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FORENSIC LAW

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I INTRODUCTION

“Condemnation without investigation is the height of ignorance”.

- *Albert Einstein*

INVESTIGATION, CONDUCTED by an investigating agency, usually by the police, is a process to explore the truth by collecting and collating evidence, including the forensic opinion of the expert. The Supreme Court of India, in *H.N. Rishbud v. State of Delhi*, held that investigation, by definition, includes “all proceedings under the procedure code for the collection of evidence conducted by a police officer”¹. In *NHRC v. State of Gujarat*,² the apex court explicitly held that discovery, investigation, and the establishment of truth are the primary purposes of the courts of justice and, indeed, the *raison d’être* for their existence. The agency entrusted with the investigation must fulfil its duties with all diligence, competence and skill at its command. Deception detection techniques (DDTs), such as narco analysis, Polygraphy, and Brain mapping, are additional tools to aid investigation, especially in blind cases. Still, the expert opinion based on DDTs has no evidentiary value *per se* except for recovery under section 27 of the Indian Evidence Act, 1872.³ The forensic evidence ensures a scientific approach to evidence collection and trust-building within the judicial system. Regarding the nature of expert opinion, the high court in *Ramakrishnan v. Unnikrishnan* has observed:⁴

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1 AIR 1955 SC 196: 1955 SCR (1) 1150.

2 (2009) 6 SCC 767.

3 *Selvi v. State of Karnataka* (2010) 7 SCC 263. Also see: *Sujit Kumar Samuel v. Sate (U.T. of Andaman and Nicobar)* 2024 SCC OnLine Cal 2744. Also see: Brent E. Turvey, *Criminal Profiling: An Introduction to Behavioral Evidence Analysis* (Academic Press Inc., 5th edn. 2022).

4 2024 SCC OnLine Ker 4472 at paras 8 and 9.

8. Thus, it is a settled principle of law that the expert evidence is only an opinion. It could just corroborate the substantive evidence. An expert's evidence being only an opinion, it is for the parties to let in evidence challenging its correctness, and it is for the court to form its own conclusions on the evidence. When direct evidence is forthcoming on the matters spoken to by an expert, the court is not precluded from acting on such direct evidence in preference to the report of an expert.

9. It is well settled further that the report of an expert is not conclusive proof. Evidence of an expert, after all, is opinion evidence. The court has to evaluate the same, like any other evidence. It is for the court to judge whether the opinion has been correctly reached on the data available and for the reasons stated. An expert's opinion is not substantive evidence in the case and is not conclusive. It is the duty of the courts to scrutinise the expert opinion tendered in evidence very closely and to find out the basis upon which it was made. After all, it is only opinion evidence and cannot be safely relied upon, unless the basis of the opinion is found to be firm. Where the court permits the evidence of one expert to be brought on record, on a technical matter, it does not abdicate its function to judge for itself whether the opinion of an expert is correct or not on a matter in issue.

In the instant survey 2024, nearly 450 judgements delivered by the constitutional courts of India, deliberating on forensic-related vital issues, have been surveyed and analysed to explore legal trends in judicial interpretation. Several seminal problems such as definition of "expert", determination of age, lackadaisical approach for handling samples and securing chain of custody, Brady rule for addressing compulsory sharing of exculpatory evidence, the right of an accused to cross-examine the expert, doctrine of privacy and consent of the subject in taking DNA and other biological samples or digital inputs, infallibility of DNA evidence, implications of not conducting DNA, legal conundrum in determination of paternity of a child, rape-related pregnancies, lineage based inheritance disputes, maintenance, CCTV footage, opinion related to fingerprints, handwriting and signature etc., have been deliberated. India has implemented new criminal major enactments from July 01, 2024. Hence, the law's salient features and existing challenges have also been examined in this survey. A few recommendations have also been derived from the study of the said judgments.

II PROCEDURAL PROSPECTS IN FORENSIC EVIDENCING

Forensic opinion mainly hinges on two broad elements: (i) technology, and (ii) procedures. The technology must meet either the *Frye* or *Daubert* standard⁵

5 *Daubert v. Merrell Dow Pharmaceuticals, Inc.* 509 U.S. 579 (1993). Also see: Lisa R. Fournier, "The Daubert Guidelines: Usefulness, Utilization, and Suggestions for Improving Quality Control" 5(5) *Journal of Applied Research in Memory and Cognition* 308-313 (2016).

for admissibility of forensic evidence in the courtroom. Barring junk science,⁶ all the forensic techniques are duly validated. However, procedural probity is most crucial and challenging, since it involves human beings, who are more susceptible to errors and manipulations. Procedural protocols for forensic techniques are either poorly implemented or not followed in letter and spirit at different stages of sample collection to analysis. Protection of the chain of custody of forensic samples remained a daunting challenge. India lacks an anonymous peer review of forensic reports to ensure the probity of procedures and accountability of forensic experts. Accreditation of laboratories by the competent authority and periodic training, in addition to the competence certification of experts, are the need of the hour. Further, over boasting about the accuracy of forensic expert results is another challenge, alongside the practice of junk science in forensic analysis. During this survey, specific procedural issues addressed by the courts that remain critical to the admissibility of forensic opinions as evidence in court proceedings are briefly outlined below.

Determination of age

In legal parlance, age generally refers to biological age, not mental age.⁷ Age determination provides vital evidence for determining a party's minor status in criminal and civil matters. Determining the age of a minor has regularly vexed the courts, as it is a vital factor in invoking the POCSO Act, 2012, or the child in conflict with law under the JJ Act, 2015. In civil disputes such as child custody, adoption, or maintenance for a minor, the necessity of age determination by reliable documents or medico-legal tests is also evident. The importance of medical reports has been highlighted in sexual assault cases under section 164-A Cr PC (section 184 of the BNSS, 2023) for the victim and under section 53-A Cr PC (section 52 of the BNSS, 2023) for the accused. The POCSO Act enables the determination of a child's age, but it provides no specific procedure for judges to follow in age determination. The Supreme Court of India in *Jarnail Singh v. State of Haryana*⁸ has directed the use of Rule 12(3) of the JJ Rules, 2007 under the JJ Act, 2000 (now under section 94 of the JJ Act, 2015), which has categorically mentioned the manner to determine age for deciding minority either by the defined documents or a medical

6 Chris Fabricant, *Junk Science and the American Justice System* (Akashic Books: New York City, 2023).

7 *Eera Through Manjula v. State (Govt. of NCT of Delhi)* (2017) 15 SCC 133; (2017) 3 MLJ (Cri) 452 [2027] 7 SCR 924. Also see: G.K. Goswami and Aditi Goswami, "Determination of Age: A Medic-legal Conundrum" 63(1) *JILI* 102-114 (2017); and Arushi Garg, "Navigating Through 'Age' and 'Agency' in *Eera v. State*" 14 *Socio-legal Review* 79-97 (2018).

8 (2013) 7 SCC 263 at para 23. The Supreme Court observed that "Even though Rule 12 is strictly applicable only to determine the age of a child in conflict with law, we are of the view that the aforesaid statutory provision should be the basis for determining age, even of a child who is a victim of crime. For, in our view, there is hardly any difference insofar as the issue of minority is concerned, between a child in conflict with law, and a child who is a victim of crime".

test.⁹ The High Court of Allahabad has enumerated several benefits from the age specified by the Medical Board in the POCSO cases:¹⁰

- (a) The said report may prove to be a reliable piece of evidence in the case.
- (b) The said medical reports will assist the process of law and enable the courts to make a conclusive finding on the victim's age after considering all the evidence in the record.
- (c) The said medical reports determining the victim's age at the very outset will also help prevent misuse of the POCSO Act.
- (d) The said medical reports are relatable to specific provisions of law.

In the *Aman* case, the High Court of Allahabad further observed that "False depiction of a victim as a minor in POCSO Act cases is an abuse of the process of the court".¹¹ The high court mentioned three lists of cases in which several complications arose due to significant variations in the documents regarding the victims' age, resulting from falsely depicting the victims' age as below 18 years, leading to wrongful implication of the accused under the stringent provisions of the POCSO Act.¹² The High Court of Allahabad held that "Medical Report determining the age of a POCSO Act offence is an imperative requirement of law and an absolute necessity of justice".¹³ The high court issued the following

9 The Juvenile Justice (Care and Protection of Children) Act, 2015: S. 94 (Presumption and determination of age):(1) Where, it is obvious to the Committee or the Board, based on the appearance of the person brought before it under any of the provisions of this Act (other than for the purpose of giving evidence) that the said person is a child, the Committee or the Board shall record such observation stating the age of the child as nearly as may be and proceed with the inquiry under section 14 or section 36, as the case may be, without waiting for further confirmation of the age.

(2) In case, the Committee or the Board has reasonable grounds for doubt regarding whether the person brought before it is a child or not, the Committee or the Board, as the case may be, shall undertake the process of age determination, by seeking evidence by obtaining-

- (i) the date of birth certificate from the school, or the matriculation or equivalent certificate from the concerned examination Board, if available; and in the absence thereof;
- (ii) the birth certificate given by a corporation or a municipal authority or a panchayat;
- (iii) and only in the absence of (i) and (ii) above, age shall be determined by an ossification test or any other latest medical age determination test conducted on the orders of the Committee or the Board:

Provided such age determination test conducted on the order of the Committee or the Board shall be completed within fifteen days from the date of such order.

(3) The age recorded by the Committee or the Board to be the age of person so brought before it shall, for the purpose of this Act, be deemed to be the true age of that person.

10 *Aman @ Vansh v. State of U.P.* 2024 SCC Online All 1126 at para 13 : (2024) 128 ACC 381.

11 *Id.*, para 17.

12 *Id.*, paras 18 to 20. *See also Monish v. State of U. P.* [Crim Misc. bail Appl. No. 55026 of 2021, High Court of Allahabad decided on Feb. 9, 2023] the court highlighted the complication caused by false depiction of a victim as minor and contradictions in age related documents.

13 *Id.*, para 21.

directions to the Director General of Police and Director General (Health), Uttar Pradesh, for compliance:¹⁴

(i) The police authorities/investigation officers shall ensure that in every POCSO Act offence, a medical report determining the victim's age shall be drawn up at the outset under Section 164A of the Criminal Procedure Code, read with Section 27 of the Protection of Children from Sexual Offences Act, 2012. The report may be dispensed with if medical opinion advises against it in the interests of the victim's health.

(ii) The medical report determining the age of the victim shall be created as per established procedure of law and in adherence to the latest scientific parameters and medical protocol.

(iii) The medical report determining the age of the victim shall be submitted under Section 164-A of the Code of Criminal Procedure to the Court without delay.

(iv) The Director General (Health), Government of Uttar Pradesh, Lucknow, shall also ensure that the doctors who comprise the Medical Board are duly trained and follow the established medical protocol and scientific parameters for determining the age of the victims in such cases. Constant research shall be done in this field to keep the reports in line with the latest scientific developments.

Age determination by medical tests isn't yet absolute, and the error range is about two years.¹⁵ Hence, such a test patently fails to correctly determine the age of a victim claiming herself to be between 16 and 18 years. This age group is critical for the allegations of elopement, where, many times, the prosecutrix deposes before the court that, with her volition, she went with her paramour and had consensual sexual intercourse with him. The observation of the high court in the *Aman* discussed above that age determination of the victim by medical test is an absolute necessity in the POCSO cases appears contradictory to section 164-A of the Cr PC, where informed consent of the victim or her parents or guardian is mandatory before conducting her medico-legal examination in the prescribed manner. Section 27(1) CrPC directs the conduct of a medical examination of a child in accordance with section 164 CrPC, which necessitates the consent of the victim, parents or a

14 *Id.*, para 22 and 23.

