when the party is able to show that there was no access to the other party when the conception could have taken place. Whenever paternity is contested, the burden of proof is on the party pleading negative. Section 125 of the Code of Criminal Procedure, 1973 states that the natural and fundamental duty of a man is to maintain his legally wedded wife, children and parents so long as they are unable to maintain themselves^[6].

Fingerprints: Fingerprints have been used by the crime investigators as one of the most essential piece of evidence. Human beings are born with a distinguishing set of ridges on the fingertips. The ridges, which are rich in sweat pores, form a pattern that remains fixed for life. Even if the skin is separated, the same pattern will be evident when the skin regenerates. Usual patterns found in fingerprints are arches, loops, and whorls. The patterns left by these substances, which collect along the ridges on fingers, make up the fingerprints required by the police at the scene of a crime.

The role of forensic science in investigation of crime

Forensic science describes the character of the suspect who committed the crime. The evidence indicates the type of crime committed. The situation explains the time of the occurrence. Forensic evidence proves the scene of the crime. Forensic study finds out the modus operandi of the offender. Lastly, it establishes the motive behind the crime. During an investigation, evidence is collected at a crime scene or from a person, analyzed in a crime laboratory and then the results presented in court. Forensic science plays a vital role in the criminal justice system by providing precise information through the analysis of physical evidence, the identity of the culprit through personal clues like fingerprint, footprints, blood drops or hair^[7]. It links the criminal with the crime through objects left by him at the scene and with the victim or carried from the scene and the victim. On the other hand, if the clues recovered do not link the accused with the victim or the scene of crime, the innocence of the accused is established. Forensic science, thus, also saves the innocent. After the surfacing of DNA technology as a method of forensic science, it provides tremendous amount of information to the investigating officers that enable him to find the suspect from evidence which he has left at the scene of crime.

Relevance of forensic science in criminal investigations: An appraisal

When it comes to level of investigation no matter what will be the level of severity of the case nothing can prove more beneficial to the crime investigator than the use and implementation of the principles of forensic science. The results of those forensic investigations can mark the difference between the acquittal and conviction in the court

of law. Forensic science has come up in a big way to assist criminal investigation. It helps to interrogate suspect, victim and even witness to get the truth. Neurological tests viz. hypnosis, psychological detection of deception (Lie detection), Narco-analysis and Brain mapping has revolutionized the police investigation saving time money and effort and providing far superior results. These scientific methods of interrogation has made the interrogations more humane and legal, thereby eliminating notorious third degree methods of: which most often prove disastrous.

Criminal investigation is a pragmatic science that comprises the study of facts, used to categorize, uncover and demonstrate the culpability of an accused criminal. A comprehensive criminal investigation can include probing, consultations, cross-examinations, evidence collection, preservation and various methods of investigation. Criminal investigation is an antediluvian science (pre-historic) that may have origins as far back as 1700 BC in the writings of the Code of Hammurabi. In the code it is advocated that both the accuser and accused had the right to present evidence they collected. In the modern era, criminal investigations are most often done by government police forces. Private investigators are also commonly hired to complete or assist in criminal investigations. Criminal investigation is simply a part of criminal justice system. It has been seen that very organized and cultural society of the world has evolved and developed a system of justice to prevent breach of law, to enforce laws, to handle law breakers and to assuage the victims so that the society and the country can function smoothly and that its members can live their life happily and work in a colorful, blissful and harmonious nature. The main aim of efficient criminal justice system is to enforce the standards of conduct necessary to protect individuals.

Crime is as old as human being himself. Crime, the word crime is not new to human civilization and came into existence from the time when Adam was established. The Quran and Bible provides evidence that the first crime on the planet done by son of Adam himself so it can be said that crime in one form or other existed in the world from times immemorial and so existed the ways to combat them. With the advent of science and technology every aspect of human life has changed and the court and its judicature is no exception to his general rule. 27 Nations all over the world have resorted to a liberal approach towards the acceptance of the scientific techniques and the importance of these techniques in criminal investigation can be gathered from the fact that it does not need further justification. This scientific investigation helps in developing a link between the past and present of the crime what known as Corpus Delicti or the body of the offence.

