

# **National Judicial Academy, Bhopal**



## **REPORT**

### ***Workshop for District Judiciary on Medical Forensics & Medico-Legal Aspects in Trial***

**[P-1305]**

**10<sup>th</sup> & 11<sup>th</sup> September, 2022**

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Academic Coordinators  
National Judicial Academy, Bhopal

# ***Workshop for District Judiciary on Medical Forensics & Medico-Legal Aspects in Trial [P-1305]***

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## **PROGRAMME REPORT**

**Programme Coordinators –Sumit Bhattacharya (Research Fellow), & Jaya Rishi (Law Associate), National Judicial Academy, Bhopal**

A two day “Workshop for District Judiciary on Medical Forensics & Medico-Legal Aspects in Trial” was organised at the Academy.

The workshop sought to sensitize the participating judges from the District Judiciary on the core domain of “Medical forensics & Medico-Legal Aspects in Trial”. The essence of the core area was schematically subsumed in four sessions accreting to a deeper understanding of the contours of law relating to “Medical forensics & Medico-Legal Aspects in Trial”. The pedagogy and the discourse stimulated intense discussions and dissemination of evolution of the indispensably important area by tracing the fundamentals of medical forensic law and medical negligence in session-1. The next session followed by identifying [the] challenge & culling out [the] best practices, thereby engaging participants to identify major bottlenecks in order to formulate feasible & justiciable solutions. A dedicated discourse determining the scope and limits of the liabilities and obligations in transplantation of human organs involved the third session. The fourth session for the workshop focused on the application of judicial mind to evaluate forensic evidence. The last session for the workshop mobilised the discourse on examining the impact of technology *vis-à-vis* forensic evidence.

The sessions were guided and navigated by Hon’ble Justice Atul Sreedharan (Judge High Court of M.P.); Dr. Lalit Kapoor, MS (Practicing GI Surgeon & Medico Legal Expert); Hon’ble Justice K. Kannan (former CJ Madras High Court & Patna High Court); Hon’ble Justice Chakradhari Sharan Singh (Judge Patna High Court); Hon’ble Justice Mukta Gupta (Judge Delhi High Court); Dr. Jayanthi Yadav, MD (Additional Professor, AIIMS, Bhopal, Expert in Forensic Medicine & Toxicology); and Ms. Nisha Menon (Certified Forensic Expert and Consultant, at Square Forensic Advisors Pvt. Ltd.).

### Session-wise Programme Schedule

#### Day-1

Session 1 - Fundamentals of Medical Forensic Law and Medical Negligence: Setting the Context.

Session 2 - Identifying Challenge & Culling out Best Practices.

Session 3 - Liabilities and Obligations in Transplantation of Human Organs: Scope & Limits.

#### Day-2

Session 4 -Application of Judicial Mind to Evaluate Forensic Evidence: Judge as a Gate-Keeper

Session 5 - Impact of Technology on Forensics Evidence.

### Session-1

#### Theme - Fundamentals of Medical Forensic Law and Medical Negligence: Setting the Context

##### Proposed areas for discussion included

- ✓ *Historic Evaluation of Forensic Law*
- ✓ *Liability/Issues arising out of Medical Negligence and Malpractices (both vicarious and non-vicarious)*
- ✓ *Open Session Discussions (Q&A)*

