

THE ROLE AND IMPACT OF FORENSIC EVIDENCE

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Abstract

This research delves into the crucial role that forensic science plays in the investigation of crimes, highlighting its diverse range of methodologies and their significant impact on the criminal justice system. Forensic science utilizes various scientific techniques, such as pathological tests, DNA analysis, ballistics, odontology, and more, to uncover truths in criminal cases. These methodologies provide precise and reliable data for the identification of individuals, the elimination of suspects, and the determination of causes of death. The study explores the extensive applications of forensic science, including the analysis of fingerprints and DNA, which greatly assist in the identification of unknown persons and the exclusion of potential suspects. Additionally, the study examines the contributions of ballistics in understanding the dynamics of firearms, as well as the role of odontology in identifying deceased individuals through thorough dental examinations. Furthermore, the study explores the significance of trace evidence, forensic anthropology, and forensic pathology in enriching investigations by revealing intricate details about crime scenes, injuries, and victim profiles.

INTRODUCTION

Forensic science plays a vital role in the investigation and unraveling of complex criminal activities through the systematic application of scientific methods. The various processes within forensic science, including tests conducted on the body, analysis of DNA, examination of ballistic evidence, and the use of odontology, all contribute significantly to uncovering the truth behind criminal incidents. These scientific techniques provide investigators with accurate data, enabling them to identify individuals, eliminate suspects, and determine the causes of death. The wide range of methodologies employed in forensic science contributes to a comprehensive understanding of crime scenes. By carefully examining fingerprints and analyzing DNA, investigators gain unique insights into the identity of those involved. The use of odontology allows for the identification of unknown deceased individuals by studying their dental records. Ballistics, another crucial aspect of forensic science, helps decipher important details about the use of firearms, such as identifying the weapon used and understanding the trajectory of bullets. Furthermore, forensic pathology sheds light on the circumstances surrounding deaths, differentiating between murder, suicide, or accidents. The significance of trace evidence, such as residues left at crime scenes, cannot be overstated, as it assists in identifying important elements like foil, gunshots, pollen, and wood. Additionally, forensic anthropology, with its innovative approach to examining skeletons, provides valuable information about the age, gender, and height of individuals, potentially revealing previous injuries and offering substantial leads for investigators.

Forensic science has become an essential and irreplaceable component in the field of crime investigation, offering invaluable insights through the meticulous examination of physical

evidence, medical reports, and crime scenes. Highly skilled forensic experts play a crucial role in analyzing a wide range of materials, such as DNA, hair, blood samples, and other residues collected from crime scenes, which in turn greatly contributes to the expeditious identification of criminals. Over the past twenty-five years, the impact of physical and forensic evidence within the realm of criminal justice has experienced a significant surge. The existence of such evidence has proven to be instrumental in establishing concrete connections between victims and perpetrators, thereby greatly simplifying the process of apprehending and bringing criminals to justice. Physical evidence, encompassing a diverse array of elements including hair, fibers, blood, and body marks, serves as a fundamental building block in comprehending the intricate details of various crimes. The presentation of forensic evidence in court not only strengthens the case but also provides unwavering support for the pursuit of justice on behalf of the victims. In contemporary times, investigative teams have harnessed the power of advanced scientific methods and cutting-edge technology to effectively collect and analyze physical and forensic evidence. Among these methods, DNA evidence has emerged as an exceptionally potent tool for identifying culprits, enabling crucial decisions in arrests, and fortifying criminal cases. Furthermore, the role of forensic evidence extends beyond its contribution to general crime investigations. In cases of sexual harassment, forensic evidence plays an essential role in shedding light on the nature and frequency of injuries sustained by victims, offering crucial insights into the severity of the offense and ultimately aiding in the pursuit of justice.

