THE ADMISSIBILITY AND RELIABILITY OF NARCOANALYSIS, POLYGRAPH AND BRAIN MAPPING: A MEDICO-LEGAL APPRAISAL

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ABSTRACT

Scientific and technological progress has altered the nature of criminal investigation by replacing coercive techniques of torture in the third degree with more refined scientific methods of interrogation. The pivotal aspect of this development is the Deception Detection Tests (DDT) which is mainly comprised of Narcoanalysis (Truth Serum), Polygraphy (Lie Detector) and Brain Mapping (P300). These psycho-physiological devices are set to retrieve the information that is usually hidden in the data of the mind of the suspect and make it available to the investigators to offer them objective corroboration of what they see. It forms a window of connection between fundamental scientific principles and the quest after justice.

Narcoanalysis, Polygraphy and Brain Mapping are not implemented without controversy. Such practices are on the border between medical science and the law, and more often than not, there is a controversially heated discussion about the scientific accuracy and evidentiary merit of these practices. They pose great constitutional and ethical issues, especially those related to the right against self-incrimination, the right to privacy and the implications of this to the wider human-rights. This research paper is the detailed analysis of procedural specifics of these three forensic tools. Besides, it examines the constitutional imperatives that govern their utilization and argues about the legal obstacles to their admissibility in courtrooms and the need to establish an objective and fair justice system when putting up with a fast-paced technological advancement.

Keywords: Deception Detection Tests (DDT), Narcoanalysis, Polygraphy, Brain Mapping, Forensic Science, Self-Incrimination, Criminal Investigation.

CHAPTER I: INTRODUCTION

1.1 Background and Context of Modern Psycho-Physiological Devices.

Traditionally, crime has always been an unalterable component of the human society, yet the essence of the crime is of a continual transformation and multiplicity. Although the development of forensic science is usually celebrated in the case of criminal investigations, they are also a threat to high human dignity established in different human rights documents. Scientific breakthroughs, especially in the biotechnological field that incorporates methods of torture, human experimentation, and psycho-physiological experimentations usually come into direct conflict with the claims of ethics. The current study deals with the application, the legal status and the ethical question of the modern psycho-physiological interrogation tools in the Indian criminal justice system. These techniques are based on psycho-physiology, which is the field of knowledge of physiology that deals with the interaction between mental (human psyche) and physical (physiological) processes. The instruments used in this analysis are Narcoanalysis test, Polygraph test and the Brain mapping test. The growing inclination of law enforcement agencies to use these tests in criminal investigations has sparked a strong controversy in the debate among lawyers, academicians and human rights activists on the issue of their scientific foundation as well as their Legal and Constitutional soundness.

Conventional ways of questioning can be highly ineffective which prompts investigating agencies to find additional ways of detecting dishonesty and enhancing the efficiency of interrogation. The application of psycho-physiological equipment has been deemed as a powerful method that can have a strong influence on the guilty and the innocent thus accelerating the cause of justice. These tests are also sought as an alternative to "third-degree methods" frequently alleged against investigating agencies for extracting information. When investigating agencies are "absolutely in dark" regarding an offense, these tests can provide crucial links or clues to reach the real accused.

However, the application of these modern techniques involves serious questions relating to medical aspects, health issues, human rights issues, and ethical issues. This necessitates an urgent need for demarcation regarding which cases are appropriate for investigation through these tests.

1.1.1 Judicial and Legislative Landscape in India

In India, there is a distinct lack of specific law or regulations governing the practice of these psycho-physiological tests, yet they are currently in practice in many parts of the country. The decision of the Supreme Court in Selvi v. State of Karnataka[1] became the benchmark for the use of these techniques. The Supreme Court determined that the involuntary administration of psycho-physiological tests amounts to an unwarranted intrusion into personal liberty and infringes the Right against self-incrimination i.e. Article 20(3) of the Constitution[2] which operates as a shield, establishing the propositions that the accused is presumed innocent, the prosecution must establish guilt, and the accused need not make any statement against their will. Furthermore, the tests violate Article 21[3] (Right to life and personal liberty) by infringing the right against cruel, inhuman or degrading treatment'.

The Court, however, permitted the voluntary employment of these tests by investigating agencies, provided they strictly follow the guidelines issued by the National Human Rights Commission (NHRC). Crucially, the outcome of these voluntary tests cannot be converted into evidence because the subject lacks conscious control over their responses during the administration of the test, particularly during Narcoanalysis. Despite this limitation, any information revealed during these tests can potentially be used within the meaning of Section 27 of the IEA, 1872[4] / Section 23 of the BSA, 2023[5]. This legal position was recently reinforced and clarified in the June 2025 judgment of Amlesh Kumar vs. State of Bihar[6]. The Supreme Court set aside a High Court order that sought to compel an accused to undergo a narco-analysis test. The Court reiterated that involuntary narco-analysis is unconstitutional. While an accused can voluntarily consent to the test, they do not have an indefeasible right to demand it as a matter of course. The results of such tests cannot be the sole basis for conviction; they must be corroborated by other independent evidence.

1.2 Statement of the Problem

The methods adopted by perpetrators are rapidly evolving, necessitating a radical change in

[1] Selvi v. State of Karnataka, AIR 2010 SC 1974 (India).
[2] INDIA CONST. art. 20(3).
[3] INDIA CONST. art. 21.
[4] Indian Evidence Act, 1872 § 27.
[5] Bharatiya Sakshya Adhiniyam, 2023 § 23.
[6] Amlesh Kumar vs. State of Bihar, (2025) 4 SCC 178.

criminal investigation methods, thereby giving modern psycho-physiological devices popularity. This study will be based on the need to know the legality of these three tests and address the problems associated with Constitutional rights, Human rights, and Fundamental rights that the use of these tests poses.

The issues of population, lack of literacy, political interests, long and cumbersome procedures of settlement of cases, the appearance of hostile eye witnesses as a result of threats or bribes are central problems of providing criminal justice in India. The entire reliance on eyewitness report which was not reliable usually led to the benefit of the doubt is in the accused leading to a severe challenge to the justice system. This failure made investigating agencies to adopt third degree techniques which are inhuman.

As a result, a demand in an in-depth study of the character and extent of the newly developed scientific methods like Narco-Analysis test, Polygraph test, and Brain mapping test and a decision on their admissibility is apparent. These tests are used without any particular laws or regulations which is a matter of grave concern. The study would examine the multifaceted problems that come along with these tests, as it is a contemporary form of third degree approach to extract the truth out of an accused.

1.3 Literature Review

The application and validity of scientific interrogation techniques in India have been subject to continuous academic scrutiny. The following synthesis summarizes the contributions of existing literature while identifying the specific gaps addressed by the present study:

BOOKS

Anoopam Modak in *Scientific Techniques in Criminal Investigation* (Universal Law publishing, 3rd Edition, 2017)[7] discussed scientific techniques in criminal investigation, emphasizing that Law and Science are interrelated, and neither can exist without the other. He argued that test results used merely as a "clue" for evidence collection would not violate Article 20(3) of the Constitution. However, this work highlighted that adequate safeguards to minimize the misuse of those tests were not provided, potentially leading to the false implication of an

[7] Anoopam Modak, *Scientific Techniques in Criminal Investigation* (Universal Law publishing, 3rd edition, 2017)

innocent man. This study fulfills this lacuna by trying to highlight those important scientific, legal, and human rights issues that deserve thoughtful reconsideration.

