

FORENSIC SCIENTIFIC EVIDENCE IN INDIA: THE QUESTION OF RELIABILITY

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Abstract

The forensic scientific evidence is always warranted in criminal investigation and adjudication process. It has been considered as the evidence provided by God when the legal system becomes dark due to the dearth of other direct or circumstantial evidence. Its accuracy and reliability is assured since it is the gift of nature. However, nowadays, due to the human mishandling and the reporting of certain miscarriage of justice cases has reduced its credibility and acceptability in the legal landscape. The question of reliability is the cornerstone of the forensic scientific evidence, which can be improved only through studying the shortcomings and improving the system including the stakeholders involved in it. The detailed research studies conducted on the issues relating to the reliability of the forensic scientific evidence shows that the major shortcoming is the lack of research and ignorance of the stakeholders involved in the system. The neglected attitude of the state in funding and rejuvenating the current system also adds more fuel to the fire. It is high time to change the entire system so as to make the forensic scientific community more useful at least in cases of utmost importance like the rape and murder.

Keywords: Forensic Scientific Evidence, Reliability, Crime Scene Investigation, Chain of Custody, Reforms

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Introduction

Forensic science, the handmade of the law enforcement machinery and judiciary, has been performing pivotal role in finding out the real culprits and saving the innocent persons from the implication of bogus charges. Whatever standing it has in the global legal landscape, nowadays, the science is considered as fractured and deteriorated. In fact, the release of the report of the National Academy of Sciences (hereinafter NAS) on Strengthening Forensic Science in the United States: A Path Forward¹ gave a death blow to the forensic scientific community. In the report there is nothing novelty since the contents in it is the overall reverberations happening in the discipline for the last two decades. Currently, the legal system is in a state of flux with regard to the fixing of the reliability of forensic scientific evidence. The utmost difficulty is to make out a particular technique as reliable or not since some research studies shows that some of them even do not have proper scientific

underpinning. The best example is forensic fingerprint identification and some other identification techniques like superimposing of skull.

In this article, I will attempt to highlight some important shortcomings associated with forensic scientific evidence and its application in India as well as suggestions for improving the system.

Issue of reliability

Reliability simply means the dependability. The crime investigation movies and CSI serials in televisions have given a virtuous image in the mind of the general public regarding the reliability of forensic techniques, which in reality is something different. It is only a public perception and not the determination based on facts. In fact, nowadays some of the forensic scientific techniques are losing the credibility in the legal community due to diverse reasons. The major one is obviously the frequent reporting of the serious miscarriage of justice cases in

¹“Strengthening Forensic Science in the United States: A Path Forward”, by National Research Council, National Academy of Sciences, (2009), available at

http://ag.ca.gov/meetings/tf/pdf/2009_NAS_report.pdf

which forensic technique had played an important role. The best example is the DNA exoneration cases of the United States Innocence Project. The data of the Innocence Project reveals a shocking fact that out of 300 cases in which the prisoners were exonerated, 51% of cases were convicted due to unvalidated/improper forensic techniques like bite mark comparison, microscopic hair analysis, firearm tool mark analysis, shoe print comparison etc. The more painful information is that the Project could help only 05-10% of convicts since in the remaining cases biological evidence is not preserved by the crime laboratories.² As per the report of the innocence project, faulty forensic science is the second major contributor of erroneous convictions. Though DNA profiling evidence has become a savior of the innocent people; it has also contributed to some of the wrongful convictions. In the United States,

microscopic hair comparison evidence is considered as the weakest and error-making form of evidence. Around 22% of the total hair comparison cases overturned as erroneous.³ Brandon L. Garrett in his 2008 research study has emphasized about faulty forensic science and its contribution to erroneous conviction and he had provided the data showing around 57% of cases were contributed by forensic science.⁴ The report of the United States National Academy of Sciences is rather substantiating the aforementioned research conclusions. The report reveals that except nuclear DNA profiling and chemical drug identification, most of the forensic scientific techniques are not up to the mark since they lack the support of valid scientific methodology.⁵

In the United States, forensic scientific evidence got the notorious dramatic player's role after the publication of the first exoneration in 1989; when the judiciary had set at liberty Mr. Gary Dotson who was

² The causes of wrongful conviction, Innocence Project, available at <http://www.innocenceproject.org/causes-wrongful-conviction>

³ Brandon L. Garrett, *Judging Innocence* (2007) *Columbia Law Review* 100, 101-190.

⁴ *Ibid.*

⁵ *Supra* n.1.

convicted and jailed since 1979 for rape. Trial court had based its conviction on the misleading blood group evidence adduced by the forensic laboratory concealing the fact that the victim also belongs to the same group and gave a whimsical finding including Dotson in the same group which would come around 11% of the population excluding the remaining 89%.⁶ Similarly, a study conducted by Brandon L. Garrett and Peter J. Neufeld, reveals that out of 100 cases in which forensic serology analysis testimony was involved, 57 turned invalid.⁷ The same study also throws light on the problems associated with microscopic hair comparison. Of the 65 cases in which trial transcripts were examined, 25/38% turned invalid. In the United States it is reported that among the major crime categories, bad forensic evidence is most likely to show up among sexual assault exoneration – 37% of the cases (76/203) – followed by homicide, 23% (96/416), and child sex abuse, 21% (21/102); it is only

rarely an issue in robbery exonerations, 6% (3/47).