ROLE OF FORENSIC EVIDENCE

Another method utilized in forensic science is odontology, which involves the examination of teeth and the structure of the mouth to identify the remains of an unknown person. By scanning dental fillings, odontologists can develop the dental anatomy and establish a positive identification. Trace evidence analysis is a method that helps identify various residues found at crime scenes, such as foil and gunshot residue, as well as pollen and wood particles. These traces can provide valuable information to investigators. Forensic anthropology involves the examination of skeletal remains and other parts of the human body. This unique technique can provide information about the age, gender, and height of the individual, as well as any previous injuries sustained. Such information can be crucial in assisting investigators in their search for the truth. Forensic Science is a crucial aspect of crime investigation as it involves the application of scientific methods and techniques to uncover the truth. There are various processes within forensic science that are employed to investigate crimes, such as pathological tests, DNA analysis, ballistics, and fingerprints analysis, among others. These scientific methods provide accurate data during the investigative process. Ballistics is a technique that aids in crime investigation by analyzing bullets found in a deceased body. This method can also identify the type of firearm used to release the bullet. Additionally, ballistics technology can determine the trajectory, angular movement, and dynamics of bombs, rockets, and missiles. Forensic science plays an essential role in crime investigation, as it helps provide accurate information and evidence. Forensic experts are highly skilled in examining evidence and medical reports, aiding in the identification of criminals. They can analyze physical evidence, such as DNA, hair, and blood samples, as well as residues collected from crime scenes. One significant aspect of forensic science is the analysis of fingerprints and DNA. Each person possesses unique fingerprints and DNA, which can help investigators identify unknown individuals and eliminate suspects from the list of accused individuals. Forensic pathology is another important technique

used to determine the cause of death, whether it was murder, suicide, or an accident. Pathological tests, conducted within the field of medical science, can identify the weapon used in a murder. While modern forensic science has made significant advancements through the utilization of high-tech technology in evidence examination, there is still room for improvement. With the increasing crime rate, it is crucial to enhance forensic science techniques to combat and prevent crime effectively.

IMPACT OF PHYSICAL AND FORENSIC EVIDENCE

Over the past twenty five years, forensic evidence has played a crucial role in the field of criminal justice. Typically, experts analyze the victim's report provided by law enforcement to establish a connection between the victim and the perpetrator. Forensic evidence serves as a means to establish this relationship between the crime and the victim. When the forensic unit, which operates separately from the State Police Crime laboratory, discovers any form of evidence, it simplifies the process of apprehending the perpetrator and ultimately ensures justice for the victim. Additionally, in order to obtain physical evidence, forensic experts collect various types of material such as hair, fibers, blood, and marks on the body, among others. This evidence aids in analyzing the nature of the crime, determining motive, and more. Ultimately, the presentation of forensic evidence in court is intended to support the victim's case and is considered by the judge.¹In addition to this, physical evidence serves a crucial role in not only determining the true culprit of a crime, but also in uncovering the motive behind the crime and providing further insights. Furthermore, physical evidence acts as a key element in comprehending the intricacies of a crime scene. In the present day and age, investigative teams employ cutting-edge scientific methodologies and advanced technology to gather both physical and forensic evidence. Initially, DNA evidence is meticulously examined through extensive research, and subsequently, forensic experts meticulously analyze the data retrieved from it. Based on these findings, the investigating team is able to successfully identify the perpetrator of the crime, while also playing a pivotal role in compiling the comprehensive crime report.²One key element that has proven to be a significant predictor in identifying suspects and facilitating their arrest is DNA evidence. This invaluable resource plays a highly effective role in linking individuals to the crime scene, enabling law enforcement officials to establish a strong case against the suspect. By relying on DNA evidence, authorities are able to not only identify the suspect with a high level of accuracy but also successfully apprehend them, ensuring they face the consequences of their actions. In order to effectively address cases of sexual harassment, it is crucial to conduct thorough medical examinations to gain a comprehensive understanding of the victim's experience. These examinations involve analyzing forensic evidence, which not only evaluates the frequency and severity of injuries suffered by the victim but also collects biological samples that can assist in identifying the actual perpetrator. By utilizing this forensic evidence, law enforcement authorities are able to apprehend and hold accountable those responsible for their criminal actions. In conclusion, the importance of medical examinations and the analysis of forensic evidence cannot be overstated when it comes to addressing cases of sexual harassment. By utilizing these methods, law enforcement agencies are able to gather critical information,

¹S. H. Belshaw, (2019). —Next generation of evidence collecting: The need for digital forensics in criminal justice education|3(1) Journal of Cybersecurity Education, Research and Practice 1-14 (2019).

