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THEORITICAL STUDY OF THE WORK OF FORENSIC LABS WITH DETAILED ANALYSIS OF THE POLYGRAPHY TEST IN THE CRIME INVESTIGATION

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ABSTRACT

The Paper focuses on the Polygraph examinations and forensic labs are essential parts of the Indian criminal justice system. In order to assist with investigations and legal proceedings, forensic laboratories examine tangible evidence such as DNA, fingerprints, and toxicological samples. These labs are crucial, but they frequently struggle with issues like backlogs in cases and a lack of resources. Polygraphy tests, which measure physiological responses to assess truthfulness, are used in investigations but their results are not typically admissible in court due to concerns about accuracy and potential misuse. While both forensic labs and polygraph tests contribute significantly to crime solving, their effectiveness relies on technological advancements, improved training, and adherence to ethical standards. This paper further focus on the overall summation of the working of the Forensic labs and further more includes about the technicalities of the Polygraphy test with mentioning about the landmark cased and National Human Rights Commission guidelines following with the addition of the significant role of Forensic labs in the Crime Investigation .

KEYWORDS: *Forensic Laboratories, Polygraphy test, Indian Criminal Justice System, Crime Investigation.*

INTRODUCTION

The Criminal Justice system mainly focuses on the value of truth and Justice by following a fair trial; it generally protects the innocent and will penalize the criminals, and render justice to the victims who are harmed by the commission of the crime by the offenders. It is noted that these all fall under the first step of the investigation, the

proper investigation consists of a search or examination of the facts that have occurred at the crime scene. One of the greatest scientific developments is the "FORENSIC LABORATORIES" which is useful to analyze the shreds of evidence collected from crime scenes, suspects, and victims. Different divisions of forensic labs particularly focus on the specialized shreds of evidence like DNA, Lie detector units,

Photographs etc for the accuracy of the work and the proper and exact findings.

FORENSIC SCIENCE

The application of natural and physical science techniques to criminal and civil law cases is known as forensic science. In addition to investigating and prosecuting crimes like drug trafficking, rape, and murder, forensic science can also be used in cases where no crime has been committed but instead a civil wrong, like wilful pollution of the air or water or causing injuries to employees at work, is being accused of. Since almost any science can help solve a crime or assess a civil harm, almost any science can be used as a forensic science. With very few exceptions, the fields of study conducted by forensic sciences and traditional sciences are identical.[\[1\]](#)

TYPES OF FORENSIC SCIENCE

The different types of Forensic Science are hereby listed below as follows[\[2\]](#);

- Forensic Anthropology
- Forensic Engineering
- Forensic Odonotology
- Forensic Entomology
- Toxicology
- These are the Various types of Forensic Science, which as separate Specialized Study and Technicalities.

FORENSIC LABORATORIES

The Laboratory is the place where certain experiments and research is held there are different kinds of Laboratories which was emerged by the past decades by the Scientific innovations in the way the Forensic Laboratories are the most developmental approach in the field of the Scientific Study, it is generally the branch of

the Forensic Science which is the main Pillar in the Crime scene investigation because the Forensic labs gives the absolute truth by experimenting the evidences and samples collected .

SCIENTIFIC DEPARTMENTS OF THE FORENSIC LABORATORIES

The Criminal Justice System is assisted by the Forensic Laboratories which is been divided into various Scientific Departments which individually focuses on separate category of the samples as the Specialist on the particular area have the technical knowledge to deal with the specific area[\[3\]](#).

1. Forensic Chemistry
2. Forensic Physics
3. Forensic Biology
4. Forensic Ballistics
5. Explosives
6. Forensic Toxicology
7. Narcotics
8. Forensic Serology
9. DNA Profiling
10. Forensic Psychology
11. Lie Detector Unit
12. Voice Analysis
13. Photography
14. Instruments
15. Cyber crimes
16. Scene of the Crime

These are the various divisions of the Forensic laboratories and the Additional Divisions will be established as per the need of the area the laboratory is serving.

FORENSIC LABORATORIES EXPERIMENTS WITH THE PHYSICAL EVIDENCES

To prove or to disprove a facts is fully based on the evidences that is collected at the time of the Investigation, with that physical

evidences Forensic laboratories experiment the samples and submits the report[4].The physical evidences are based on the Physical attributes like density, elasticity, composition, temperature, luminescence etc. The Physical evidences like Contact traces, Marks scratches of Paint, Glass and Shoe marks, Tyre marks, Ropes, Metallic pieces, Fibres etc ,these evidences helps the Forensic labs to trace the Crime scene and able to establish the nature of the Crime with Criminal.

