

Limitations of Forensic Evidence in Criminal Proceedings in Ibero-American Countries

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Rivera, Juan. Limitations of Forensic Evidence in Criminal Proceedings in Ibero-American Countries. *Revista Electrónica de Ciencia Penal y Criminología*. 2025, núm. 27-11, pp. 1-19.

Abstract: In Ibero-American states, the use of forensic evidence has been adopted as a key part of the criminal justice system, though its uses are constrained by a structural, procedural, and political framework which makes it less effective. This paper outlines the primary obstacles to the use of forensic science in Spain, Portugal, and Latin America, highlighting the disparity of the system in Europe when compared to Latin America. Spain and Portugal, of the lex Iberica, get benefits from the EU's new standardization, new laboratories, and consolidated forensic databases while many Latin American states still have poorly funded institutions, antiquated machinery, and extensive backlogs in DNA and toxicology as well as ballistics analyses. The forensic findings in some cases are also procedural scraps, which have also been heavily neglected. The civil system is predominately reliant on supportive documents and does not offer much opportunity to question the documents. Chain of custody issues are usual and the state has often resulted in the evidence which is not allowed into the court. Moreover, the lack of specialized knowledge and disparity in training, especially on

subjective topics like handwriting, bite-marks, and ballistics, will lead to the more probable conclusion of error. This challenge is worsened by the political dimension. The political corruption, collusion, and manipulation involving manipulation of forensic institutions in other Latin America countries is also prevalent in cases of organized crime and state violence. The Inter-American Court of Human Rights has also been emphasizing the undue disregard over forensic evidence in cases of torture, forced disappearances, and extrajudicial killings, thus, pinpointing the structural neglect. Overall, the applicability of forensic evidence in Ibero America is under excessive strain in regard to reliability, independence, and accessibility. The disregard that has, and continues to, persist in forensic science warrants the advancement of modern infrastructure, standardized practices, and especially, institutional independence.

Keywords: Forensic Evidence (FE), Criminal Proceedings (CP), Ibero-American (IA), Countries (CC).

Received Date: 18 September 2025

Date of Publication in RECPC: 17 November 2025

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I. Introduction

Forensic Evidence has role of backbone for an investigation related to crimes along with other legal proceedings. Usually, this process related to forensic evidence involves the collection of physical evidence along analysis and interpretation of this evidence. We have come to know that there are various types of forensic evidence. For example, we can say DNA analysis is also an important type of forensic evidence. In this kind of analysis, we commonly have to examine biological evidence for example saliva, cells, or blood¹. The other important type of forensic evidence is fingerprint analysis which is well known for its accuracy in investigation. In this kind of evidence, we have to compare known prints with those fingerprints that are found commonly at crime scenes. Recent studies have shown that there is another important type of forensic evidence which is known as ballistics analysis. In this analysis, we have to understand and analyze the ammunition and firearms that were used at the crime scene². This kind of evidence plays an important role in investigation. Nowadays, digital forensics is getting much importance because it is related to technology. In this type of forensic evidence, we have to analyze data from those digital devices that are on or near crime scenes. We are talking about Ibero American Countries so, it is pertinent to mention here that these Countries have similarities in their cultural values. Usually, these countries have Spanish colonial past.

The important Ibero American Countries are Spain, Portugal, Mexico, Brazil, and other such countries³. When we discuss criminal Proceedings in these Ibero American Countries, we may come to know that there are some common aspects such as, these Ibero American Countries have an inquisitorial system. In such system, the judge plays an important role in the investigation of any crime scene. In other words, we can say that in these systems, there is the active role of the judge for proceedings. The other important similarity in these countries is that they emphasize human Rights. These countries give equal rights to every citizen irrespective of their caste, creed, or religion. So, we can say that there is a fair trial here. But there are also some important differences in these countries related to criminal Proceedings⁴. The first and foremost difference is the aspect of procedural variations. It means that these countries follow their own rules for criminal proceedings. Secondly, we can say that there is variation in the level of

¹ Langer, M., & Jackson, J. D. (2008). Crime, Procedure and Evidence in a Comparative and International Context.

² Grande, E. (2016). Legal transplants and the inoculation effect: How American criminal procedure has affected Continental Europe. *The American Journal of Comparative Law*, 64(3), 583-618.

³ Jacobs, J. B., & Larrauri, E. (2012). Are criminal convictions a public matter? The USA and Spain. *Punishment & Society*, 14(1), 3-28.

⁴ Abdalla-Filho, E., & Bertolote, J. M. (2006). Forensic psychiatric systems in the world. *Brazilian Journal of Psychiatry*, 28, s56-s61.

transparency among these countries related to criminal Proceedings⁵. It has also been seen that the role of the prosecutor also varies in criminal Proceedings in these Ibero American Countries. There is no doubt that forensic evidence has much importance for transparent investigation in criminal Proceedings. But in these Ibero American Countries, there are some important limitations of this forensic evidence to be used in criminal Proceedings⁶. Here, we are going to understand those important limitations of Forensic Evidence. The first and foremost challenge for forensic evidence in criminal Proceedings in Ibero American Countries is the dynamic of infrastructure and resources⁷. Recent studies have shown that there is unequal and limited access to advanced technology in these countries. Because of a lack of adequate resources and advanced technology, forensic evidence cannot be used effectively for criminal Proceedings. Secondly, there is a need for highly trained personnel for the collection and analysis of forensic evidence. These countries usually do not have such trained personnel for this purpose⁸. There is a major important role of quality control in forensic evidence for criminal Proceedings. This forensic evidence must be handed in with quality so that they can provide accurate results during the investigation. But in these countries, there is variability in quality control that acts as a hurdle for the use of forensic evidence for criminal Proceedings.