Dr. C.K. Parikh in his book, *Parikh's text book of Medical Jurisprudence and Toxicology,* (1995)[8] explained the implication of forensic science, noting its praiseworthy role in solving crime and its usefulness for investigating agencies, stressing the urgent need for training on methods of gathering evidence due to the changing modus operandi of crimes. This earlier work, however, did not fully incorporate the implications of the definitive Supreme Court judgment in Selvi v. State of Karnataka regarding constitutional validity and voluntary consent. This study analyzes the judicial pronouncements pertaining to this area and attempts an analysis of the existing situation relating to the topic.

Malik's *Criminal Investigations, practice, Procedures, Proceedings, Techniques &Trials* by Panel of Lawyers, (Delhi Law House, 2018)[9] comprehensive work on criminal investigations highlighted forensics, criminal profiling, criminal psychology, and criminal jurisprudence with the advent of modern techniques, including Narcoanalysis, Polygraph, and Brain Mapping, along with the role of C.B.I investigation, Supreme Court Guidelines, and U.N. Covenants. This work, however, lacked a focused examination by confining its scope to only the three psycho-physiological tests (Narcoanalysis, Polygraph, Brain Mapping). This study fulfills the need for a focused examination by confining its scope to the three psycho-physiological tests and analyzing them specifically through a human rights perspective.

R. Ramachandran, *Law of Narcoanalysis*, *[Right against self -incrimination) (*Kamal publishers, New Delhi)[10], discussed various aspects of the Narcoanalysis test, thoroughly providing legal provisions and case laws to clarify the subject, particularly concerning the Right against self-incrimination. This work, however, lacked a comprehensive scientific analysis of the tests' merits. This study fulfills the need for a comprehensive scientific analysis by dedicating separate chapters to the validity, reliability, and demerits of the tests.

Other critical foundational works included **Dr. B. R. Sharma *Forensic Science in Criminal Investigation &Trial*, (Fourth Edition, 2003, Reprint in 2011**[11], who discussed the use of

[8] Dr. C.K. Parikh, *Parikh's text book of Medical Jurisprudence and Toxicology,* (1995)
[9] Malik's *Criminal Investigations, practice, Procedures, Proceedings, Techniques &Trials* by Panel of Lawyers, (Delhi Law House, 2018)
[10] R. Ramachandran, *Law of Narcoanalysis*, *[Right against self -incrimination) (*Kamal publishers, New Delhi)
[11] Dr. B. R. Sharma, *Forensic Science in Criminal Investigation &Trial*, (Fourth Edition, 2003, Reprint in 2011

forensic science in investigating criminal cases (such as assault, robbery, murder) and civil cases (forgeries, fraud); **M.K. Singh *Interrogation and Investigation polygraph and Brain Mapping test,* (Published by Lucky International, New Delhi, 2016**[12], who analyzed forensic science as an important and effective tool; **Modi's *Medical Jurisprudence & Toxicology*, Ed.23, (2006)**[13], which detailed various scientific tools, their medical purpose, utility, and procedure; and **Sarita Jand, *Forensic Science and Law*, (New Era Law Publications, Faridabad, Haryana, 2017** [14], who analyzed DNA fingerprinting, Brain Mapping, Polygraph test, Cyber technology, and Medico-legal analysis.

P.M Bakshi, *The Constitution of India* (14th edition, Lexis Nexis, Gurgaon 2017)[15], analyzed the constitutional concepts of the right against self-incrimination and the right to life and personal liberty.

Dr. Ishita Chatterjee *Law of Forensic Science*, (Central Law Publications, Allahabad, 2015)[16], felt the necessity for a simple version on law of forensic science to aid investigating and prosecuting agencies. **V.R Dinkar *Scientific Expert Evidence* (Determining probative value and admissibility in the courtroom, (Eastern Law House, New Delhi, 2013)**[17] attempted to reduce the tension arising from the conservative perspective of lawyers about science.

ARTICLES

Dr. Jyotirmoy Adhikari in his article **'*The modern psycho-physiological devices in police investigation- some emerging issues*' published in SCC Vol. IV (2011)[18].** highlighted various issues relating to scientific tests and opposed the administration of modern psychophysiological devices of interrogation without proper legislation, arguing it is an infringement of Fundamental and Human rights. The author identified some emerging issues and grey areas which were not dealt with by the Apex Court in the *Selvi v. State of Karnataka*

[12] M.K. Singh, *Interrogation and Investigation polygraph and Brain Mapping test,* (Published by Lucky International, New Delhi, 2016
[13] Modi, *Medical Jurisprudence & Toxicology*, Ed.23, (2006)
[14] Sarita Jand, *Forensic Science and Law*, (New Era Law Publications, Faridabad, Haryana, 2017
[15] P.M Bakshi, *The Constitution of India* (14th edition, Lexis Nexis, Gurgaon 2017)
[16] Dr. Ishita Chatterjee *Law of Forensic Science*, (Central Law Publications, Allahabad, 2015)
[17] V. R Dinkar *Scientific Expert Evidence* (Determining probative value and admissibility in the courtroom, (Eastern Law House, New Delhi, 2013)
[18] Dr. Jyotirmoy Adhikari,'*The modern psycho-physiological devices in police investigation- some emerging issues*' published in SCC Vol. IV (2011)

judgment. This study fulfills this lacuna by trying to highlight those important scientific, legal, and human rights issues that deserve thoughtful reconsideration.

Dr. Subodh K. Singh, *Admissibility of Polygraph in Indian Criminal Justice System*, *Cri.LJ*, Vol-118, (March) (2012)[19] explained the origin, development, and admissibility of the Polygraph test in the Indian Criminal Justice System, detailing case laws and the guidelines given by the National Human Rights Commission. This study, however, lacked deeper scrutiny regarding the legal remedies available for non-consensual testing. This study fulfills the need for deeper scrutiny by explicitly framing a research question regarding the legal remedy available if these tests are conducted against the will of the subject.

Parthana Banerjee, *Violation of Human Rights through Scientific Techniques*, *Cri.LJ*, Vol119, (July) 2013[20], explained the violation of human rights through these techniques and detailed the tools and stages of conducting tests. This existing body of work confirms the relevance and complexity of the issues addressed by the present research.

'Role of police in the society', by Singh A.Ramen Kumar, published in GLT 2012 VOL.1[21] and **'Brain mapping –an important scientific discovery for the identification of criminals', by Das Jayasri and Sinha, A. K, Published in GLT 2012 VOL.II, Issue 1**[22], the researcher have found in this article the scientific reliability of the tests results and also the issues involving health hazards in Narco analysis test.