In India also the incidences of faulty forensic science and miscarriage of justice cases are traceable. The recent example is *Koilpillai v. State of Tamil Nadu*,⁸ in which the petitioners prayed for lodging an FIR against the law enforcement authorities for illegal confinement, torture and violation of human rights and direct the State of Tamil Nadu to give adequate compensation for false incarceration. The entire case was based on a dramatic woman missing incident (Missing case of one Manimegalai @ Megala) following an exhumation of a half burned 20-25 years old lady with injuries suspected as the missing woman. The body was not possible to be identified by her relatives; however, one of her close relative told the police that the cloth materials found on the body were same as the dress materials of her. The skull of the body was sent to the forensic

⁶ Edward Connors et al., *Convicted by Juries, Exonerated by Science: Case Studies In the Use of DNA Evidence to Establish Innocence After Trial* 51-52 available at <http://www.dna.gov/case-studies/convicted-exonerated/dotson>

⁷ Brandon L. Garrett and Peter J. Neufeld, *Invalid Forensic Science Testimony and Wrongful Convictions* (2009) *Virginia Law Review* 95.

⁸ *V.Koilpillai v. State of Tamil Nadu*, Criminal Original Petition (Madras) No. 4225 Of 2011 (Decided on 15/07/2015).

science laboratory for superimposition, which in turn reported that it was of the missing woman. Based on this and some other circumstantial evidences, trial court had framed the charge sheet against the petitioners for murder. The most interesting thing in this case is that the trial court on the basis of the scientific evidence had declared that the missing person was no more. However, the trial court had abstained from convicting the accused stating the reason that the entire case was based solely on circumstantial evidence. Time being, in a fine morning a woman came to the village claiming that she was Manimegala @ Megala. When the accused (petitioners) came to know about this fact had filed this petition for compensation. The court had directed the Superintendent of Police, Tuticorin to conduct a DNA test of both Manimegala and her Father Muthu. The DNA test result had revealed that Muthu was the biological Father of Manimegala. Thus the elongated mystery on the identification and murder of Manimegala was resolved.

This is the best example for the serious miscarriage of justice due to the involvement of forensic scientific evidence. There was a serious error committed by the investigating officer in this case. Since the entire case was based on the identity of the unidentified dead body recovered from a public place, he should have sent the blood stained sand as well as the biological materials for DNA profiling. During the trial proceedings, even the court did not apply its judicial mind for the same and hurried up to declare the identity of the victim. In the aforementioned case after considering the flaws in the criminal trial and chances of miscarriage of justice to the petitioners; invoking the inherent powers under section 482, High Court has set aside the judicial declaration of the District Court after examining the witnesses and considering the DNA evidence. Through this case the strange fact that came out was the reliability of the forensic identification technique known as the Superimposition. The court has rightly observed that the human beings who conducted the superimposition test would

commit mistakes, there is no need to totally disbelieve the test since science will never false.

The record of accomplishment of the technique skull superimposition shows that since the first case, i.e. the famous Ruxton case, which happened in early 20th century, hundreds of cases might have been examined with the techniques successfully. Forensic scientists opine that shortcoming in technique is not there but what happens, being time consuming and less attractive, no one wants to get trained in those techniques, and then techniques like DNA appear on the horizon which engulfed most of the traditional techniques. What is required is that in addition to introducing DNA profiling, the existing techniques must have been upgraded with inputs from the research. Just take the example of skull superimposition For successful accomplishment of this technique, there is a need for continuous updating of data related craniometric measurements and variations

among various populations. It has been observed, previously that forensic anthropology section was part of the forensic biology division where forensic physical anthropologists were employed but now this is not the case. In no laboratory, such expert is available.

Recent scientific literature also substantiates the aforesaid finding which says that Craniofacial Superimposition test has declined in casework application due to the wide availability of molecular level identification.⁹ Moreover, the probability of proving the identity of a person through Craniofacial Superimposition is lesser than the molecular identification methods like DNA profiling. Similar to DNA profiling, it is not unique in nature since there are possibilities of establishing match of a photograph with another skull. Reddy and Darion has stated that craniofacial superimposition should be limited to

⁹ Douglas H. Ubelaker, Craniofacial Superimposition: Historical Review and Current Issues, 60(6) *Journal of Forensic Science* (2015) 1395.

exclusionary purpose than inclusionary.¹⁰ In some articles it has been stated that the lack of unified working protocols and the absence of commonly accepted standards, led to contradictory consensus regarding its reliability.¹¹ The National Research Council, United States has rightly observed in its work that "...in some cases, substantive information and testimony based on faulty forensic science analyses may have contributed to wrongful convictions of innocent people. This fact has demonstrated the potential danger of giving undue weight to evidence and testimony derived from imperfect testing and analysis. Moreover, imprecise or exaggerated expert testimony has sometimes contributed to the admission of erroneous or misleading evidence."¹²

