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CRIME SCENE INVESTIGATION- A TOOL FOR FORENSIC SCIENTISTS

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Abstract
In a developing country like India, forensic science plays a major role in curbing crime rates. In a statistical survey released by the National Crime Records Bureau in 2018, 91 rapes, 80 murders and 289 kidnappings have been reported daily on an average basis across the country. The rate of offences not just physical but also white collar and cyber-crimes have increased rapidly over the years. Forensic science is now being considered as an emerging branch to effectively solve and prevent offences. Forensic science was not non-existent in the country but rather its importance has been underplayed a lot resulting in huge number of pending cases and trials in the court. Lack of technical expertise, proper knowledge and efficient resources have led to increased crime rates and poor disposal of duties. Forensic science justifies the offences and penalties mentioned in the Indian Penal Code and the procedures of Criminal Procedure Code. The very popular dual murder case of a teenager girl and the domestic help shocked the entire nation. The lag in delivering justice was traced back to the poor investigation methods followed by the police. Most of the evidences were either damaged or contaminated and the forensic team was not informed to collect evidences. Patterned evidences like fingerprints, palm prints, blood spatter can only be properly collected and documented by forensic scientists. The initial step towards any investigation involves the barricading of the entire crime scene. In most of the crime scenes, local people including on-lookers and media often trespass the scene and form the major source of evidence damage and contamination.
Keywords: Chain of Custody, Crime scene investigation, Criminal justice

Introduction
Forensic science is an essential branch of the criminal justice system as it brings together crime scene reconstruction and crime scene management. As it has been quoted that “facts do not lie, men can and do”, it is very essential to have a system that relies completely upon science and helps in overt examination of evidences. Forensic science deals with varied branches like biology and serology, chemistry and toxicology, questioned documents, fingerprints, arson and ballistics, digital forensics and thus the range of crimes that it can employ its resources to is very high. Also developing branches like forensic odontology, entomology, wildlife forensic and palynology have increased the application of forensic science in widespread crimes’ investigation.[1] Starting from identification of

potential evidences, their ideal collection, packaging, forwarding to specific departments, examination of those evidences and the display of the results in the court of law following the proper chain of custody is guided by forensic science. Newer analytical methods have come up that can join hands with the judicial system to effectively reduce crime rates and deliver faster justice in India.

A proper crime scene investigation is of primary importance in order to solve a crime. Barricading the crime scene to prevent entry of unwanted trespassers and preserve as much evidences as possible. The entire area shall be made free of on-lookers and other viable threats to the evidences. The area of crime can only be entered by the forensic experts, investigating officers and police officers. The entire area can be divided into zones or searching blocks. The point of entry and point of exit shall be decided before searching begins .The investigating officer shall ensure proper safety measures, like wearing gloves, using masks to prevent contamination of physical evidences and also keep his personal safety. Prior to searching, the investigating officer should have some knowledge about the type of crime committed by questioning the witnesses or the people near the crime scene. The initial survey of the crime scene should be started with Collection of potential evidences, Note Making- about approximate time of crime, lighting conditions, weather conditions, Sketching the crime scene roughly to determine a central point in the crime scene to measure the distance of all objects present in the crime scene from that point. Photography –With the subject, scale, and object of reference.

Documentation of the crime scene. It includes photography, videography, evaluation of the crime scene to determine if any dead body, loaded weapon, or bombs if involved are present.[2] The Dog squad helps in this field followed by a fingerprint collection team. Sketching the crime scene and note-making about the lighting conditions, weather conditions, type of crime scene. The most important step involves the identification of potential evidences, and searching the crime scene in different methods depending upon whether it is an indoor or outdoor crime scene. The evidences once located should be placed with number tags and photographed immediately to document it. During Crime Scene Photography, a scale or any object of distinctive size should be kept along with the evidence. All the three different methods of Overall, Close-up and Mid- range photography should be done.[3] Once the evidences are properly photographed, they should be collected according to their chemical and physical properties, for example, blood from separate pools should be collected by different cotton saline swabs and placed in different vials.