15 H. Prasad and N. Kala, "Accuracy of two dental age estimation methods in the Indian population: A meta-analysis of published studies 37(3) *J. Forensic Odontostomatol* 2-11 (2019); and Petter Mostad and Fredrik Tamsen, "Error rates for unvalidated medical age assessment procedures" 133(2) *International Journal of Legal Medicine* 613-623 (2019), available at: <https://doi.org/10.1007/s00414-018-1916-3> (last visited on April 27, 2025). Also see: In *Jaya Mala v. Home Secretary, Government of J&K* (1982) 2 SCC 538 at para 9, the Supreme Court observed, "However, it is notorious and one can take judicial notice that the margin of error in age ascertained by radiological examination is two years on either side".

legal guardian.¹⁶ Further, the observations in *Aman* patently contradict provisions under section 94 of the JJ Act, 2015,¹⁷ in conjunction with the directions of the Supreme Court in the *Jarnail Singh* case,¹⁸ for age determination to determine status as a minor. However, there is no mention of these provisions of law or the apex court's observations in *Aman*, and the high court appears primarily to be referring to umpteen cases of the same court and to be more concerned about the alleged misuse of the POCSO Act by the complainants.

However, the High Court of Allahabad in the *Anurudh* has observed, "The determination of victim's age in a bail under POCSO Act offences has to be made upon an integrated reading of Section 94 of the of the Juvenile Justice (Care and Protection of Children) Act and Section 164-A of Cr PC read with Section 27 of the POCSO Act in light of the judgements of this Court in *Monish* (supra) and *Aman* (supra)".¹⁹ The high court further reiterated that "*Aman* (Supra) reinforced the significance of the medical age determination in the scheme of the POCSO Act. The trial court must form an opinion on the credibility of the documents in deciding the bail application. In appropriate cases, the age of the victim determined by the competent medical authority can prevail over other age-related documents (including school records). In fact, in the instant case, this Court has relied upon the medical determination of the victim's age in preference to the school records about her age".²⁰

The high court in *Anurudh* observed that the rationale in *Pradeep Kumar Chauhan v. State of Uttar Pradesh* shall not be applicable in POCSO Cases, since the *Pradeep* case was a *habeas corpus* writ petition filed by the husband seeking production of the corpus of his wife, and the police subjected her to a medical examination to determine her age. In the *Pradeep* the high observed that "It appears that either Investigating Officer is not aware of the procedure and the provisions contained in the Juvenile Justice (Care and Protection of Children) Act, 2015 or with a view to shield the accused person, he has directed the victim to undergo medical examination".²¹ In the *Anurudh*, the High Court of Allahabad issued directions to the authorities categorically mentioning that "The judgement of this Court in *Pradeep Kumar Chauhan* (supra) does not apply to POCSO Act offences. The police authorities/investigation officers are directed to strictly comply with

16 S. 27 of the POCSO Act, 2012 - Medical examination of a child.

27(1) "The medical examination of a child in respect of whom any offence has been committed under this Act, shall, notwithstanding that a First Information Report or complaint has not been registered for the offences under this Act, be conducted in accordance with section 164A of the Code of Criminal Procedure, 1973 (2 of 1973)".

17 *Supra* note 11. S. 94 (2)(iii) specially mentioned "and only in the absence of (i) and (ii) above, age shall be determined by an ossification test or any other latest medical age determination test conducted on the orders of the Committee or the Board ...".

18 *Supra* note 10.

19 *Anurudh v. State of U. P.* 2024 SCC OnLine All 5338 at para 27.

20 *Id.*, para 28.

21 *Ibid.*

the directions of this Court in Aman (supra) and ensure that the competent medical authority draws up the medical report determining the age of the victim at the commencement of the investigations of POCSO Act offences in accordance with the provisions of the Section 164-A Cr PC read with Section 27 of the POCSO Act".²² On the strength of the cases discussed above and referred therein, it can be deduced that the High Court of Allahabad is evidently concerned about false accusations under the garb of the stringent provisions of the POCSO Act.

In *Dharmendra v. State of U.P.*,²³ the High Court of Allahabad emphasised that a medical report that merely records the subject's age without providing the underlying criteria or scientific parameters used to reach the conclusion leads to a flawed prosecution and a miscarriage of justice; hence, it is inadmissible. This issue is critical for all types of expert opinions based on scientific analysis. In fact, the term 'expert' has not been so far defined in Indian procedural laws as referred in section 39 of the *Bharatiya Sakshya Adhinyam* (BSA), 2023, or section 45 of the Indian Evidence Act, 1872. This issue has been addressed by the Supreme Court, which explained that the term 'especially skilled' requires these sections of law to mandate the provision of underlying data alongside expert opinion, which is often missing in practice.²⁴ The author has also extensively deliberated on this legal conundrum that perpetually exists in the Indian legal lexicon.²⁵

22 *Supra* note 21 at para 39(I). The other directions in the said judgment include:

II) The medical report of the victim determining her age and drawn up under Section 164-A Cr.P.C. read with Section 27 of the POCSO Act shall be produced by the police authorities/investigation officers before the court hearing the bail application. The learned courts while hearing bail applications shall make due enquiries about the compliance of these directions and Aman (supra) during the bail proceedings.

III) The judgement of this Court rendered in Monish (supra), Aman (supra) as well as this case have to be read together and not in isolation. The directions in Aman (supra) as well as this case will be of little avail, if not examined and implemented in light of the directions made in Monish (supra).

IV) The age of the victim in bails arising out of POCSO Act offences has been determined by a composite reading of Section 94 of the Juvenile Justice (Care and Protection of Children) Act and Section 164-A of Cr.P.C. read with Section 27 of the POCSO Act in light of the judgements rendered in Monish (supra), Aman (supra) and this case.

V) The court hearing the bail application has to accord full weight to the medical age determination report of the victim and also carefully examine all other documents relating to the victim's age. The court has to determine the credibility of the respective age-related documents while deciding the bail application in the facts of the case. In appropriate facts and circumstances as in the instant case, the age determined by the competent medical authority under Section 164-A of Cr PC read with Section 27 of the POCSO Act can prevail over other age-related documents (including school records).

23 2024:AHC:158630.

24 *State of Himachal Pradesh v. Jai Lal* (1999) 7 SCC 280 : AIR 1999 SC 3318.

25 G.K. Goswami, "A Need to Define Forensic Expertise" *The New Indian Express*, Hyderabad edn., Jan. 3 2024, available at: [02/a-need-to-define-forensic-expertise2647232.html#:~:text=It%20says%20that%20when%20the,in%20the%20entire%20Evidence%20Act](https://www.newindianexpress.com/national/2024/jan/03/a-need-to-define-forensic-expertise-2647232.html#:~:text=It%20says%20that%20when%20the,in%20the%20entire%20Evidence%20Act) (last visited on April 27, 2025).

Consent for taking DNA and other samples

Consent is the embodiment of the right to privacy, which has been declared a fundamental right under Article 21 of the Constitution of India by the apex court.²⁶ The concepts of competence to consent and informed consent are twin components essential for protecting the right to privacy.²⁷ Consent and the right to privacy are intertwined concepts directly linked with the right to self-determination. Consent is a critical criterion for forensic sampling, ranging from digital devices to DNA samples from a person, irrespective of her status as an accused or a victim. In the forensic domain, the consent subject must be expressed and obtained in writing. It is pertinent to note that under section 53-A Cr PC, the consent of the accused is not required for conducting a medico-legal test or for collecting the accused's DNA. However, consent of the victim of rape is desired under section 164-A Cr PC for subjecting her to medical examination and taking a DNA sample. Strangely, in an appeal against conviction order in a POCSO case, it is observed that "Referring to the DNA test reports, learned amicus curiae had submitted that no consent of the appellants was obtained before obtaining the blood samples for the DNA test. Therefore, the test report of the appellant in this regard should be discarded".²⁸ The Digital Personal Data Protection Act, 2023, became the legal instrument for implementing the right to privacy, and prior consent is required for the use of others' data. Law enforcement agencies and other stakeholders in the criminal justice system need to be sensitised and trained on the right to privacy when dealing with forensic and digital data.

III FORENSICS IN CRIMINAL ADJUDICATION

Forensic science played a stellar role in criminal adjudication, both as inculpatory evidence to prove guilt and as exculpatory evidence to establish innocence. In the Indian context, the prosecution is primarily responsible for conducting forensic analysis of samples. Before July 1, 2024, police may collect forensic samples and forward them to the forensic laboratory for analysis. However, after the introduction of section 176(3) of the BNSS, 2023 scenario has changed, and forensic evidence has now been recognised as a powerful tool for investigation to explore the truth and aid the justice delivery system. A few significant observations of the constitutional courts on forensic evidence used in criminal matters surfaced during a survey of judgments delivered in 2024 have been discussed below:

DNA profiling

Over the last four decades, DNA has emerged as a powerful evidentiary tool for human identification, assisting courts in corroborating facts and exploring the truth.²⁹ In *District Attorney's Office for the Third Judicial District v. William G.*

26 *Justice K.S. Puttaswamy (retd.) v. Union of India* (2017) 1 SCC 10.

27 Eike-Henner W Kluge, "Competence, Capacity, and Informed Consent: Beyond the Cognitive-Competence Model" 24(3) *Canadian Journal on Aging* 295-304 (2024).

28 *Sanjib Talukdar v. State of West Bengal* 2024 SCC OnLine Cal 2507 at para 23.

29 *Surendra Kumar v. State of H.P.* 2024 SCC OnLine HP 1641 at para 44; and *Rattan Lal v. State of H.P.* 2024 SCC OnLine HP 3005 at para 32.

Osborne, Chief Justice John Roberts observed, “DNA testing has an unparalleled ability both to exonerate the wrongly convicted and to identify the guilty. It has the potential to significantly improve both the criminal justice system and police investigative practices”.³⁰ DNA technology, as part of Forensic Science and a scientific discipline, not only guides investigations but also provides the Court with information on forensic features of criminal identification. Recent advances in modern biological research have standardised Forensic Science, resulting in significant support for the administration of justice.³¹

In *Dharam Deo Yadav v. State of U.P.*, the Supreme Court of India has observed, “DNA profile, however, is consistently held to be valid and reliable, but of course, it depends on the quality control and quality assurance procedures in the laboratory”.³² Further, “DNA may be more useful for purposes of investigation but not for raising any presumption of identity in a court of law.”³³ “After the amendment in the Criminal Procedure Code by the insertion of Section 53-A by Act 25 of 2005, DNA profiling has now become a part of the statutory scheme. It is held that the DNA report deserves acceptance unless it is absolutely defective, and that, for its non-acceptance, it must be established that there was no quality control or quality assurance. If the sampling is proper and if there is no evidence of tampering of samples, the DNA test report has to be accepted,” observed the High Court of Bombay.³⁴ In a rape case, DNA examination assists in determining whether the sperms found on the articles or vaginal swab belong to the accused or suspect. However, the age of the semen cannot be determined from the microscopic examination.³⁵

It is strange to note that sometimes the police and the court refuse the accused’s request to conduct a DNA test to establish the truth. Such a negative response from the judiciary undermines the level playing field and violates the accused’s equal opportunity to prove his innocence. In the *Banarsi* case, the accused was convicted, and his request was turned down by the trial court to permit DNA profiling of the appellant and the child, to determine the paternity of the child, who was born to the prosecutrix as a consequence of alleged rape.³⁶ However, the high court acquitted the accused.

DNA profiling is a powerful tool for human identification with global credibility, demonstrating its evidentiary authority in a wide range of criminal

30 557 U.S. 52 (2009) at 55: 2009 *U.S. LEXIS* 4536.

31 *Arun Kumar v. State of H.P.* 2024 SCC OnLine HP 3261; and *Vikas Verma v. State of H.P.* 2024 SCC OnLine HP 2712.

