

FORENSIC METHODOLOGY AND CRIMINOLOGY

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Abstract: Forensic Methodology and criminology are related fields that focus on the investigation and analysis of crime. Forensic science applies scientific methods to the collection and analysis of evidence, while criminology studies the social and psychological aspects of crime and criminal behavior.

The complex interaction between forensic Methodology and criminology has become a central element of the modern justice system, shedding light on complex criminal behavior and supporting the pursuit of justice. In essence, forensic science encompasses a variety of disciplines that use scientific methods to collect, analyze, and interpret evidence from crime scenes. This analysis not only helps to accurately reconstruct the crime scene, but also helps to identify the perpetrator through techniques such as DNA analysis, ballistics, and toxicology. Criminology, on the other hand, is concerned with the psychological and sociological underpinnings of criminal behavior, seeking to understand the motives and effects of crime on society. Together, these fields create a comprehensive framework for investigating criminal activity, emphasizing the importance of scientific inquiry in the pursuit of truth and the effective implementation of legal procedures.

Keywords: Forensic Science, Criminal Investigation, Crime Scene Analysis, Forensic Methodology, Criminology, Forensic , DNA Analysis, Fingerprint Analysis, Law and Forensics, Forensic Techniques, Investigative Procedures.

Introduction

Differences Between Forensic Methodology and Criminology

Forensic Methodology:

- Focus on analyzing scientific evidence.
- Includes disciplines such as chemistry, biology, and statistics.
- Forensic scientists work in laboratories, morgues, or at crime scenes.
- Responsibilities include analyzing evidence such as DNA, fingerprints, and drugs.
- Must follow strict procedures for collecting and analyzing evidence.
- Often asked to testify in court about their findings and methods.

Criminology:

- Focuses on understanding criminal behavior and the motives behind crime.

- Includes psychological and sociological perspectives.
- Criminologists often engage in field work, interacting with witnesses and suspects.
- Focuses on the “why” of crime, including social context and individual motives.
- May involve roles in law enforcement, policy development, or academic research.
- Career Path

Methodology:

This study uses a literature review methodology and a qualitative descriptive research design. Information was gathered from published journal papers and forensic textbooks that are mentioned in the references. English-language reviewed sources were the main focus of the inclusion criteria. Content analysis was done to summarize the topic and find commonalities. Appropriate citations were used to uphold ethical standards.

Results and Discussions :

Definition and Importance of Forensic Methodology in Criminology

Measurable Strategy serves as a pivotal crossing point between logical request and criminal equity, on a very basic level forming the field of criminology. It envelops a extend of specialized disciplines, counting DNA examination, toxicology, and ballistics, which collectively help within the distinguishing proof and indictment of wrongdoers. The precise application of legal strategies has not as it were improved the precision of examinations but too built a strong store of prove that policymakers can utilize to observe wrongdoing patterns and advise anticipation methodologies. As highlighted in later writing, the viability of scientific DNA databases significantly impacts both law requirement hones and criminological inquire about, displaying their urgent part in recognizing and settling criminal cases.

In this manner, legal science is irreplaceable, giving not as it were specialized back for examinations but moreover basic experiences into the subtleties of criminal behavior.

The Role of Forensic Methodology in Criminal Investigations

Measurable Technique serves as a basic component in criminal examinations, giving important strategies for prove collection and translation that can impact case results altogether. With methods established profoundly in different logical disciplines, scientific science not as it were points to fathom wrongdoings but too looks for to maintain the judgment of the legal prepare. For occurrence, the application of scientific geoscience highlights the basic for exact strategies, as dubious explanatory hones can abdicate false-positive or false-negative comes about, which may lead to destroying lawful results .

Moreover, in spite of the expanding request for measurable testing, numerous wrongdoing research facilities confront critical operational challenges, counting asset allotment

irregularities and excess issues.

Tending to these challenges is fundamental to moving forward the unwavering quality of legal prove. In this way, the interaction between thorough logical measures and productive research facility administration is crucial for the victory of scientific science in guaranteeing equity inside the criminal equity frameworks.

Asphyxial Deaths:

Hanging : 1.Knotting

2.Suspension

3.Le Facie Sympathique

4.Ligature Marks

Ligature Mark In Hanging and Strangulation:

Strangulation	Hanging
Below thyroid	Above Thyroid
Horizontal	Oblique
Complete	Incomplete
Continuous	Symmetrical
Transverse complete	IOS

Types of Suspension:

TYPICAL COMPLETE HANGING	PARTIAL HANGING
Above Thyroid Cartilage	Below thyroid cartilage
Oblique	Usually Transverse
Bilateral Symmetrical	Incomplete
Incomplete	

Suffocation Deaths:

- ✓ Smothering
- ✓ Choking
- ✓ Gagging
- ✓ Traumatic Asphyxia
- ✓ Burking
- ✓ Positional Asphyxia
- ✓ Overlying
- ✓ Café Coronary Syndrome

Human Identification:

- ✓ Dactylography
- ✓ Chileoscopy
- ✓ Trichology
- ✓ Poroscopy
- ✓ Rugoscopy
- ✓ Podography

Cardiac Poisons :

Important CARDIAC Poisons are:

Aconite

Nicotine

Digitalis

Oleander (Cerebra thevetia, Cerebra Odorum)