ESTABLISHMENT OF THE FORENSIC LABORATORIES

Head of the Division is the Deputy Director having master's degree or a doctorate in the concern speciality with several years of the experiences in the expertise and have research experience in the field.

Assistant directors, Junior Scientific officers, Senior and Junior scientific assistants, laboratory assistants and attendants, assist the head of the division

Non Scientific duties, maintenance of stores and supplies, Administrative works are carried out by the Non- Technical Staffs[5]

Thus the Forensic labs are working with these officials, the Deputy Director, Assistant Director, work together to provide the needed information based on their research.

The Forensic labs are categorized by the following way,

Central Forensic Science labs--- State Forensic Science Labs---Reginal Forensic Science Labs---Mini and Local Forensic Science labs.

WORK OF THE FORENSIC LABS

1. The main duty of the Forensic labs is to carry out research in forensic
2. Forensic labs generally analze all evidences to find out whether consistent or inconsistent

- To take photos in the crime scene.

1. The Police trainees, Prosecutors, judges, investigating officers general public may not have the technical knowledge regarding the experiments followed by the Forensic labs, so it is the duty of the directors and other Juniors Directors to make them understand that is.,
2. To educate the general public about their role,vis-à-vis the scene of occurrence, for the successful investigation of the crime
3. To teach, train and demonstrate methods of science used to police trainees, prosecutors and judges.
4. To assists the Investigating officers in the examination of the scene of occurrence in important cases, when required and to locate the hidden latent and invisible evidence.
5. Training and Providing guidelines and leads to the investigators when required
6. v) The appraisal of scientific evidence, produced by the opposing party.
7. vi) The examination of clue materials involved in crime, submitting in the courts whenever required

vii) Verifying the Veracity of a version if needed

Thus these are the main functions of the Forensic laboratories and it always provides needed information regarding the Crime

Scene and Render the Scientific assistance whenever needed.

OTHER SIGNIFICANT ROLES OF THE FOENSIC LABS

The management of the laboratory must ensure that: The type and scope of the forensic science services it offers are clearly defined and documented that is;

1. The laboratory will not involve in any of such actions that might reduce faith in its capability, impartiality, judgment or operative reliability.
2. The laboratory personnel will not indulge themselves in to commercial, financial or any other irregularity that might undesirably affect the quality of their work.

The laboratory have to maintain a case record under unique case designator, generally a laboratory case number and documentation generated by a laboratory on a particular case constitute a case record.

FORENSIC LABS IN INDIA

There are six Central Forensic Science Laboratories of Directorate of Forensic Science Services (DFSS) in the country located at Bhopal, Chandigarh, Guwahati, Hyderabad, Kolkata & Pune. One more Central Forensic Science Laboratory (7th) is under the control of Central Bureau of Investigation (CBI) located at New Delhi[\[6\]](#).

LIE DETECTOR TEST

It is also called as the POLYGRAPHY TEST. There are various Forensic labs in that Lie detector also plays a vital role. This device has certain procedures to be followed.

HISTORICAL BACKGROUND

Lombroso in 19th century used a machine for testing the B.P of criminal suspects. Then in 1914 William Marston used it. Later in 1920 Larson and Keeler for the first time independently developed the instruments which works on the individual Blood pressure, Pulse rate and Respiration during the interrogation. Then Keeler refined the instruments by adding electro dermal galvanometer which records electrical resistance of the skin.

NHRC GUIDELINES FOR THE ADMINISTRATION OF POLYGRAPHY TEST ON ACCUSED IN 2000

1. Consent of the Accused is must
 2. The Consent should be recorded before the Judicial Magistrate
- The Accused should be represented by a Advocate
1. The Polygraphy test must be conducted by the Independent Agency like Hospitals
 2. When Accused volunteers for the test he should be access to Advocate and the Physical, Emotional, Legal implications should be explained by the Police or Advocate.
 3. Accused should not be harmed by the Authority in any circumstances

These are Main Significant guidelines that is to be followed by the Authority while Proceeding with the test. And it is also held that the statement confessed by Lie Detector test cannot be considered as the evidence this is just for Investigation that is a kind of Corroborative evidence and cannot be as a Accepted evidence in the Trial stage.