32 (2014) 5 SCC 509 at para 36.

33 *Prem Singh v. State of U.P.* 2024 SCC OnLine All 1675 at para 93 : (2024) 5 All LJ 319 : 2024 Cri LJ 3762; and *State of Bihar v. Imteyaz Alam* 2024 SCC OnLine Pat 7260 at para 165.

34 *Vaibhav v. State of Maharashtra* 2024 SCC OnLine Bom 3557 at para 22 : (2024) 4 Bom (Cri) 717;

35 *Poshram Dhruw v. State of Chhattisgarh* 2024 SCC OnLine Chh 496 at para 23

36 *Banarasi Sah v. State of Bihar* 2024 SCC OnLine Pat 9065 at para 32.

cases to connect crimes to the perpetrators.³⁷ DNA also helps to establish innocence in the absence of other clinching inculpatory evidence.³⁸ The defence has assailed the prosecution's case, arguing that DNA testing has not linked the crime to the accused and that, at times, the defence can gain an advantage if other evidence does not corroborate the circumstances.³⁹ DNA is among the best corroborative evidence; however, in the absence of an incriminating DNA report, guilt may also be established with other cogent evidence.⁴⁰ The DNA report, if excluding the accused, further supports the claim for granting bail to the accused.⁴¹ It helps to identify human dead bodies or bodily remains.⁴² In addition to DNA, skull superimposition, and fingerprints, these methods also assist in the identification of a dead person with greater precision.⁴³ In many cases, failure to conduct a DNA profile on the dead body for establishing the identity of the deceased weakens the

- 37 *Piyush Shyamdasani v. State of U.P.* 2024 SCC OnLine 7387 at para 156 (xxxii); *Prem Naresh v. State of U.P.* 2024 SCC OnLine All 4846 : (2024) 5 All LJ 436; *Dudekula Siddaiah v. State of Andhra Pradesh* 2024 SCC OnLine AP 5067 at para 16; *Muppalla Chiranjeevi v. State of AP* 2024 SC Online AP 4703 at para 10; *Bhupati Uday Kiran v. State of AP* 2024 SC Online AP 1867 at para 10; *Vikash Sah v. State of Bihar* 2024 SC Online Pat 7213 at para 27; *Vivek Gulabrao Palatkar v. State of Maharashtra* 2024 SCC OnLine Bom 942 at para 71; *Anup v. State of Maharashtra* 2024 SCC OnLine Bom 3309; *State of Maharashtra v. Pradip Vishwanath Jagtap* 2024 SCC OnLine Bom 3307 at para 27.1; *State of Maharashtra v. Sunil Rama Kuchkoravi* 2024 SCC OnLine Bom 3131 at para 40; *Sandip v. State of Maharashtra* 2024 SCC OnLine Bom 2397 at para 21; *Shailesh Mahadeo Lanjewar v. State of Maharashtra* 2024 SCC OnLine Bom 3531 : (2024) 4 Bom CR (Cri) 740 : 2025 Cri LJ 478; *Roshan v. State of Maharashtra* 2024 SCC OnLine Bom 2648 : (2024) 4 Bom CR (Cri) 814; *v. State of Maharashtra* 2024 SCC OnLine Bom 2648; *Iliyas Ahmad Abdul Hamid Qureshi v. State of Maharashtra* 2024 SCC OnLine Bom 2056 at para 14; *Neelkanth v. State of Chhattisgarh* 2024 SCC OnLine 13078 at para 29; *Krishna v. Delhi Police* 2024 SCC OnLine Del 2422 at para 17; *Jagtar Singh v. State of Himachal Pradesh* 2024 SCC OnLine HP 5156 at para 12; *Jai Bahadur v. State of Himachal Pradesh* 2024 SCC OnLine HP 3334 at para 25; and *Mahesh Kumar v. State of Haryana* 2024 SCC OnLine P and H 10687 at para 27.
- 38 *Laxman Jaywantrao Gurhale v. State of Maharashtra* 2024 SCC OnLine Bom 3212 at para 21; and *Binu K.C. v. State of Kerala* 2024 SCC OnLine Ker at para 35.
- 39 *Makineni Sravanya v. State of Andhra Pradesh* 2024 SCC OnLine AP 1765 at para 21; *Deepak Pandurang v. State of Maharashtra* 2024 SCC OnLine Bom 2935 at para 8; and *Ratnakaranv. State of Kerala* 2024 SCC OnLine Ker 772.
- 40 *Ajayachandran v. State of Kerala* 2024 SCC OnLine Ker 3461 at para 22.
- 41 *Lieni Kumar v. State rep. by the Inspector of Ploice* 2024 SCC OnLine Mad 293 at para 7.
- 42 *Shaik Khasim Basha v. State of Andhra Pradesh* 2024 SCC OnLine AP 582 at para 4; *Nitin Gorakhnath Sartape v. State of Maharashtra* 2024 SCC OnLine Bom 1047 at para 419; *Paragv. State of Maharashtra* 2024 SCC OnLine Bom 2499 at para 20; *Pravin Popat Kharat v. State of Maharashtra* 2024 SCC OnLine Bom 597 : (2024) 1 AIR Bom R (Cri) 940; and *Vikas Jain v. State of Chhattisgarh* 2024 SCC OnLineChh 1656 at para 11.
- 43 *Arun v. State of Chhattisgarh* 2024 SCC OnLine Chh 10102; *Martin Montrique Mansoor v. Inspector of Police* 2024 SCC OnLine Mad 6186; *Manik v. State of Maharashtra* 2024 SCC OnLine SC 2625.

prosecution's case.⁴⁴ However, DNA is not mandatory to identify the dead body, provided other cogent evidence establishes identity beyond a reasonable doubt.⁴⁵

Exclusionary DNA evidence may provide strong support for the accused's innocence. Still, in sexual assault cases, exclusion may be due to multiple factors, such as delayed collection of biological samples from the deceased or non-ejaculation, etc.⁴⁶ In *Sunil v. State of Madhya Pradesh*,⁴⁷ the Supreme Court held that if the result of the DNA test is in favour of the accused, the weight of other materials and evidence on record will still have to be considered. In a case of penetrative sexual assault with a 14-year-old girl, who got impregnated, but the DNA report excluded the accused as the putative father of the child, the high court upheld the conviction after observing:⁴⁸

It further reveals, from the case diary, that she was 14 years old at the time of the incident. All these facts established a prima facie case of rape or penetrative sexual assault as well as threat perception against the present petitioner. It is an admitted fact that the DNA report, collected from the CFSL, shows the present petitioner is not the biological father of the female baby titas. Only on such a scientific report can the accused be discharged from a case where direct evidence is apparent from the Case Diary. Allegation of rape may be proved by substantive evidence, and to prove substantive evidence, leading evidence from both sides is essential. Accordingly, at this initial stage, the accused cannot be discharged only based on a scientific report, i.e., a DNA Report, because a DNA analysis report cannot be said to be conclusive evidence regarding rape and can only be used as corroborative evidence in the trial, and it is not clinching proof.

44 *State of U.P. v. Sajid* 2024 SCC OnLine All 7304 at para 31; (2025) 130 ACC 183; *Kadiyala Kamlesh v. State of AP* 204 SC Online AP 4224 at para 28; *Bova v. State of AP* 2024 SC Online AP 2293 at para 11; *State of Maharashtra v. Bhagwat Bajirao* 2024 SCC OnLine Bom 3775 at para 79; *Koyo v. State of Chhattisgarh* 2024 SCC OnLine Chh 4320 at para 15; and *Dhurau Manjhi v. State of Chhattisgarh* 2024 SCC OnLine Chh 10488 at para 26.

45 *State of AP v. Mohammad Abdul Sammad Munna* [2024 SCC Online AP 1713], the High Court of Andhra Pradesh observed, "In the instant case, though the dead bodies were putrefied and DNA report could not be obtained, still by virtue of their cloths, concerned witnesses have identified those dead bodies". Also see: *Jerin Mathew v. State of Kerala* 2024 SCC OnLine 988 at para 12.

46 *Kisan v. State of Maharashtra* 2024 SCC OnLine Bom 1823 at para 12; *Pawan Kumar Verma v. State of Chhattisgarh* 2024 SCC OnLine Chh 3750 at para 26; and *Gokul Krishnan v. Deputy Superintendent of Police* 2024 SCC OnLine Mad 7097at para 5.

47 (2017) 4 SCC 393. Also see: *Raj v. State of Maharashtra* 2024 SCC OnLine Bom 2398 at para 20; and *Dashrath v. State of Maharashtra* 2021 SCC OnLine Bom 2921.

48 *Rabi Das v. State of West Bengal* 2024 SCC OnLine Cal 4569 at para 7b. Also see: *Abhijit Kar v. State of West Bengal* 2024 SCC OnLine Cal 2731; and *A v. State of Uttarakhand* 2024 SCC OnLine Utt 2748.

In *Akash v. State of NCT of Delhi*, the High Court of Delhi dismissed the bail application, holding that a DNA report that excludes the accused cannot be taken to mean that he is not involved in the crime.⁴⁹ In a sexual assault and murder of a two-year-old toddler, the trial court awarded the death penalty to the accused, who was the uncle of the deceased. Still, the High Court of Allahabad acquitted him after observing that “we hold that the finding recorded by the Trial Court that the victim ‘K’ was subjected to penetrative sexual assault and was later on murdered is upheld. However, we find that three important links in the chain of circumstantial evidence, *i.e.*, last seen, extrajudicial confession and DNA report, could not be proved by the prosecution, in view of the detailed finding recorded above, to prove that the appellant-accused committed the offence and he is entitled to get the benefit of doubt”.⁵⁰ In *Harishchandra Sitaram Khanorkar v. State of Maharashtra*, the high court has observed:⁵¹

There can be no doubt that there have been remarkable technological advancements in forensic science and in scientific investigations. The DNA testing has an unparalleled ability both to exonerate the wrongly convicted and to identify the guilty. It has the potential to significantly improve both the criminal justice system and police investigative practices. Modern DNA testing can provide robust new evidence, unlike anything known before DNA technology as part of forensic science and the scientific discipline, not only providing guidance to investigations but also supplying the Court with accurate information about the identifying features of criminals.

Prosecution’s tendency to suppress exculpatory evidence

In an adversarial criminal justice system, police, as state representative, has an onerous duty to collect all evidence, including exculpatory evidence, since the defence has no authority to gather evidence or to participate in the investigation till a process is issued to them.⁵² However, police and prosecutors are usually blamed for failing to collect and share exculpatory evidence, thereby undermining defence strategies. Non-sharing of exculpatory evidence with the accused violates the Due Process Clause under the Fifth and Fourteenth Amendments of the United States Constitution. In the United States, *Brady* disclosure ensures fair procedures by requiring disclosure of exculpatory and impeaching information to the accused.⁵³ *Brady* violations are among the root causes of wrongful convictions, and they are now a cogent ground to quash convictions in a plethora of cases.⁵⁴ In the Indian

49 2024 SCC OnLine Del 142 at para 7.

50 *Supra* note 36 at para 97.

51 2023 (1) ABR (CRI) 259 at para 21.

52 *Union of India v. W.N. Chadha* 1993 Supp (4) SCC 260; 1993 SCC (Cri) 1171. Also see: *Sakiri Basu v. State of U.P.* (2008) 2 SCC 409 ; (2008) 1 SCC (Cri) 440; *Emperor v. Khwaja Nazir Ahmad* AIR 1945 PC 18; and *Vinubhai Haribhai Malaviya v. State of Gujarat* (2019) 17 SCC 1.