*Speaker: Justice Atul Sreedharan & Dr. Lalit Kapoor*

The discourse flagged off by tracing a brief account of the evolution of the independent faculty of “forensic science”. While removal and examination of visceral organs by autopsy has been cited on around 3000 BC by the Egyptians, as the earliest example of autopsy; It was in 44 BC, Roman Physician Antistius, the first officially recorded autopsy on the body of Julius Ceaser. In around 1<sup>st</sup> century AD when the Roman Jurist and orator Quintilian acquitted someone as innocent with the aid of certain elementary forensics. While the Chinese book *Xi Yuan Lu*<sup>1</sup> authored by Song Chi, accounts for the earliest available literature as a guide to establish the cause of death in the 13<sup>th</sup> Century; the trio Italian scientists Furtunato, Fidelis & Paolo Zacchia shared their wisdom regarding the changes in the structure of a body owing to a disease as a modern pathology in 16<sup>th</sup> Century; 1773 saw the Swedish chemist Carl Wilhelm Scheele invent detection of arsenic poisoning in a dead body; 1892 the world saw the first technique of “finger print” matching by Sir Francis Galton after he published his book “Finder Prints”; the father of forensic toxicology Mathieu Orfilla a Spanish toxicologist and chemist, published the first scientific treatise<sup>2</sup> on detecting poison in 1814; In the year 1835 Henry Goddard gave the landmark advance in the science of ballistics when he became the first to connect a bullet to a murder weapon by physical analysis; in 1896 Edward Henry developed the “Henry Classification System” a global standard for criminal fingerprinting technique; with the global acceptance of the “Locards Theory” as the elementary principles for forensic science , 1910 could be considered as a milestone for modern forensic sciences. Edmond Locard was also popular as the Sherlock Holmes of France, as his celebrated theory “that every contact leaves a trace” cemented its mark in the evolution of the forensic sciences. After tracing the history some definitions for “forensic science” (FS) were discussed. The historic evolution and impact of FS with the advancement of science and technology was exemplified by citing *Archimedes*, who detected fraudulence of a fake golden crown through the principle of density and

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<sup>1</sup> The Washing Away of Wrongs

<sup>2</sup> *Traité des Poisons Tirés des Règnes Minéral, Végétal et Animal ou Toxicologie Générale* (A treatise on poisons found in the mineral, vegetable and animal kingdoms, or, a general system of toxicology), which was published in 1814.

buoyancy. Proofs of Indian approaches to scientifically investigate crime dated back to 2300 years in the *Arthashastra* by *Kautilya*. References to the Coroner's Act, 1871 (for India with its seats limited only to Bombay and Calcutta) with its primary function to investigate any sudden, unexplained, violent or unnatural death was discussed. Every such inquest by a Coroner's Court would be a judicial proceeding under Sec. 193 of Indian Penal Code, 1860 (IPC). Such inquests were done by a jury, until it was abolished in 1990s<sup>3</sup>. However, the scope, nature, and limitations and scope of the office of the Coroner could be found in *Khorshed Aga v. State of Maharashtra*, AIR 1992 Bom 427. A brief timeline of the establishments in India accounted for first Forensic Science Laboratory (FSL) which was set up in 1952 at Calcutta followed by Central Forensic Science Laboratory in 1955, and Central Fingerprint Bureau established in Calcutta in 1957. The subsequent recommendations and suggestions to (re)constitute Coroner's Courts by the Law Commission (2008), and Delhi High Court (2012) were discussed.

The role a judge becomes important while dealing with forensic evidence – particularly in criminal cases of higher order – because of the fact that the police is seldom skilled to deal with the scientific nuances of the underlying causes, the doctor is often dealing with the corpse or is generally focused with the injury, and neither of the flanks ever effectively interact mutually as in the case of US, wherein the police would interact with the prosecuting attorney - even at the time of investigation – to carefully collect the “best evidence” operating on the doctrine of “exclusionary evidence” popular in US<sup>4</sup>. It was therefore suggested that for the judges – particularly the “trial judges” – to have knowledge of forensic medicine, toxicology, ballistics and anatomy is highly desirable to enable effective justice dispensation. While addressing the source from where such specialized domain knowledge – at least working knowledge – could be attained was contemplated. Apart from available (online) formal education; leveraging free web and mobile applications *viz.* “Complete Anatomy”<sup>5</sup> or “3d4medical”<sup>6</sup> from Elsevier.