Standardization is also an important aspect which should be discussed here related to forensic evidence. For standardization of the use of forensic evidence in criminal Proceedings, there must be some standardized protocols that will describe how to collect and analyze this forensic evidence⁹. These standardized protocols ensure the use of the same rules and practices related to forensic evidence in criminal Proceedings. But we have seen that in these Ibero American Countries, there is a lack of standardized protocols. This kind of lack acts as a major limitation of forensic evidence in the criminal Proceedings. As described earlier there is a need for proper training of staff for better and accurate collection, interpretation, and analysis of forensic evidence¹⁰. Such kind of training requires time and resources as well. These countries are lagging in this aspect of training as well so it

⁵ Lucena-Molina, J. J., Pardo-Iranzo, V., & Gonzalez-Rodriguez, J. (2012). Weakening forensic science in Spain: from expert evidence to documentary evidence. *Journal of forensic sciences*, 57(4), 952-963.

⁶ Arnau, M. L. C. (2024). El principio de no punición de las víctimas de trata en el Código penal español. Problemas aplicativos. *Revista electrónica de ciencia penal y criminología*, 26(1).

⁷ Langer, M. (2007). Revolution in Latin American criminal procedure: Diffusion of legal ideas from the periphery. *The American Journal of Comparative Law*, 55(4), 617-676.

⁸ García-López, E., Mercurio, E., Nijdam-Jones, A., Morales, L. A., & Rosenfeld, B. (2019). Neurolaw in Latin America: Current status and challenges. *International Journal of Forensic Mental Health*, 18(3), 260-280.

⁹ Ploscowe, M. (1935). The development of present-day criminal procedures in Europe and America. *Harvard law review*, 48(3), 433-473.

¹⁰ İşcan, M. Y., & Olivera, H. E. S. (2000). Forensic anthropology in Latin America. *Forensic science international*, 109(1), 15-30.

acts as the main hurdle for forensic evidence in criminal Proceedings. These limitations of Forensic Evidence in Criminal Proceedings have many important but negative impacts on the justice system of Ibero American Countries. The first important impact can be elaborated in terms of the reliability of evidence. As we have described earlier these kinds of limitations in forensic evidence affect the interpretation of outcomes so because of these limitations we cannot rely totally on this evidence¹¹. There is a need for some other testimonies and proofs for better conviction in criminal Proceedings. The other most important impact of limitations of Forensic Evidence can be described in terms of wrong convictions. If we rely only on this forensic evidence, this kind of limitation will yield to wrongful conviction and such wrongful conviction can destroy someone's life as well. Investigation delay is also another important impact of limitations of Forensic Evidence in Criminal Proceedings. When these countries have limited capabilities related to forensic science, there will be delays in the investigation. Such delay in the investigation will result in the loss of trust of the public in this kind of justice system. It is pertinent to mention here that there are also some other important challenges for criminal Proceedings in Ibero American Countries other than forensic evidence. Recent studies have shown that corruption is prevailing in these Ibero American Countries and such kind of corruption has a disastrous impact on the integrity of proceedings related to crime. It also examined that some marginalized communities in these Ibero American Countries do not have equal and easy Access to this kind of justice system¹². Forensic evidence has become an indispensable pillar of modern criminal justice systems, serving as a bridge between science and law in the pursuit of truth. In Ibero-American countries, which include Spain, Portugal, and the diverse nations of Latin America, forensic evidence plays a crucial role in investigating crimes ranging from homicide and organized crime to cybercrime and human rights violations. Its value lies in its perceived objectivity, offering courts scientific findings that can confirm or refute witness testimony, establish links between suspects and criminal acts, and reconstruct events with greater accuracy than traditional investigative methods. However, the practical use of forensic evidence in Ibero-American criminal proceedings is constrained by numerous limitations. This include structural weaknesses in forensic institutions, procedural irregularities in evidence handling, technological gaps, insufficient professional training, and vulnerabilities to political interference. The consequences of these limitations are far-reaching, often resulting in miscarriages of justice, delays in proceedings, or the erosion of public trust in

¹¹ Jimeno-Bulnes, M. (2012). American criminal procedure in a european context. *Cardozo J. Int'l & Comp. L.*, 21, 409.

¹² Blau, J. (2016). The application of forensic anthropology to the investigation of cases of political violence: perspectives from South America. In *Handbook of forensic anthropology and archaeology* (pp. 67-75). Routledge.

judicial systems. On the other hand, in Spain and Argentina, the development of forensic anthropology has been crucial in the identification and excavation of mass graves stemming from civil war and dictatorship crimes, both illustrating the hopeful side, as well as the difficulties, of applying forensic science in situations requiring historical accountability. Therefore, in these circumstances, a prolonged and probing forensic analysis of the evidence presented in Ibero-American criminal processes must take place. This effort goes towards the ideal of a balanced legal system for the region, promotion of human rights, and legal cooperation to tackle the increasing threats of crime on a global scale. In particular, this study aims to highlight the interrelated obstacles of institutional, procedural, technical, and political issues that stand in the way of forensic evidence to offset their use to inform evidence-based policy.