53 *Brady v. Maryland* 373 U.S. 83 (1963).

system of criminal administration, prosecution relies solely on documents with the accused, and there is no provision akin to *Brady* Disclosure in the Indian legal lexicon. However, in recent times, the Supreme Court has held that disclosing exculpatory evidence is crucial, as it is an integral part of the right to a fair trial under Article 21 of the Indian Constitution and necessary for the accused to establish innocence.⁵⁵

In a POCSO case,⁵⁶ the DNA report was prepared 10 days after the trial court passed the conviction order. The DNA report excluded the accused from the guilt. The investigating officer neither shared the exculpatory DNA report with the trial court nor the appellate court until an affidavit was called during the appeal. The high court allowed the appeal and set aside the conviction order after observing, “The involvement of the accused being the perpetrator of the crime has been completely ruled out based on the DNA report. In my view, this vital evidence, in the form of a DNA report, cannot be excluded from consideration. If the DNA report is considered and used as is, it is fatal to the prosecution’s case. It is consistent with the accused’s innocence. As such, the appeal deserves to be allowed”.⁵⁷ It is strange to note that the High Court of Uttarakhand has curtailed the right of accused to cross examine the forensic expert and not sharing forensic report with the accused after observing “non examination of the Scientific Officer of the State Forensic Science Laboratory, Dehradun and not exhibiting the forensic report but acting upon the same, has not caused prejudice to the condemned prisoners”.⁵⁸ In the realm of forensic science, the doctrine of fair trial requires detailed deliberation in the Indian system.

Lackadaisical approach for dealing with forensic samples, analysis, and interpretation

In *Karnel Singh v. State*⁵⁹, the Supreme Court held that the prosecution’s case cannot be doubted on the ground of defective investigation, because the investigating officer is not under the control of the complainant and the complainant cannot be penalised for the Investigating Officer’s negligence.⁶⁰ The High Court of Kerala, on a shoddy investigation, observed:⁶¹

54 *Milke v. Ryan* 711 F.3d 998 (2013); In re Jasmine Jenkins S267391, Second Appellate District, Division One, Los Angeles County Superior Court, decided on Mar. 27, 2023.

55 *Manoj v. State of Madhya Pradesh* (2023) 2 SCC 353; 2022 SCC OnLine SC 677 at paras 199 to 209. The apex court at para 209 directed that: “In view of the above discussion, this Court holds that the prosecution, in the interests of fairness, should as a matter of rule, in all criminal trials, comply with the above rule, and furnish the list of statements, documents, material objects and exhibits which are not relied upon by the investigating officer. The presiding officers of courts in criminal trials shall ensure compliance with such rules”. Also see: *Ponnusamy v. State of Tamil Nadu* 2022 SCC OnLine SC 1543.

56 *Bhaiyya v. State of Maharashtra* 2024 SCC OnLine Bom 2553 at para 28.

57 *Id.*, para 24.

58 *State of Uttarakhand v. Kuldeep* 2024 SCC OnLine Utt para 90.

59 (1995) 5 SCC 518.

60 *Ranjeet Singh v. State of H.P.* 2024 SCC OnLine HP 5129 at para 33.

61 *Ansar V.K. v. State of Kerala* 2024 SCC OnLine Ker 5423 at para 24.

Significantly, the prosecuting agency missed crucial opportunities for a more rigorous and scientific investigation. They could have easily established the appellant's culpability by conducting a DNA analysis to confirm if the semen found on the victim's body matched the appellant. Additionally, two mobile phones were seized from the appellant, yet the agency failed to obtain tower dump and location details, which could have corroborated his presence at the crime scene. Moreover, the soil samples collected from the clothes allegedly hidden by the appellant were found to be inconsistent with both the soil from the crime scene and the soil on the victim's body and clothing.

It is distressing to observe that a casual approach to handling forensic samples and their analysis frustrates the very purpose of scientific investigation.⁶² It is observed that in umpteen cases, including *Rahul v. State of NCT of Delhi*⁶³ and *Manoj v. State of Madhya Pradesh*,⁶⁴ the courts at different levels have reversed conviction orders, despite incriminating expert opinions. The reasoning behind the acquittal is the violation of protocols and due procedures for handling DNA and other forensic samples, and the resulting broken chain of custody.⁶⁵ Often, forensic samples are collected but either not forwarded to the forensic laboratory or the expert opinion is not placed on the court record.⁶⁶

In *Chetan Kailas v. State of Maharashtra*,⁶⁷ the high court set aside the conviction order in a POCSO case despite an inculpatory DNA report based on procedural lapses in DNA sample collection, delayed submission to the laboratory, and not examining the sample at the forensic laboratory during the trial. The High

62 *Md. Kamal v. State of Bihar* 2024 SCC OnLine Pat 7738 at para 48; *Sunil Kumar v. State of H.P.* 2024 SCC OnLine HP 3594 at para 44; and *State of Jammu and Kashmir v. Rakesh Kumar* 2024 SCC OnLine J and K 588 at para 15.

63 *Rahul v. State of Delhi, Ministry of Home Affairs* (2023) 1 SCC 83.

64 *Supra* note at 59.

65 *Akash v. State of Maharashtra* 2024 SCC OnLine Bom 3440; *Rahul Gajanan Tumbada v. State of Maharashtra* 2024 SCC OnLine Bom 1073 at para 22; *Neelmani Sahu v. State of Chhattisgarh* 2024 SCC OnLine 7844 at para 23; *Hetram Nayak v. State of Chhattisgarh* 2024 SCC OnLine 1505 at para 36; *Rangpati Nayak v. State of Chhattisgarh* 2024 SCC OnLine Chh 3135 at para 18; *Aman Kumar Rana v. State of Himachal Pradesh* 2024 SCC OnLine HP 3075 at para 51; *Edward Bhengra v. State of Jharkhand* 2024 SCC OnLine Jhar 1644 at para 11; *Surjit Singh v. State of Punjab* 2024 SCC OnLine P and H 2994 at para 27; and *State of Uttarakhand v. Mohd. Azhar* 2024 SCC OnLine Utt 1921 at para 54.

66 *Md. Kamal v. State of Bihar* 2024 SCC OnLine Pat 7738 at para 37; *Sidhartha Jyotiram Awale v. State of Maharashtra* 2024 SCC OnLine Bom 2656 at para 20; *Pramod Dhanji Purabiya v. State of Maharashtra* 2024 SCC OnLine Bom 2455 at para 7.3; *State of Jammu and Kashmir v. Mohd. Farooq* 2024 SCC OnLine J and K 532 at para 17; and *Ajit Oraon (Juvenile) v. State of Jharkhand* 2024 SCC OnLine Jhar 1291 at para 12.

67 2024 SCC OnLine Bom 3308 at para 20 : (2024) 4 Bom CR (Cri) 697. Also see: *Mansaram Sahadeorao Dhurve v. State of Maharashtra* 2024 SCC OnLine Bom 3813 at para 21

Court of Bombay, after referring to a plethora of judgements on the procedural probity of forensic evidence, has succinctly observed:⁶⁸

From the above observations, it is clear that there is a protocol for selecting and preserving samples for DNA analysis. Necessary precautions are required throughout the study, from taking samples for DNA testing to the final results. Even the chain of custody for samples must be established to rule out contamination or tampering. Further, the said exercise must be undertaken and completed without delay. What can be gathered from the above observations made by the Hon'ble Supreme Court is that the evidence, like a DNA report, can only be relied upon or accepted provided the Prosecution establishes that the integrity of the samples remains uncompromised right from the beginning till the end. The chain of handling the samples is established. All possibility of contamination or tampering of the samples is completely ruled out. Further, it leads to the conclusion that DNA cannot be said to be infallible, as, after all, it is opinion evidence.

In an unnatural sexual assault case with a 10-year-old boy, the medical examination and collection of undergarments, etc., were timely done by the police. However, the DNA report indicates that only a partial DNA profile could be generated; therefore, no definite opinion could be expressed linking the DNA profile to the crime.⁶⁹ There is no valid reason for such reporting unless there was mishandling of samples, such as anal swabs and undergarments of the minor victim. This culture of unprofessionalism among various stakeholders of the justice system require immediate attention and strict oversight; otherwise, the purpose of introducing section 176(3) of the BNSS, 2023, would be futile.

In the *Puranlal* case, the trial court convicted the accused of rape relying upon the DNA report. In appeal, the high court observed, "It is shocking to note that only two pages of the DNA report are part of the Court record. The DNA report consists of four pages. The last two pages, where the DNA profiling, analysis, and opinion have been recorded, are not part of the record".⁷⁰ The High Court of Bombay quashed the conviction after observing:⁷¹

Before parting with this subject, I must mention that, while admitting the CA reports and the DNA report, the Court must pass an appropriate order without examining the Chemical Analyser and the DNA Expert. First and foremost, the learned Presiding Officer shall insist on the examination of the Chemical Analyser and the DNA

68 *Nivrutti v. State of Maharashtra* 2024 SCC OnLine Bom 3068 at para 18.

69 *Mohammad Rehan v. State of U.P.* 2024 SCC OnLine All 1110 at para 11 : (2024) 128 ACC 19.

70 *Puranlal Sakaru Dhurve v. State of Maharashtra* 2024 SCC OnLine Bom 3437 at para 25.

71 *Id.*, para 28.

Expert to prove the contents of the reports. The examination of the Chemical Analyser and the DNA expert, in such a case, can ensure the custody, preservation, and handling of the samples from receipt through final analysis. This is a very vital flaw in the prosecution's case, which has crept in due to the casual and careless approach of the Prosecutor and the learned Presiding Officer.

In the case of *Rajesh Kumar*, a case of murder, based on a DNA report submitted by the CDFD Hyderabad, the dead body of the deceased was identified, and the trial court awarded life imprisonment.⁷² However, in the Appeal by the accused, the High Court of Chhattisgarh acquitted the accused, citing the *Rahul, Manoj, and Pattu Rajan* cases, since the chain of custody of the sample was not protected. The high court observed, "...there is nothing on record to show whether it was kept in proper custody from the date of seizure till it was sent to the said laboratory, where it was lying for a period of six months, whether it was kept in a proper/safe custody to dispel any suspicion and as to why it was not sent for DNA profiling test immediately after its seizure. Even the *Maalkhana* register, indicating that it was kept in safe custody, has not been filed. In that view of the matter, the DNA Profiling test report comes under the cloud of suspicion and in the absence of any corroborative piece of evidence on record, it would be unsafe to convict the appellants relying upon the said DNA Profiling test".⁷³

The Supreme Court in *Chotkau v. State of Uttar Pradesh*⁷⁴ held that the failure of the police to subject the accused to a medical examination during the investigation was fatal to the prosecution's case and constituted a sufficient ground to overturn the conviction. Accordingly, the High Court of Calcutta has *set aside* the trial court order to direct the accused petitioner to submit a biological sample to conduct a DNA test to determine the paternity of the child born to the prosecutrix.⁷⁵ During the Appeal in *Ramkishore*, it was revealed that the DNA did not match the accused of rape, but the DNA profile matched that of another person charged in a different case. Despite knowing all these facts, the investigating officer did not investigate in this regard and arrested the accused. The trial court overlooked the vital DNA evidence and convicted the accused. The high court quashed the conviction order, but no direction was issued for a reinvestigation of the match DNA with another accused known in a different case.⁷⁶

Demand for a DNA test by the accused

Police typically conduct DNA testing on a case-by-case basis, depending on their priorities and willingness to do so. Many times, the accused also requests the police and the court to prove his innocence, to conduct his DNA to explore the truth behind the alleged crime. Interestingly, the courts also refuse to order a DNA

72 *Rajesh Kumar v. State of Chhattisgarh* 2024 SCC OnLine Chh 3459.

73 *Supra* note 76 at para 21.

74 (2023) 6 SCC 742.

75 *Sanjay Biswas v. State of West Bengal* 2024 SCC OnLine Cal 1337.