In fact, in India unscientific and faulty crime scene investigations also paves way for erroneous and dubious judicial decisions especially in serious criminal cases. The importance and inevitability of proper crime

scene investigations cannot be sidelined at least in serious criminal cases like rape and murder particularly in cases where there is no direct evidence available to link the crime with the perpetrator, victim and the valuable crime scene materials. The manner in which the crime scene investigation has conducted, the way in which the chain of custody has been followed and secured, following of the standard protocol etc. are all determining factors in fixing the reliability of the forensic scientific evidence in legal setting. Lapses, inordinate delays and untimely actions cannot be compromised. The major problem is that sometimes trial judges may overestimate or underestimate the scientific evidence that comes before them seeking admissibility. To some extent this may be due to certain inner psychological drives happening in the mind of the judge's due to the exaggerations created through scientific fictions like motion pictures, crime investigation thriller serials etc. The danger is

¹⁰ Caroline Wilkinson and Christopher Rynn, *Craniofacial Identification* (Cambridge University Press, 2012) pp.249-250.

¹¹ O Ibanez et al., MEPROCS Framework for Craniofacial Superimposition: Validation Study (2016) *Legal Medicine* 23, 99-108.

¹² *Supra* n.1 at p.4.

that these simulated artistic may even influence the real probative value of the scientific evidence.

In India, it is very pertinent to disclose one significant fact when we discuss about the reliability of forensic scientific evidence. The case studies show that in majority of the cases the flaw is traceable from the very beginning of the crime investigation i.e. in most of the cases from the crime scene investigation itself. For example, the recent well publicized acquittal of the Talwar spouses by the Allahabad High Court who were convicted by the Sessions judge for the gruesome murder of their loving daughter Aarushi Talwar and the male servant Hemraj shows that there were errors committed by the police during the crime scene investigation. The factual analysis of the case shows that from the very beginning of the crime scene investigation, the investigators have failed to follow the proper chain of custody. The High Court has found that the crime scene analysis and the crime reconstruction have carried out on the basis of the wrong and misleading information provided by the CBI

investigation officer. The Court had found that there was a discrepancy in between the evidence given by the crime scene analyst and CFSL personnel and finally detected that it was due to the wrong information given by the investigating officer.

From the limited factual narration in the decision, it is clear that the crime scene analyst had performed his side on the basis of the story planned by the investigating officers inculcating the Talwars. There was a major flaw in the crime scene investigation since there was seldom effort from the side of the forensic team in tracing any inculcating evidence of any other outsiders apart from Talwars and three suspects. List of evidence adduced by the prosecution was nearly one sided and there was no proper balancing of the evidences that ought to have adduced to close the reasonable doubt about the innocence of the appellants. In cases in which only circumstantial evidence is available to reach the conclusion of guilt, as a matter of caution, the prosecution ought to have adduced other independent evidence to dilute the innocence presumption. Here

comes the significance of forensic scientific evidence that would help them to prove the guilt conclusively. The major flaw in this case was that the crime scene analyst had acted and worked in complete deference to the input given by the investigators instead of applying his mind towards alternative hypotheses. One of the important circumstances which were specifically mentioned by the trial judge for finding out guilt was that “there was nothing to show that an outsider(s) came inside the house in the night of the commission of offence.” It is evident from this case that, if the same has been conjointly investigated by a forensic team, the result would have been different.

In India, the media responses and daily outcomes of court cases are time and again giving a very bad picture about the crime scene investigation and criminal detection of at least some of the cases which got high public attention. The records show that in most of the cases the CSI was initiated in a wrong direction due to the lack of awareness of the investigation officers. They would be tampering and destroying the most valuable

piece of evidence due to their ignorance in handling the crime scene. The quality of the evidence collected from the crime scenes can be preserved only if the crime scene investigators are well versed in collecting and preserving it as per the standard national or international protocols for the same. In India, it is unfortunate that before the evidence collection most of the crime scenes will be disturbed by the police personnel during their investigation. The best example is the Aarushi-Hemraj murder case wherein immediately after the body of Aarushi was found murdered in her bedroom, the flat was jam-packed with outsiders including the police, media, relatives and even strangers and the police had failed to take any precaution to protect the crime scene.

Apart from the errors and flaws in conducting forensic investigation, there are certain grey areas where the criminal justice system’s existence itself would be questioned. One among them is the faulty appreciation of the forensic scientific evidence like DNA profiling. No doubt, the technological bearings of the DNA profiling has already

been sorted out and clarified in the recent past. However, there are doubts about the evaluation of the case specific application of the technique especially in cases in which it comes as the sole evidence. Though time and again judges claim that they are expert of experts in judging scientific evidence; in reality they are not capable enough for the same. The best example is the conviction and acquittal of Amanda Knox and Raffaele Sollecito for the charge of murdering Meredith Kercher in Perugia, Italy. Knox and Sollecito (Husband and Wife) were convicted by the trial court and acquitted by the appellate court and ordered for retrial. In retrial, they were again convicted and again finally acquitted by the appellate court after confirming miscarriage of justice. The case had shocked the integrity of the criminal justice delivery system as a whole and got widespread public attention. The case is very interesting that the conviction was awarded by the trial court on the basis of scientific evidence and certain speculations put forward by the prosecution. A knife which was recovered from the flat of Knox was