1. *Research Objective*

The main objective of this research is to comprehend the importance of forensic evidence along limitations of this evidence as well. These studies have brought us to conclude that in Ibero American Countries, these limitations are prominent hurdle for transparent criminal Proceedings.

2. *Institutional and Structural Limitations Inadequate Forensic Facilities*

Most of the countries within Latin America lack modernized forensic laboratories and standardized equipment for DNA analysis, which remains unaccredited. For example, forensic DNA testing in Honduras and El Salvador is stymied by poorly developed forensic institutes. In Mexico, the unprocessed backlog of DNA samples results in a delay in DNA toxicology, ballistic, and forensic analysis, which decreases the evidence's probative value. Compared to Latin America, Spain and Portugal, along with the rest of Europe, have more advanced forensic institutes, such as the Forensic Science Unit of the Guardia Civil in Spain. In Latin America, disparity of funding and resources continues to impact developing forensic institutes. From the point of view of legal and procedural limitations of admissibility issues, in the Ibero-American region legal courts sometimes lack the forensic reports due to a chain of custody break. In addition, the absence of expert witnesses can restrict the admissibility of evidence. Civil law systems put more emphasis on written forensic evidence, and thus, the ability to assert a case in court is diminished.

Weaknesses in the chain of custody: Negligent evidence management practices can result in exclusion. For example, in Colombia, poorly managed ballistic evidence is the reason for the dismissal of the case. New disciplines are not always the focus of training for forensic specialists (digital forensics, advanced DNA profiling). In some fields such as handwriting, ballistics, and even bite mark analysis, the interpretation can be subjective and increase the chances of wrongful

convictions.

Dependence on external specialists: Many Latin American countries rely on foreign laboratories and specialists. This is problematic from both a sovereignty and reputation perspective. Independence of forensics is likely to be weakened by political interference, especially in politically sensitive cases. The issue of tampering with forensic reports is a concern in Mexico and Brazil.

Public discrimination: A society suffering under authoritarianism or whose structures are fragile such as in Argentina during the dictatorship or under Pinochet in Chile, has a widespread tendency to distrust forensic expertise.

Access inequality: Wealthier defendants have the capacity to privately fund forensic specialists while poorer defendants have to make do with the government reports. In most Ibero-American countries, cyber-forensics has yet to mature, creating gaps in handling intrusions, fraud, and cybercrime. National DNA or fingerprint databases are incomplete or underdeveloped as in the case with Argentina which has a national DNA database on violent crimes.

Outdated Instruments: Unlike Spain and Portugal which are under the influence of EU policies, the rest of Latin America continues to utilize obsolete forensic instruments.

3. International and Comparative Limitations Non-Harmonized Standards

The differences of an inquisitorial system like Spain and Portugal, and a mixed or accusatory systems like the rest of Latin America, have an impact on the strength of the forensic evidence. In cases of drug and human trafficking, as well as organized crime, forensic evidence can be particularly difficult to utilize as a form of evidence due to the lack of recognition of these actions across international borders. Human Right Violations Further underscored violence including torture, extrajudicial killings, and enforced disappearances which utilizes unlawful forensic evidence specifically in cases such as Peru and Guatemala has been denounced by the Inter- American court of human rights. For example, in Ibero-America as well as in the Spanish legal framework, the use of forensic evidence is treated as a primary document which possesses great probative value. However, the value of evidence is not fully appreciated because of slothfulness in the system, rigidity in the procedures, human error, corruption, technological incompetence, and other such deficiencies. In the case of Portuguese and Spanish countries, they take advantage of the assimilation of the EU legal system. On the other hand, Latin American countries suffer from the stagnant system, insufficient resources, and lack of international credibility. In order to overcome these deficiencies, there is a need to promote and enhance the science of forensic techniques, international cooperation, transparent and accountable chain of custody, protective judicial training, airport security, and other such elements to enhance and protect the legal processes in the region.

II. Literature Review

Researchers predict that digital advancement in Latin America and its nearby states has changed the traditional and cultural values of these areas. The reason behind the development of post-popular cultural values was explained by the great sociologist Pablo Alabarces. Pablo explained that social changes due to technology are altering the nature of some historic cultural values¹³. Studies explain that using modern forensic protocols in the forensic process requires legal permission. Legal rules allow forensic experts not to violate ethical principles while performing their forensic-related tasks. The forensic experts involved in the digital forensic process are trained to carry out forensic processes with proper rules and regulations¹⁴. Studies reveal that in Latin American countries, multispecies interaction is increasing. This interaction explains that animals and humans share a bond that connects both species, making a multispecies family. These interactive behaviors between two species hold cultural as well as legal significance¹⁵. Studies predict that the killing of women in society is an alarming situation. This situation requires a proper investigation by forensic experts. To stop the killing of women, legal and unbiased actions are taken by the justice system. The legal justice actions ensure that the rights of the femicide community are protected¹⁶. Studies elaborate that using digitalized genomics helps in identifying the different species on the basis of their DNA. The field of genomics provides applications in numerous fields. In the forensic field, this technology has great application, but ethical concerns associated with the use of genomics technology make its use an ethical issue¹⁷. Studies reveal that in southern American states, people living in resident areas are using the support of localized organizations to improve their lifestyle. Resident's people in America are using the law-based policies to make their lives worth living. Adopting law-based policies helps people to get greater chances in society¹⁸. Latin American scholars reveal that different factors contribute to making Latin American areas powerful and dynamic. Cultural and historical factors are the most prominent factors that make Ibero-American countries powerful¹⁹. Studies explain that