76 *Ramkishore Bharatsinh Yadav v. State of Gujarat* 2024 SCC OnLine Guj 3121 at para 24.

test at the accused's request, on the pretext of the police's statutory autonomy in conducting crime investigations.⁷⁷ The Supreme Court had observed, "There is a clear-cut and well-demarcated sphere of activity in the field of crime detection and crime punishment. Investigation of an offence is the field exclusively reserved for the executive through the police department, the superintendence over which vests in the State Government."⁷⁸ In fact, DNA and other forensic evidence are tools for exploring the truth, which may help to establish guilt or innocence. The High Court of Patna set aside a conviction order in a POCSO case, on the ground that the trial court refused to allow a specific plea of the accused expressing his willingness, at the time of framing charge, to undergo a DNA test for paternity of the child born to the minor victim.⁷⁹ However, after the introduction of section 176(3) of the BNSS, 2023, the forensic expert's visit to the crime scene became mandatory for the collection of forensic evidence.

Consequenses, if the prosecution does not conduct DNA test

It is a settled judicial rule in India that when the prosecution has not conducted DNA profiling in a criminal case, the court should not draw an adverse inference.⁸⁰ It is significant to mention that in *Sandeep Rai v. State of Bihar*, the court observed, "In *Chotkau v. State of Uttar Pradesh*, (2023) 6 SCC 742, the Supreme Court considered the importance of Section 53-A of the Cr.P.C in *Krishan Kumar Malik* (supra) but also noted that in a three-judge bench of the Supreme Court had indicated in *Rajendra Pralhadrao Wasnik v. State of Maharashtra*, (2019) 12 SCC 460 that Section 53-A is not mandatory.⁸¹ In *Sunil v. State of Madhya Pradesh*, the apex court has observed:⁸²

From the provisions of Section 53A of the Code and the decision of this Court in *Krishan Kumar* (supra), it does not follow that failure to conduct the DNA test of the samples taken from the accused or prove thereport of DNA profiling, as in the present case, would necessarily fail in the prosecution case. As held in *Krishan Kumar* (para 44), Section 53A really "facilitates the prosecution to prove its case". A positive DNA test result would constitute clinching evidence against the accused. If, however, the outcome of the test is negative, i.e. favouring the accused, or if DNA profiling had not

⁷⁷ Chapter XII of CrPC.

⁷⁸ *State of Bihar v. J.A.C. Saldanha* (1980) 1 SCC 554 at para 25; *State of West Bengal v. Sampat Lal* (1985) 1 SCC 317. Also see: *Vinubhai Haribhai Malaviya v. State of Gujarat* (2019) 17 SCC 1 : (2020) 3 SCC (Cri) 228 : 2019 SCC OnLine SC 1346 : AIR 2019 SC 5233 at paras 22-24.

⁷⁹ *Banarasi Sah v. State of Bihar* 2024 SCC OnLine Pat 9065 at para 32.

⁸⁰ *Rajendra Pralhadrao Wasnik v. State of Maharashtra* (2019) 12 SCC 460 at paras 49 and 50; *Krishna Kumar Rajendar v. State of U.P.* 2024 SCC OnLine All 4845 at para 88; *State of AP v. Mohammad Abdul Sammad Munna* 2024 SCC Online AP 1713; and *Smasudeen v. State of Haryana* 2024 SCC P&H 7036;

⁸¹ 2024 SCC OnLine Pat 7483 at para 32.

⁸² (2017) 4 SCC 760 at para 3.

been done in a given case, the weight of the other materials and evidence on record will still have to be considered.

Indeed, failure to conduct DNA in sexual offences weakens the prosecution's case, entitling the accused to the benefit of the doubt, resulting in an acquittal.⁸³ The high court set aside the conviction order in *Dil Kumar*, where a minor delivered a child as a consequence of penetrative sexual assault. Still, the prosecution failed to conduct a DNA test to connect the child with the accused as the putative father.⁸⁴ The court rejects bail typically if the DNA report is incriminating, mainly in sexual offences.⁸⁵ The High Court of Jammu Kashmir observed that during investigation or the initial trial stage, before recording evidence, an analysis report, such as a DNA report, can be considered in deciding a bail petition.⁸⁶ The prosecution's tendency not to conduct DNA testing or to submit the DNA report promptly also supports the bail claim.⁸⁷ A DNA report excluding an accused supports the defence's bail argument.⁸⁸ It is also observed that the court grants bail if the accused submits to a DNA test to establish the truth.⁸⁹ A petition was filed by the accused before the high court, alleging that his DNA sample, collected during the investigation, was delayed for 37 days before being forwarded for forensic analysis. The prosecution could not explain the delay. The petitioner further alleged that "the Scientific Officer who authored the report and conducted the examination was never produced as a witness. As such, not only was the DNA report not properly proved, but the appellant was deprived of the opportunity to cross-examine such Scientific Officer to elicit certain facts which might have gone in favour of the appellant".⁹⁰ Cross-examination of the expert is an essential element of a fair trial, so the appeal was allowed.

However, after the introduction of section 176(3) of BNSS, 2023, a forensic expert's visit to the crime scene for the collection of evidence became mandatory in those offences where the punishment is either seven years or more. Hence, a crime committed after July 1, 2024, and a failure to collect DNA or other forensic evidence must lead to the drawing of an adverse presumption against the prosecution's case. Interestingly, in *Kalyan*, the high court observed, "...

83 *Raghuraj Singh v. State of U.P.* 2024 SCC OnLine All 2653 at para 45; and *Deepak Bhoi v. State of Chhattisgarh* 2024 SCC OnLine Chh 4091 at para 27;

84 *Dil Kumar Munda v. State of Chhattisgarh* 2024 SCC OnLine Chh 5863 at para 17.

85 *Vicky Kumar Paswan v. State of Haryana* 2024 SCC OnLine P and H 11965 at para 7.

86 *Pawan Kumar v. UT of Jammu and Kashmir* 2024 SCC OnLine J and K 787 at para 30

87 *Rohit v. State of U.P.* 2024 SCC OnLine All 5141 at para 14; *Om Prakashv. State of U.P.* 2024 SCC OnLine All 6976 at para 10; *Santosh Kumar v. State of U.P.* 2024 SCC OnLine All 6124 at para 5; *SonuYadavv. State of U.P.* 2024 SCC OnLine All 7038 at para 14; and *Prince Dixitv. State (NCT of Delhi)* 2024 SCC OnLine Del 9225 at para 77;

88 *Neerajv. State of U.P.* 2024 SCC OnLine All 6421 at para 3; *Bhaulal Bariha v. State of Chhattisgarh* 2024 SCC OnLine Chh 10211at para 6; *Madan v. State of Himachal Pradesh* 2024 SCC OnLine HP 3380; and *Anurag v. State of Punjab* 2024 SCC OnLine P and H 3846 at para 11.

89 *Vikash Kumar v. State of Bihar* 2024 SC Online Pat 3885 at para 9. 11

90 *In the matter of Muskan Tamang* 2024 SCC OnLine Cal 10345 at para 7.

Investigating Officer or investigating agency did not endeavour whatsoever to subject the clothes of the appellants for DNA examination and in such circumstances, adverse inference has to be drawn against the prosecution because had these clothes been subjected to DNA examination, possibility cannot be ruled out that those would not have matched with DNA of the deceased".⁹¹

Conflict between the DNA test to explore the truth and the right to privacy

The Supreme Court of India has declared privacy a fundamental right, an integral part of the right to life under Article 21 of the Indian Constitution.⁹² It is pertinent to note that when ordering a DNA test by the court, the defendants typically refer to the celebrated and pioneering *Goutam Kundu* case, in which the Supreme Court issued five guidelines for courts below to conduct a DNA test.⁹³ It is essential to know that *Goutam Kundu* dealt with a legal issue to determine the disputed paternity of a child by DNA test, where the petitioner, as a poignant husband, alleged the infidelity of his wife. Thus, it was a purely civil suit to determine paternity by DNA testing. However, section 112 of the Indian Evidence Act, 1872, is the sole legal provision in the Indian legal lexicon that provides conclusive proof of the legitimacy of a child born to a legally wedded couple.⁹⁴ On the other hand, in criminal cases, DNA testing of the accused of sexual assaults is dealt under section 53-A of the CrPC, where the consent of the accused is not required to collect a biological sample from his person.⁹⁵ In *Krishna Kumar Malik v. State of Haryana*,⁹⁶ the Supreme Court referred to Section 53-A of the Cr PC and observed that after the enactment of this provision with effect from 23rd June, 2006, "it has become necessary for the prosecution to go in for a DNA test in such types of cases, facilitating the prosecution to prove its case against the accused".

91 *Kalyan Chand v. State of Himachal Pradesh* 2024 SCC OnLine HP 2826 at para 29.

92 *Supra* note at 29.

93 *Goutam Kundu v. State of West Bengal* (1993) 3 SCC 418 at 428.

26. From the above discussion it emerges:

(1) that courts in India cannot order blood test as a matter of course;

(2) wherever applications are made for such prayers in order to have roving inquiry, the prayer for blood test cannot be entertained.

(3) There must be a strong prima facie case in that the husband must establish non-access in order to dispel the presumption arising under Section 112 of the Evidence Act.

(4) The court must carefully examine as to what would be the consequence of ordering the blood test; whether it will have the effect of branding a child as a bastard and the mother as an unchaste woman.

(5) No one can be compelled to give sample of blood for analysis.

94 Section 112 of the Indian Evidence Act, 1872. Birth during marriage, conclusive proof of legitimacy: The fact that any person was born during the continuance of a valid marriage between his mother and any man, or within two hundred and eighty days after its dissolution, the mother remaining unmarried, shall be conclusive proof that he is the legitimate son of that man, unless it can be shown that the parties to the marriage had no access to each other at any time when he could have been begotten.

95 *XYZ v. State of Chhattisgarh* 2024 SCC OnLine Chh 1177 at paras 15 and 16.

96 (2011) 7 SCC 130.

This legal issue has also been addressed by the Allahabad High Court, where an accused of rape prayed before the court to conduct his DNA test to determine the truth behind the accusation of rape and a child born to the prosecutrix. On the conflict between DNA test and the right to privacy, the high court observed, "... right to privacy is a part of the right to life and personal liberty under Article 21 and that Article 20(3) provides that nobody should be compelled to give evidence against himself, we are of the view that the said would not over-ride the search for the truth, as the offence of rape is an offence against the society at large and as the objective of a Court proceeding is to find out the "truth". We are of the view that the appellant's right under Articles 20(3) & 21 would have to give way to public interest, so that the truth is laid bare for all to see".⁹⁷

Refusal of the Accused to provide a DNA sample

The accused in a rape or POCSO case has to undergo a medical examination under section 53-A CrPC, irrespective of his consent. DNA samples must also be collected during a medico-legal exam by a registered medical practitioner. A legal question arises as to whether a DNA sample may be collected from the accused only during police custody. The High Court of Calcutta held that in the case of refusal to submit a DNA sample by the accused, "... it would be incorrect to draw an adverse presumption against the appellant under section 114 of the Evidence Act. However, refusal of the appellant to give semen/hair samples may be treated as conduct of an accused relevant under section 8 of the Evidence Act. Such conduct may provide an additional link in the chain of circumstances to prove guilt. However, conduct by itself in the absence of proof of any other incriminating circumstance may not be sufficient to prove the guilt of the appellant beyond doubt".⁹⁸ The High Court of Chhattisgarh dismissed the Appeal against the conviction order since the court drew an adverse presumption against the appellant, accused of rape, who refused to submit a DNA sample.⁹⁹

Male potency test

The High Court of Madras has observed that the male potency test need not be undertaken routinely in all cases involving sexual offences. The court issued a standard operating procedure for conducting a male potency test:¹⁰⁰

- (i) If the accused person raises impotence as a defence, the burden of proof will be upon the accused person to prove that he is impotent. Only in such instances is it required to conduct the potency test.
- (ii) The doctor must, in rare cases, adopt invasive methods to determine if the man had consumed any pill or other medication and committed penetrative sexual violence, where otherwise he is impotent.