In 1983, Lynda Mann, age 15, was raped and murdered near the village of the Ender by. This case was not solved. Three years later, another 15-year-old, Dawn Ashworth, was a victim in similar offense. Comparing the DNA "fingerprints" derived from the semen recovered from both victims' bodies, the investigators realized that the same man had raped and killed both women. A 17-year-old man was initially arrested and sample of his blood was subjected to the DNA analysis. This man's innocence, however, was clearly established by the lack of DNA match, and was released. Subsequently, all the males in the Ender by area between 13 and 30 years of age were asked by the police to voluntarily provide the blood samples for DNA typing.

During 1986 a series of the rapes and assaults occurred in Orlando, Florida, that resulted in the first use of the DNA in the criminal investigation cases in this country. The crimes shared a common pattern: the attacks occurred after the midnight, in the victims' homes, by knife-wielding perpetrator. The perpetrator was quick to cover the eyes of the victims with a sheet or blanket, so none of them could give the detailed descriptions of their assailant. During early 1987, the investigators were staking out a neighbourhood in which it was believed that the rapist might strike saw a blue 1979 Ford speeding out of the area. They followed the car for a short distance before it crashed into a utility pole while making a turn.

In *Bazari Hajam v King Emperor* case, the question arose whether it would be safe to act on the uncorroborated testimony of the fingerprints and declare the guilt of the accused. On this point Bucknill, J, observed thus: "I think that apart from the fact that I should be rather sorry without any corroborative circumstances to convict a person of a serious crime solely and entirely upon similarity of the thumb marks or finger prints, the very fact of the taking of a thumb-impression from an accused person for the purpose of the possible manufacture of the evidence by which he could be incriminated is in itself sufficient to warrant one in setting aside the conviction upon the understanding and assumption that such was not really a fair trial as well." This view was disapproved of by Schwabe, C J in *Public Prosecutor v Kandasami Thevan* although the point did not directly arise in the case as there were the thumb-impressions of the accused in the evidence other than that taken by the judge in court for the comparison with the thumb-impressions in the document alleged to have been forged.

Rejecting the contention that the study of the footprints is not a science in *Din Muhammad v Emperor*, Central Provinces Police Gazette³¹, the court of the Judicial Commissioner at Nagpur (H J Stanyon and H F Hallifax, A J Cs) as far back as in 1914 held: "The knowledge of the footprints has similarly been systematized and pursued by the trackers, mainly uncivilized and ignorant people an all the other respects, all over the world. The matter is therefore undoubtedly a science and opinion of a person especially skilled in it is a relevant fact, under Sec-45 of the Evidence Act". In the case of *Pritam Singh v State of Punjab* there is an observation to the effect that the science of identification by the footprints is a rudimentary science and much reliance cannot be placed on the result of such identification.

In *Harpal Singh vs State Of H.P.*, the fact in issue was about the age of the girl, the age of the girl was ascertained by scientific techniques the same result obtained by that of the medical tests was then corroborated with those of the records of the school which was certified by that of the headmaster and also by the entry in the birth register. The case which brought DNA controversy to the forefront in the Indian Legal System was rape and murder of Priyadarshani Matoo. At trial stage, this case relied upon the DNA tests of vaginal swabs of the deceased, which later came to be positive and made ends of justice meet. The same technology of DNA testing has also helped to prove that the former minister Rajendra Mushahary belonging to Asom Gana Parishad had raped a woman twice and due to which such lady became pregnant thus he was held to be the father of the woman's child. This technology of DNA Testing proved beneficial in bringing the murderer of Rajiv

Ghandhi, Dhannu, to meet her fate by testing her mutilated body. Similarly, the terrorist attack that happened on WTO building 9/11 in New York bodies of victims were identified by scientific technology of DNA testing.