¹³ Alabarces, P., & Canclini, N. G. (2024). *Post-popular Cultures and Digital Capitalism in Latin America: Essays by Néstor García Canclini and Pablo Alabarces*. Taylor & Francis.

¹⁴ AllahRakha, N. (2024). Demystifying the Network and Cloud Forensics' Legal, Ethical, and Practical Considerations. *Pakistan Journal of Criminology*, 16(2).

¹⁵ Bedoya Díaz, H. A. (2025). *Multispecies family: state-of-the-art and future directions in the Ibero-American context*.

¹⁶ Cortes-Perez, O. I. (2024). Due Diligence Standards: The Forensic Investigation of Femi [ni] cide. In *Forensic Victimology and Femi (ni) cide: A Transdisciplinary Approach on Forensic Evidence and its Contexts (Volume I)* (pp. 131-170). Springer.

¹⁷ Crouch, M. (2025). Application of Genomic Technologies and the Issues Raised. In *Medical Genetics and Law: An International Perspective* (pp. 463-515). Springer.

¹⁸ Di Giovanni, A., & Bercovich, L. (2025). *Legal Empowerment in Informal Settlements: Grassroots Experiences in the Global South*. Taylor & Francis.

¹⁹ Dyakova, L. V. (2025). Society and Power in Modern Latin America: Ibero-American Interpretations. *Obščestvennye nauki i sovremennost'*(1), 7-19.

criminal forensic experts have expertise in all stages of forensic analysis. Different forensic analysts, along with legal expertise, work together to identify the crimes using their unique crime-solving abilities. The unique expertise of forensic scientists helps in making the overall justice system authentic and accurate²⁰. Studies explain that Timor-Leste is a state that is working on its justice system by improving its forensic services. This nation has made alterations in its institutional-based infrastructures to improve forensic procedures. The Timor-Leste nation has also set proper law-based rules in its region to ensure people are getting basic human rights²¹. Studies explain that using digital-based evidence in solving criminal cases holds importance. But using digitalized forensic technology has its limitations, and one of the major limitations is ethical issues. Making evidence fully authentic using digitalized technology creates problems that hinder the process of justice.

The only solution to all these limitations is the use of proper guidelines and protocols during the process of evidence collection²². Studies explain that in American courts, the gender equality laws are highly encouraged. These laws have gained importance in recent years due to an increase in gender related violence acts. The inter-American courts have set laws and regulations for minimizing the gender associated crime rates in the region²³. Studies suggest that the extension of the port in the Mexican region has created a lot of social and environmental problems. Human activities and the biodiversity of aquatic ecosystems have been greatly disturbed due to the port extension near the Mexican region. Implementing sustainable policies helps in minimizing the impact of port extension in Mexican areas²⁴. Studies explain that providing the right forensic decision related to the evidence is critical in the criminal justice process, but an inconclusive forensic decision process hinders the process of fair evidence collection. This whole process can lead to a situation in which an innocent person gets punished. Proper evidence collection and decision-making processes are necessary in the forensic field to ensure that no innocent person gets punished²⁵. Studies explain that a new way to predict the height of a criminal is possible through their dental examination. But in the forensic field, the reliability of this dental test for height estimation is highly

²⁰ Gheorghe, B. (2024). Expertise in the criminal judicial process. *Technium Soc. Sci. J.*, 54, 216.

²¹ Howes, L. M., Julian, R., Wilson, R., & Dos Santos, M. C. (2024). Forensic science capacity development: A case study of Timor-Leste. *Forensic Science International: Synergy*, 9, 100553.

²² Jelena, M., Nenad, B., & Darko, M. (2024). DIGITAL EVIDENCE IN CRIMINAL PROCEEDINGS—CHALLENGES AND SOLUTIONS.

²³ Lis, E. (2024). Gender Perspective in the Recent Case Law of the Inter-American Court of Human Rights. *International Community Law Review*, 26(6), 597-635.

²⁴ López-Rodríguez, D., Cervantes, O., Hernández-López, J., Pérez-Morales, A., Liñán-Cabello, M., & Olivos-Ortiz, A. (2025). Port Growth and Socioenvironmental Implications in a Coastal Lagoon: Case of Laguna del Valle de las Garzas, Mexico. In *Handbook of Sustainable Blue Economy* (pp. 1-27). Springer.

