Innovative methods in forensic science: the science of forensic dermatoglyphics

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Abstract. Forensic dermatoglyphics describes the study of the features and characteristics of the prints and volar surfaces of the hands and feet, as well as the flexors, functional folds, and skin of the person as a whole. It also studies the traces of them found on various items during investigative and search activities in order to determine the character features and body specifics using genetic, national, and geographical traits. Serving as a background for this paper is the fact that in 2016 dermatoglyphics was deemed a pseudoscience. Due to this, it was decided to study the current problems of dermatoglyphics, particularly forensic dermatoglyphics, using proven methods of scientific research as the basis. These include the necessary differentiation of scientific knowledge in combination with its necessary integration with other sciences. At the same time, the method of deduction allowed us to draw conclusions about the unfoundedness of forensic dermatoglyphics as a field of science, at least in its current state. This paper relied on data obtained by various authors. However, forensic dermatoglyphic research is currently being carried out in small groups of test subjects which cannot be a reliable base for scientific statistics; it was concluded that further research focused on developing ways of using dermatoglyphic data in court and investigative practices can only be carried out on a significant empirical basis by creative teams which are made up of representatives of anthropology, doctors of various specialties, primarily, dermatologists, and criminal lawyers. Only this approach will help solve the question in the future about whether or not forensic dermatoglyphics can become a field of science.

Introduction

Despite its current status as a pseudoscience [1], dermatoglyphics is the subject of study for researchers from various fields [2-6]. For example, in the area of medicine, the peculiarities of fingerprints and palm prints and their correlation with specific types of illnesses are being studied – myocardial infarction [7,8], diabetes [9], hypertension [10] and oral diseases [11,12]. Dermatoglyphics is also given considerable attention in anthropology when studying the peculiarities of specific types of nationalities and the fingerprint features of men and women [13,14]. Dermatoglyphics acts as a research method and is used to determine various hereditary diseases [15]. One of the focuses of dermatoglyphics is the established link between fingerprints and the physical activity of a person. The main objective of forensic science is to provide the scientific investigation of crimes [16, p. 72] and catch criminals. Therefore, it also uses results of dermatoglyphic research. Crimes can only be effectively investigated with proper forensic support. However, the forensic methods which exist today are not always sufficient for completing the tasks set before forensic science [17, p. 4].
The goal of this paper is for the analysis results of research work focused on the study of the role of dermatoglyphics as a scientific method to give an idea of the current state of forensic dermatoglyphics and to predict its possible state in the future.

Methods
This paper is an overview of scientific research on the issues of implementing dermatoglyphics in modern scientific activities. It is focused mainly on gathering a general conclusion of different research on the possibilities of integrating dermatoglyphics in order to investigate and solve crimes. Scientific papers which were published in peer-reviewed scientific publications with public access were used. The samples used by the authors during their research were also analyzed. When writing this paper, the worldview principles in relation to the processes of perception were used as the main method of scientific research. So, the philosophic law which was widely used suggests the differentiation of the sciences (in our case, of dermatoglyphics and the science of fingerprints) in combination with the necessary integration of the sciences (primarily, in the fields of forensics, medicine, and anthropology) in accordance with the research data with other sciences. The research relied on such general scientific methods as analysis, in which the described phenomenon is broken down into characteristics and properties in order to study it more exactly, and synthesis, used to combine the individual elements of the studied phenomenon into a single whole for a more detailed study. The method of deduction allows conclusions to be drawn about specific phenomena, using data from a large number of their small (individual) features. It helped make certain conclusions about the unfoundedness of forensic dermatoglyphics as a field of science in today’s world.

Results and Discussion
At the end of the 20th century, Russian author V.V. Yarovenko put forward a new term, “forensic dermatoglyphics”. This was used to describe as a system of scientific positions and special tools and methods based on them for studying fingerprints in order to obtain forensically significant (in other words, significant for investigating crimes) information [18,19].

In 2013 V.V. Yarovenko elaborated on this definition by pointing out that forensic dermatoglyphics is an independent section of investigative sciences, which studies the features and characteristics of the prints and volar surfaces of the hands and feet, as well as the flexors, functional folds, and skin of a person as a whole, and also the traces of them found on various items during investigative and search activities in order to determine the character features and body specifics using genetic, national, and geographical traits. [18, p. 361].