Tandoor Murder Case (1995) Delhi was the first criminal case in India solved by the help of forensics. In this case Shusil Sharma murdered his wife by firing bullets in to her body because of the misunderstanding that she had illicit relationship with her classmate and fellow congress worker Matloob Karim. After committing the sinful act he took her body in his car to the Bagiya restaurant, where he along with the manager of restaurant Keshav Kumar attempted to burn her in a tandoor there. Police recovered Sharma's revolver and blood-stained clothes and sent them to Lodhi Road forensic laboratory. They also took blood sample of Sahni's parents, Harbhajan Singh and Jaswant Kaur and sent them to Hyderabad for a DNA test. Lab reports Confirmed that the body was that of wife of Shusil Sharma, the DNA report said, "The tests prove beyond any reasonable doubt that the charred body is that of Naina Sahni who is the biological offspring of Mr. Harbhajan Singh and Jaswant Kaur." And finally Mr. Shusil Sharma was found guilty with the help of forensic evidences.

In the Aarushi Talwar murder case (2013) Noida, Aarushi Talwar, the 14-year-old daughter of a successful dentist couple, was found dead with her throat slit in her parents home at Jalvayu Vihar in Noida, a posh suburb of Delhi. Suspicion immediately fell on the family's live-in man-servant, Yam Prasad Banjade alias Hemraj, a 45-year-old Nepalese national, who was found missing from the home. But later on after the investigations were complete it was seen that the murder was committed by her own parents and declared as a case of honour killing.

Legal provision of forensic science in India^[8]

The relevance of forensic science to crime investigation and trial has to stand the limitation of law. The major questions are: viz. a) what is the constitutional validity of such techniques? b) To what extent does the law allow the use of forensic techniques in crime investigation? Articles 20(3) of the Indian Constitution provide that no person accused of any offence shall be compelled to be a witness against himself. Article 20(3) is based upon the presumption that the accused person is innocent till proved guilty^[9]. It also protects the accused by protecting him from the possible torture during investigation in police custody. Criminal law considers an accused as innocent until his guilt is established beyond reasonable doubt. The Universal Declaration of Human Rights, Article 11, states: "Everyone charged with a penal offence has the right to be presumed innocent until proved guilty according to law in a public trial at which he has had all the guarantees necessary for his defence."^[10] Article 20 (3) of the Constitution of India guarantees fundamental right against self incrimination and guards against forcible testimony of any witness. This right has been taken to ensure that a person is not bound to answer any question or produce any document or thing if that material would have the tendency to expose the person to conviction for a crime^[11] c) What is the evidentiary value of the forensic information obtained from the experts? Sec.73 of the Indian Evidence Act empowers the court to direct any person including an accused to allow his finger impressions to be taken^[12].

The Bombay High Court in another significant verdict in the case of, Ramchandra Reddy and Ors. v. State of

Maharashtra^[13], upheld the legality of the use of P300 or Brain finger-printing, liedetector test and the use of narco analysis. The court upheld a special court order allowing SIT to conduct scientific tests on the accused in the fake stamp paper scam including the main accused, Abdul Karim Telgi. The verdict also maintained that the evidence procured under the effect of truth serum is also admissible. The Code of Criminal Procedure, 1973 was amended in 2005 to enable the collection of a host of medical details from accused persons upon their arrest. Section 53 of the Criminal Procedure Code 1976 provides that upon arrest, an accused person may be subjected to a medical examination if there are "reasonable grounds for believing" that such examination will afford evidence as to the crime. The scope of this examination was expanded in 2005 to include "the examination of blood, blood-stains, semen, swabs in case of sexual offences, sputum and sweat, hair samples and finger nail clippings by the use of modern and scientific techniques including DNA profiling and such other tests which the registered medical practitioner thinks necessary in a particular case."^[14] Section 164A Code of Criminal Procedure, 1973 provides for the medical examination of a woman who is an alleged victim of rape within twenty-four hours and such examination includes the DNA profiling of the woman. Both the sections authorize any medical practitioner within the meaning of Sec. 2(h) Indian Medical Council Act, 1956 to collect a DNA sample^[15]. Question is as to whether every medical practitioner is capable to collect and preserve DNA evidence. It is a well-known fact that DNA evidence is entirely dependent upon proper collection and preservation of sample. Any simple mistake or unawareness can contaminate the sample and contaminated sample is of no use. Under Indian Evidence Act, 1872, forensic report is considered as "opinion" tendered by expert. An expert may be defined as a person who, by practice and observation, has become experienced in any science or trade. He is one who has devoted time and study to a special branch of learning, and is thus especially skilled in that field wherein he is called to give his opinion. The credibility of an expert witness depends on the reasons stated in support of conclusion and the tool technique and materials, which form the basis of such conclusion. However, the court is free to disagree with the conclusions drawn by the expert and rely on other evidences for the purpose of decision^[16].

