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REVIEW

Forensic science in a process of transition[☆]

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KEYWORDS

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Scientific validity;
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Abstract In recent years, the use of forensic investigations has increased not only due to the advent of new technologies, but also an increased awareness of what forensics can offer. Forensic science has been thrown into a process of transition due to the introduction of objectivity as a concept derived from quality assurance, statistics and probabilistic reasoning. In addition to the basic requirement of a piece of evidence's scientific validity, other values have emerged aimed at improving the integration of the forensic chain from the scene of the crime to the court. For this reason, forensic science is looking towards a future where the standardisation of its disciplines will guarantee the reliability of forensic evidence, thereby facilitating a common language and shared understanding of significant findings, to support the legal process and the implementation of justice.

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PALABRAS CLAVE

Ciencia forense;
Validez científica;
Normalización

La ciencia forense en proceso de transición

Resumen En los últimos años es notable el incremento del uso de investigaciones forenses debido al advenimiento de las nuevas tecnologías y a una mayor conciencia de lo que la ciencia forense tiene que ofrecer. La introducción de la objetividad, como concepto derivado del aseguramiento de la calidad, la estadística y el razonamiento probabilístico han situado a la ciencia forense en proceso de transición. Partiendo de la exigencia de la validez científica de la prueba, aparecen valores añadidos encaminados a la mejora de la integración de la cadena forense, desde el lugar de los hechos hasta el juzgado. Por estas razones, la ciencia forense

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mira hacia un futuro en el que la normalización de sus disciplinas sea garantía de la fiabilidad de la prueba, lo que permitirá un lenguaje común y la comprensión compartida de los resultados significativos, para asistir a los procesos judiciales y a la aplicación de la ley.

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Introduction

I refer to the Letter to the Editor recently published in this journal calling attention to individualisation and the need for a commitment to collaborating with a more open mind, as this significantly contributes to the forensic process.¹ With this article, I offer a view of events and issues, such as the one referred to, that define forensic science as a sector in transition. Diverse circumstances have led to a change in the role of forensic laboratories. Now they are able to investigate more and a greater variety of evidence, extracting more information from less material. They have moved up from the supporting role to the leading actor in numerous investigations. They provide quick and reliable information on crime scenes, suspects and victims, and that is where the experts performing specialist tests in the different fields of forensic science are directing their efforts.²

The test methods are categorised as subjective and objective. Subjective tests are based on experience, heuristic techniques and intuition. Such methods are useful, but they have a different type of value and they have to be interpreted in a specific way. The most important advance in the history of forensic science was the introduction of objective methods and the concept of probability to measure the degree of uncertainty of a result.³

This objectivity has to do with validated methodologies, verified and calibrated equipment, detection and quantification thresholds, certified reference materials, estimation of uncertainty, and accuracy and precision in measurements. It is also related to guaranteeing the repeatability and reproducibility of the results, the selectivity, the specificity and the traceability of the procedures, taking part in inter-laboratory comparison exercises and being subject to internal and external audits carried out by accredited experts and by national assay accreditation organisations. Some scientists have summarised all these requirements into two principles: transparency and quality control.⁴

The end users—both existing and potential—the press and the public are now more aware of the extent of forensic capabilities and that in turn is generating an increasing demand. Forensic investigation has gradually taken on a more central and high profile role and is becoming a useful tool for the State Security Forces and Law Enforcement Bodies in the defence of the nation, as well as for others responsible for maintaining justice, social order and security.²

The current situation in forensic science

One of the clearest and most important trends in forensic science is its remarkable growth in the last 15 years. This is the result of three main factors: the introduction of new technological capabilities; the increase in awareness among users of forensic services of the value of forensic science efficiency; and the arrival, not yet in Spain, but in other European countries, of new clients outside the traditional forensic field.

The increased use of forensic investigations is not only due to the advent of new technologies but also the fact that the general population has more information about what forensic science can offer.

The rapid development of analytical methods has led to great importance being given to the inherent “quality” required to measure the data; this hand in hand with the two essential criteria of reliability and utility, meaning that the analytical results need to allow reliable decisions to be made.²

Until twenty or thirty years ago, forensic science had more in common with the arts and crafts than with a mature science, and some areas were even still in the pre-scientific era, as reflected in the National Academy of Sciences (NAS) report, “Strengthening Forensic Science in the United States: A Path Forward” (2009).⁵ Obviously, if the interpretation made by the forensic scientists is lacking in objectivity or a strong scientific basis, the value of the information and the interpretation provided by the forensic laboratories decreases considerably.

Forensic scientific development has not been as fast as it should have been precisely because of this culture of the artistic and the manual (already on the decline in the vast majority of forensic laboratories), combined with the demand for better performance from laboratories and the peculiarity that some scientists were not always in the habit of sharing or organising their knowledge acquired over time, preferring to keep it firmly to themselves.⁶

The above-mentioned report presents a critical view of the weaknesses in the scientific foundations of a series of forensic disciplines routinely used in the criminal justice system and, although not exempt from extreme factors, it was undoubtedly the beginning of a profound change to advance the forensic disciplines, especially in terms of improving the systems and the organisation of structures, better qualification of personnel, generalised adoption of best practices in terms of uniformity and applicability, and the obligatory nature of certification and accreditation programmes.

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