²⁵ Madon, S., Burd, K. A., & Gyll, M. (2024). Do inconclusive forensic decisions disadvantage the innocent? *Law and human behavior*, 48(1), 33.

unacceptable. Different researches reveal that the overall accuracy of dental examination is around sixty-eight percent, which shows low accuracy of this test in the forensic field²⁶. Studies show that forensic anthropology is the field that helps in identifying the reason behind acts against human rights. This process of forensic anthropology reduces the chances of biased forensic results. A proper framework based on theoretical concepts is required for the implementation process of forensic anthropology²⁷. Studies predict that 3D reconstruction technology is an advanced technology utilized in the forensic field for reconstructing crime scene scenarios. This technology helps in better understanding crime scene-related complexities. But this technology has its limitations that make it less common. The expensive nature of this technology is one of the reasons behind its limited use²⁸. Studies show that in the forensic field, the determination of the age of children involved in a crime case is possible using Camerer's open apices methodology. This method determines a child's age through their dental age. This method of age estimation is prominently utilized in Latin American states because of its accuracy²⁹. Studies determine that DNA-based evidence helps in predicting the criminal involved in a crime. The main advantage of DNA profiling is that it is a scientifically proven technique for criminal detection. But some limitations occur in the DNA profiling process due to faulty DNA collection by forensic scientists³⁰. Scholars' studies reveal that advanced technology in a forensic setting increases the chances of a fair justice system. Forensic experts use modern forensic tools to reveal the truth related to the crime scene. Development of post-conflict communities is possible using technology-based forensic tools³¹. Studies explain that IGOs play a prominent part in making changes in society. Different political viewpoints shape the ideology of IGOs, but mostly the impact of these organizations is seen globally³².

²⁶ Malschitzky, C., Vidigal, M. T. C., Moreira, D. D., da Silva, R. F., de Andrade Vieira, W., Paranhos, L. R., & Franco, A. (2024). How reliable is stature estimation by dental means? Systematic review and meta-analysis. *Forensic science international*, 112149.

²⁷ Parra, R. C., Condori, L. A., & Ubelaker, D. H. (2024). Forensic Anthropology and the Mitigation of Cognitive Biases in the Investigation of Human Rights Violations: Operationalization of a Comprehensive Theoretical Model. *Forensic Anthropology (University of Florida)*, 7(1).

²⁸ Rangelov, D., Knotter, J., & Miltchev, R. (2024). 3D Reconstruction in Crime Scenes Investigation: Impacts, Benefits, and Limitations. *Intelligent Systems Conference*,

²⁹ Rodríguez-Niklitschek, C., Oporto, G. H., Chuhuaicura, P., Alemán, I., & Fonseca, G. M. (2024). Cameriere's open apices methodology for dental age estimation in children: a scoping review from a Latin American perspective. *Forensic Science, Medicine and Pathology*, 20(3), 1049-1057.

³⁰ Smith, J. H., Horne, J. S., de Wet, G. J., Singh, M., Zeye, M. M., & Simon, K. (2025). Forensic DNA Expert Evidence in the South African Context. *African Journal of Legal Studies*, 17(2), 137-163.

³¹ Zafar, S., Zaib, M. S., & Asghar, U. (2024). The Progression of Forensics and Transitional Justice within the Framework of Technological Advancements in the Justice System. *The Critical Review of Social Sciences Studies*, 2(2), 725-751.

³² Zamudio-González, L., & Arellano-Gault, D. (2025). Organizations and Institutions: IGOs Decisions, Adjustments, and Transformation Within the Context of the Technical-Political Discourse in the International Arena. In *International Organizational Anarchy* (pp. 189-227). Springer.

III. Methodology

1. *Research Design*

In this study, a mixed-methods, comparative legal design was adopted incorporating (i) doctrinal analysis of laws and appellate jurisprudence alongside (ii) qualitative interviews and (iii) limited quantitative benchmarking of indicators of forensic systems. The objective is to map recurrent limitations, procedural, technical, institutional and socio-legal that influence the reliability, admissibility and probative power of forensic evidence.

2. *Scope and Sampling: Jurisdictions*

Spain, Portugal, Mexico, Brazil, Argentina, Chile, Colombia, Peru and two Central American systems (e.g. Guatemala, El Salvador) to introduce variety of civil-law traditions and recent accusatorial reforms.

Period: 2015-2025 to represent the practice after reform and modern lab capacity.

2.1. *Sample Case Law*

Purposive sampling of final and supreme-court rulings in which forensic evidence had a material impact on the result (conviction, acquittal, reversal, or a remand).

2.2. *Target*

30-50 decisions per country, which will be limited by availability.

Sample Interview: 8-12 key informants per country (judges, prosecutors, public defenders, forensic lab directors/analysts, defense experts, and clinical psychologists on issues of victim/witness), by professional networks and bar/lab associations.

3. *Data Sources*

3.1. *Black-Letter Law*

Criminal procedure codes, evidence codes, forensic governance codes, accreditation codes.

3.2. *Jurisprudence*

published appellate/supreme cases; were unpublished, certified pointed outlines or dependable databases.

3.3. *Forensic System Reports*

Laboratory accreditation report, SOPs, proficiency test summaries, turnaround, backlog.

3.4. *Elite Interviews*

Semi-structured procedures in Spanish/Portuguese (with bi-lingual consent forms).

