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BEYOND TESTIMONIES: THE POWER OF PHYSICAL EVIDENCE

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ABSTRACT

The Criminal Justice System heavily relies on evidence to establish the truth in criminal cases. According to Locard's Principle of Exchange, interactions that occur during the commission of a crime leave behind valuable evidence that, when carefully analyzed, can play a vital role in identifying the perpetrator. It is crucial to conduct a thorough crime scene analysis and search for potential evidence, while also ensuring the proper maintenance of the chain of custody during crime scene processing. The admissibility and reliability of evidence presented in court greatly influence its credibility and weight. This paper emphasizes the significance of various types of evidence and presents several cases where forensic science expertise aided in linking evidence to suspects, ultimately resulting in successful crime resolution through the examination of modus operandi.

Hanging, being one of the most prevalent methods of suicide (accounting for 57% of cases), followed by poisoning (25%) and drowning (5%), necessitates meticulous evaluation of both the crime scene and the victim. This paper provides a detailed study of death by hanging, highlighting the crucial pieces of evidence and their roles in the investigation. By enhancing our understanding of the evidentiary aspects associated with hanging cases, we can improve the accuracy and effectiveness of crime investigations and enhance our ability to deliver justice.

Keywords: Physical evidence, Hanging, Case study on hanging, Trace Evidences, Locard's principle of exchange etc.

INTRODUCTION

The term "physical evidence" refers to any material or object that is connected to a criminal act and can be used to link the crime scene with the perpetrator and the victim which will aid in solving the crime. This can include a variety of items, such as bloodstains, hair, fibers, fingerprints, DNA samples, etc.[1] Physical evidence is an integral component of criminal investigation and the criminal justice system, as it provides concrete proof of a crime and can help to establish a suspect's guilt or innocence and irrefutable information about a crime scene, perpetrator, or victim. Furthermore, physical evidence plays a critical role in forensic investigations, its examination and interpretation can assist in reconstructing the sequence of events that led to a crime.[2] The role of physical evidence can be best explained by the principle formulated by French forensic scientist Edmond Locard's "Principle of Exchange" which states that "every contact leaves a trace." This means that whenever two objects come into contact, there will be a transfer of material between them, such as fingerprints, DNA, fibers, or

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particles, later on, this exchange only will serve as a source of physical evidence.[3]

Physical evidence refers to any tangible object or material that is encountered at a crime scene or is related to a criminal investigation. They are a vital element in the criminal justice system, and its examination and interpretation can help to uncover the truth behind a crime. Despite the challenges posed by the handling and analysis of physical evidence, its importance cannot be overstated. Through the analysis of a specific case study, we have demonstrated the significance of physical evidence in criminal investigations and how it can be used to define events and establish the guilt or innocence of a suspect.

Since the beginning of criminology, forensic investigations have advanced significantly. In the past, a lack of scientific tools and techniques often resulted in inadequate investigations and incorrect convictions. However, modern forensic science has made it feasible to gather, examine, and interpret a variety of evidence that can aid in the investigation of even the most difficult crimes. In the wide range of evidence, physical evidence is the one that plays a major role in decoding the crime and the crime scene. Virtually speaking, physical evidence can range from the smallest dust particles to as large as a train.

TYPES OF PHYSICAL EVIDENCES

The importance of types of physical evidence in criminal investigations and legal proceedings cannot be overstated. Physical evidence serves as objective and tangible proof, providing crucial information that can significantly impact the outcome of a case.

Majorly, all the evidences encountered at the scene of crime are summarized as-

Trace evidence is one sort of evidence that is particularly valuable in forensic investigations. This includes tiny fragments or materials found at the crime scene, such as hair, fibers, or glass fragments. Despite their apparent insignificance, these can offer crucial hints on the identity of the offender or the circumstances of the crime.[4]

Biological evidence is another critical type of evidence including DNA, blood, and other bodily fluids that can be used to identify suspects and link them to a crime. With modern DNA testing techniques, even small amounts of biological evidence can be used to provide compelling evidence in court.[5]

Chemical evidence, such as gunshot residue or drug residues, can also be valuable in forensic investigations. This type of evidence can provide valuable information about the type of weapon used in a crime, or the presence of drugs in a suspect's system.[6]

Impression evidence is yet another important type of evidence. This includes evidence like tire tracks and footprints, which can be used to track the movements of the perpetrator. Even seemingly insignificant details like shoeprints can be analyzed to determine the brand, size, and model of the shoe worn by the perpetrator.[7]

Firearms evidence includes bullets and casings which can be utilised to pinpoint the precise type of weapon that was used in a crime. Experts in ballistics can study these objects to identify the type of firearm used and perhaps connect it to other crimes. [8]