adduced by the prosecution to establish her culpability wherein the sufficient quantity of DNA was extracted from the blade and declared a match with the deceased. DNA was also extracted from the handle of the same knife and declared the match with Knox. However, there was no evidence that the same knife was used by the accused for murdering the deceased since the prosecution couldn't find any blood on the blade and came with a false theory that it was due to the application of bleach to clean the blade after the commission of murder. But it was logically countered by the defence during the appeal stating that if any bleach was used to clean the blood on the knife then definitely it would also wipeout the DNA on it. Similarly, during trial, the prosecution has come out with an assumption that the distribution of DNA on a particular portion of the handle of the knife shows that it was used in the upper direction for stabbing the deceased. This theory was also set-aside by the appellate court stating that it was illogical and untenable. As a deathblow one more theory was also introduced by the

prosecution to fix the criminality of the accused. That was the shared bathroom hypothesis which says that the DNA which was collected from the washbasin of the deceased bathroom mixed with the accused points out that after the murder, Knox has used the deceased wash basin to clean the debris. The most significant thing which makes all these hypotheses weak was the access of the accused in the flat of the deceased. The accused was staying in the adjoining flat of the deceased. Thus the appeal court has found that the conviction granted by the trial court was clearly illogical and without application of mind. The trial judge ought to have considered the logical existence and connections of the hypotheses framed by the prosecution before fixing the criminal liability of the accused. Instead of simply believing and mechanically applying the prosecution theories, trial judge ought to have properly performed his gatekeeping role as an independent arbiter of scientific evidence. The important lesson from the facts of the case is that in forensic DNA trace evidence there is a strong possibility of

crossover and contamination. Similarly, DNA trace evidence and its potential is beneficial only for establishing the identity of the accused and nothing more. Law is concerned only about the scientific truth and not mere speculations. If forensic personnel are coming with either speculations or scientific truths mixed with speculations, it is their burden to demonstrate it and prove it before the court of law. Unless it has been proved by the scientists, they are only mere speculations and the court cannot act upon it. In the eye of law experts become real experts only if they are capable to help judiciary with proper scientific basis.

What is the fault? Who is responsible?

How to overcome this?

Whenever we discuss about the reliability of forensic scientific techniques, it is natural that its association with science would automatically come into the picture. No doubt, the application of scientific principles to solve the legal issues is not easy as reading the thrilling fictional private detective character “Sherlock Holme’s” or watching the CSI TV series. The query “whether

forensic science is part of scientific discipline” is still continuing as a moot question. Science has its own parameters like observation, verification, validation, reproducibility, internal system of governance, quality control, testability or falsifiability etc. Though forensic science is considered as part of the scientific discipline, still it is doubtful whether the techniques and practices in forensic science could satisfy the aforesaid parameters of science. The best example is fingerprint, footprint, hair and bite mark identification techniques. Science has its own method. As Isaac Newton has said “Scientific method refers to the body of techniques for investigating phenomena, acquiring new knowledge, or correcting and integrating previous knowledge. It is based on gathering observable, empirical and measurable evidence subject to specific principles of reasoning.”¹³ A proper analysis of some of the forensic techniques would show that the real scientific methods are lacking. Courts have also approved those

techniques whenever they approach for legal admissibility. The *status quo* somewhat started changing immediately after the pronouncement of the revolutionary U.S. Supreme Court decision *Daubert v. Merrell Dow Pharmaceuticals, Inc.*,¹⁴ wherein the “reliability test” was introduced along with ‘relevance.’ The Supreme Court has insisted the trial judges to act as gatekeepers while evaluating the scientific evidence. The court has emphasized that “in order to qualify as “scientific knowledge,” an inference or assertion must be derived by the scientific method. Proposed testimony must be supported by appropriate validation -- i.e., “good grounds,” based on what is known... [T]he requirement that an expert's testimony pertain to “scientific knowledge” establishes a standard of evidentiary reliability.”

After the *Daubert* decision many fields of forensic sciences have been discredited by scientific as well as legal community due to want of scientific underpinnings. In some cases, the convictions granted wholly or

¹³ Isaac Newton (1687, 1713, 1726), Rules for the Study of Natural Philosophy, *Philosophiae Naturalis Principia Mathematica*.

¹⁴ 113 S. Ct. 2786 (1993).

partly were either overturned or strongly doubted as a result of the involvement of faulty forensic science. This includes the latent fingerprint analysis, footprint analysis, bite-mark analysis, hair analysis and firearm analysis.