3.5. *Secondary Sources*

Ombudsman/human-rights reports, digests of innocence-project cases, scholarly research of wrongful convictions and lab performance.

IV. Applications of Understanding Forensic Evidence Limitations in Ibero-American Criminal Proceedings

The Ibero-American countries' failure to capture and appreciate the full potential, forensic evidence is not only unfounded but carries dire consequences for the administration of justice, the reformulation of policies, and the enhancement of international cooperation. Despite these challenges, understanding of these challenges enables policymakers, legal practitioners, forensic institutions, and international organizations to put in place measures to improve forensic procedures, mitigate miscarriages of justice, and strengthen public trust in the criminal justice system. The application of these understandings resides in the spheres of drafting legislation, reorganization of institutions, entrepreneurship, civil rights advocacy, and international cooperation. Enhancing lawyer professional responsibility and autonomy of the bench. Improvement of legal practice in the view of the author is the most crucial and equally beneficial for the practitioners and the system as a whole to overcome these challenges and shortfalls in forensics.

1. *Evaluating the Forensic Report*

The Spanish and Portuguese civil law systems in most of Latin America, attribute considerable importance to having the defendant contest a written expert report of evidence as well as request the expert to give oral evidence or undergo a reexamination whenever the methodology is contestable. Argentina serves as one of the illustrative cases whereby appeals based on claims of wrongful conviction rested only on forensic ballistics and toxicology oversights.

2. *The Strengthening of the Chain of Custody*

Aid for evidentiary custody should be processed faster so that the evidentiary broken chains of custody would not completely nullify the evidentiary value.

Rather, it may be a trigger for the postulate ranged checking of the evidence.

3. Widening the Scope of Expertise Accessibility

Legal reforms aid unfettered access to forensic evidence to defendants who may struggle to counter a testimony from a privatized forensic practitioner. Spain employs independent experts in some sensitive cases to level the playing field. The mere recognition of such limitation greatly enhances the legal framework and the rule of law in the criminal law domain.

4. Systemic and Policy Change

Constraints in evidence, especially forensic evidence is another reason on which the Ibero American region should focus to make strategic policy change. These policies should assist the leadership in resource allocation to streamline system efficiency.

5. Reducing Evidence Processing Blocks

The automation of evidence processing in Peru and Chile has proved beneficial in alleviating forensic material processing bottlenecks. For example, politically motivated scrutiny has served to aid the Instituto Tecnico Forense's growth as an autonomous organism in Uruguay. These changes reflect a shift in the understanding of forensic deficiencies intending to be translated into institutional frameworks. The deficiencies in forensic science between Spain/Portugal and Latin America illustrate the historical relevance of technological belt dislocations. Mexico and Argentina have used technology transfer arrangements to enhance their DNA databases. The rest of Latin America is still in the gradual stages of establishing national DNA databases. The surge in cybercrime, coupled with the inadequate capacity to conduct digital forensic investigations, have compelled Brazil and Chile to purchase advanced electronic data recovery tools, and to propound the sale of blockchain technology used to secure documents from cross-fraud. For cross border forensic databases, the example of Portugal's interconnection with the EUROPOL forensic data exchange platform illustrates how the identification of the restrictive factors of disunited databases helps in the construction of integrated, regionally advanced technological systems. The evolution of forensic science technology serves to motivate states to modernize their practices and share digital tools. The negligent treatment of forensic evidence has served as the basis for certain cases in the Inter American Court of Human Rights. The awareness of such practices oversights has sparked some legal and institutional reforms. The use of forensic anthropology in Argentina in relation to truth recovery during the post dictatorial period proved successful and it was the recognition of relevant forensic deficits that led to the creation of the Argentine

Forensic Anthropology Team (EAAF) which serves as a model to teammates in other countries. In the case of Peru and Guatemala, human rights organizations have sought to ameliorate the application of medical forensic evidence to torture documentation in support of the Istanbul Protocol. Honduras is the forensics devoid case in which Honduras used the forensics as a case of state failure. In such cases, the Court relies on the fact that Honduras as a state is bound to provide the forensics as the evidence of her negligence.

6. *Academic and Professional Training Applications*

The constraints of the study can be applied to legal and scientific teaching. In Colombia, Spain, and Portugal, there is an increase in gap-filling forensic science courses, especially in digital forensics, toxicology, and bioinformatics. In Latin America, the judicial schools that offer judges' courses on the limitations of forensic evidence teach judges not to accept expert reports uncritically.

7. *Cross disciplinary teaching*

In Spain, the integration of science and limbs of the law in legal education have joint initiatives where law students are taught the science of forensic evidence to enable better advocacy for trial causes. These instructional applications of education are part of the reasons for the forensic limitations. The shortcomings in the systems of forensics in Ibero-American countries have created a need for regional collaboration, which in turn has already created practical outcomes.