Latest judicial pronouncements

In Anil @ Anthony Arikswamy Joseph v. State of Maharashtra^[17], relying on scientific evidences including DNA profile and oral evidences, the accused was convicted and punished with death sentence and fined by the Sessions Judge, Nagpur for gruesome murder of a minor boy aged about 10 years after subjecting him to carnal intercourse and then strangulating him to death.

In Vishal Yadav vs State of UP, Nitish Katara murder case, the identification of the deceased victim was difficult due to availability of only a small portion of one un-burnt palm with fingers. DNA profiling helped in identifying the body remains by matching DNA profile with parents of the deceased which helped the High Court of Delhi to uphold the conviction of the accused^[18].

In State by the Inspector of Police v Manoharan^[19], the use of DNA technology paved the way to prosecute and convict the culprit to death, liable for kidnapping and killing after gang rape of a 10 year old school girl by auto rickshaw

driver and throwing the corpse of the victim in a running canal.

In *Sushil Mandal v. The State represented by CBI* ^[20], the petitioner, father of the deceased boy, challenged the findings of DNA profiling. The deceased boy fell in the adolescent cusp of mutual infatuation with a school girl and parents of both were advised by school administration to keep a check on them. Later, the boy was found reportedly missing and, after a week, a fully decomposed unidentified body was fished out from a lake. The petitioner claimed of not identifying the body remains and clothes of his missing son. He preferred habeas corpus petition in the high court accusing the father of the girl and praying the high court for directing the investigation by the Central Bureau of Investigation (CBI). The DNA test of the body matched with the genetic profiles of the parents (the petitioner and his wife) of the deceased. Petitioner refused to accept the truth of scientific tests despite the fact DNA test was repeated for his satisfaction. The apex court placed reliance on scientific tests including DNA profiling for human identification and accordingly closed the matter.

In *State of NCT Delhi v Sujeet Kumar* ^[21], the brutal rape and unnatural sexual act with a four year old girl child living in a slum dwelling was investigated by Delhi police and DNA profiling was used to link the perpetrator with the ghastly act of sexual violence. The court after having examined the detailed analysis of the child's testimony and various methodologies involved therein agreed to the investigation findings based upon DNA reports and other evidences and held the accused guilty and set aside the order of the Trial Court acquitting the accused.

In *Dharam Deo Yadav v. State of Uttar Pradesh* ^[22], a judgment which deals with the admissibility of DNA evidence, Supreme Court observed that "Crime scene has to be scientifically dealt with without any error. In criminal cases specifically based on circumstantial evidence, forensic science plays a pivotal role, which may assist in establishing the evidence of crime, identifying the suspect, ascertaining the guilt or innocence of the accused. One of the major activities of the investigating officer at the crime scene is to make thorough search for potential evidence that have probative value in the crime. Investigating Officer may be guarded against potential contamination of physical evidence which can grow at the crime scene during collection, packing and forwarding. Proper precaution has to be taken to preserve evidence and also against any attempt to tamper with the material or causing any contamination or damage."

Conclusion

Forensic science has undergone remarkable growth in recent years, including in the areas of DNA collection and analysis and the reconstruction of crime scenes. Nonetheless, too few professionals are capable of applying forensic science in legal matters.

Advance technology has given the world a usefulness and accuracy tool for the purpose of criminal investigation. At present forensic science plays a vital role in crime and criminal detection. The main dictum of criminal justice system is to afford fair justice. Undeniably, forensic evidence is more real than visual evidence. Forensic science as a scientific evidence is a benefit for criminal justice system.

Lastly, in the words of Wicker of the college of Law University of Tennessee "If and when convincing evidence

is produced that are reasonably reliable, scientific methods of exposing falsehoods either in or out of the court rooms are available, these methods should be promptly utilized by the legal profession".

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