Problem with the stakeholders

If we take the legal stakeholders, the persons absolutely responsible are the prosecutors, defence counsels and the judges. No doubt, the first and the foremost responsibility should be placed on the shoulders of the prosecutors. Nowadays, the mindset of the majority of the prosecutors is that they should get conviction for the accused at any cost. They will come with forensic evidence concealing the pitfalls or shortcomings if any in both scientific as well as the legal setting. There is a mistaken belief among prosecutors that the truth finding system has assigned them the duty to find out the truth at the cost of the innocent accused. On the other hand, they are considered as the officers of the court to help judges in attaining absolute truth and thereby justice in a completely neutral manner. Experience shows that

instead of helping the courts in finding out the flaws in forensic evidence, prosecutors and scientific experts have been working as a consortium for getting conviction. As far as scientific expert evidence is concerned the defence lawyers can be assigned in a vulnerable group. After accepting heavy fee from the defendants, they often fail to scrutinize the evidence through accurate cross examination. This would be very pitiable in the case of amicus curiae since they will be getting the fee as set by the court as well as the heavy caseload of their own private cases. In some cases, the amicus curiae may be raw junior lawyers who do not have enough practice to do the job properly. Some of them are even engaging senior lawyers to cross-examine the scientific witnesses due to ignorance or fear. In fact, it is high time in India to have neutral scientific experts with legal background to help the defence lawyers and judges in screening forensic scientific evidence that flows into the court of law. In one of the earlier cases in Kerala in which the petitioner introduced the DNA typing evidence; the court had

mistakenly called a medico-legal expert who was not an expert to critically evaluate and appreciate the report of the scientist who was well versed in forensic DNA typing. This shows that the Indian Judicial system is not even able to identify the person who belongs to a particular scientific community. The condition is so pitiable when we come to the position of Indian trial judge's as gate-keepers of forensic scientific evidence. They are indeed duty bound to properly screen scientific evidence so as to discern the wheat from the chaff. At the inception itself it is clear that the Indian judges lack basic scientific knowledge to understand and apply their judicial mind on high-tech forensic scientific evidence. In most of the cases, they may either be deferring the job to the defence counsels or accepts the evidence at face value. The ignorance of the defense lawyers would also add fuel to the fire. The only relief to the trial judges in India is that as a matter of caution the Supreme Court has reiterated that in criminal cases conviction cannot be based solely on expert evidence, though it may act as an independent corroborative

form of evidence. But it is doubtful how long trial judges can take shelter under this roof since nowadays grievance offences like rape with murder had been mounting throughout India in which the entire prosecution case may be based on hard earned forensic scientific evidence.

Individualization Predicament

The purpose of any forensic identification is to individualize either the person or an object which has been involved in the crime. The strength and weight of forensic individualization using divergent forensic techniques depends on its power to isolate an individual or object from the rest of the individuals or objects in the world possible to be part of the deed. Here, the entire population in the world is considered as possible suspects. When the individualization report comes for judicial scrutiny, the only concern of the legal stake holders is about the probative value or force of the evidence. The forensic expert can properly adduce it only through measurable characteristics or through numerical communication. Therefore, the translation of forensic reports

into legal proof is always a controversial area where legal stakeholders should be very cautious. Unlike other forms of evidence, the forensic evidence completely vests on its probabilistic nature. But it is very unfortunate to say that in India there is no such practice. The forensic scientists often come and simply testify that the evidence sample is matching with the suspect's sample and some experts may even transgress their boundary and testify that the accused is the real culprit. For example, in *Nirbhaya case*, the forensic expert has stated in his report that "the samples were authentic and capable of establishing the identities of the persons concerned beyond reasonable doubt." In fact, after having perusal through the evidence adduced either by the prosecution or defence, it is the court to decide whether the concerned evidence is beyond any reasonable doubt for granting conviction.

Similarly, in India the other major shortcoming which is often perceptible in forensic reports is that there is no statistics regarding the possibility of any others having such combinations or matches. This is

possible only if we have the population study statistics on the frequency of different genetic features in a specified racial class. This calculation is utmost important to determine the strength of the forensic evidence by excluding the possible suspects who would be coincidentally incriminated. In India, it is interesting to note that in most of the criminal cases the DNA profile evidence are being admitted by the judiciary without these statistics. It is also not challenged by the defence counsel. For instance, in *Nirbhaya case* without adducing the coincidental match probability, the DNA expert has stated that "once a DNA profile is generated, its accuracy is 100%." The statement was neither questioned by the defence counsel nor by the judge who was acting as a judicial gate-keeper. It was so sad that the trial judge had admitted the evidence stating that "the counsel for the defence did not raise any substantial ground to challenge the DNA report during the cross-examination of the scientific expert. In such circumstances, there is no reason to declare the DNA report as inaccurate, especially when it clearly links the

accused persons with the incident.” Similarly, in another famous rape and murder case known as *Jisha Murder case*, conviction was granted solely on the basis of circumstantial and scientific evidence. The trial judge had admitted the DNA evidence stating that the identity of the accused was conclusively proved beyond reasonable doubt without mentioning anything about the probative value of the same. The prosecution has simply testified without any probabilistic reports so as to exclude any other person who had committed the crime. It is extremely doubtful that without this calculation how the trial judge had reached the conclusive proof about the identity of the accused. It is not necessary that in each and every case the court has to mention about the power and potentiality of forensic DNA typing. The general hypotheses on forensic DNA typing have already survived the judicial scrutiny and it had been judicially noticed by the jurisdictions across the world. Now the judicial gatekeeping duty of the trial judges is only to check the case specific application of the technique. In India, the decided cases

show that the case specific application of the technique is neither properly screened by the judges nor cross examined by the defence counsels. In cross examinations, defence lawyers fail to touch the vital points to be clarified by the scientific experts. After getting the statistical reports, the judge has to determine the probative value of the DNA evidence. This is possible only if he is able to find out the answer for the query that “how likely it is the accused person whose DNA profile matches the incriminating profile is actually the source of the incriminating evidence.” This is nothing but the frequency of the DNA profile in the concerned population. This important thing is missing in most of the cases in India.