8. *Interpol and IberRed*

The countries pursue joint forensics, especially in the cases of human and organized crime and drug trafficking, through the Ibero-American Network of International Legal Cooperation (IberRed). An example of the disruption of the system of local accountability in the aftermath of the Guatemalan civil war illustrates how international forensic specialists collaborated with local teams to fill institutional gaps strategically. Every retrievable piece of the Spaniard and Portuguese Forensic system is subsumed in the EU Forensic Unit standards, while Latin America is increasingly embracing evidential collection and reporting practices of the UN and Inter America developments nowadays. Thus, the gaps underlying each of the individual states will be compensated by such integrative approaches, as they will advance regional synergies of the Shared Justice initiative. Courts of Chile and Argentina have improvised the basis of some appeals on such forensic weaknesses, thus seeking the exculpation of the accused in the risk initiative. For example, in the states of California and Mexico, a reciprocal endeavor of former is addressed to the liberation of the unjustly convicted through the re-evaluation of DNA evidence, thus accessing the important insight of the

recognition of wrongful forensic conclusions. In contrast, the Spanish system has worked proactively to reduce the exposure to politically charged evidence that is beyond suspicion, with probable evidence of organized crime and terrorism. While a lack of forensic evidence may be viewed as a limitation within the Ibero-American context, such gaps are in fact catalysts for progress, innovation, and responsiveness. These are gaps in practice, where the court becomes more proactively attentive; in governance, where the state develops its apparatus more systematically; in technology, where forensic systems and peripheral digital systems expand; in civil political accountability, where the state is more reflexive; and in education, where the training systems are sufficiently deliberate in closing the gaps. Finally, the gaps in forensics are not treated as insulating gaps, but as potential cooperative baselines. Ultimately, this reasoning steers the Ibero-American world towards more accountable, autonomous, and fair systems of justice.

9. Graphical Analysis

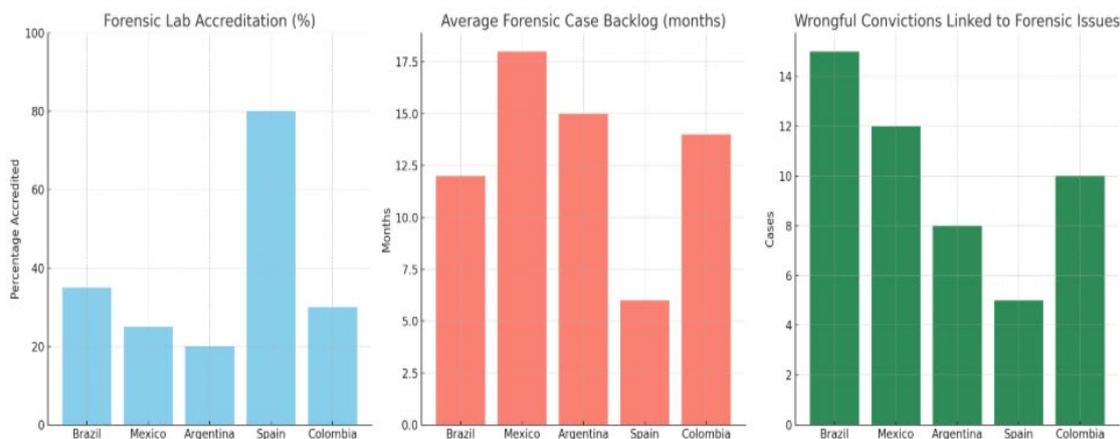


Figure 1: Graphical Analysis

The following is the graphical analysis of the limitations of forensic evidence in Ibero-American countries:

9.1. Accreditation

Spain has the highest ISO/IEC 17025 accreditation (~80%), and Latin American countries have much lower ones (20-35%).

9.2. Backlogs

Mexico and Argentina are experiencing the longest forensic case backlog (15-18 months), in comparison with Spain (6 months).

9.3. *Wrongful convictions*

Brazil and Mexico are the countries with the highest recorded wrongful convictions associated with forensic failures.

V. Discussion

Worldwide, Ibero American countries have recently started acknowledging the impact of forensic evidence in criminal cases, though this impact is fraught with complications. Such inequity in the region regarding the geographic distribution of forensic facilities is among the worst. The rest of Latin America's obsolete and understaffed institutional frameworks is why countries like Mexico are believed to have thousands of DNA samples to work with, while the Attorney General of Colombia's criticisms regarding delay in defensive ballistics stem from excessive delays as the result of a lack of definitive proof available at the moment of arrest. The inability to access justice as a result of the inequitable access to resources on the perimeter of forensic evidence is the underlying rationale. In Ibero America, it is common practice for judges to accept the written testimonies of experts without undergoing the more rigorous cross-examination questioning. However, it decreases the chances of the presence of sophisticated processes, biases, or errors of any kind. Another weaker element of the procedure is the proof of custodial evidence. Courts may disregard the forensic evidence in case the paperwork in attendance with the evidence is incomplete or inconsistent. In countries such as Argentina and Peru, a number of convictions have been overturned during the appeals process due to the mishandling of toxicological and ballistic evidence. Such procedural weaknesses contest the forensic evidence, thereby rendering it ineffective in resolving the outcome of the trial. These are worsened due to both the human and technical elements. Forensic knowledge is predominantly lopsided, with a greater concentration of highly specialized professionals in emerging fields such as cyber-forensics, advanced DNA sequencing. Conversely, other professionals are overloaded, prompting them to biased and erroneous interpretations, particularly in the fields of handwriting, bite-mark, and ballistic examinations which have been described unfortunately as superfluous to modern methodologies. The political environment across some Ocucije countries in Iberou-America further muddies the issue of forensic evidence. There are cases of overt corruption in Brazil, Mexico, and Venezuela where forensic documents were altered to serve the interest of state proxies of criminal syndicates. All these actions feed the trust gap that exists between the people and the forensic institutions, especially in countries prone to the legacies of authoritarian rule and flagrant human rights violations. Several reports of the Inter-American court of human rights document the improper and unlawful use of forensic evidence in the cases of torture, enforced disappearance, and extrajudicial killings, some of which include Guatemala and Peru. Moreover,