The discourse deciphered the difference between “medical negligence” and “medical malpractice”. It was clarified that while “negligence” is a more general concept of deviation from the standard of care by a reasonable person, “malpractice” is more specific in nature and constitutes involvement of “professional status” in addition to the “standard of care”. Hence, to be liable for malpractice, the person committing the wrong must be a professional. A capsulated overview of the nature and type (civil, tortious or criminal) of negligence and malpractices were shared. The appropriate *fora* for a particular type was enumerated. A brief overview of the provisions under IPC generally used to implicate a medical negligence or malpractice *viz.* Sec(s) 304 Part II, 304A, 312 – 316, 320, 324, 326, 340 & 354 were discussed as against the general defenses available under Sec(s) 87, 88 & 92. It was asserted that delivery of effective justice was enabled with the enactment of the Consumer Protection Act, 1986 (CPA). The said legislation served as a panacea to the protracted, tardy and convoluted procedural duress. The pre-CPA period *lis* had to suffer the tortuous transit *via* Sec 1-A of the Fatal Accidents Act, 1855 consuming decades for an insignificant monetary compensation.

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<sup>3</sup> See, The Coroners (Maharashtra Repeal) Act, 1999, Maharashtra Act No. 8 of 2000.

<sup>4</sup> The interoperability and communication between the police and prosecution helps to strategize and plan when to arrest?

<sup>5</sup> Available at: <https://www.elsevier.com/solutions/complete-anatomy>

<sup>6</sup> Available at: <https://3d4medical.com/>

The concept of “vicarious liability” was discussed citing case law jurisprudence based on the maxim *respondeat superior* (let the master answer). *Poonam Verma v. Ashwin Patel*, (1996) 4 SCC 332 was discussed to examine the classification of various types of negligence including, active negligence, passive negligence, collateral negligence, comparative negligence, continued, negligence, concurrent negligence, criminal negligence, gross negligence, willful/reckless negligence, hazardous negligence, negligence *per se*. *Jacob Mathew v. State of Punjab*, (2005) 6 SCC 1 was discussed to elucidate simple negligence and gross negligence. Other judgments referred to discerned various aspects of “medical negligence” were: *Dr. Suresh Gupta v. Government of NCT, Delhi*, (2004) 6 S.C.C. 422; *Martin F. D’Souza v. Mohd. Ishfaq*, (2009) 3 SCC 1; *V. Kishan Rao v Nikhil Super Speciality Hospital*, (2010) 5. SCC 513; *Lalita Kumari v. Govt. of U.P.*, (2014) 2 SCC 1. A concern was raised on the rampant violation of the aforementioned landmark cases pan India.

The “Bolam Test” a legal apparatus devised out of *Bolam v. Friern Hospital Management Committee*, [1957] 1 W.L.R. 582 was explained. The said test has been adopted and regularly applied by the Indian Courts. The *Bolitho v. City and Hackney Health Authority*, [1996] 4 All ER 771 (an amended and better version of *Bolam*) was discussed. It was accentuated that, combined together, the *Bolam Test* and the *Bolitho Test* make up the twin pillars of all assessments of medical negligence. They state that a doctor is not negligent if (s)he acts in accordance with a responsible body of medical opinion, *provided that the Court finds such an opinion to be logical*. *Samira Kohli v Prabha Manchanda*, 2008 AIR SC 855 was discussed to elaborate Indian position taken by the apex court on “consent”.<sup>7</sup> The types of consent by patients were enumerated. *Samira Kohli* went on to lay down the distinction between “informed consent” (a form of consent judicially preferred and popular in US, and also made its pervasion in UK through *Montgomery*) versus “real consent”. In Indian context the said judgment laid down that the Doctor should disclose (a) nature and procedure of the treatment and its purpose, benefits and effect; (b) alternatives if any available; (c) an outline of the substantial risks; and (d) adverse consequences of refusing treatment. But there is no need to explain remote or theoretical risks involved (1-2 %), which may frighten or confuse a patient and result in refusal of consent for the necessary treatment. (More than 10 %). It was asserted that for India to get into the slot of US or UK model - discussed above through the case law jurisprudence – the concept is yet to fertilize to such desired extent. The session culminated with a participative model.