Thus, by using this area of knowledge when investigating crimes, law-enforcement agencies could obtain information about the identity of a criminal by figuring out the personal traits, identify the individual using parameters characteristic of his blood relatives, and put together a portrait of the perpetrator using fingerprints.

Of course, by relying on this kind of knowledge, the court and investigative practices would enter a much higher and new quality level of work.

However, so it is that the research of modern forensic scientists is in need of a critical analysis.

In connection with this, it is thought that works on forensic dermatoglyphics need to be especially thorough and careful when approaching reviews of all statistical handlings of dermatoglyphic markers. At the same time, the scientific validity of forensic dermatoglyphic research remains the main issue. Supporters of forensic dermatoglyphics find various links between the peculiarities of the patterns of the dermal ridges and the identity of a perpetrator. They give statistical samples, but unequivocally proving the trueness of their findings is not possible.

Most research is still taking place in small test groups, which is unable to serve as a reliable base for scientific statistics.
In the work by Malhotra, K.C., Vasulu, T.S., Dikshitulu, Y.S. et al. [20], when studying the type of men who commit sexual crimes, the conclusions were based on data obtained from 347 men who had committed similar crimes.

In the research led by Pricilla ONC, Samuel EC, Sunday IP, et al., 50 women were selected as the test subjects [21]. When researching the genetic peculiarities of fingerprints, 76 families were selected for testing [22].

Similar research was also conducted in Russia.

Efremov I.S., Chistikina T.A., and Chistikin A.N. (2016) studied the prints of skin patterns from the hands of residents from the Tyumen Oblast who had been convicted of committing first-degree murder, causing grievous bodily harm, and rape. The results of the conducted research shows, according to the authors, that the people who had committed such crimes had skin patterns with specific diversions, clearly differentiating them from people who were not involved in criminal liability [23, p. 160]. 433 men were studied.

V.V. Yarovenko in many ways took the data from the expeditions of G.L. Khit as the basis for his works. In his opinion, the prints of the fingers and palms could be used to compile a behavioral portrait of the suspect and to determine the psychological characteristics of the person, including their sexual orientation [19, с. 36 - 40].

The result of K.H. Badikov’s work was a suggested method for researching the identity of fingerprints based on measuring the angle of the delta, which would help solve diagnostics problems. At the same time, two components were analyzed: the fingerprint cards and information from material on criminal cases presenting the mental element of the murders – 50 criminal cases in total (40 convicted males, 10 females). 40 fingerprint cards from the Ministry of Internal Affairs information center of the Primorsky Krai were selected as the control group.

Based on the data from his research, K.N. Badikov came to the far-reaching conclusions that dermatoglyphics can be looked at as an additional genetic marker which carries information not only about the behavior (mediated by a mass of interrelated environmental factors, upbringing, and so on), morphology and physiology, but also about the presence of genetically determined symptoms, diseases, and so on. Relying on the methods and the modern achievements of forensic dermatoglyphics, it seems possible to study the psychological structure of an individual with the subsequent analysis of the motives for behavior and the formation of a forensic search model for working out preventative measures [24, p. 55].

It has thus been established that the number of variations of fingerprint patterns and their combinations may be very great.

However, the authors do not study the issue of the sufficiency of empirical material for forming something so radical and even revolutionary for forensics (the science of investigating crimes).

Due to this, the possibility of law-enforcement agents using such kinds of research in their practical work is doubtful. It is also thought that research in this field should rely not only on the analysis of the studied information but also on the subsequent statistical handling of the collected significant empirical material. In any case, the collection and analysis of material characteristic for the practice of counteracting crime needs to be continued. Russian scientists have pointed to the need for this approach several times [25, p. 195; 26, pp. 57 – 63].

Conclusions

Further research focused on working out ways to use dermatoglyphic data in court and investigative practices can be conducted only by creative teams made up of representatives from the anthropologic field, doctors of various specialities, primarily, dermatologists, and criminal lawyers, based on the use and statistical summation of significant empirical material.

Only then will objective data be obtained which can be used as the basis for dermatoglyphic science in the future. There will also be the possibility of claiming forensic dermatoglyphics as a field of science.
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