Collection of evidences shall be done by wearing PVC gloves of uniform thickness to prevent contamination of evidences, forceps should be used to prevent destruction of evidences. Biological fluids in different pools must be collected in different glass vials, dried blood can be scraped off using a scalpel while liquid blood can be collected by a syringe, or cotton saline swabs. Hard flattened surfaces like glass fragments, weapon of offense, bullets, spent cartridges, furniture should be held only at the edges not at the centre to preserve the evidences. Tool marks, tyre marks and paint chips, latent and bloody fingerprints, blood spatter are potential physical evidences. Packaging of evidences should be done in wax free envelopes. Stains of biological fluids should be air dried before packing to prevent contamination. Fragile evidences like spent cartridges; paint chips shall be collected in strong wooden boxes with a padding of cotton wool. Sealing of evidence shall be done with molten laac. The envelopes should be folded and tied using the druggist fold method and the molten laac seal should be placed on every knot tied to seal the packaging. Once all the evidences have been

collected, they can be packed and sealed and forwarded to the forensic science laboratory for analysis and testing. All the above steps should be followed before dispatching the evidences and Chain of Custody should be maintained accordingly.[4]If any seal is broken, or damaged, the Forensic Lab can reject the evidence as the chain of custody is not maintained. Sometimes due to contaminated samples collected or less than required amount, analysis of samples is not proper.

Role of Different Departments in Forensic Investigation

Forensic Medicine and Toxicology comes into role if any dead body is found in the crime scene. The deceased should be brought back to the mortuary and family members or identifying members should be called immediately for autopsy. A police inquest form is required if any foul play is found or suspected. Medicolegal autopsies help in determining cause, mode and time since death. They also can be used for identification, age determination if it is an unidentified body. Autopsies help to examine ante-mortem and post-mortem injuries and collect viscera, stomach wash, blood, from the body for analysis.[5] In cases of sexual assault, examination and collection of evidences from the victim and accused is done by a medical practitioner in the forensic medicine department. Once the physical evidences are collected, along with the Post Mortem Report and a forwarding letter from the Investigating officer is sent to the Forensic laboratory. The forensic laboratory can exist in the Regional, State or Central Level. Currently India has 7 Central Forensic Science Laboratories [6.] The crime branch of the laboratory decides which department it needs to be forwarded depending on the type of evidences. Like a blood-stained cloth is sent to the Biology and Serology division whereas a forged passport is sent to the Questioned documents division. All the evidences analyzed and reported are brought to the court of law for delivery of justice either supporting the prosecution or defense accordingly.[7] Evidences can be in the form of physical, documented or testimonials. Sometimes expert testimony is also asked for to obtain more insight. The immediate investigation, collection, packaging and forwarding of evidences are done by the police officials, namely the Station House Officer (SHO). The seal shall bear the impression of the police station from where it is dispatched. The impression shall not be that of a button or coin. The package should contain a note from the investigating officer addressed to the forensic lab examiner regarding the brief description of the case, types of evidences sent and types of examination required and a letter of authority to conduct such examination. An exact copy of the seal present on the package along with a letter of recommendation from the investigating officer. Sometimes the most common evidences bear the mark of crime investigation thus each and every detail of the crime scene shall be properly analysed before releasing the crime scene[8]. Cigarette buds often have saliva in them that can be a potential source of identification by species origin determination, ABO typing by the Absorption-Elution Method and Absorption-Inhibition Method. Blood can be found in case of murder, homicide, hit and run, abortion, sexual assaults, suicides. It is one of the most important types of evidence as we can find a lot of information using it like age of stain, source of origin i.e., whether it belongs to dead or living people, it is normal or menstrual, species origin determination, blood spatter analysis to find direction of weapon use, types of weapons used, paternity test, gender reveal and race of the person. Saliva can be found in cases of hanging, strangulation, fear and bite marks. Urine is present in frightening and sexual assaults. It can be used for ABO typing, determining traces of drugs and its metabolites and any disorder the victim may be suffering from. Milk is found in case of illegal abortions[9]. Faecal matter is found in cases of sodomy and bestiality. Seminal and vaginal fluids are