Allan Lind, John Thibaut and Lauren walker in the article **'The Adversarial system in India: Assessing challenges and alternatives' (Verginia Law Review, 2004)** [23] It has been stated that the Indian criminal justice system is plagued by significant under-funding and understaffing, resulting in a persistently slow process. It is imperative to enhance the training of all judicial personnel and court administrators beyond the current level. Additionally, the author highlights the inadequate training of police in India in investigation techniques, leading to instances of torture and mistreatment. The prevalence of corruption among police personnel

[19] Dr. Subodh K. Singh, *Admissibility of Polygraph in Indian Criminal Justice System*, *Cri.LJ*, Vol-118, (March) (2012)
[20] Parthana Banerjee, *Violation of Human Rights through Scientific Techniques*, *Cri.LJ*, Vol-119, (July) 2013
[21] Singh A. Ramen Kumar 'Role of police in the society',GLT 2012 VOL.1
[22] Das Jayasri and Sinha, A. K,'Brain mapping –an important scientific discovery for the identification of criminals' GLT 2012 VOL.II, Issue 1
[23] Allan Lind, John Thibaut and Lauren walker 'The Adversarial system in India: Assessing challenges and alternatives' (Verginia Law Review, 2004)

further facilitates extortion and intimidation tactics.

NHRC GUIDELINES

Furthermore, while the **National Human Rights Commission (NHRC) issued Guidelines in 2000** for the administration of the Polygraph, Brain Mapping, and Narcoanalysis tests, which were critical in the *Selvi* judgment, the guidelines provided no specific punishments to punish the investigator, Scientific Report analyzer, or any other person if they mishandle or misuse their power while conducting the voluntary tests. This study highlights the importance of filling this gap and has tried to make some suggestions for application of the psycho-physiological tests.

1.4 Research Gap

The core research gap is the lack of specific laws or regulations governing the practice of psycho-physiological tests in India, despite their widespread use.

The Supreme Court's decision in Selvi v. State of Karnataka failed to fully address certain important scientific, legal, and human rights issues. Specifically, while the NHRC issued guidelines for the voluntary administration of these tests, no specific punishments are currently provided for investigators or experts who mishandle or misuse their power. This gap necessitates the regulation of these devices through a parliamentary enactment.

1.5 Research objectives

The main aim of this dissertation is to study the application of modern psycho-physiological tests in criminal investigation and to determine their scientific reliability and legal validity in the courtroom.

The specific objectives of the study are:

1. To discuss the scope and ambit of the modern psycho-physiological devices of interrogation used during the course of investigation.

2. To discuss the utility of psycho-physiological devices of interrogation used for the investigation of the offenses.

3. To analyze and evaluate the application of Narcoanalysis, Polygraph, and Brain Mapping test as a scientific aid to investigation in the criminal justice system.

4. To analyze and evaluate the Constitutional validity and admissibility of Narcoanalysis, Polygraph tests, and Brain Mapping test in the courtroom without violating any rights.

1.6 Research Questions

The research is guided by the following four core questions:

1. Whether Modern Psycho-physiological tests are reliable and admissible in the Indian courtroom?

2. Whether Narcoanalysis, Polygraph test and Brain Mapping test are in violation of Constitutional rights, Human rights, and Fundamental rights?

3. Is there any legal remedy available if these tests are against the will of the subject?

4. Whether Modern Psycho-physiological devices in criminal investigation have been helpful in protecting the human rights in the present society?

1.7 Hypotheses

This dissertation is based on the hypothesis that even though contemporary psychophysiological instruments (such as the Polygraph, Narcoanalysis, and P300 Brain Mapping) are theoretically highly investigative in crime detection, their contemporary use, especially in situations that do not constitute consensual usage, generates an irreconcilable dilemma with the basic rights provided within the Constitution of India.

In particular, the following hypotheses will be verified:

1. Involuntary administration of psycho-physiological devices is the direct infringement of the Fundamental Right Against Self-Incrimination (Article 20(3)) and the Right to Life and Personal Liberty that comprises the right to mental privacy (Article 21).

2. Although they are scientifically founded, the output of these devices is not reliable enough in law and science to meet the high standards of substantive evidence that would grant

the application of such a type of evidence in courts in India, and allow the admissibility of the evidence in Indian trials.

3. There is a major gap in both legislative and ethical systems in regulating the standardization, application and control of these scientific tests which may lead to misuse by the investigating agencies and lack of procedural protection to the accused.

1.8 Research Methodology

The methodology to be employed in this thesis is Doctrinal. This method presupposes the critical evaluation of the material and making certain conclusions based on the facts and information available, which implies a rather broad range of references to the books, scholarly articles, statutes, reports of National (NHRC, Law Commissions) and International organizations, and the internet. More importantly, the researcher has surveyed case laws of the Supreme Court and High Courts of India to analyze it further in regards to the Indian Criminal Justice system.

1.9 Chapterisation

Chapter 1: Introduction

This chapter provides the basis of the research study. It provides the history and backdrop of the contemporary psycho-physiological equipment, namely the changing judicial and legislative context of scientific interrogation in India. The chapter describes the Statement of the Problem, where the author identifies the conflict between the old-fashioned ways of conducting investigations and the latest uses of scientific assistance. It includes an exhaustive Literature Review to determine the academic discourse that is already available and the Research Gap that will be filled by this study. In addition, the chapter outlines the precise Research Objectives and Research Questions upon which the inquiry will be conducted and a description of the Research Methodology through which the study will be carried out in detail.

Chapter 2: Modern Psycho-Physiological Devices in Forensic Sciences and Their Utility in the Criminal Justice System.

It follows the history of forensic science and considers the synthesis of science, technology and the law. The fundamental purpose of this chapter is to define the scientific aspect, process and

usefulness of the three main instruments that are under scrutiny namely the Polygraph Test (Lie Detector), Narcoanalysis Test (Truth Serum), and the P300 Test (Brain Mapping/Brain- Wave Fingerprinting). The chapter has ended with an analysis of the functions of these devices in the contemporary crime investigations and how they help the law enforcement agencies in marshalling leads and closing the cases.

Chapter 3: Admissibility of Narco-Analysis, Polygraph Test, and Brain Mapping Test.

This chapter changes the narration to the legality of the evidence obtained using these devices. It is a critical analysis of the constitutional and legal admissibility issues, and more specifically, the basic rights in the Constitution of India. The chapter questions the conflict between these tests and Article 20(3) (Right Against Self-Incrimination) and Article 21 (Right to Life and Personal Liberty). It reviews important judicial precedents with an aim of establishing the present evidentiary position of test results in the Indian courts. In addition, the chapter explains the investigative value of these tests as compared to the legal requirement of consent acquisition by describing the protection needed to ensure that scientific evidence is not abused in the courtroom.

Chapter 4: The Psycho-Physiological Devices in Crime Investigation – An Analysis from Human Rights Perspective

Although the last chapter is devoted to the statutory law, the fourth chapter examines the moral and ethical aspects of scientific interrogation. It examines the interaction between human rights, scientific research, and legal contradictions. The chapter reviews the international and national systems that have been put in place to safeguard the human dignity and mental privacy. It evaluates critically whether the forced administration of these tests is a contravention of core constitutional rights and international standards of human rights in terms of torture and cruel, inhuman and degrading treatments.

Chapter 5: Conclusion, Findings, and Recommendations on the Application of Modern Psycho-Physiological Devices.