Chain of custody responsibility

The credibility and weight of the forensic scientific evidence that comes before the courts entirely depends on the proper documentation of the “chain of custody” procedure which had been followed by the crime detectors throughout their scientific investigation from the very beginning of the crime scene evidence collection that would

extend up to the submission of the report before the court. Crime scenes and crime scene objects are treasures in crime investigations especially the crimes in which the direct and circumstantial evidences are lacking. The “chain of custody” simply means the accounting of the materials collected from the crime scene, accused and victim/deceased including the way in which it was collected, sealed, documented, dispatched, analyzed, reported and translated into proof.¹⁵ Though it is not possible to frame a general and common policy for the “chain of Custody” procedure, the experience from the foreign jurisdictions shows that it is so viable to form the crime labs own protocol so that the legal stake holders can check its implementation in the case at hand while evaluating the weight of the evidence. If the court finds any missing links or any irregularities while tracking the chain of custody followed by the crime detectors; it would categorically affect only the weight of the concerned scientific

evidence and not its admissibility. Therefore, any breaks in the chain of custody would reasonably affect the evidential link and thereby directly castrate the overall scientific evidence. Chain of custody challenge should not be entertained by the appellate court since it is a matter of importance during the trial so as to assure the sanctity and credibility of the scientific evidence. How much of weightage to be given to a particular piece of scientific evidence after taking into account of its chain of custody demonstration is exclusively on the trial judge who is expected to apply his mind while evaluating the evidence.

Problem associated with the CSI

In India, the other major problem is with regard to the Crime Scene Investigation (CSI). The quality of the forensic scientific evidence categorically depends on the way in which it was procured from the crime scenes, the body of the accused, victim and the deceased. As far as forensic investigations are concerned, crime scenes are considered as

¹⁵ Vinay Kumar v. State, (2012) available at <https://indiankanoon.org/doc/13129371/>

treasure where they could secure the objects involved in the crime or accidentally tumbled from the culprit or victim. The crime investigators should take extreme care while handling the crime scene throughout their investigation including identifying, establishing and preserving it. Considering the matter of importance, the untrained police officers should not enter the crime scene especially without proper lighting. In India, in almost all criminal cases the major flaw from the side of the police authorities is that immediately after getting information about the commission of a crime, the untrained police personnel will proceed to the crime scene without taking any precautions and enter into the scene and disturb it so as to make it hopeless for the criminalistics. It is the basic rule in criminalistics that the first responder should use his all efforts to identify and secure the crime scene from any possible interference of public or even the relatives of any victim or deceased. In some cases, it was also reported about the possibility of manipulating the crime scene including the planting of new

evidence to make their job easy. The other major work to be done by the crime scene investigator is the systematic search to be conducted in the scene for physical evidence. This is a great task since evidence identification and collection is possible only if the investigator has that much of foresight and application of mind to identify and realize the importance of a particular form of physical object available in the scene and besides he has to establish the logical connection of that object with the deed in time bound.

Flaws in law

At this juncture, it is germane to discuss about the adequacy of the provisions in the procedural laws in India in association with the crime scene investigation, forensic testing and reporting. It is very sad to say that in India there is no provision available in either Code of Criminal Procedure or any other legislation regulating the conducting of forensic procedures especially the crime scene investigation. As a mammoth legislation which contains 484 sections on divergent matters; it is so disgrace to say that

not even a single provision is there in connection with the forensic procedures to be followed in criminal investigation except two words of 'forensic' used in sections 292 & 293 i.e. the reporting and examining of some of the government forensic scientific experts. In fact, the whole problems associated with the reliability of forensic scientific evidence sprouts here. Conceiving the importance of these issues, Justice J.S. Verma Committee in its report on Amendments to Criminal Law has emphasized about the procedure to be followed by the investigating officer who is handling the offences against children as: "Upon receipt of a complaint or registration of FIR for any of the aforesaid offences, immediate steps shall be taken to associate a scientist from Forensic Science Laboratory or some other Laboratory or department in the investigations. The Investigating Officer shall conduct investigations on the points suggested by him also under his guidance and advice". This is most welcome recommendation so as to solve the issues at least in the case of offences against children