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<sup>7</sup> *Samira Kohli v Prabha Manchanda*, 2008 AIR SC 855 held:

A beginning has been made in *Bolitho v City and Hackney* and *Pearce v United Bristol Healthcare*. We have however, consciously preferred the ‘real consent’ concept evolved in *Bolam*.

## Session-2

### Theme - Identifying Challenge & Culling out Best Practices

#### Proposed areas for discussion included

- ✓ *Engaging participants to identify major bottlenecks in order to formulate feasible & justiciable solutions*
- ✓ *Challenges regarding the legality of Assisted Reproduction, In Vitro Fertilization (IVF), “Consent”, inability to consent, and treating in the “best interest” the scope and limitations*
- ✓ *Best Practices and Case Law Jurisprudence on:*
  - *Expert Opinion*
  - *DNA Technology*
  - *Finger Prints*
  - *Hand Writing*
  - *Footprint & Footwear Analysis*
  - *Digital Evidence*
- ✓ *Open Session Discussions (Q&A)*

*Speaker: Justice Atul Sreedharan & Justice K. Kannan*

The session was primarily funnelled to work out the operational practices and challenges while dealing with forensic science and appreciating forensic evidence. It intended to discern pure and substantive law for the domain to identify and examine the systemic challenges faced by the judicial officers to try to assimilate shared best practices to deal with such spikes of discomfort in the justice delivery mechanism. The evidence of an expert, while dealing with Constitutional matters, Criminal matters, and those of Civil flavour were discussed in the light of several issues and doctrines including the appropriate application of standards of proof in a particular case.

At the outset a question was posed, probing the participants as to any situation wherein (s)he considers him/herself as an expert? Section 73 of the Indian Evidence Act, 1872 (IEA) wherein a judge can examine handwriting or signature was prompted in response. It was suggested that while dealing in the role of an expert the judge needs to be conservative enough to limit his/her capabilities to figuring out the inconsistencies as an optimum or *de minimus* level and not illusively fall a prey as an “expert who knows it all” phenomenon. Case law relating to Who is an Expert? What is his/her duty? What is the credibility of an Expert opinion? could be referred from *State of H.P. v. Jai Lal*, (1999) 7 SCC 280; and *Pattu Rajan v. State of T.N.*, (2019) 4 SCC 771. The role and limitations of a judge as an expert, as against a judge appreciating the deposition by an expert was discerned. The next question posed was to probe if there are any such occasion wherein a judge would counter, probe or investigate into, a deposition by an expert? The answer to which could commonly be found in a situation, wherein a direct and/or a reliable evidence placed before the judge is rendered contradictory, or is incongruous to the circumstantial evidence supplied by an expert opinion. Yet another occasion of discounting of an expert opinion flagged was, an unreasonable report, or an opinion lacking the supporting

reasons to have arrived at a conclusion. It was asserted that after the expert report has been filed as an exhibit, it is the bounden duty of the judge to demystify the technicalities reported therein to a comprehensible and comprehensive explanation by further probing and seeking clarifications (in an inquisitorial role) by the judge, before allowing a cross-examination, as a best practice. It was underscored that the court is competent: to pose questions to experts; to turn-down an expert opinion on (non)reliance or insufficient reliability; call for second or third opinion of other experts, all to seek clarity and confirm reliability on an expert opinion before treating it as an important corroborative evidence. While exploring as to when an expert opinion is justified or called for has been factored in the apex court in *Ramesh Chandra Agrawal v. Regency Hospital Ltd.*, (2009) 9 SCC 709.