The conclusion chapter is the synthesis of the arguments and data in the study. It gives an overview of the study and gives the most important conclusions on the effectiveness, legal status and ethics of psycho-physiological equipment. Upon these conclusions, the chapter has

provided practical policy changes in a way that would streamline the adoption of current forensic technology with the constitutional rights.

CHAPTER 2: MODERN PSYCHO-PHYSIOLOGICAL DEVICES IN FORENSIC SCIENCES AND THEIR UTILITY IN THE CRIMINAL JUSTICE SYSTEM

2.1 Introduction to Forensic Science and the Justice System

The meaning of the term 'forensic' refers to science related to the court of law, utilizing scientific methods and techniques for the evaluation of evidentiary clues and the extraction of information[24]. The word forensic is derived from the Latin word forensic which signifies 'of' or 'before the forum' and denotes belonging to a court of justice. Forensic Science is applied for the purposes of the law. It provides impartial scientific evidence to be used in courts of law, specifically in criminal investigations and trials, and is defined as the application of scientific principles and techniques for the purpose of Justice[25].

Forensic science and the criminal justice system are closely related. The justice delivery system includes police, prosecutions, courts, and the punishment of the wrongdoer or acquittal of the innocent. While forensic science provides scientific evidence to be used in court, it is impossible for any human being to know the intention or object of another human being until it has been expressed. To achieve justice, scientific techniques are essential to determine with certainty that an individual is involved in the commission of the crime, or that they are an innocent person.

Forensic science has emerged as a significant constituent in the criminal justice system, aiding in crime control while helping to maintain a high quality of justice. Law enforcement officials have become increasingly dependent on laboratory results. As a developed technology, forensic science supports the legal system by imparting justice through various disciplines. This field has emerged as a new study within the criminal justice system, noted for its wide application in the dissemination of justice, encompassing thought processes, emotions, and the intention of the subject, and their effects on the body[26].

[24] Sarita, Jand, *Forensic Science and Law*, 1 (New Era Law Publications, Faridabad, Haryana, 2017).
[25] *Ibid.*
[26] Ishita Chatterjee, *Law of Forensic Science*, 7 (Central Law Publications, Allahabad, 2015)

Forensic science is also referred to as applied psychology. Specifically, forensic psychology is defined as the application of psychological knowledge to legal concerns, encompassing the application of the science and profession of psychology in relation to questions and issues of law and legal systems.

Modern forensic science began in the late nineteenth century when European criminal investigators started employing identification techniques like fingerprinting to solve crimes. As the scope of science broadened throughout the twentieth century, its application to legal issues became more frequent. Given that nearly every area of science potentially bears on law, the list of areas within forensic science is extensive. Currently, forensic science is used to investigate nearly all crime scenes, as well as to resolve some civil and paternity disputes.

2.2 Historical Development and Scope

The origins of Forensic Science can be traced to ancient Greek and Roman civilizations, which brought significant advancements to various scientific disciplines related to criminal investigation. For instance, poisoning was an early method of killing, leading to the gathering of widespread knowledge regarding its production and symptoms, making its detection possible in previously undetected murders. The earliest recorded autopsy was conducted in 44 B.C. by a Roman physician named Autistics, on the body of Julius Caesar, concluding that only one chest wound caused his death.

The seventeenth century, known as the age of enlightenment, saw renewed interest in forensic science, necessitating new means to identify evidence for solving crimes. In the eighteenth and nineteenth centuries, numerous incidents of the collection and scientific analysis of evidence were recorded. Early evidentiary techniques included identifying footprints, matching paper fragments (such as crumbled newspaper used as wadding in a pistol to a torn piece found on a suspect), and matching clothing fibers. In the 19th century, fine powder dusting was introduced to make barely visible contact marks, known as fingerprints, more visible.

The application of modern psycho-physiological tests for crime detection and justice administration is not new to India. Detailed references to scientific techniques of investigation are discovered in Kautilya's Arthashastra , which was inscribed about 2300 years ago[27].

[27] L.N.Rangaranjan, 348 (*kautilya*, The Arthashastra, Penguin Books, 1992)

Institutional structures were established in India, including Central Forensic Science Advisory Committee (CFSL) establishments. CFSLs were established in Calcutta (1957), Hyderabad (1965), and Chandigarh (shifted 1961, initially established in Lahore in 1933).[28]

Forensic evidence collected at a crime scene is unique and necessitates separate testing and analysis to reach a conclusion. Complex cases sometimes require multiple experts specializing in the same field to examine the evidence.

The scope of forensic science encompasses traditional branches like fingerprints, anthropometry, crime scene investigation, questioned document examination, and forensic ballistics. Recent advances have introduced sophisticated fields such as serology, voice analysis, brain fingerprinting, criminal profiling, and Narcoanalysis.

2.3 Integration of Science, Technology, and the Law

Science and law, though distinct professions, have become increasingly blended to ensure a fair judicial process. The legal system frequently encounters novel scientific evidence, posing profound challenges often rooted in the fundamental differences between legal and scientific processes. Scientific evidence has historically produced dynamic changes in criminal trials. Given this power, the court must be "alert and extremely careful in placing reliance on it". The routine use of scientific evidence and techniques marks a period of rapid change in forensic science. The application of science in criminal investigation has initiated a new era in investigative methods, sometimes leading investigators to depend on scientific methods to the extent that the individual efficiency of investigators is largely eclipsed. This scientific assistance is vital to tackle the challenges of modern crimes, such as terrorism, financial frauds, cybercrimes, drug trafficking, and human trafficking. However, the use of scientific advancement by criminals is also evident, such as the 2001 World Trade Centre bombing.

Investigators generally face a choice between the time-consuming process of meticulous evidence collection and the shortcut method of rounding up suspects and eliciting the truth through extensive interrogation, sometimes involving "barbaric torture generally known as ‘third degree’". A true and genuine investigator would utilize the multi-dimensional process of

[28] M.K. Singh, *Interrogation and Investigation polygraph and Brain Mapping test,* 93 (Published by Lucky International, New Delhi, 2016).

evidence collection.

A forensic scientist is first a scientist. They become a forensic scientist when their knowledge is used to help lawyers, juries, and judges understand the results of scientific tests. Scientific analyses conducted by qualified forensic scientists can both convict and exonerate an accused person. Because scientific evidence is potent, the forensic scientist must be accurate, methodical, detailed, and, above all, unbiased. They must document the process, maintain detailed notes, and write clear reports.

Forensic scientists serve as expert witnesses unlike ordinary 'fact' witnesses and are permitted to give opinions about what the test results mean. To qualify as an expert witness, the scientist must have a solid, documented background of education, training, and experience in the relevant scientific discipline. The credibility of forensic scientific evidence fundamentally depends on the reliability of the test conducted. Judges test the integrity of scientific evidence through legal techniques like cross-examination and by appointing well-reputed, competent scientific experts.

2.4 Modern Psycho-Physiological Devices and Their Utility

The use of tools for the interrogation of offenders is crucial for extracting relevant information related to the commission of an offense. The sources discuss three specific psychophysiological devices: the Polygraph, Narcoanalysis, and P300 tests. These techniques fall under forensic psychology.