ESSENTIALS OF THE INTERROGATION

EXAMINER-There must be an examiner who has completed masters or Ph.D in psychology and a specialization in the Forensic Psychology in a reputed institution.

After the Examination of the Subject, the examiner must submit a report based on ;

(EXPERIMENTS+OBSERVATION)-
DATA-INFERENCE=REPORT

ROLE OF EXAMINER-Examiner must know the facts of the case and read all Documents related to the cases and Medical reports. The Examiner should inform the Information about the process of the interrogation.

SUBJECT-The Subject should not be tired or exhausted, Should not be hungry and should not be under the influence of Drugs or liquor, there should not be any physical violence on the subject should be stable to the environment.

Consent of the Subject to proceed the test is important without the Consent the Test cannot be proceeded.

PROPER INTERROGATION ROOM-The interrogation room should be on the following procedures;

1. There should be a lie detector
2. Audio video record device should be placed on the visible place
3. To maintain privacy two members sitting arrangements should be made for the Subject and the Examiner.
4. One way mirror is fitted where Advocates are allowed.

EQUIPMENTS USED

1. **PNEUMOGRAPH**-It measures Respiratory changes
2. **SPHYMOGRAPH**-It measures Cardio-Vascular changes
3. **ELECTRODE**-It measures galvanic electrodermal skin response
4. **PLETHYSMOGRAPH**-It measures Blood volume reflecting pulse rate.

“ALL INSTRUMENTS RECORDED SIMULTANEOUSLY FORM TRACES ON GRAPH INDIVIDUALLY IS POLYGRAPH”

It generally identified bases on the emotional stress from any question asked.

LANDMARK CASES

SELVI VS STATE OF KARNATAKA^[7]

According to a three-judge panel that included the former chief justice of India, J. RV Raveendran, J. JM Panchal, and K.G. Balakrishnan, administering the contested techniques (Brain mapping, Narco analysis ,Polygraphy test)involuntarily violates one's "right against self-incrimination. This Court has recognised that the protections afforded by Article 20(3) apply to the investigative stage of criminal cases. Combined with Section 161(2) of the 1973 Code of Criminal Procedure, this means that accused individuals, suspects, and witnesses questioned in the course of an investigation are all protected. The test results cannot be used as evidence if they were obtained under duress. Article 20(3) protects a person's choice to speak or stay silent, regardless of whether the subsequent testimony proves to be exculpatory or incriminating.

Mumbai serial rapist-murderer case^[8]

Rehan Qureshi, a serial killer in Navi Mumbai, is implicated in this case for

allegedly raping multiple young girls, including two who passed away at the ages of two and nine. One of the more complicated cases in Navi Mumbai, the Mumbai police's pursuit of justice for the minors took eight long years of committed investigation. Up until Rehan Qureshi's conviction, the atmosphere in that area was tense. The entire police force was under pressure to solve the case after three girls, aged 5 to 9, were raped and killed in June 2010. One victim was discovered in a gunny bag, and another was discovered on the terrace of the police quarters. Because everyone was in such a panic, if a girl was even an hour late getting home, her parents raised an alarm, and that was the only case discussed in the city. Police conducted thorough investigations, searched history sheets, distributed their informers, visited mental hospitals in search of missing inmates, etc., but nothing was discovered. Then the Maharashtra Forensics lab provided assistance to the police. With their assistance, they performed more than 500 DNA tests on all suspected individuals, including the son of a senior official, who was made a suspect because the police didn't want to take any chances.

Although their efforts failed to find the murderer, it was discovered that two murderers were involved in the crime, one of whom was apprehended and sentenced to prison in September 2015. In 2012, the other two minors' murder case was then given to the Maharashtra Criminal Investigation Department (CID).

The case remained unresolved for a long time until 2017, when a string of minor sexual assaults occurred again 20 km from Kurla, the site of other girl killings.

With the additional assistance of CCTV, the police were able to narrow down their

search this time to a suspect who was wearing a blue shirt and was always on the phone, most likely listening rather than speaking. They suspected him of being a salesman. Despite being captured on camera, he remained unaccounted for, with a new assault case being reported every week. He was still missing on camera, and every week there was a new assault case registered.