but unfortunately the government has failed to insert it in Cr.P.C. through the Amendment Act, 2018. In Cr.P.C. apart from the aforesaid sections 292 & 293, other three sections indirectly connected with the forensic investigation are sections 53, 53-A, 54 & 164-A which deal with the medical examination of the accused and victims and the collection and forensic examination of the bodily fluids collected from them. Despite these three sections there is nothing in the Code either authorising the investigating officers to engage, collect, aid, preserve, test and report of the samples from the crime scene or from the persons involved in the crime. Therefore, it is high time to insert specific provisions in the Cr.P.C. relating to forensic investigation. This will serve two purposes – one is that the investigating officer will conduct the crime scene investigation with utmost care without destroying or missing valuable real evidence especially in grievous crimes; the police can also make available to the accused the part of the samples collected from his/her body or from the crime scene to prove the innocence. In some jurisdictions, they have special

legislation for forensic procedures; for example, the Crimes (Forensic Procedures) Act, 2000 in Australia, which covers the entire forensic procedures to be mandatorily complied with by the police during investigation.

Evidence supplied by the nature cannot lie but humans do lie

The most important thing to be kept in mind by the legal stakeholders is that the objects supplied by the nature cannot be lie unless it has been unnecessarily tampered, manipulated or destroyed by the persons who have handled it. Recently, in India, it has been reported that in the Kathua gang-rape case, the accused in connivance with the police authorities have made the forensic analysis of the crime articles difficult by manipulating and destructing the same. The police authorities have washed the frock which was worn by the victim so as to remove the blood stain evidence in it.¹⁶

Overcoming the problems

Everything be placed at standstill; the vital consideration should be given to educate the legal stakeholders, forensic scientists and law enforcement authorities. In India, majority of the lawyers and judges have arts background and they do not have the basic understanding about the core scientific principles. The result is that when forensic scientific techniques comes before them seeking admissibility, they may either admit it at face value giving complete deference to the words of the experts or reduce the rigor in evaluating and thereby properly appreciating the evidence. The unwavering mind-set of the Indian judges seeking corroboration for granting conviction is also because of this ignorance. This could be overturned only by properly educating them on the concerned fields. The Indian government can simply follow the steps, which had been taken by the Federal Judicial Centre in the United States after the pronouncement of the *Daubert's* gatekeeping

¹⁶ Nitisha Kashyap, How Delhi Forensic Lab Traced Evidence From Kathua Rape Victim's Washed Salwar Kameez to Nail Accused, News 18 (April 19, 2018) available at [https:// www. news18. com/news /india](https://www.news18.com/news/india)

[/overburdened-delhi-fsl-helped-jammu-and-kashmir-sit-crack-kathua-gangrape-and-murder-case-1723447.html](#)

responsibility to the trial judges. They have published a Reference Manual on Scientific Evidence for Judges so as to make them thorough on the different scientific form of evidences that would come for trial. They also implemented several judicial training programmes on varying scientific evidences, which are very useful for the judges. The same programs can be extended to the prosecutors, lawyers and other stakeholders in the legal system. Similarly, in India, the BCI has to take urgent steps to incorporate forensic science in the law school curriculum at least as a compulsory course for the students who are interested in criminal law specialization for their honours programme in varying law streams. The lawyers who have already entered into the profession can be given continuing education on the novel forensic techniques.

The second important reform should be to give more advanced education and training to the forensic science personnel so as to make them thorough in forensic procedures especially in mining evidence for rape and murder cases. The government should also

increase the research funding on forensics and allied subjects making it attractive to the best scientists in pursuing research.

Same as improving the human resource, it is also pertinent to improve the system. In India, it is high time to improve the crime scene investigation. As a part of the reformation, the first and the foremost thing is that, the forensic personnel and the forensic science department should be completely detached from the control of the law enforcement wing. This would definitely give an immediate relief to them. The government should take immediate steps directing the law enforcement and criminal investigation wings to avail the help of criminalists at least in severe crimes like rape, murder, robbery, cybercrimes etc. To a great extent this will minimize the chance of manipulation and destruction of the valuable real evidence in the crime scenes, victims and the accused. The FSL's or even the government can introduce a common protocol to be followed by the crime investigators in maintaining the custody of care procedure. This will help to increase the

reliability and weight of the particular evidence and also to increase the confidence level of the judges in approving the scientific evidence beyond reasonable doubt.

The State governments shall take immediate steps to educate the law enforcement and crime detection officers on the minimum procedure to be followed by them while arriving at a crime scene. The initial response of the officers is the benchmark in determining the quality and reliability of any type of forensic evidence gathered from the scene.

Discussion, conclusion and recommendations

Translation of probabilistic form of forensic evidence into an inductive method of proof is always problematic and creates confusion in the mind of judges. In law, the evidential proof should reach to the level of certainty in order to eliminate any doubt in the mind of judges so as to make it in the form of a conclusive proof beyond any reasonable doubt. In the recent future, the prosecution may come with the sole forensic scientific

evidence to prove their case especially in rape with murder cases in which there might not be any direct or even circumstantial evidence.