generally found only in cases of sexual assaults. There are other evidences like a weapon of offense may contain the latent fingerprints of the assailant; bullet fired may contain striation marks of the gun it was fired from. Paint chips can be found in the undercarriage of the automobile in hit and run cases. Glass fragments can be found in gun shots and fractures in glass can tell us the types of bullets used. Hairs obtained from the crime scene can help in knowing the identity of the person by the mitochondrial DNA. Analysis of hair sequencing patterns can tell us the race of the person, and whether it is natural or animal fibre[10].

Procedure in Crime Scene Investigation

A crime scene can be present in an indoor or outdoor set up. It may be a primary or secondary crime scene. Irrespective of such facts, proper practices should be followed while investigating a crime scene. The first step towards investigation is following a proper search technique. There are quite a few techniques like strip method, grid method, wheel method and spiral method for searching the premises. These techniques have been developed keeping in mind, the size and nature of the crime scene. The only need of following such technique is to ensure an unparallel search of the entire crime scene. This not only brings to notice an array of evidences, but also helps in correlating the evidences following the linkage theory. Searching the crime scene is a necessary step to identify potential evidences and document them as soon as possible. Transient and conditional evidences also can be documented with ease if a proper search technique is implemented[11].

It has been often noted that because of the incompetency of the investigating officer, a lot of evidences are lost, which may have been crucial in the solving of the case. For instance, in the famous Aarushi Double Murder case, the incapability of the searching team had led to the destruction of substantial leads to the case. Often the police officers are not trained enough to make them aware of such search methods thereby leading to delay in solving the case. Sometimes whether changes like rainfall, snowfall or extreme climate can also spoil the evidences. Therefore, identification of potential evidences, their immediate documentation is a necessity. The collection of evidences also includes the amount or proportion in which they are collected. Many of the times, the investigating officers are not aware of the minimal amount of the evidence mandatory to run any kind of analytical techniques on them. Also, a robust mechanism has to be followed for maintaining a digital database for such evidence collection.

Also, the maintenance of chain of custody plays a vital role in crime scene investigation. Following a step-by-step procedure not just ensures a standard collection technique but also ensures the evidentiary value. The Forensic scientists within the lab should also be well aware of the recent advancements in the analytical techniques. Starting from preliminary examination to instrumental analysis, the procedures enumerated in the manual by the Director of Forensic Science Services (DFSS) should be followed accordingly[12].

Conclusion

Forensic brings together medicine, judiciary and analytical branches of investigation. Initially people were not aware of this existing field because of which India doesn't have a developed system for forensic science. It is only of recent times that the advantages of such system have been discovered and various government and private sectors have taken up the work to develop this branch. With the

increase in rate and modes of crimes, more developed techniques are required to solve pending cases and also make people aware of such crimes. Only then crime scenario in India can be monitored and controlled.

With the ever-growing concept of digitalization, maintaining digital records of the entire crime scene investigation forms an indispensable tool. Ethical issues in crime scene investigation becomes a challenge especially if all records are maintained in a hand written format. Thus, most of the Forensic Laboratories have started maintaining digital records for all their exhibits received, examined and forwarded to the court of law. Also, the mortuaries and police stations which form a major wing of the criminal justice system have also ensured digitalization of their records. Many hospitals have started online portals from where the family of the deceased can access the death certificate[13]. Also, in the cases of unidentified bodies, a proper inquest report is mandatory prior to any post-mortem examination.

This digital database will not only look after the ethical issues and confidentiality of crime scene investigation but also help in speedy delivery of justice within the country.

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