97 *Complainant of Case Crime 1479/2017 v. State of U.P.* 2024 SCC OnLine All 4838 at para 14.

98 *Banamali Choudhary v. State of West Bengal* 2024 SCC OnLine Cal 5800 at para 58.

99 *Pundasv. State of Chhattisgarh* 2024 SCC OnLine Chh 1351 at para 25.

100 *Kajendran J. v. Superintendent of Police* 2024 SCC OnLine TN at para 22.

- (iii) Even in cases where the semen may be traced in the victim or in her undergarments, etc, it is enough if the blood sample of the offender is taken and the DNA is matched. It is not necessary to draw the semen from the accused person.

Rape-related pregnancy

In case of termination of the rape-related pregnancy, the biological samples of the aborted foetus must be preserved by the doctor and handed over to the investigating agency for forensic analysis.¹⁰¹ Section 112 of the Indian Evidence Act, 1872, deals with conclusive proof of the legitimacy of a child born to a legally wedded couple or within 280 days of the divorce between the parents of the alleged child. Legitimacy under section 112 aids in adjudicating the legitimacy of a child, relevant for adjudicating civil disputes such as lineage, maintenance, divorce, etc. Section 112 should not be applied in a rape related pregnancy to determine the putative father. Most cases on this subject involve civil disputes.¹⁰² They should not be confused in dealing with DNA-based paternity determination in rape-related pregnancies, which is necessary to determine the guilt of the accused. The high court has discussed the same problem in the *Lob Das* case, where the court permitted the conduct of a DNA test after observing:¹⁰³

16. But in a case as the present one, where there is admittedly no marriage and the allegations include an offence under Section 376 IPC of the Penal Code, 1860, among others, the paternity of the child, if 'positive', shall prima facie prove access to the relationship. But then the questions of the proof of offence under Section 376 IPC and other offences are to be proved by way of relevant evidence to prove such offences.

17. If 'negative', it will strengthen the defence of the petitioner of 'non-access' to the relationship, and the petitioner will then be entitled to relief as provided under the law.

101 "XYZ" v. *State of Maharashtra* 2024 SCC OnLine Bom 2933 at para 9 : (2024) 6 AIR Bpm R 512; *XYZ v. State of Maharashtra* 2024 SCC OnLine Bom 2605 at para 10; *Abc (Minor) through Natural Guardian v. State of Chhattisgarh* 2024 SCC OnLine Chh 1430 at para 10; *ABC Nil v. State of Chhattisgarh* 2024 SCC OnLine Chh 3358 at para 11; *Abc Nil v. State of Chhattisgarh* 2024 SCC OnLine Chh 9681 at para 15; *A B C Nil v. State of Chhattisgarh* 2024 SCC OnLine Chh 13788 at para 17; *Minor N v. State of NCT of Delhi* 2024 SCC OnLine Del 6341 at para 15 (iv); *XYZ v. State of Gujarat* 2024 SCC OnLine Guj 4042 at para 28 (v); *Xyz v. State of Gujarat* 2024 SCC OnLine Guj 4448 at para 15; and *Txxx v. State of UT Chandigarh* 2024 SCC OnLine P and H 11560 at para 1.

102 *Goutam Kundu v. State of West Bengal* (1993) 3 SCC 418; *Sharda v. Dharpal* (2003) 4 SCC 493; *Banarsi Das v. Teeku Das* (2005) 4 SCC 449; *Bhabani Prasad Jena v. Convenor Secretary, Orissa State Commission for Women* (2010) 8 SCC 633; *Nandlal Wasudeo Badwaik v. Lata Nandlal Badwaik* (2014) 2 SCC 576; *Dipanwita Roy v. Ronobroto Roy* (2015) 1 SCC 365; and *Inayat Ali v. State of Telangana* (2024) 7 SCC 822;

103 *Lob Das v. State of West Bengal* 2024 SCC OnLine Cal 10836.

DNA helps to connect the rape accused with the pregnancy or the child to the prosecutrix, thus facilitating a conviction.¹⁰⁴

Medico-legal examination

In many cases, medical examinations of the victim and the accused, conducted promptly and in accordance with due process, provide evidence of high probative value. It is shocking to observe that despite explicit prohibitory directions issued by the Government of India, in a few cases, the medico-legal practitioners still conduct the “two-finger test” upon the prosecutrix to test her virginity. This test has been declared violative of the right of a rape survivor challenging her privacy, dignity, and physical and mental integrity. In *Lilu @ Rajesh v. State of Haryana*,¹⁰⁵ the Supreme Court has observed, “So far as the two-finger test is concerned, it requires a serious consideration by the court as there is a demand for sound standard of conducting and interpreting forensic examination of rape survivors”. The High Court of Himachal Pradesh, in *Sachin Kumar* has ordered to pay Rs. 5 lac as compensation to the child victim who suffered from “Two-finger” test during her medical examination.¹⁰⁶

CCTV footage

In the modern era of technology, various surveillance devices, such as CCTV camera feeds, help connect criminals to crimes.¹⁰⁷ The high court in a murder case observed, “... absence of blood and DNA of deceased on the clothes of petitioner is not relevant because his presence has been duly established through scientific evidence, i.e. CCTV footage as well as statements of Ritik and victim Yuma Devi”.¹⁰⁸

Fingerprint

It is a well-settled principle that the evidence of a fingerprint expert is not substantive evidence and can only corroborate other evidence on record. However, as to what value could be attached to a report by a police officer who claims to be trained in fingerprint comparison, even for aiding corroboration, would depend on the facts and circumstances of each case.¹⁰⁹

Handwriting and signature

Section 311A CrPC empowers a magistrate to order a person to submit a specimen signature or handwriting, and this is not a violation of Article 20(3) of the Indian Constitution, as settled by the Supreme Court in the *State of Bombay v. Kathi Kalu Oghad* and, more recently, in *Vijay v. State of Haryana*.¹¹⁰ Protection

104 *Kushal Marapi v. State of Chhattisgarh* 2024 SCC OnLine Chh 3076 at para 24; and *State of Chhattisgarh v. Kamlesh Kumar Suryawanshi* 2024 SCC OnLine Chh 1596 at para 2; 105 (2013) 14 SCC 643 at para 7. Also see: *In Re* (2020) 18 SCC 540.

106 2024 SCC OnLine HP 84 at para 16.

107 *Prakash Kumar Yadav v. State of Himachal Pradesh* 2024 SCC OnLine HP 5152 at para 9.

108 *Akhil v. State of Himachal Pradesh* 2024 SCC OnLine HP 1504 at para 13.

109 *Arumugam v. State represented by Inspector of Police* 2024 SCC OnLine Mad 6116 at para 11(iii) : (2024) 2 LW (Cri) 276 : (2024) 3 Mad LJ (Cri) 491.

110 2024 SCC OnLine P and H 6703 at para 8 and 9.

under article 20(3) applies only to testimonial evidence, not physical evidence.¹¹¹ The GQED opinion falls within the category of physical evidence, not testimonial evidence. In a chain of decisions, the courts held that, without independent, reliable corroboration, the opinion of the handwriting expert cannot alone support a conviction.¹¹² Expert opinion is inherently subjective, and the science of handwriting comparison is not infallible.¹¹³ The Constitution Bench of the Supreme Court in *Shashi Kumar Banerjee v. Subodh Kumar Banerjee*, observed that:¹¹⁴

The evidence of a handwriting expert can rarely be given precedence over substantive evidence. In the said case, the Court chose to disregard the handwriting expert's testimony regarding the disputed signature of the testator of a Will, finding it inconclusive. The Court instead relied on the clear testimony of the two attesting witnesses as well as the circumstances surrounding the execution of the Will.

The questioned handwriting must be compared with the admitted signatures of the person. It is the fundamental principle for admissibility that the signature for comparison must be taken from the original document, and not from the photocopy.¹¹⁵ In *Abhay Jain v. State of M.P.*,¹¹⁶ specific reasons have been highlighted for why the level of certainty of an expert opinion is affected by analysing only copies. Copies lose intricate details of pen direction and writing movements, which are essential for reaching accurate conclusions. Similarly, loss of information about the beginning and ending strokes, evaluation of line quality, hesitations, pauses in the writing line, etc., are specific reasons not to use copies of documents for matching handwriting or a signature.

In *Dinesh Kumar*, the High Court of Delhi held that "It is settled, in evidence, that comparison of thumb impressions results in far more accurate and exact result than comparison of handwriting. Handwriting may change over time and with mood, whereas a thumb print remains unchangeable. In *Jaspal Singh v. State of Punjab*,¹¹⁷ the Supreme Court observed that "the science of identifying thumb

111 *Supra* note at 3; and *Dewan Singh @ Ram Singh v. State of Haryana*, (2023) 4 RCR (Cri) 17, it has been categorically held that there is a distinction between the physical evidence and testimonial evidence. Physical evidence can be utilized for explaining relevant facts within the meaning of Sections 9 and 11 of the Indian Evidence Act, 1872. As such, there is no bar in directing the accused to give his fingerprints, blood sample, signatures specimen etc. Thus, providing such physical evidence lies outside the scope of Article 20(3) of the Constitution of India as observed in plethora of cases.

112 *Padum Kumar v. State of Uttar Pradesh* (2020) 3 SCC 35; *S. Gopal Reddy v. State of A.P.* (1996) 4 SCC 596 : 1996 SCC (Cri) 792; *Magan Bihari Lal v. State of Punjab* (1977) 2 SCC 210 : 1977 SCC (Cri) 313; and *Yogarani v. State by the Inspector of Police* 2024 SCC OnLine SC 2609.

113 *K. Gopal v. B. Srinivasa Reddy* 2024 SCC OnLine AP 5760 at para 22.

114 1963 SCC OnLine SC 114.

115 *Capt. Dinesh Ahluwalia v. Roopa Ahluwalia* 2004 SCC OnLine Del 1465 at para 40.

116 2018 SCC OnLine MP 1839 at para 30. Also see: *Dali Rajammav. Dali Srinivasa Reddy* 2024 SCC OnLine AP 5741.

117 (1980) 1 SCC 487.

impression is an exact science and does not admit of any mistake or doubt.”¹¹⁸ On expert opinion on handwriting, the High Court of Delhi has observed, “The evidence of the handwriting expert is only corroborative to prove the report of the handwriting expert. However, defendants have not been able to establish the authenticity of this document itself, sending the document to seek the expert opinion would not further the case of the defendants and no fruitful purpose would be served in seeking the expert opinion”.¹¹⁹

The High Court of Madras discarded the fingerprint expert’s opinion because, in his report, he did not assign any reason for concluding that the chance fingerprint was identical to that of the accused. Further, there is absolutely no evidence to show that the Chance Prints lifted from the occurrence pertained to any particular finger, or that it had prints of all fingers of the suspect. It is unclear how the expert ascertained that the chance fingerprint matched the fingerprints of two fingers of the accused.¹²⁰ Similarly, in the *Govindan* case, the high court rejected the fingerprint report due to procedural lapses in the collection of chance fingerprints.¹²¹

In *Hydru v. Govindankutty Nair*, it was held that “...under S. 45 of the Evidence Act, there is no prohibition as such against making a second reference to a handwriting expert without setting aside the report of the first; the Court has a discretion in the matter. ... The discretion is there, of course, to be used with circumspection.”¹²² Regarding the experience of an expert, the high court observed, “The age of a handwriting expert also is relevant because he is required to have a ‘photographic eye’ to recognise similarities and differences in the questioned and the admitted or proved signatures”.¹²³ The high court further observed that “An expert opinion has two parts, data part and opinion part. The opinion part is useless without the data part. Reasons should support the opinion.”¹²⁴

Additional evidence during trial or appeal – A pathway for complete justice

To explore the truth, it may sometimes be necessary to introduce new evidence. In the United States, since 1992, the Innocence Project has initiated legal challenges to convictions to correct injustices against innocent convicts. It has become instrumental in releasing thousands of wrongly convicted innocents, including

118 *Dinesh Kumar Gurjar v. Union of India* 2024 SCC OnLine Del 8057 at para 22.