2.4.1. The Polygraph Test (Lie Detector Test)

The origins of the polygraph are traced to the criminologist Lombroso, who experimented with measuring blood pressure and pulse to assess the honesty of suspects. Lombroso's device was called the Hydrosphygmograph. Psychologist William Marston also used a similar device during World War I.[29]

A polygraph, also known as a lie detector, measures and records several physiological indices, including blood pressure, pulse, respiration, and skin conductivity, while the subject is

[29] Dr. Subodh K. Singh, *Admissibility of Polygraph Test in Indian Administration of Criminal Justice System, 76* (*Cri.LJ,Vol 118, March 2012).*

answering questions. The underlying belief is that deceptive answers will generate physiological responses that can be distinguished from non-deceptive ones.

However, the term "lie detector" is considered misleading. A polygraph measures only arousal, which is assumed to accompany telling a lie. Because a specific pattern of physiological activity directly related to lying does not exist, examiners must measure deception indirectly.

This technique is also known as a deceptive detecting technique.

2.4.2. Narcoanalysis Test (Truth Serum)

The term "Narco-Analysis" was introduced by J. Stephen Horsely in 1936 to describe the use of narcotics to induce a trance-like state for questioning.[30]

The Narcoanalysis test involves administering small doses of intravenous infusion of "truth serum" (sodium penthetol or sodium amythal) under medical supervision. Before the test, the accused must undergo a detailed medical examination and be found medically fit to proceed.

The test operates on the principle that a person's capacity for lying, which relies on imagination, is blocked or neutralized when they are led into a semiconscious state. In this stage, it becomes difficult for the person to lie, and their answers are restricted to facts they are already aware of.

The reliability of the truth serum is a matter of debate. Currently, the results of the Narcoanalysis test are not legally admissible in India, although the test does assist investigating agencies in finding leads. Apart from efficiency concerns, significant ethical issues are involved, including whether it is medically ethical to subject someone to the risk involved, and whether it violates a person's right not to incriminate him/herself.

The push to combat new types of crime through these scientific techniques is raising concerns that conventional constitutional protections are being diluted. There is a concern that Narcoanalysis, currently used as an investigative tool, may be elevated to the status where the results themselves will be made admissible as evidence. The use of these supposedly scientific

[30] Marvin Dsouza &R.P. Kataria, *Forensic Science in Criminal Investigation*, 231 (Orient Publishing Company, New Delhi, 2018).

technologies is seen by some as illustrating inherent violence.

2.4.3. P 300 Test (Brain Mapping/Brain-Wave Fingerprinting)

The brain mapping test is also known as the P300 test, Brain fingerprinting, or Brain Electrical Activation Profile test (BEAP). It was developed and patented by Dr. Lawrence A. Farwell in 1995. This process detects whether an individual is familiar with certain information by measuring activity in the brain that is triggered by exposure to selected stimuli. The premise of brain fingerprinting is that the brain is central to all human acts and records the sequences of a crime. The fundamental difference between a criminal and an innocent person is that the criminal has the details of the crime stored in their brain. During testing, sensors on a headband measure electrical brain responses. Unlike a conventional polygraph, which detects emotional stress, brain fingerprinting focuses only on detecting whether the relevant information exists within the subject's brain. This deceptive detecting technique is highly useful to investigating agencies in finding out the truth.

2.5 Role of Investigation and Conclusion

Criminal investigation is an applied science that identifies, locates, and proves the guilt of a criminal, involving steps such as searching, interviewing, interrogations, and evidence collection. Interrogation is an integral part of police investigation. Techniques employed in interrogation include deception, torture, and modern scientific techniques.

Despite the advancements in forensic science, police in India still frequently use physical force to elicit confessions. This stands in contrast to developed nations that follow basic human rights principles and have done away with physical means. Modern techniques, conversely, are intended to confirm innocence or to psychologically break down a suspect into confessing a crime. For evidence to pass judicial scrutiny, proper investigation requires full technical knowledge and compliance with legal norms.[31]

The reliance on scientific methods is increasing because traditional tools of investigation are becoming ambiguous, non-reliable, and obsolete. The scientific methods are characterized as efficient, specific, rapid, verifiable, and unbiased.

[31] Ramen Kumar Singh '*Role of police in the society'* 46 (GLT, VOL.1, 2012).

However, the foundation of the criminal justice system the investigation process is not fully trusted by the laws and courts in India. Under Sections 161 and 162 of the Indian Evidence Act, 1872, the statements of witnesses examined during investigation are not admissible, and confessions made by the accused to the police are also not admissible in evidence.

While there is an alleged shift by the police away from third-degree methods toward scientific tests, the data also suggests that police are not well trained in this specialized field. The goal of the criminal justice system is to search for truth, which requires that investigating officers be properly trained, supervised, and provided with necessary scientific and logistic support. Strengthening the investigating agency is necessary to prevent the guilty from escaping conviction or the innocent from being implicated and punished.

CHAPTER 3: ADMISSIBILITY OF NARCO-ANALYSIS, POLYGRAPH TEST, AND BRAIN MAPPING TEST

3.1 Constitutional and Legal Admissibility Conflicts

The integration of Narcoanalysis, Polygraph, and Brain Mapping tests into the criminal justice system precipitates major legal and ethical challenges concerning fundamental constitutional rights, specifically Articles 20(3) and 21.

3.1.1 Right Against Self-Incrimination (Article 20(3))

Article 20(3)[32] guarantees that "no person accused of any offence shall be compelled to be a witness against himself," thereby establishing the individual's right to remain silent. Since the subject is made to answer questions while in a semi-conscious stage, they may not have control over their responses or be able to exercise the right to remain silent, which amounts to an infringement of the right guaranteed under Article 20(3). Courts have historically analyzed the nature of compulsion. However, legal protection under Article 20(3) is only attracted if the accused is compelled to make a statement that is likely to be incriminatory of himself.

3.1.2 Right to Life and Personal Liberty (Article 21)

The administration of the test on a subject is considered a violation of human rights and other

[32] Supra note 2

fundamental rights such as personal liberty under Article 21 of the Constitution[33]. Furthermore, if the drug is injected against the accused's will, the resulting pain, even if slight, may technically amount to hurt as defined under Section 319 of the Indian Penal Code[34].

3.2 Judicial Precedent and Evidentiary Status

The judiciary's stance on DDTs marked a significant turning point with the Supreme Court's ruling in Smt. Selvi v. State of Karnataka[35].

Unconstitutionality: The Supreme Court overruled previous High Court decisions that had affirmed the tests, holding that Narcoanalysis, the Polygraph, and Brain Mapping tests violate both Article 20(3) and Article 21 of the Constitution. The Court mandated that no such test shall be conducted on the accused without their consent.

Admissibility Status: The results of the Narcoanalysis test are not legally admissible in India. The statements made during the Narcoanalysis interviews, as well as the expert testimony related to them, have not been given weightage in criminal cases . The Court's position is that the outcome of the test cannot be admitted as evidence, even if consent is given, because the subject does not exercise conscious control during the procedure.

Landmark Case Laws Defining Admissibility and Constitutionality-

The primary legal challenge to deception detection tests (DDTs) centers on the constitutional guarantees of the Right against Self-Incrimination (Article 20(3)) and the Right to Life and Personal Liberty (Article 21).