²R. Granja and H. Machado, —Forensic DNA phenotyping and its politics of legitimation and contestation: Views of forensic geneticists in Europe|Social Studies of Science1-19 (2020).

identify perpetrators, and take decisive actions to bring them to justice. Furthermore, the collection and analysis of forensic evidence serve as a crucial tool in the arrest of suspects involved in sexual harassment cases. The examination of injury evidence, in particular, allows the police to make informed decisions regarding the apprehension of the perpetrator. Once physical evidence is obtained, the police can take immediate actions to ensure justice is served.³Over the past few decades, forensic laboratories have significantly expanded their range of techniques for gathering evidence, experiencing a fourfold increase since the early 1970s. These laboratories have been instrumental in collecting a wide variety of evidence related to criminal activities such as drug abuse and sexual crimes, among others. Once the physical evidence is identified, it is meticulously compared with control specimens in order to analyze its source. This crucial step not only aids in the identification of the perpetrator but also contributes to strengthening the overall integrity of the criminal case by establishing a sequence of forensic evidence.

Conclusion

Furthermore, the utilization of advanced scientific methods and cutting-edge technology in evidence collection, particularly in the realm of DNA analysis, has significantly enhanced the efficiency and accuracy of criminal investigations. The advent of these technological advancements has revolutionized the field of forensic science, empowering investigators with the ability to extract invaluable information from even the tiniest traces of evidence. Consequently, this has not only expedited the process of solving crimes but has also served to ensure a higher level of confidence in the criminal justice system.

The research conducted on this topic not only highlights the importance of forensic science in uncovering the truth and delivering justice but also emphasizes the need for continued and dedicated efforts in refining and advancing this critical field. It is a call to action for scientists, researchers, and professionals in forensic science to work collectively towards enhancing the techniques, methodologies, and tools used in crime investigation. With the constant evolution of criminal activities and the emergence of new technologies, forensic science must adapt and keep up with these changes. This means staying up-to-date with the latest advancements, regularly reviewing and improving existing procedures, and developing novel techniques to address the challenges posed by criminals. In addition to technological advancements and interdisciplinary collaborations, the field of forensic science must also address ethical considerations. As the importance of forensic evidence in legal proceedings continues to grow, it is essential to ensure that the integrity and reliability of the evidence are upheld. This requires the development and implementation of rigorous quality assurance protocols, adherence to ethical standards, and ongoing training and education for forensic professionals. In conclusion, while forensic science has undoubtedly made significant strides in recent decades, the challenges posed by modern criminal activities demand continuous improvement and innovation in this field. The research conducted on forensic science serves as a reminder of its crucial role in providing truth and justice. It calls for sustained efforts in refining techniques, embracing new technologies, fostering interdisciplinary collaborations, and upholding ethical standards. By doing so, forensic science can better serve society and contribute to a safer and more just world. Over the years,

³E. K. Cheng and G. A. Nunn, —Beyond the witness: Bringing a process perspective to modern evidence law 197 Texas Law Review 1077 (2018).

significant progress has been made in the field of forensic science since the 1970s. However, it is crucial to acknowledge that there is still much room for improvement. This is especially true in light of the increasing crime rates and the ever-evolving methods employed by criminals. To effectively combat these modern challenges, it is imperative that forensic science continues to push the boundaries and strive for continuous advancements. Furthermore, the increasing complexity of crimes necessitates a multidisciplinary approach in forensic science. Collaborations between experts from various fields such as genetics, chemistry, computer science, and psychology are vital to provide a comprehensive and accurate analysis of crime scenes and evidence. By combining their expertise, these professionals can bring unique perspectives and insights to investigations, leading to more reliable and robust results.