The trial judges cannot frequently run away from the scientific form of evidence stating that it has no further corroboration. Evaluating scientific evidence is always a herculean task for the judges since it's a hearsay form of evidence. Though the scientific and technical underpinning of the reliability of the general theory of the scientific evidence like DNA had been validated and judicially noticed by almost all jurisdictions across the world, the application of the same by different scientific personnel should be rigorously evaluated and crosschecked for eliminating the minor chance of human errors. This should be *sine qua non* for determining the reliability and weight of such evidence. The examination of the link of the chain of custody will also promote the overall weight of the evidence.

No doubt, the forensic evidence cannot play anything in the legal setting unless it is in the form of statistical calculations. But, these probabilistic forms of evidence would be

insoluble mixture in the inductive form of proof unless the prosecution is not able to persuade the judge among other evidence that there is no room of innocence. Here again it is a matter of confidence of the trial judges and this would be more challenging in a situation in which the prosecution is relying solely on forensic scientific evidence. In the case of DNA type of evidence, the confidence level of the judges can be amplified by increasing the number of loci and repeating the test.

Richard P. Feynman the great physicist and Nobel Prize winner once said “Scientific knowledge is a body of statements of varying degrees of certainty-some most unsure, some nearly sure, but none absolutely certain.”¹⁷ If we track the history of scientific expert testimony in court room, one thing is apparent that the experts often come with their jargons and testify that they are 100% absolutely sure or a conclusive proof beyond any reasonable doubt that they have established the match in between the crime

sample and the suspect sample. For forensic scientists it is a matter of their livelihood, for the prosecutor a great support for getting conviction and for the court of law a disposal of one more case. What would be the profit earning by the defendant; the hanging cord or jail. In fact, it is high time to exclude this type of embroidered and closed statements coming from the mouth of scientific experts since it would directly influence the judges in cross checking their findings. The judges are not expected to decide the case according to the self-serving statements and scientific absoluteness provided by the experts; instead they are judicially duty bound to evaluate its accuracy and to check the possibility of committing any error with the help of independent experts who are well versed and experienced on the subject matter of expertise. Insisting to provide the approximate error rate of the concerned technique should be a usual procedure before accepting the testimony and findings. This is also one of the important factors which were

¹⁷ Richard P. Feynman, “What do You Care What Other People Think?” 1988, p.245.

listed by the *Daubert* court to be considered by the trial judges before admitting scientific expert testimony. Deprived of any scientific or technical knowledge, one could easily infer that the scientific accuracy of the forensic scientific techniques is not in par with the real scientific techniques since the forensic scientists may be getting the highly contaminated, smudged, ruined or tampered samples collected from the crime scenes unlike the fresh samples using by the scientists for real scientific research. Hence the possibility of error in forensic scientific analysis would be very high than the normal scientific research and analysis.

Apart from these things, the proficiency testing of the experts as well as the labs should be a routine process and the reports says that the blind tests also serve to fix the accuracy and reliability of the concerned expert scientific evidence.

Recommendations

Considering the importance of the forensic scientific evidence in the administration of justice, the researcher offers the following

recommendations so as to improve its reliability and thereby credibility.

1. The first and the foremost one is to make forensic science as a completely separate and autonomous department i.e. free from the clutches of law enforcement;
2. A separate Crime Scene Investigation team should be created who will accompany the investigating officer every crime scene at least in grievous offences like murder, rape with murder, robbery, dacoity etc.;
3. A special protocol should be issued by the Ministry of Law and Justice on Crime Scene Investigation same as the one issued by the U.S. Department of Justice;
4. Ensure the Centre and State Forensic Science Laboratories have adequate staff and instruments for their routine work so as to avoid backlog of cases and delay in submitting reports;

5. The government should take immediate steps to improve the research and its funding on forensic science discipline as in the case of other scientific research;
6. The concerned authorities shall take urgent necessary steps to impart training to the stakeholders in forensic science and its allied disciplines as continuing education programmes or special programmes for updating their knowledge on latest techniques;
7. The forensic science community personnel should take a pledge that they will not take any case for analysis unless and until they are perfect in handling that particular forensic technique;
8. As a part of governance, the Central Government should create a National Council or Body like Forensic Science Council of India, which regulates the CFSL and SFSL across India and make them responsible for fixing the standards which competes the International standards in the case of accreditation, certification and initiating disciplinary action against the personnel and the institution. The council shall make the certification and accreditation mandatory for working in the field;
9. The council should take steps to monitor the validation of new forensic techniques in India;
10. The council shall be responsible to inculcate ethics in the mind of forensic personnel so as to improve its sanctity;
11. The judiciary should not allow any person who belongs to the public or private forensic science institution to act as expert witness without the certificate from the council;
12. The council should take steps to check the quality control procedures of each lab as a part of improving standards;

13. The council and the Ministry of Law and Justice shall take necessary steps to create National DNA Database and Data Bank for identification purpose, Fingerprint Database of convicted offenders;

14. The council shall step to encourage population genetic studies on the Indian population and its statistical

analysis of calculating locus based frequency of DNA in forensic cases;

15. Above all, the Central Government should consider a comprehensive legislation covering the entire forensic procedures including the collection, preservation, analyzing and reporting of the evidence materials as well as the administration of crime laboratories in India.