It was affirmed that an effective use of expert opinion would renders a trial judge to decide unprecedented issues which is armoured to withstand its validity throughout the life of the case at appellate stage till its journey end with the final arbiter at the apex court. The process assures and enables the trial courts to immediately respond to address an issue by awarding quick relief (i.e. victim compensation) to enable the victim and the accused to sustain a meaningful and reasonable journey to seek justice in a *lis*. Effective use of Section(s)-53 and 53A of the CrPC, 1973 was discussed. The important disposition of *Selvi v. UoI*, (2010) 7 SCC 263 was discussed to trace the contours of indiscriminate and forceful use of neuroscientific investigative techniques constituting testimonial compulsion violative of a person's "right against self-incrimination" (Art. 20(3)), and their "right to life and personal liberty" (Art. 21) of the Constitution of India. The apex court went on to hold that:

[The Court] must recognise the importance of personal autonomy in aspects such as the choice between remaining silent and speaking. An individual's decision to make a statement is the product of a private choice and there should be no scope for any other individual to interfere with such autonomy, especially in circumstances where the person faces exposure to criminal charges or penalties.

The procedural difference between "Inquest" u/s 174 CrPC and "Investigation" u/s 154 & 157 CrPC was examined w.r.t. *Divisional Manager, United India Insurance Co. Ltd. v. Reshama*, 2020 SCC OnLine Kar 3364. Caution an "best practices" between "Eye-witness" versus "Medical Testimony" was discerned with the help of *Mohanlal v. State*, 1960 SCC OnLine Raj 54 . The areas in litigation where an opinion of the expert is vital includes determination of age, potency of an individual to rear offspring, as well as virginity determination. It was asserted that "virginity" or "potency" tests, if requested should be immediately turned down by the trial court on account of its irrelevancy. The very purpose of such test draws no legal bearing on a case and hence, should not be entertained. On determination of death and the time of death the call for an expert opinion was discussed. In civil matters, determination of paternity, were discussed as potential areas which would justify expert opinion and scientific inferences as corroborative evidences to help resolve an issue quickly and conclusively with determinative reasons. *Narayan Dutt Tiwari v. Rohit Shekhar*, (2012) 12 SCC 554 was cited during the discourse. On the question of the scope, capacity, and power of the court to draw adverse inference and order DNA tests *Goutam Kundu v. State of West Bengal*, (1993) 3 SCC 418; and *Sharda v. Dharampal*, (2003) 4 SCC 493 were referred. Section(s) 4, 41, 112 , and 113 of the Indian Evidence Act, 1872 (IEA) were discussed to explore the scope and dimensions of "conclusive proof" or "irrefutable presumption of law". It was underscored that to abolish

the infamy of being a bastard the court generally would draw an exception allowing or ordering a DNA test. Yet another area where an expert opinion is sought to aid the court to decide quickly, correctly and effectively is cases of document forgery etc.

Challenges faced by the court while dealing with IVF cases was discussed. The concept of “renting” was discerned to distinguish renting a body (commonly prostitution) which is immoral, as against renting a womb (commonly surrogacy) which is a serious activity in the eyes of law. The law in India prohibits commercial surrogacy, but allows altruistic surrogacy. Who is eligible under the law in India to go for a surrogate motherhood was discussed. It was clarified infertility when certified by District Medical authority are eligible as against surrogacy for convenience (to avoid the pains of carrying a baby in womb), which is not permissible under law. Hypothetical situation in law wherein a parent who have commissioned for surrogacy, in the interim, prior to the birth of the child from surrogacy get divorced and retract to have the child born out of surrogacy, or demand termination of such a surrogacy, were discussed w.r.t. *Baby Manji Yamada v. Union of India*, (2008) 13 SCC 518; *Jan Balaz(s) v. Anand Municipality*, AIR 2010 Guj 21. The various aspects and challenges relating to “consent” was discussed. Case law jurisprudence and the evolution of the theories formed part of the discourse citing the UK case law *Bolam v. Friern Hospital Management Committee* (1957) 1 WLR 582; *Bolitho v. City and Hackney Health Authority*, [1998] AC 232; and *Samira Kohli v. Prabha*, (2008) 2 SCC 1. The doctrine of “living will” also known as “advance medical directives” was pondered upon with reference to *Common Cause (A Regd. Society) v. Union of India*, WRIT PETITION (CIVIL) NO. 215 OF 2005 (2018) while discussing the concept of “consent”. It was argued that the percentage evaluation suggested in *Samira Kohli v. Prabha*, (2008) 2 SCC 1, on “real consent” (i.e. if it is less than 10% risk then consent is not needed and otherwise a “real consent” needed) may not be a good proposition, since even a risk as low as 10% means that every tenth person out of a hundred is at a risk, and therefore the Doctor must explain the risk to the patient and seek consent.