119 *Santosh Yadav v. Jaswant Singh* (2024) 2 HCC (Del) 499 at para 132.

120 *ArulJoe v. State represented by Inspector of Police* 2024 SCC OnLine Mad 6120 at para 10.

121 *Govindan v. State represented by Inspector of Police* 2024 SCC OnLine Mad 3387 at para 11.

122 AIR 1982 Ker 49 at para 14. Also see: *Ramakrishnan v. Unnikrishnan* 2024 SCC OnLine Ker 4472.

123 *Chandrasekharan Nair v. Olympic Credit Corporation* (2014) 2 KLT 242 at para 14.

124 *Id.*, para 15

hundreds of them who were on death row.¹²⁵ The first author of this article has done extensive empirical research on wrongful convictions in the United States as a Fulbright Fellow in 2022.¹²⁶ Wrongful conviction remained a global challenge for good governance, and India is no exception.¹²⁷ Post-conviction innocence claims, especially when all appellate remedies are exhausted and the case has finality, often seek ‘new’ evidence to reopen the case and adjudicate innocence claims. In the Indian legal lexicon, new evidence cannot be introduced before appellate courts. *Anokhilal’s* case is a glaring tale of wrongful conviction in India, where a 21-year-old, illiterate and marginalised accused was arrested for the sexual assault and murder of a 9-year-old girl. The investigation and trial were concluded in 33 days, and the death penalty was awarded. In short, after a prolonged legal battle supported by public-spirited identities and efficient lawyers, the accused on death row was found innocent and was acquitted on March 18, 2024 during the third trial conducted by the district court in Madhya Pradesh.¹²⁸ It became the first case of DNA exoneration in India. Indeed, additional or new evidence becomes vital for addressing miscarriage of justice.

In India, section 391 CrPC (section 432 of BNSS, 2023) provides enabling provision for taking additional evidence by an Appellate Court, based on its necessity, after recording its reasons, and may either take such evidence itself, or direct it to be taken by a Magistrate, or when the appellate court is a high court, by a court of session or a magistrate.¹²⁹ When the additional evidence is taken by the court of session or the magistrate, it shall certify and forward such evidence to the appellate court. Such court shall proceed to dispose of the appeal. The accused or his pleader shall have the right to be present when the additional evidence is taken. Section 311 of CrPC (section 276 of BNSS, 2023) enables the court to exercise its power only to find the truth or obtain proper proof of such facts, which will lead to a just and correct decision in the case.¹³⁰

IV CIVIL DISPUTES RESOLUTION

Civil disputes are between private parties over violations of their rights, and both parties must prove the facts they allege. The evidence in civil proceedings

125 Innocence Project, *available at*: <https://innocenceproject.org/> (last visited on April 27, 2025). Also see: GK Goswami, “Innocence Denied: Safeguarding Constitutional Rights Amid Wrongful Convictions” in Nitesh Chandra and Manoj Kumar Sinha (eds.) *Perspective on Indian Constitution and Development* 79-102 (ILI New Delhi, 2023).

126 GK Goswami, *Global Response to Wrongful Convictions and Innocence Claims: Scope and Legal Challenges in India*, LLD Dissertation. The Degree awarded in March 2025 by the Rajiv Gandhi National University of Law (RGNUL), Patiala, Punjab – 147001, India.

127 Kent Roach, “Wrongful Convictions, Wrongful Prosecutions and Wrongful Detentions in India” 35(1) *National Law School of India Review* 250-300 (2023).

128 *Anokhilal v. State of Madhya Pradesh*, ST No. 100053/2013, Special Judge POCSO, Khandwa, Madhya Pradesh, decided on Mar. 19, 2024. Also see: *Supra* note 134 at 175-183.

129 *Rambhau v. State of Maharashtra* (2001) 4 SCC 759.

130 *Rajaram Prasad Yadav v. State of Bihar* (2013) 14 SCC 461 at para 17.4; and *Md. Abbas v. State of West Bengal v. State of West Bengal* 2024 SCC OnLine Cal 6039.

must meet the preponderance standard of proof. Forensic inputs such as DNA profiling, handwriting and signature analysis, forensic chemistry, *etc.*, help to resolve civil disputes with greater accuracy. DNA plays a vital role in determining the paternity of a child. However, DNA reveals the biological father of a child. Still, section 112 of the Indian Evidence Act, 1872 (section 116 of the BSA, 2023) establishes a conclusive presumption of legitimacy for a child born during a valid marriage or within 280 days after its dissolution, provided the mother remained unmarried until the child's birth. During this annual survey, several issues in civil matters, such as paternity determination, maintenance, *etc.*, with a forensic overtone have surfaced and are briefly discussed below.

Paternity disputes

The right to know parentage is fundamental to enabling a child's right to self-determination, identity, and psychological development.¹³¹ Article 8 of the UN Convention on the Rights of the Child (UNCRC), 1989 states that "State Parties undertake to respect the right of the child to preserve his or her identity, including nationality, name and family relations as recognised by law without unlawful interference".¹³² The law presumes against vice and immorality.¹³³ In the Indian legal lexicon, a standalone provision under section 112 of the Indian Evidence Act, 1872, deals with the conclusive presumption of paternity of a child conditioned upon two factors:¹³⁴

- (a) During the continuation of a valid marriage between his mother and any man;
- (b) Within 280 days after its dissolution, the mother remains unmarried;
- (c) Unless it can be shown that the parties to the marriage had no access to each other.

The evidence that a child is born during wedlock is sufficient to establish its legitimacy and shift the burden of proof to the parties seeking to prove the contrary.

The Supreme Court of India in *Aparna Ajinkya Firodia v. Ajinkya Arun Firodia*,¹³⁵ has succinctly observed, "... the question as to whether a DNA test should be permitted on the child is to be analysed through the prism of the child and not through the prism of the parents. The child cannot be used as a pawn to show that the mother of the child was living in adultery. It is always open to the respondent-husband to prove by other evidence, the adulterous conduct of the wife, but the child's right to identity should not be allowed to be sacrificed." In

131 Samantha Besson, "Enforcing the Child's Right to Know her Origins: Contrasting Approaches Under the Convention on the Rights of Child and European Convention on Human Rights" 21(2) *International Journal of law, policy, and the Family* 137-159 (2007).

132 Art. 8 of the UN Convention on the Rights of the Child (UNCRC), 1989.

133 *Odiosa et inhonesta non sunt in legepraesumenda*" (Nothing odious or dishonorable will be presumed by the law).

134 *Ifaq v. State of U.P.* 2024 SCC OnLine All 4598 at para 19.

135 2023 SCC OnLine SC 161 at para 122. Also see: *Gagandeep Singh v. Bhumika* 2024 SCC OnLine Del 611.

Jagar Chand, the petitioner husband appealed to the high court for a direction to the respondent wife and their children to undergo a DNA test.¹³⁶ The high court dismissed the appeal by quoting the observation of the Supreme Court in *Inayath Ali* as under:¹³⁷

Merely because something is permissible under the law cannot be directed as a matter of course to be performed, particularly when a direction to that effect would be invasive to the physical autonomy of a person. The consequence thereof would not be confined to the question as to whether such an order would result in testimonial compulsion, but encompasses the right to privacy as well. Such a direction would violate the privacy rights of the persons subjected to such tests. It could be prejudicial to the future of the two children who were also sought to be brought within the ambit of the Trial Court's direction.

In 2013, the Pennsylvania Supreme Court, in *T.E.B. v. C.A.B. v. P.D.K.*¹³⁸, dealt with the legal question of whether a man who has held out a child as his own would be precluded from invoking paternity by estoppel to prevent the biological father from asserting paternity at a later stage. Applying the doctrine of paternity by estoppel, which is based on the concept of equitable estoppel, it was held that once a man, by his conduct, has held out to be the child's father, he will not be permitted to deny the child's parentage. "Estoppel is based on the public policy that children should be secure in knowing who their parents are. If a certain person has acted as parent and bonded with the child, the child should not be required to suffer the potentially damaging trauma that may come from being told that the father he had known all his life is not in fact his father", the court observed in *Brinkley v. King*.¹³⁹ Relying upon Article 8 of the UNCRC, 1989,¹⁴⁰ the Supreme Court of India in *Aparna Ajinkya Firodia v. Ajinkya Arun Firodia*,¹⁴¹ held that long-accepted notions about a child's parentage must not be frivolously challenged before courts of law.

Property disputes

DNA-led paternity determination also assists courts in adjudicating property disputes.¹⁴² However, property inheritance must depend on the marriage between the parents of the parties involved. Marriage is a socio-legal phenomenon, but DNA-based paternity is a biological reality of parenthood. Hence, conducting DNA testing alone can establish paternity, but it does not directly help to establish

136 *Jagar Chandv. Tara Devi* 2024 SCC OnLine HP 6092.

137 (2024) 7 SCC 882 at para 11 : 2022 SCC OnLine SC 1867.

138 74 A.3d 170.

139 2013 Pa. Super 211.

140 *Supra* note 140.

141 *Supra* note 143. Also see: *A.J. Stephen v. Rosemariya* 2024 SCC OnLine Ker 2641.

142 *Palavali Viswanath v. Palavali Mallika* 2024 SCC OnLine AP 976 at para 25.

a marriage between the parents.¹⁴³ It is a settled principle of law in India that a Court in a civil dispute cannot compel a person to submit a DNA sample; however, an adverse presumption may be drawn under section 114 of the Indian Evidence Act, 1872. The Punjab and Haryana High Court in *Chandan Kaur* dismissed the petition after observing “Court cannot order a DNA test as a matter of course, and such a prayer cannot be granted to lead to a roving inquiry to collect the evidence for the plaintiff”.¹⁴⁴ In *Satya Brata Ghosh*, the High Court of Calcutta decided that the testamentary court has no power to direct the production of a DNA test report or order a DNA test for lineage determination.¹⁴⁵ Paternity disputes generally derive from or lead to maintenance suits filed by the wife and minor children.

Maintenance

It is observed that disgruntled husbands, to avoid paying maintenance to their wives and minor children, demand a court order to conduct a DNA test for paternity of children to establish bald allegations of adulterous life of their wives. In many cases, the court has refused to order a DNA test and dismissed the petition, mainly if no access to the wife during the subsistence of the marriage is not established.¹⁴⁶ In an Appeal before the High Court of Allahabad, the facts are that the petitioner, Ifraq, and his wife were married in accordance with the *Sharia* provisions and were blessed with two daughters.¹⁴⁷ Later, there was matrimonial discord, and the wife, along with both daughters, left the marital home because of dowry demand and harassment by the husband and in-laws. She filed a petition against her husband for maintenance for herself and their daughters. To avoid maintenance for his daughters, the doctor’s husband, clandestinely using his medical skills, collected biological samples of his minor daughter for a DNA test in a private DNA testing lab at Hyderabad, to claim that he is not the biological father of the daughter. The DNA report excluded Ifraq as the biological father of the child. He placed a private lab report before the court for consideration. Ifraq wanted to get a court order for the collection of DNA samples of the child so that her paternity may exclude him as the biological father, and he can establish the fidelity of his estranged wife, leading an adulterous life. However, the petitioner husband has no claim of non-access to his wife during the subsistence of their marriage.