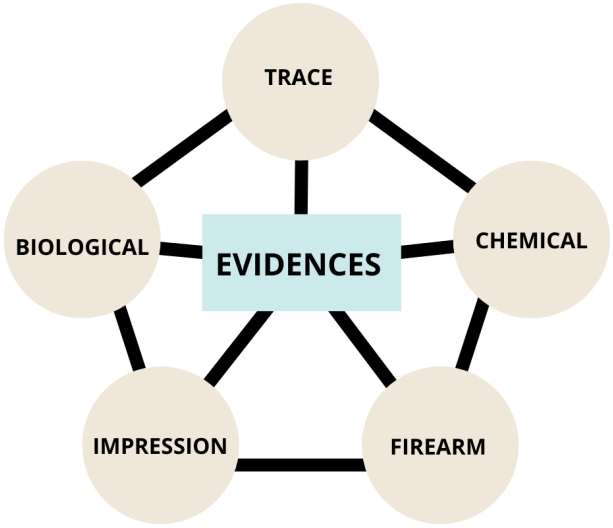


Figure 1: Major types of Physical Evidences

While these types of evidence are crucial in forensic investigations, it's important to remember that not all evidence is equally reliable or admissible in court. Forensic experts must carefully evaluate the evidence they collect and consider all factors that could affect its accuracy.

Physical evidence can also be categorized based on its nature and characteristics. Some common categories include:

Associative Evidence: This type of evidence links a suspect, victim, or object to a crime scene. For example, finding a murder weapon near a suspect's residence would be considered associative evidence.

Circumstantial Evidence: Circumstantial evidence indirectly suggests a fact or event. It may not prove guilt or innocence on its own but can contribute to the overall understanding of a case. For instance, the presence of a suspect's fingerprint on a stolen item can be considered circumstantial evidence.

Exculpatory Evidence: This type of evidence supports the innocence of an accused individual and contradicts the prosecution's case. It can provide an alibi, challenge witness statements, or raise doubts about the accuracy of other evidence.

Demonstrative Evidence: Demonstrative evidence helps explain or illustrate facts and concepts related to a case. It can include diagrams, models, photographs, or videos that aid in the understanding of complex or technical information during a trial.

RELEVANCE AND ADMISSIBILITY

The admissibility and reliability of trace evidence, biological evidence, chemical evidence, impressions as evidence, and firearms as evidence are crucial factors that determine the credibility and weight of evidence presented in court. These forms of evidence have become increasingly important in modern forensic investigations, as they often provide crucial information that helps identify perpetrators, establish the sequence of events, and reconstruct crime scenes. However, in order to be admissible in court, these evidences must meet certain legal standards and be proven to be reliable, scientifically valid, and accurate.

- **Biological evidence,** such as DNA, is often considered the most reliable form of forensic evidence, as it can provide a definitive link between a suspect and a crime scene or victim. However, the reliability of DNA evidence depends on the quality of the sample, the accuracy of the testing, and the interpretation of the results. Trace evidence such as hair, fibers, and fingerprints, are also valuable tools in forensic investigations, but their reliability may depend on the quality of the sample, the methods used to collect and preserve the evidence, and the expertise of the analyst.[9]
- **Chemical evidence,** such as drugs, toxins, and explosive residues, can provide important information about the type and source of a substance found at a crime scene. The sensitivity and specificity of the tests employed, as well as how the evidence was handled and stored, could all affect how reliable this evidence is.
- **Impressions,** such as shoe prints, tire tracks, and bite marks, can also provide valuable information about the identity and actions of suspects, but their reliability may depend on the quality of the impression, the methods used to recover the evidence, and the expertise of the analyst.[10]
- **Firearms and ammunition** are often used in violent crimes, and their analysis can provide important information about the type and source of the weapon used. However, the reliability of this evidence may depend on the quality of the recovered evidence, the accuracy of the testing, and the interpretation of the results.

The admissibility and reliability of forensic evidence depend on various factors, including the type of evidence, the quality of the sample, the methods used to collect and preserve the evidence, the accuracy and sensitivity of the testing, and the expertise of the analyst.[11] It is important that forensic analysts adhere to established guidelines and standards to ensure the reliability and validity of their findings.