### Session-3

#### Theme - Liabilities and Obligations in Transplantation of Human Organs: Scope & Limits

##### *Proposed areas for discussion included*

- ✓ *Legal and ethical aspects of Organ Donation and Transplantation*
- ✓ *Rights of an Organ Donor in light of an unrelated donor*
- ✓ *MCIR guidelines, consent for donation (ex ante v. ex post), unclaimed bodies (authority), legal standards for consent*
- ✓ *Organ shortage as a global challenge*
- ✓ *Role of courts in (dis)allowing permission*
- ✓ *Open Session Discussions (Q&A)*

*Speakers: Justice Chakradhari Sharan Singh & Justice K. Kannan*

The purpose of enacting of Transplantation of Human Organs Act, 1994 (THOA) was attributed to two vital objects: a) Scientific advancement; and b) Human greed. It was narrated that on one hand scientific advancements have enabled extending life by harvesting organs to rejuvenate a needy terminal person, on the other hand the human greed to commercialize the whole thing has given birth to the statutory enactment. An introduction to the legal and ethical aspects of organ transplantation and organ donation was given. Rights of an organ donor, MCIR guidelines, and consent for donation of the unclaimed bodies and the legal standards for acquiring consent were discussed. Further, in the session the crisis of organ donation globally was also discussed. Issues like cadaver donation and the complications arising out of commercial dealing in human organs (a matter of serious concern) and such were cases were dealt in detail and discussed. The legal provisions for organ transplant, the limitations and the bottlenecks in the implementation of these acts formed the important part of the session. Further in the session the importance of the consent in organ transplantation, the legal obligations and the recommended guidelines in practices were mainly highlighted and discussed elaborately. The significance of consent in medical practice, as it has layers of complexities that raises different sets of issues for the medical practitioners (and hence a crucial area of study), was effectively dealt and discussed. The session highlighted the various types of organ donation, pre-requisites and criteria for ethical and legal process. Further discussions on the regulations of hospitals in conducting the removal, storage and transplanting and the prohibition on removal or transplantation of human organs except for the therapeutic purposes were discussed in detail.

The huge shortage of organs at global level and the increasing gap between demand and supply of organs formed an important subject of discussion in the session. This global demand leading to crisis for organ transplant has rapidly increased in the past decades, due to increased cases of organ failures and the rising success of the medical sciences, the demand is even felt larger in the contemporary society. The same was attributed to the advancement in the science and technology domain and also owing to the available resources. Therefore, the session also

discussed on ethical pathways for obtaining organ transplant with appropriate consideration of the legal provisions elaborately.

The session also highlighted and discussed the mis-information and mis-conception associated with organ donation and the refraining of people from this practice, various myths attached to this process and the possible solutions in removing the false narratives on the subject.