Techniques and Technologies Used in Forensic Analysis

Forensic analysis is increasingly incorporating advanced techniques and technologies to improve the accuracy and reliability of investigations. A major advancement has been the application of computer forensics. This field has attracted significant attention, especially in the United States, the United Kingdom, and India, reflecting the importance of managing digital evidence in criminal cases. Furthermore, the expansion of crime laboratories has led to a significant increase in forensic testing. However, this increase has also revealed significant challenges. Despite increasing expenditures, many laboratories suffer from resource allocation issues, which leads to backlogs and quality control deficiencies. This paradox raises questions about the effectiveness of current practices in forensic science. As the field continues to evolve, the need for regulatory frameworks and innovative quality assurance methods will become increasingly important, not only to expand the quantity of forensic technology but also to improve the quality and integrity of the evidence that is collected and analyzed.

Types of Autopsies:

MEDICOLEG AL	CLINICAL/PATHOLOG ICAL	PSYCHOLOGI CAL	VITROPSY	NEGATI VE
AUTOPSY	AUTOPSY	AUTOPSY		AUTOPS Y
In suspicious, unnatural death	In Natural/hospital Deaths,where cause of death is uncertain	Usually suicidal cases	Virtual autopsy	All findings negative & cause

				of death unknown
Police Authorization is Mandatory	Consent from legal guardian is Mandatory	Done by questionnaire & interviews with survivors of the diseased-families, friends	Using imaging techniques like CT & MRI Scan	No definite opinion can be given after complete examination and other tests
Consent from relative is not required		To Assess the person state of mind prior to death	Non-invasive/Minimally invasive procedure	2-5% of all Autopsies are negative

The Interrelationship Between Forensic Science and Legal Proceedings

The interrelationship between forensic science and legal procedures is becoming increasingly important in contemporary criminal justice, as innovations in scientific methods require a reassessment of established legal practices. The evolution of forensic science, particularly in areas such as cybercrime and behavioral biology, poses complex challenges for law enforcement to manage. For example, recent efforts to engage cybercrime investigators demonstrate the important organizational and cultural considerations required to effectively implement new technological approaches. In addition, the growing reliance on scientific knowledge, such as brain imaging, has the potential to redefine sentencing decisions, allowing for a more nuanced understanding of criminal behavior. This intersection highlights the need for a legal system capable of appropriate regulation, ensuring that scientific discoveries are used responsibly while minimizing the risks associated with “junk science”. Such synergy between forensic advances and legal frameworks ultimately aims to enhance the pursuit of justice.

The Impact of Forensic Evidence on Courtroom Outcomes

The introduction of forensic evidence into court proceedings plays a significant role in shaping the outcome of a case, significantly influencing the perceptions and decisions of the subjects in the courtroom. Federal Rule of Evidence 702, along with the Frye and Daubert Standards, establishes criteria for the admission of scientific evidence, ensuring that only reliable and relevant findings are presented in a trial. As noted, the application of these standards can lead to different trial outcomes depending on whether a state follows Frye or Daubert. Furthermore, recent research indicates that physical evidence has a significant impact on prosecutors’ initial decisions, particularly in the selection of charges, and also influences subsequent steps such as reduction of charges and sentencing. In the case of the Indian judiciary, this used to be the IPC. The Code of Criminal Procedure is the official

criminal code now amended as BNS, Bharatiya Nyay Sanhita . The interaction between forensic evidence and case management therefore highlights its crucial importance to judicial outcomes, arguing for the adoption of standard criteria across jurisdictions to ensure fair legal practice.

Here are some BNS to regulate:

- Rape – BNS 63
- Gang Rape – BNS 70
- Murder -BNS 100
- Criminal Negligence Act – BNS 106
- For MTP – BNS 88-92
- Harassment for Dowry – BNS 85

Future Trends in Forensic Science and Their Implications for Criminology

As technology continues to advance, the future of forensic science holds great potential to revolutionize criminology. The integration of artificial intelligence and machine learning into forensic analysis aims to improve the accuracy and speed of evidence evaluation, enable more accurate crime scene reconstruction, and inform predictive policing strategies. Additionally, emerging techniques such as 3D printing and virtual reality offer innovative ways to visualize crime scenes, facilitating better training for law enforcement and forensic professionals. Combined with advances in genomics and the ability to analyze trace evidence at an unprecedented level, these trends promise to not only solve cases previously considered unsolvable, but also inform criminological theories regarding criminal behavior. The development of forensic methods therefore represents a fundamental change in the way justice is administered, highlighting the need for continued ethical consideration and interdisciplinary collaboration in this field.

Conclusion

In conclusion, the integration of forensic science into the field of criminology has significantly improved our ability to understand and combat crime in modern society. Technological advances have been accompanied by the sophistication of criminal activities, requiring a corresponding development of forensic methods. The rise of cybercrime has seen traditional crimes being transformed into digital formats, requiring a new investigative approach that combines both forensic analysis and criminological theory. In addition, the use of forensic DNA databases has proven to be essential in assisting law enforcement agencies by performing a dual role: identifying suspects and contributing to a better understanding of criminology. These databases not only help detect and prevent crime, but also provide us with a deeper understanding of criminal behavior patterns. Overall, continued collaboration between forensic science and criminology promises to produce more effective strategies, thereby improving public safety and informing future research initiatives.

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