1. Smt. Selvi v. State of Karnataka & Anr[36]

This case is the single most crucial judicial pronouncement regarding the legal validity of Narcoanalysis, the Polygraph, and Brain Mapping tests.

Decision on Constitutionality: The Supreme Court overruled previous High Court decisions that had favored these tests. It conclusively held that the compulsory administration of Narcoanalysis, Polygraph, and Brain Mapping tests violates Article 20(3) and Article 21 of the

[33] Supra note 3
[34] The Indian Penal Code, 1860, No. 45, §319
[35] Supra note 1
[36] Supra note 1

Indian Constitution.

Mandatory Consent: The Apex Court established a strict rule: no such test will be conducted on the accused without his consent. The Court held that the judiciary cannot interfere with the personal rights of an accused person.

Evidentiary Status: The Supreme Court determined that the statements made during Narcoanalysis interviews and expert testimony related to the same have not been given weightage in criminal cases . The test results are not legally admissible in India . The outcome of the test cannot be admitted as evidence even if the accused gives consent, because the subject does not exercise conscious control during the procedure.

The Section 27 Exception (Discovery): The Court left a significant "loophole" regarding investigative leads. It held that if the accused voluntarily consents to the test, any material or information discovered subsequent to the information obtained from the test can be admitted as a discovery statement under Section 27 of the Indian Evidence Act, 1872[37] .

The Selvi decision represented a significant setback for the mandatory use of these tests by police. Prior to this ruling, police could often seek permission from a Magistrate to conduct the test, which is no longer permissible.

This legal position was recently reinforced and clarified in the June 2025 judgment of Amlesh Kumar vs. State of Bihar[38]. The Supreme Court set aside a High Court order that sought to compel an accused to undergo a narco-analysis test. The Court reiterated that involuntary narco-analysis is unconstitutional. While an accused can voluntarily consent to the test, they do not have an indefeasible right to demand it as a matter of course. The results of such tests cannot be the sole basis for conviction; they must be corroborated by other independent evidence.

2. Ramachandra Ram Reddy v. State of Maharashtra[39] and State of Maharashtra v. Kathikalu[40]

These cases address the specific threshold for attracting the protection of Article 20(3) (SelfIncrimination). Inculpatory Requirement: The Bombay High Court in Ramachandra Ram

[37] Supra note 4
[38] Supra note 6
[39] Ramachandra Ram Reddy v. State of Maharastra (2004 AII MR (Cri) 1704)
[40] State of Bombay v. Kathikalu (AIR 1961 SC 1808)

Reddy held that there was no violation of Article 20(3) because the statements made by a person under the influence of Narcoanalysis were not incriminatory.

Similarly, in the Supreme Court case of State of Bombay v. Kathikalu , it was held that to attract the protection of Article 20(3), it must be shown that the accused was compelled to make the statement likely to be incriminative of himself . The protection applies only if the accused is compelled to testify against themselves.

3. D.K Basu v. State of West Bengal[41]

This Supreme Court decision deals broadly with prohibiting "third degree methods" (barbaric torture) for extorting confessions.

Harmonizing Technology and Rights: The law should not shut out modern technology adopted by the investigating agency, even while prohibiting third-degree methods for conscious confessions. However, in DDTs, police are attempting to extract information from the subconscious mind of the accused.

4. M.P. Sharma v. Satish Chandra[42]

This early case clarified the scope of the right against self-incrimination.

Scope of "To Be a Witness": The Apex Court observed that since Article 20(3) uses the words “to be a witness” and not “to appear as a witness,” the protection is extended to compel evidence obtained outside the Court Room . This ruling emphasizes the need for prerequisite consent before drug administration.

5. Dinesh Dalmia v. State[43]

Before the Selvi judgment, this case reflected an affirmative view from the High Courts regarding these tests.

Pre-Selvi View: The Madras High Court held that conducting Polygraph, Brain Mapping, and Narcoanalysis tests to bring out the truth would not amount to breaking the accused’s silence

[41] D.K Basu v. State of West Bengal (AIR 1997 SC 610)
[42] M.P. Sharma v. Satish Chandra (1954 AIR 300 SC)
[43] Dinesh Dalmia v. State (2006 Crl.L.J. 2401)

by force or intrusion of the constitutional right to remain silent Article 20(3). (This stance was subsequently overruled by the Selvi judgment.)

6. Rojo George v. Deputy Superintendent of Police[44]

Voluntary Intrusion: While allowing the voluntary intrusion of the Narcoanalysis test, the Court opined that when such techniques are used in the presence of an expert, it cannot be argued that the investigating agencies violated the fundamental human rights of any citizen.

These case laws illustrate the dynamic approach of the judiciary: initially grappling with how to accommodate new scientific tools, then establishing a hard line against compulsion based on fundamental rights in Selvi, while still permitting the use of leads derived from voluntary tests under the Section 27 principle. This ongoing dialogue highlights the complexity of integrating advanced psycho-physiological devices into a system built on constitutional protections.

The Section 27 Exception (Discovery)

Despite ruling the direct results inadmissible, the Selvi judgment left an exception under the Indian Evidence Act, 1872. If the accused gives voluntary consent to the test, any material or information discovered subsequent to the information obtained from the test can be admitted as a discovery statement under Section 27 of the Indian Evidence Act[45].

3.3 Investigative Utility, Necessity, and Required Safeguards

Narcoanalysis and other scientific techniques, often touted as an alternative to "third degree" interrogation methods, have utility in modern criminal investigations. Scientific investigation is viewed as necessary because the conventional methods of questioning may not yield results against increasingly sophisticated and modern criminals. When the investigating agency is "absolutely in dark" and all efforts have failed, scientific tests can help provide leads to further investigate the crime.

Given the significant risks and constitutional concerns, the following safeguards are

[44] Rojo George v. Deputy Superintendent of Police (AIR 1953 SC 131)
[45] Supra note 4

necessary:

Mandatory Consent and Judicial Oversight: The accused must be given all necessary information about the test before signing the consent form, and the written consent of the person and the consent of the Court should be compulsory.

NHRC Guidelines: The National Human Rights Commission (NHRC) has suggested that a specialized team—including a forensic psychologist, a psychiatrist, and an anesthetist should be present. The entire proceeding must be audio and videotaped . The subject must also be assisted by a lawyer, who should explain that the resulting statement has the status of a statement made to the police, not a confessional statement made to a magistrate.

Liability: Serious reconsideration is needed for the remedy available under the law if a person, even after giving voluntary consent, dies or suffers a chronic disease or permanent disability due to the side effects of the test.

The legal system must continuously strive to balance the rights of the citizen with the interest of social security, especially given the socio-economic factors that contribute to crime in India. Scientific investigation is the need of the hour for controlling complex issues like terrorism and organized crimes, provided these tests are conducted under judicial supervision to prevent the misuse of power by police authority.