#### Session-4

#### Theme - Application of Judicial Mind to Evaluate Forensic Evidence: Judge as a Gate-Keeper

##### Proposed areas for discussion included

- ✓ Policy review by courts: extent & limits
- ✓ Evaluating forensic evidence
- ✓ Determining the probative value of forensic
- ✓ The “Individualization Fallacy”: Exaggerated and definitive opinions without any scientific justification: invalidated assumptions
- ✓ Dichotomy of ipse dixit of expert opinion versus judge as a “super expert”
- ✓ Determining the veracity of “Presumptive Tests”
- ✓ Impact of “Cognitive Biases” on forensic evidence
- ✓ Case Law Jurisprudence
- ✓ Open Session Discussions (Q&A)

*Speakers: Justice Mukta Gupta & Justice K. Kannan*

The session underscored the role that forensic evidence plays in crime detection especially in cases of circumstantial evidence and in ascertaining the guilt or innocence of the accused. The no error genre that any crime scene investigation is demands a thorough search for potential evidence that also possess a probative value without any contamination throughout the investigation and trial stages.

Forensic sciences can be divided into medical and non-medical forensic. The former primarily deals with the human body and mostly require opinion by medical experts/doctors, i.e. the PM report, MLC, DNA profiling, the blood examination, Serology, Bloodstain pattern, Bone Ossification, Toxicology and so on, and the non-medical aspect deals with the issues like handwriting comparison, fingerprinting, ballistics, Trace Evidence, Digital Forensics, Forensic Engineering, Physical Matching, Chemical Analysis, NARCO Analysis, Polygraph Examination & BEAP. These techniques although represent the top breakthroughs are still marred by room for error as their use depends on the human intervention of the operator and hence susceptible to “human fallibility” *Selvi v. State of Karnataka*, (2010) 7 SCC 263, at para 41.

The session proceeded with deliberations on the individualisation fallacy whereby many experts, judges and advocates try to attach “uniqueness” to a factual scenario just because it might be rare. But the “fallacy” is that even though an event or fact is rare, it does not imply uniqueness, because rarity is not individualisation and so it was concluded that such individualisation is not based on any scientific foundation.

The role of a judge in overseeing and analysing all the evidences and testimonies given even by an expert witness on the grounds of relevancy, admissibility and reliability of evidence so as to render it admissible under Sections 136 and 65B of the Indian Evidence Act, 1872 makes the judge a super expert in juxtaposition to *ipse dixit* of expert opinion as there is no presumption in law that the opinion or conclusion of expert is the ultimate truth. The Indian Evidence Act 1872 merely prescribes the evidence of expert to be relevant but how much value is to be given to such evidence is for the court to decide, which will vary from case to case. It has largely been maintained by the courts that such forensic expert evidence is generally corroborative in nature and not conclusive in nature. In the light of these viewpoints the relevant provisions dealing holistically with an expert evidence were also exhaustively discussed in the session.

The issue of the extent of probative value, reliability and the weightage a judge has to render to the evidence of an expert was also discussed vividly in the light of the contemporary case law jurisprudence with the take away that the final opinion is always of the judge. The nuances and the difference between a presumptive test, preliminary test and confirmatory test was also deliberated upon. In the end the indispensability of the various kinds of biases and how to avoid their clouding of the decision making faculty of a judge was also discussed

## Session-5

### Theme - Impact of Technology on Forensics Evidence

#### **Proposed areas for discussion included**

- ✓ *Policy review by courts: extent & limits*
- ✓ *DNA analysis and its impact on judicial decision making*
- ✓ *Mitochondrial DNA and Y-STR DNA*
- ✓ *Use of AI and Machine Learning in current status of Medical Forensic leading to efficient Justice Delivery Mechanism*
- ✓ *Novel technology enabling Autopsy, Biosensors (fingerprints), Immunochromatography, Geolocating Isotopes, Forensic Palynology, Digital Vehicle Forensics, Blockchain Forensics, Drone Forensics etc.*
- ✓ *Open Session Discussions (Q&A)*

*Speakers: Justice Mukta Gupta, Dr. Jayanthi Yadav & Ms. Nisha Menon*

The session commenced with focalizing the imperative role of forensic evidence in judicial decision making alongside highlighting the impact of technology within it. When no

eyewitness is present and with the standard of proof being beyond reasonable doubt, the role of forensic evidence becomes indispensable as scientific facts cannot be denied. The panelist began with discussions on *Locard's Exchange principle* which states that whenever two objects come into contact a mutual exchange of matter will take place between them. A scientific basis must exist for concluding that properly performed comparisons can distinguish possible sources. If such evidence is to be useful in court, scientifically acceptable procedures must permit the reliable measurement and comparison of physical features.