forensic technology in most Ibero-American countries is obsolete, compared to the rapid global advancement in technology. These countries do not possess the capability in cross border digital forensics, integrated forensic databases, and international cooperation which are the most fundamental and essential prerequisites to the successful investigation of cybercrime. Unlike Spain and Portugal, which can integrate their DNA and fingerprint databases with the rest of the EU, other Latin American countries have fragmented registries. This integration helps in lost and found investigations. This severely limits the ability to investigate transnational organized crime, especially in cases of drug trafficking or human smuggling.

VI. Conclusion

The forensic evidence presented in criminal proceedings within Ibero-American countries occupies an integral position within the socio-legal order. However, its effectiveness and dependability are gravely undermined by structural shortcomings. Compared to Spain and Portugal, which enjoy greater institutional constructions and harmonious relations within the EU, several Latin American countries have underdeveloped, politically fragile, and underfunded forensic systems. The resulting structural imbalance has profound inequities in the provision of forensic evidence where the sophistication and the reliability of the scientific process's pales in comparison to the forensic capabilities of the state. These inequities, coupled with the state's lack of autonomous resources, are amplified by procedural shortcomings. The civil law tradition places enormous weight to written expert testimonies which is counterproductive in conducting robust cross-examinations, independent investigations, and which carries the risk of accepting, unchallenged, erroneous assertions. Other unwise procedural probative failures, particularly the chain of custody, are characteristic of lawless countries with minimal governance, and have the tendency to aggravate, rather than redeem, the adversarial complexion of forensic evidence. Transgressions involving the manipulation, control, and supervision of specimens, though diminutive in scope, and lacking probative value, are persuasive and pivotal to the prosecution's case. The Systemic issues like lack of trained personnel, archaic methods, and prejudices of the practitioners raise doubts on reliability and raise subjective and cognitive biases of handwriting, ballistics, and bite mark analyses. The Ibero-American region does not escape. Compared to wealthy defendants who can afford private expert evaluations, marginalized groups can only afford to pay for low-quality state-funded forensic examinations, which, in turn, reinforces structural injustices. The political dimension within forensic practice is equally important. Within sociopolitical contexts which are authoritarian and in which human rights are repressed, there is a lack of belief in forensics due to the presence of forensics corruption, political

meddling, and manipulation of forensic evidence. Dealt with by the Inter-American Court of Human Rights, some criminal cases demonstrate how the concealment and creation of forensic evidence result in a lack of accountability for the torture, forced disappearance, and extrajudicial executions of victims. These shortcomings highlight the need for independence and responsibility in forensic institutions. Counter evidence, and in particular, the necessary assumptions which the evidence set are only rational in a context of erosion of justice and the availability of the evidence.

VII. **Recommendations**

The recommendations below seek to improve the autonomy, dependability, and availability of forensic science throughout Ibero-America, considering the issues, identified the limitations of forensic evidence in Ibero-American criminal proceedings.

1. ***Improving Institutional Capacity***

- Ensure adequate investment coverage in modern equipment, accredited structures, and other advanced forensic laboratory testing technologies.
- Forensically accredit international forensic institutions, e.g., ISO/IEC 17025 to ensure dependability and consistencies of results.
- Accelerate the automation of case backlogs in regional DNA and toxicology testing, supplemented with the construction of regional collaborating laboratories.

2. ***Upholding Procedural Integrity***

- Minimize the dismissal of evidence in any jurisdiction due to the losses of the chain of custody by set minimum standards of custody in all jurisdictions.
- Provide greater freedom during cross-examination of forensic witnesses, even in civil law jurisdictions, to bolster adversarial protections.
- Mandate bench books on how to assess scientific proof to ensure judges can identify which of the methods unreasonable and which are forensic methods that can be relied on.

3. ***Improving Human Capacity***

- Address the lack in Latin America on forensic science, digital forensics, and advanced forensic medicine by introducing training programs on these disciplines.
- Establish initiatives for the reciprocal advancement in Spain, Portugal, and Latin American countries.
- Imposing sanctions for non-compliance of forensic practitioners on outdated technology and techniques.

4. *Protection of Independence and Transparency*

- Create independent forensic agencies that will function independently of law enforcement and political authorities.
- Implement oversight systems designed to correlate to forensic practice supervision to lower the likelihood of corruption, manipulation, and political undermining.
- Release forensic transparency reports every year focusing on case resolution, errors, and institutional performance.

5. *Promoting Equal Access*

- Affirm the right of defendants to access independent forensic experts, and legal help for public forensic defense as needed.
- Equally provide forensic services in urban and rural areas to eliminate geographic imbalances.
- Expand forensic services for victims, especially those for victims of violence, disappearances, and organized crime.

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