PRACTICAL SCENARIOS IN REAL LIFE CASES

'DNA' The Master Evidence : Case Summary

The Bombay High Court has upheld the conviction and life sentence of a man for the 2010 kidnap, rape and murder of a minor, citing DNA evidence obtained from hair found on nail clippings and semen samples from the decomposed body. The court ruled that despite degradation of some of the DNA samples, forensic expert Shrikant Lade had obtained specific markers for DNA profiling that matched the accused. The ruling noted that DNA testing had unparalleled abilities to identify both the guilty and the innocent. It also highlighted the amended law calling for DNA profiling of rape case suspects.[12]

'Fingerprint Impression' The Central Evidence: Case Summary

A report by fingerprint experts played a crucial role in convicting a former personal security officer (PSO) for the double murder of the family members of a judicial officer in Gurugram in 2018. The case, which was cited in the 2019 National Crime Records Bureau (NCRB) report, serves as a case study for the value of fingerprint experts in criminal investigations. It was featured in the CFPB's annual report. The case was solved by experts Pritam Singh, Karnail Singh, and Ramesh Chand when the fingerprints from the crime's weapon were compared to those of the PSO. Only this report, from the Fingerprints Bureau of Haryana, was featured in the NCRB report.[13]

Silent Struggle: An Inside Look at the Hidden Signs of Hanging Suicide

In developing nations such as India, hanging is a prevalent approach for both suicide and homicide, primarily due to the ready availability of ligature materials such as rope, dupatta, saree, and wire, and the painless nature of the method. As per the National Crime Records Bureau (NCRB) data for 2021, hanging accounted for 57% of all suicide cases, making it the most common method, followed by poisoning (25%) and drowning (5%).[14] A retrospective study indicates that the ceiling fan is the preferred point for suspension in hanging, followed by window beams and tree trunks.

CASE REPORT

A man in his mid-twenties, hailing from a small village, was reportedly discovered hanged from an Eucalyptus tree, located near the pond canal in the same village. The victim's bike, laden with milk containers for delivery, was discovered parked near the crime scene. The mobile forensic unit conducted an investigation of the area, and the victim's body was found suspended in a particular position (as depicted in the attached figure).



Figure 2: Crime Scene

Upon initial examination of the crime scene, the most noteworthy physical evidence discovered was the presence of a ligature material, along with a white, powdery substance which was found on the victim's clothes, hands, and feet (as seen in the attached figure).

Subsequent analysis of the victim's body did not reveal any signs of struggle, and the eyes were found wide open, with the tongue slightly protruding from between the teeth.

Photographic	Interpretation
	A thick nylon rope used as ligature compressing the neck with the knot present at the midline on the posterior area of the head forming a loop which is a circumstantial evidence usually seen in the cases of homicidal suicide.
	Protruding Eye with saliva dribbling out of the mouth suggesting that the person was alive at the time of hanging.
	The presence of residual white powder from the Eucalyptus tree on both palms which strongly supposed to have come from the tree while gripping the trunk for ascending the tree indicating that the deceased had himself climbed the tree.
	The presence of residual white powder from the Eucalyptus tree on both feet strongly indicates that the deceased had himself ascended and reached their by own
	The presence of residual white powder from the Eucalyptus tree on the lower portion of the pants in a particular manner, specifically below the knee, provides compelling evidence that the individual had indeed climbed the tree on his own.

Figure 3: Virtual Role of Evidences

Eucalyptus, also known as "safeda," may secrete a white mildew powder due to a disease affecting its leaves.[15] The presence of this powder in various locations on a person's body suggests that the individual has voluntarily climbed the tree, hanged himself and committed suicide. Therefore, by examining the aforementioned case and analyzing other cases, we can infer that physical evidence plays a significant role in crime scene processing and analysis.

CONCLUSION

Physical evidence plays a vital role in criminal investigations, aiding in the resolution of crimes and providing concrete proof in the criminal justice system. The principle of exchange, formulated by Edmond Locard, highlights the significance of physical evidence in connecting individuals to a crime through the transfer of materials.

Various types of physical evidence, such as trace evidence, biological evidence, chemical evidence, impression evidence, and firearms evidence, contribute to the investigation process. Real-life cases demonstrate the importance of physical evidence in establishing guilt or innocence. For example, DNA profiling has been crucial in convicting perpetrators by matching DNA samples from hair and semen to the accused. Fingerprint impressions have also played a central role in linking suspects to crime scenes, leading to successful convictions.

In the case of hanging, a prevalent method of suicide in some regions, thorough examination of physical evidence is necessary to determine the circumstances surrounding the incident. Analyzing the ligature, body positioning, presence of substances, and other evidence can provide insights into the nature of the hanging and any potential foul play involved.

It is crucial to ensure the reliability, accuracy, and admissibility of physical evidence through proper collection, handling, preservation, and analysis techniques. Adhering to scientific standards and guidelines enhances the credibility and weightage of evidence presented in court, contributing to the pursuit of justice.

Overall, physical evidence serves as a tangible and objective source of proof in criminal investigations. Its careful evaluation and recognition of its admissibility in court are essential to ensure fair and just outcomes in legal proceedings.

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