Building upon the edifice of a man can lie but science doesn't, the speakers brought forth the importance and benefits of DNA Analysis in administration of justice. As individuals all have a different number of repeats in a given sequence of satellite DNA, they will all generate unique fragment profiles. Such a differentiation and linkage would be highly reliable, scientific and unbiased as held in *Dharam Deo Yadav v. State of U.P.*, (2014) 5 SCC 509, Para 36. Thus, the usage of DNA Analysis includes inter alia in civil cases - determination of paternity/ maternity *Goutam Kundu v. State of West Bengal*, AIR 1993 SC 2295 and *Sharda v. Dharam Pal*, AIR 2003 SC 3450, inheritance cases, immigration cases and in criminal cases- Establishing biological relationships between two or more people, identification/restoration of kidnapped/ exchanged babies & babies born out of wedlock or sexual assault, Identification of mutilated bodies *Sushil Sharma v. State (N.C.T of Delhi)*, (2014) 4 SCC 317 in mass disaster cases, In linking cases like rape cases as observed in *Mukesh & Another v. State (NCT Of Delhi) & Ors* (2017) 6 SCC 1- serial rapist *Santosh Kumar Singh v. State through CBI* , (2010) 9 SCC 747, social microbial DNA profile proves a link between suspects & crime scene, transplantation of organs (in medical science) etc. The novel method of Mitochondrial DNA & Y-STR DNA and its growing significance in a considerable number of situations of human identification where autosomal DNA is highly degraded or isn't available at all such as old bones, teeth and hair was also pinpointed in light of *Ravi v. State of Maharashtra*, (2019) 9 SCC 622.

A caveat in light of DNA as a double edged sword was also flagged whereby the mere presence of an individual's DNA on an item does not prove their guilt ,but conversely, a lack of DNA does not necessarily prove their innocence. When forensic DNA analysis is adduced as an evidence in court, it should be borne in mind that although these profiles are generated using scientifically accepted techniques and following validated scientific methods, contamination and errors can occur in the process whilst assessing both its admissibility and weightage.

The session further embarked upon the discussions on newer advancements in autopsy comprising of imaging technologies such as CT, MRI, Magnetic Resonance Spectroscopy (MRS) and Virtopsy. The science of Forensic Palynology which uses pollen grains collected from crime scene or suspects to ascertain where a person or object has been helps to create ties between crime scenes, individuals and even determine possession and trade of endangered species was also highlighted.

Use of Artificial Intelligence (AI) and Machine learning in contemporary scenario of Medical Forensics leading to efficient Justice Delivery Mechanism also formed part of the interactions. The gathering was apprised of the advanced algorithms that pave the way for detection of crime scenes, identifying criminal patterns and anomalies and also uncovering criminal networks. The breakthrough technologies and developments in the field of Artificial Olfaction, Bite Mark, Convolutional Neural Network (CNN), Age Estimation, Human Face Recognition,

Drone Forensics, Block chain Forensics, Digital Vehicle Forensics, Biosensors, Immuno chromatography and Geolocating Isotopes were also extensively deliberated upon during the session.

The session concluded with the melding of views on the idea that AI and ML should not replace human decision making, rather assist in decision making. AI powered tools should remain non-intrusive when it comes to decision making. The science although has advanced manifolds but the Indian judicial system is generally conservative and a lot more work remains in making India's legal data amenable to ML formats. With the massive growth of AI technology, concerns about data protection, privacy, human rights and ethics will pose fresh challenges and will require great self-regulation by developers of these technologies.