CHAPTER 4: THE PSYCHO-PHYSIOLOGICAL DEVICES IN CRIME INVESTIGATION - AN ANALYSIS FROM HUMAN RIGHTS PERSPECTIVE

4.1 Introduction: Human Rights, Scientific Investigation, and Legal Conflict

Human rights are defined as the basic entitlements and freedoms that make life meaningful, often referred to as "natural rights" because no one grants them and no one can legitimately take them away. These rights are considered inalienable and universal, belonging to everyone regardless of their social status, race, or religion. Human rights represent the basic standards without which people cannot live in dignity, including the right to life, liberty, freedom of thought, and equality before the law.[46]

[46] H.O Agarwal, *Human Rights*, 3 (Central Law Publication, Allahabad 2010).

Fundamental Rights, conversely, are those human rights that are specifically guaranteed by a state's constitution. While all Fundamental Rights are Human Rights, the reverse is not true, as Human Rights are concerned with all global human beings, while fundamental rights relate to the state and its citizens. In India, the ultimate purpose of the government is to maintain human dignity, and the defense of human rights is an imperative of the Constitution, particularly under Article 21[47].

Recent advancements in modern scientific techniques, specifically the Narcoanalysis, Polygraph, and Brain Mapping tests, have introduced a major legal conflict: whether the involuntary administration of these three tests violates fundamental and human rights under contemporary Indian law. A crucial question is whether the results derived from these impugned techniques constitute testimonial compulsion, thereby attracting the bar of Article 20(3) of the Constitution of India[48].

4.2 The Global and Domestic Framework for Protecting Human Dignity

The concept of human rights is as old as the ancient doctrine of natural right, with roots traceable to the Babylonian Code of Hammurabi, the Hindu Vedas, and the Bible, which addressed questions of people's rights and responsibilities. Internationally, the UN Charter of 1945 was the first international mechanism to incorporate human rights as a core purpose of states, informed by the necessity perceived during World War II. The Universal Declaration of Human Rights (UDHR), adopted in 1948, became a moral inspiration for subsequent instruments.

Several international instruments explicitly protect individuals from the type of compulsion inherent in DDTs:

UDHR and ICCPR: Article 5 of the UDHR[49] and Article 7 of the International Covenant on Civil and Political Rights (ICCPR)[50] provided that no one shall be subjected to torture or to cruel, inhuman, or degrading treatment or punishment.

[47] Supra note 3
[48] Supra note 2
[49] Universal Declaration of Human Rights, G.A. Res. 217A (III), art. 5 (1948).
[50] International Covenant on Civil and Political Rights, art. 7, Dec. 16, 1966, S. Treaty Doc. No. 95-20, 999 U.N.T.S. 171.

ICCPR: Article 14(3)(g) of the ICCPR[51] guarantees a minimum right during a trial: the right 'not to be compelled to testify against himself or to confess guilt'.

UN Convention Against Torture: The 1984 United Nations Convention against Torture and other Cruel, Inhuman or Degrading Treatment or Punishment is the most important international agreement prohibiting torture.

The Role of the NHRC in India

The National Human Rights Commission (NHRC) was constituted in India under the Protection of Human Rights Act of 1993, drawing inspiration from international covenants, including the ICCPR and the International Covenant on Economic, Social and Cultural Rights (ICESCR) . The primary object of the NHRC is to protect human dignity, a goal that originates not only from statutes but also from Article 21 of the Indian Constitution[52]. The NHRC organized a core Group of specialists to examine forensic science services and submitted a report in 1998, emphasizing the need for better attention to this area.

4.3 Violations of Core Constitutional Rights

The application of involuntary psycho-physiological tests directly challenges constitutional rights in India.

Right Against Self-Incrimination (Article 20(3))

Article 20(3)[53] states that 'no person accused of any offence shall be compelled to be a witness against himself', which also grants the individual the right to remain silent .

Compulsion in DDTs: During a Narcoanalysis test, the subject is made to answer in a semiconscious state. Consequently, the subject may not have control over the questions they are asked or be able to exercise their right to remain silent, thereby infringing Article 20(3)[54].

[51] International Covenant on Civil and Political Rights, art. 14, ¶ 3(g), Dec. 16, 1966, S. Exec. Doc. E, 95-2, 6 I.L.M. 368, 999 U.N.T.S. 171
[52] Supra note 3
[53] Supra note 2
[54] *Ibid.*

Custodial Environment: The involuntary administration of any of the three scientific tests in a forensic laboratory or hospital, which physically confines the subject, fulfills the requirement of a custodial environment and thus attracts the provision under Article 20(3)[55]. This protection applies not only to the accused but also to suspects and witnesses questioned during an investigation.

Mental Pressure and Infringement: The Supreme Court held in Nandini Satpathy v. P.L. Dhani[56] that if there is any mode of substantial pressure subtle or crude, mental or physical, direct or indirect applied by the police to obtain information, such 'compelled testimony' infringes the right against self-incrimination.

Right to Life and Personal Liberty (Article 21)

The involuntary administration of these three scientific tests, which causes the subject to lose control over their responses, is clear evidence that the tests amount to cruel, inhuman, and degrading treatment in the context of Article 21.[57]

Physical Harm, Narcoanalysis, in particular, presents severe health hazards. The drug Sodium Pentanol, used as a truth serum, can, in larger doses, be used to induce a deep, sleep-like state, or even for executions by lethal injection in the USA . Experts warn that a wrong dose may lead to paralysis or coma. The use of this test allows the investigating agency to obtain information at the cost of human life.

Lack of Remedy: A critical human rights concern is the lack of remedy for a person who, even after giving consent, dies or suffers a chronic disease or permanent disability due to the side effects of the test, especially if the state is later unable to prove any allegations against them.

This effect is sometimes considered more injurious than the third-degree method of torture.

4.4 Intersecting Rights and Ethical Challenges

Right to Privacy and Right to Information

The application of scientific techniques also raises concerns regarding the Right to Privacy,

[55] *Ibid.*
[56] Nandini Satpathy v. P.L. Dani, AIR 1978 SC 1025.
[57] Supra note 3

guaranteed under Article 21[58]. Privacy is an individual condition of life characterized by exclusion from public and publicity, defined as the person's own choice not to be compelled by anyone to disclose anything . The implementation of various government programs, including DNA profiling and brain mapping, has generated concerns about the possible invasion of a citizen's Right to Privacy.

The law also recognizes the Right to Information (RTI), which stems from the fundamental right to freedom of speech and expression (Article 19(1)(a))[59]. RTI allows individuals to demand information held by government bodies, serving a larger public interest. When the privacy of an individual conflicts with the right to information of citizens, the latter right has to be subordinated to the former right as it serves the larger public interest. However, the general consensus is that no rights, including the right to privacy, are absolute rights, and the balance must be decided on a case-by-case basis.

Ethical and Professional Challenges

Beyond constitutional conflicts, ethical issues plague the forensic application of these devices: Competency and Bias: Forensic scientists are ethically obligated to be honest about their qualifications, employ reliable methods, and confine their reports to their area of expertise.

However, the reality is that forensic scientists, often employed in labs under police administration, may develop institutional or personal bias, leading to partial findings that prejudice one side.

Interference: Forensic scientists are duty-bound to the court, not the prosecution or police. Nevertheless, the tight control of forensic laboratories by police departments raises doubts about whether experts can deliver independent opinions without interference. Police often insist on experts making evidence that incriminates suspects, controlling the process from evidence collection to final conclusion.