After committing a crime, on September 26, police patrolled the Mira Road area close to Naya Nagar, where he was frequently spotted. Sanjay Kumar, the commissioner of police for Navi Mumbai, was among the local police officers dressed in civilian clothes. Kumar noticed Qureshi's tilt movement when he was brought next to him, and the forensics lab received a sample of his blood. After spending 40 lakh rupees on 880 tests, the forensics lab responded with a smile and "Test no. 881 was a match" when another sample was submitted.

RECENT ISSUE

SHARADHA MURDER CASE^[9]

Shradha Walkar was a 27-year-old Indian woman who was murdered by her 28-year-old boyfriend and [live-in](#) partner Aaftab Amin Poonawala in [Delhi](#) on 18 May 2022. Up until 2018, Shraddha Walkar lived in Vasai, Palghar District, Maharashtra, with her mother and brother. She attended a convent school in Vasai where she studied before enrolling in a BMM programme at the Viva Institute of Technology in Virar. Later, she withdrawn from the course. Vikas Walkar, her father, ran an electronics repair business and lived separately. Shraddha met Aaftab Amin Poonawala while working at a call centre of an MNC in Malad. They connected through the Bumble app. Vasai is also home to Aaftab. He enrolled at L.S. Raheja College to pursue a BMM.

Unexpectedly, he was employed by the same call centre. Against the wishes of her family, who were against the interfaith relationship and the idea, she moved out to live with him in 2019. Shraddha Walkar and Aaftab Poonawala both worked at the same MNC call centre. After the police found contradictions in his statements and found the murderous evidence, he confessed to the crime. After that, he was brought to the forest to locate Shraddha's remains.

The Delhi Police accused Aaftab Amin Poonawalla of murdering Shraddha Walkar and dismembering her body in May 2022. The chargesheet was supported by facts and witness accounts. Police claim that he strangled Shraddha and then disposed of her body parts. After finding his last known location in Delhi, Aaftab was detained. Aftab Amin Poonawalla, accused in Shraddha Walkar's murder case, left the Forensic Science Laboratory (FSL), Rohini as the Delhi Police began court-sanctioned polygraph tests to take the probe forward.

SUGGESTIONS

In India's criminal justice system, polygraph tests and forensic labs are developing disciplines with fascinating new developments. Modern tools like artificial intelligence and machine learning are being used more often by forensic labs to improve data analysis, crack cold cases, and promote cross-border cooperation in the fight against transnational crimes. Here are some of the suggestions mentioned below;

1. Increase the budget for equipment, technology upgrades, and laboratory maintenance to handle higher case loads and improve analysis capabilities.
2. Ensure that forensic scientists receive continual training and

professional development to keep them abreast of emerging methods and tools.

3. In order to detect deception, new technologies like voice stress analysis and functional magnetic resonance imaging are being investigated as complements or substitutes for conventional polygraphy and the Media representations of polygraphy frequently influence public opinion, which can result in false beliefs about its reliability or utility. As a result, polygraphy's use in practical contexts needs to be streamlined.

CONCLUSION

A multidisciplinary scientific institution is what the Forensic Science Laboratory is typically. Forensic reports are prepared by laboratories for important evidence that helps convicts be successfully prosecuted, cleared of all charges, and exonerate innocent parties. With modern technological and knowledge features and an eye towards space, the Laboratory can anticipate being accepted globally with a facility commensurate with the calibre of work for which it has gained a reputation. As the Heart of our body, the forensics division is the most important component of our criminal justice system, yet in India, it is completely out of control. Numerous cases remain unresolved because the forensics officers in the vacant labs were not appointed. Without a doubt, victims in this nation don't swiftly receive justice. With so many cases still open, the forensics department needs to hire qualified people to fill the open positions. The Polygraphy test is also something a innovative invention but its applicability is just as a investigation process and cannot be considered as the Evidence for a case .The Indian Evidence

act,1872 defines Expert Opinion in the Section 45 which is considered as the relevant fact for the case. An expert have Superior knowledge and Practical experience in the field.

Thus Forensic labs are most strongest support system to handle the evidences and samples in a proper way so that it may aid the investigation officers and other officials to take the case one step forward with the evidences to identify the criminals and Crime occurrence to find out the truth. Even though the Forensic labs is considered as the most inventive measures to identify crime likewise there is also a drawback that is to be noted due to lack of the technical errors and lack technical experts.

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