143 *Gangadharan v. Sreedevi* 2024 SCC OnLine Ker 2316 at para 18. In this case, the petition for sibling DNA test was rejected.

144 *Chandan Kaur v. Ramdei* 2024 SCC OnLine P and H 10362: (2024) 3 RCR (Cri) 503 at para 8; *Sukhwinder Kaur v. Gurmeet Singh* (2023) 244 AIC 683 and *Manjit Kaur v. Inderjit Singh* 2022(2) *Law Herald* 1716.

145 *In the matter of Staya Brata Ghosh* 2024 SCC OnLine Cal 5878 at para 21.

146 *Matapher v. State of U.P.* 2024 SCC OnLine All 1019 : 2024 Cri LJ (NOC 371) 122 : (2024) 4 All LJ 10 : (2024) 128 ACC 230; *Pinki v. State of U.P.* 2024 SCC OnLine All 478 : (2024) 127 ACC 758 : (2024) 165 ALR 159; *Abdhesh Kumar Sah v. Sarita Devi* 2024 SCC OnLine Pat 8498; and *Abdhesh Kumar Sah v. Sarita Devi* SCC OnLine Pat 8498 at para 5.

147 *Supra* note 142.

In this case, the high court also referred to *Ajinkya Firodia v. Ajinkya Arun Firodia*, in which the apex court examined a tricky legal question from the perspective of a young boy or girl and its adverse impact on the psyche of that boy, whose legitimacy is under challenge by none other than his own father. The high court observed that “It is undeniable that the finding as to illegitimacy, if revealed in the DNA test, would at very least adversely affect the child’s tender mind. It can cause not only confusion in the mind of the child but a quest to find out who the birth father is, and mixed feelings towards a person who may have nurtured the child but is not a biological father. Not knowing who is one’s father, would create a mental trauma in that child”.¹⁴⁸ The high court also addressed paternity of child involved in assisted reproduction especially intrauterine insemination (IUI) and in-vitro fertilization (IVF), and observed, “Further, a child’s quest to locate its biological father may compete with the right to anonymity of the sperm donor. Having regard to such factors, a parent may, in the child’s best interests, choose not to subject the child to a DNA test. It is also antithetical to the fundamentals of the right to privacy to require a person to disclose, in the course of proceedings in rem, the medical procedures resorted to conceive”.¹⁴⁹ Finally, the high court dismissed the husband’s appeal challenging the conduct of a *de novo* DNA test and poignantly observed that the said DNA test report by a private DNA lab is simply trash and cannot be relied upon.

V IMPLEMENTATION OF NEW CRIMINAL LAWS

The Indian Parliament in 2023 enacted three major criminal laws, repealing the old, archaic British-era legislation that were often criticised for their punitive focus and colonial orientation. These laws have shifted the criminal justice orientation towards a justice-oriented approach rooted in fairness and victim-centricity, harmonising with the Indian cultural ethos. The new federal criminal laws have been named the *Bharatiya Nyaya Sanhiata, 2023* (BNS); the *Bharatiya Sakshya Adhinyam, 2023* (BSA); and the *Bharatiya Nagarik Suraksha Sanhita, 2023* (BNSS).¹⁵⁰ These laws have been effective across India since July 1, 2024.

The evidence, *per se*, is the subject matter of procedural law, and forensic evidence has been dealt with under the BSA and the BNSS. However, BSA handles criminal and civil disputes, while BNSS provides procedural rules for criminal matters. In the new procedural laws, emphasis has been placed on enhancing the reliability and validity of forensic opinion. The highlights of the provisions on expert opinion in the old and new laws have been briefly discussed in Table 1.

¹⁴⁸ *Supra* note 142 at para 27.

¹⁴⁹ *Ibid.*

¹⁵⁰ New set of major criminal laws of India include the *Bharatiya Nyaya Sanhita* (BNS), 2023 (No. 45 of 2023); the *Bharatiya Nagarik Suraksha Sanhita* (BNSS), 2023 (No. 46 of 2023); and the *Bharatiya Sakshya Adhinyam* (BSA), 2023 (No. 47 of 2023) which have replaced the Indian Penal Code (IPC), 1860; the Code of Criminal Procedure (CrPC), 1973; and the Indian Evidence Act (IEA), 1872 respectively.

Table 1: Provisions for forensic evidence under the old and new procedural laws

S.N.	Features	Old Legal Provisions	New Legal Provisions	Impact
1.	Expert Opinion	Sections: 45 to 51 IEA, 1872. Scope: Limited to art, science, handwriting, fingerprints, foreign law etc.	Sections: 39 to 45 BSA, 2023 Scope: Broadened by including digital, cyber, DNA experts	Expanded and acknowledged technological advancement in forensic science
2.	Mandatory visit of forensic expert to crime scene	No compulsion, purely optional to the investigator to collect forensic evidence	Section 176(3) BNSS, 2023 mandates compulsory visit of forensic expert to the scene of heinous crimes	Ensures objectivity, minimizes bias, strengthen quality of evidence
3.	Forensic Laboratory	No specific reference in CrPC	Section 176(4) BNSS provides statutory status to forensic report similar to medico-legal	Improves credibility and reliability of forensic opinions
4.	Admissibility of electronic or digital evidence	Section 65A & 65B of IEA, 1872 provide admissibility with technical requirement of certificate	Sections 61 to 63 of BSA expanded definition of document including electronic records, simplified certificate requirements and recognize electronic/digital evidence as primary evidence	Enable modern evidence collection procedures for digital footprints, CDRs, location tracking etc.
5.	Technology in Investigation	Limited provision for videography, electronic records in CrPC.	BNSS enabled for electronic communication, audio-visual recording of evidence, search and seizure using technology	Strengthens procedural probity by ensuring chain of custody, packaging, transport, storage of samples

Forensic and electronic evidence in the new criminal laws

Forensic and digital evidence play a vital role in linking crimes to criminals. Earlier, in the old laws, forensic evidence collection was optional for the investigating agencies. Under the new rules, introduction of Section 176(3) BNSS is perhaps the most ground breaking provision in Indian forensic jurisprudence, which mandates mandatory visit of forensic expert to the crime scene for collection of forensic and scientific evidence immediately after an information of commission of crime is received at police station, especially in those offences where punishment is either seven years or more. It is pertinent to note that the seven year embargo does not prevent investigating agencies from investigating offences carrying a punishment of less than seven years. Legislative intent provides phased

compulsion for the collection of forensic evidence, given the limited resources in India.

The provisions under section 176(3) must be implemented within five years of the execution of the new laws. The state governments across India have to ensure capacity building in forensic laboratories and a suitably trained workforce, including experts and support staff, within five years from the date of implementation, as envisaged in the law. The Indian Government has implemented new laws from July 1, 2024 across India, and the Government of India has allocated a significant budget, especially for building forensic capability.¹⁵¹ There is a need for a monitoring mechanism to facilitate periodic review of the implementation of the mandatory provisions under section 176(3), particularly the capacity-building in each State. It is heartening to note that the courts are monitoring the progress of forensic facilities in implementing the provisions of section 176(3) of the BNSS, 2023.¹⁵²

Electronic evidence-related procedures are complex and are governed by the Information Technology Act, 2000, BSA, and BNSS. These laws align Indian criminal jurisprudence with global best practices. They are likely to foster a culture of scientific investigation and evidence-based justice rather than a confession-based conviction culture, which may lead to wrongful convictions. Digital data provides enormous information on location, chat, ownership of digital devices, possession, financial transactions, and so on. In a kidnapping case, in addition to incriminating DNA evidence, one of the mobile SIMs, by which the kidnappers contacted the informant, was found to be issued in the name of the accused.¹⁵³

Challenges in new procedural laws

There are several challenges in the new laws related to expert opinion that require immediate attention from lawmakers and the judiciary. The term ‘Expert’ has not been defined under section 39 of BSA, 2023.¹⁵⁴ This ambiguity creates space for undeserving claims of a person as a forensic expert. Various jurisdictions have defined the term ‘expert’ categorically.¹⁵⁵ To annul ambiguity, the author has proposed to define an expert as “a specially skilled person having essential education, knowledge, experience, skill, and training of the subject who provides

151 Expenditure Profile 2025-2026, Feb. 2025, Ministry of Finance, Budget Division, Government of India, New Delhi, available at: <https://www.indiabudget.gov.in/doc/eb/vol1.pdf> (last visited on April 27, 2025).

152 *In Re: The Court in its own motion* 2024 SCC OnLine Cal 6610; *In Re: The Court in its own motion* 2024 SCC OnLine Cal 2864.

153 *State of Jharkhand v. Vivek Kumar* 2024 SCC OnLine Jhar 2788 at para 48.

154 GK Goswami, “A Need To Define Forensic Expertise” *The New Indian Express*, January 03, 2024, available at: <https://www.newindianexpress.com/opinions/2024/Jan/02/a-need-to-define-forensic-expertise-2647232.html#:~:text=It%20says%20that%20when%20the,in%20the%20entire%20Evidence%20Act> (last visited on April 27, 2025).

155 Rule 702 of the U.S. Federal Rule of Evidence, and Part 19 of the UK Criminal Procedure Rules, and Section 79 of the Evidence Act, 1995 of Australia.

an expert opinion based on reproducible, sufficient facts or data derived from reliable and accredited principles and methods”.¹⁵⁶ Further, India may introduce an autonomous ombudsperson, such as the Texas Forensic Science Commission or the Forensic Science Regulator of the United Kingdom, to regulate, facilitate, and advance the credibility and probity of expert opinion. The author has extensively deliberated on various issues and challenges, as well as on viable legal remedies related to forensic evidence under the new criminal laws.¹⁵⁷ Hence, having brevity in consideration, further discussion on this subject may not be within the scope of this annual review.

VI CONCLUDING REMARKS

The Indian Parliament has taken a landmark step by formally recognising the evidentiary value of expert opinion and mandating the use of forensic science in the investigation of heinous crimes. Equally transformative is the elevation of digital evidence to the status of primary evidence, marking a progressive shift aligned with technological advancements. Despite these legislative strides, critical systemic challenges do persist. The term ‘expert’ has no statutory definition, causing ambiguity regarding the admissibility and evidentiary inviolability of forensic testimony. This legal vacuum can compromise the integrity of trials. Another pressing concern is the uneven capacity of forensic infrastructure across states. Building robust forensic capabilities, both in terms of a skilled workforce and modern equipments, not require sustained investment but also strong political commitment and administrative resolve. The right of the accused to cross-examine forensic experts must be unequivocally upheld to ensure fair trial standards. Furthermore, the prosecution must be obligated to disclose all inculpatory evidence to the defence, reinforcing the principles of a just, equitable and due process. It is noted that the Supreme Court has disapproved the quashing of the POCSO Act case on the basis of a settlement between the parties, invoking its powers under section 482 of the CrPC.¹⁵⁸

Accreditation of forensic laboratories is imperative to maintain quality and consistency in forensic practices. Establishing a forensic ombudsman would provide an independent statutory mechanism to address grievances and enhance public trust in forensic services. It is also essential to equip all stakeholders in the criminal justice system, including police, prosecutors, and members of the judiciary, with foundational and ongoing training periodically. India stands on the threshold of a forensic revolution, but the promise can only be fulfilled through continuous investment in infrastructure, skilled workforce, and modern equipments and technologies. With the apt structural reforms, the future of forensic science in India is not only bright but indispensable to the pursuit of justice under the rule of law.

¹⁵⁶ *Supra* note 154.

¹⁵⁷ GK Goswami and Aditi Goswami, “Navigating Forensic Evidence Under Indian Legal Landscape” (2024) 7 SCC J-1.

¹⁵⁸ *Ramji Lal Bairwa v. State of Rajasthan* 2024 SCC OnLine SC 3193.