Right to Fair Trial: The reliability of the Polygraph test is compromised by physiological changes caused by simple factors like common cold, headache, over-excitement, fear, nervousness, or anger. Since results may be inaccurate due to individual factors, there is a

[58] *Ibid.*
[59] INDIA CONST. art. 19(1)(a)

chance of false implication, putting the result gathered from these techniques in conflict with the right to a fair trial.

4.5 Conclusion and Future Requirements

The controversy surrounding Narcoanalysis, the Polygraph, and Brain Mapping tests highlights the tension between the modern necessity for scientific investigation and the fundamental human rights guaranteed by the Constitution. However, the constitutional position is clear: the involuntary administration of these tests is unconstitutional and violates Articles 20(3)[60] and 21[61]. While the Selvi decision confirmed the inadmissibility of the test results for determining guilt, it sanctioned the admission of subsequent discoveries under Section 27 of Indian Evidence[62] effectively maintaining their utility as investigative aids. To prevent the highly probable scenario where police compel the subject to "voluntarily" consent to the test, and to mitigate the risks of chronic disease or permanent disability caused by the drug, the challenges necessitate strong legislative action that follows the Supreme Court's guidelines. The protection of human rights and dignity must remain the primary concern of the state and its functionaries, ensuring that the pursuit of truth does not come at the cost of basic individual freedoms.

CHAPTER 5: CONCLUSION, FINDINGS, AND RECOMMENDATIONS ON THE APPLICATION OF MODERN PSYCHO-PHYSIOLOGICAL DEVICES

5.1 Conclusion and Chapter Summary

The current study has examined the use of the modern psycho-physiological tools in the field of police interrogation namely Narcoanalysis, Polygraph, and Brain Mapping in the Indian criminal justice system in terms of human right and medico-legal factor. The above chapters explained the history and definition of forensic science, how the current tests are applied in India, the steps which are followed in conducting tests, and the specific methods of detecting crime. This is the final chapter that summarizes the work and suggests the further steps.

The Role of Forensic Science in Truth Finding

The reliability of the test conduct is the basic factor of credibility of forensic scientific evidence

[60] Supra note 2
[61] Supra note 3
[62] Supra Note 4

whose duty of making the test conduct reliable is mainly left to the personal scientist and his/her laboratory. Ultimate justice is based on the truth finding exercise wherein forensic science has a significant and unavoidable role to play in the process of conducting criminal trials. In order to maintain the quality and integrity of the forensic outcomes, the courts using such methods as cross examination and appointment of the reputed scientists are used.

Criminal Justice System and Human Rights Conflict

The Rule of Law requires a strong and efficient Criminal Justice System (CJS) which brings a sense of security which is vital to the people. India needs to modernize its CJS to the same level as the western developed countries to move on the social front, which is a task that cannot be achieved without the involvement of the scientific methods. The study covered the application, abuse, constraints, and legal course of action with regards to scientific practices such as Narco Analysis, the Polygraph test, and Brain mapping in delivering criminal justice. More importantly, the CJS should implement criminal laws without cruelty or breaking of individual dignity. The offender is still a human being, and most of the human rights have been interpreted by the judiciary in its own way to bring about a balance between the interests of the accused and that of the society. A civilized society is characterized by the quality of justice brought about by the quality of the investigation, the judges, and the lawyers. The CJS is mandated with the official responsibility of defending the rights of the collective and individual and law and order. Modern scientific equipments and Audio-Video Forensics are known to be useful in tracing criminals and proving their participation in the crimes committed in the past and those in the future.

5.2 Findings

According to the data analysis, interpretation, and observations, the studies provided a number of major results about the usage and control of DDTs:

Investigative Effectiveness/Legal Implications: Narco, Polygraph and Brain Mapping tests have been effective in investigating numerous high profile cases and have helped to prevent big disasters such as the Mumbai, Malegaon and Hyderabad explosions. Although there are legal implication of Article 20(3) and Article 21 of the Constitution, these tests have been found to be useful in conducting investigation.

Lack of Policy and Admissibility: It was established that no Government has promulgated any policy regime in express terms that scientific instruments such as Narco- analysis, Brain mapping as well as the Polygraph test should be introduced as formal evidence in before the court of law.

Weaknesses in Training: One of the major problems is the deficiency of training between investigating and prosecuting agencies. The officers do not have the necessary expertise to gather, carry, conserve, seal, and label the evidence including blood samples, fingerprints, hair follicles, and nails that fails to allow the agencies to establish the actual crime committed.

Coordination Problems: The coordination between the forensics professionals and the police does not always happen, the experts even work without each other. It is in the discretion of the investigative body as to whether or not to seek expert opinion of the court permission to conduct these tests.

Necessity and Regulation: When it comes to the high-tech crime, sophisticated methods of evidence collection are required. The Polygraph, Narco Analysis and Brain Mapping can be very helpful where the traditional means fail to help, however, considering the Constitutional and Basic Human Rights, these tests should be controlled with the help of appropriate rules and regulations.

Judicial Limit and Rights Protection: The rule of law criminal justice system is directed by the much treasured idea of safeguarding the rights of the accused. The restrictions on investigating power including those founded on Art. 20 (3) and Sec. 161, 162, 163, 164 of Cr.P.C. are essential to prevent the misuse of police power and coerced confessions against the accused.

5.3 Recommendations

The researcher recommends the following based on the research finding to overcome the repugnant nature of scientific necessity and human rights in the Indian legal system:

I. Legislative and Admissibility Reforms

1. Promulgate a Policy Regime: The Government ought to adopt a policy regime with some statements on the admissibility of such scientific instruments (Narco-analysis, Brain

mapping, Polygraph) in court. These stipulations must be made flexible enough to take into account the future scientific activity.

2. Statutory Interpretation: Narco-analysis, Brain mapping and Polygraph should be read in the context of modern and scientific techniques in different forms of judicial pronouncement and acts.

3. Section 27 Enhancement: Discovery of these techniques should be formally accepted as the discovered facts under Section 27 of the Indian Evidence Act, 1861, to assist further with the investigation of the law enforcement agencies.

4. Special Crime Designation: The legislature ought to incorporate these tests in the investigation process of crimes that have an enormous impact on the State and the society in general, i.e., bomb blasts, terrorist attacks as well as scams.

II. Procedural, Training, and Ethical Safeguards

5. Standardized Guidelines: NHRC guidelines are available to the Polygraph test, whereas there are no guidelines to the powerful techniques such as Narco-analysis, Brain mapping,

DNA test, Computer forensics, and Electronic surveillance. The Central Government ought to harmonize the management of all these methods in all states with sole guidelines, after taking into account the opinion of all the stakeholders.

6.Training Console: The Government should develop a training console on how to investigate and prosecute agencies to give them the requisite skills in the collection of the samples, lifting, preservation, sealing, and labelling. This will contribute to efficiency, the fundamental human right of a violence free environment and dignity in custody.

7. Police Credibility: Police needs to make efforts to enhance their image and credibility to the society because the current legal restrictions are meant to safeguard the accused against the misuse of the police power.

8. Follow-Up and Authentication: Forensic Science Laboratories (FSLs) should take due follow-up on the way the test results contributed to the investigation and final decision of the court. This will give a clear impression on whether the tests are authentic.

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