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NATIONAL SCENERY OF THE USE OF GENETIC IDENTIFICATION TECHNIQUE IN THE OFFICIAL SERVICES OF IDENTIFICATION AND THE DENTIST PARTICIPATION

Abstract: DNA analysis can be considered a major technical advance in criminal investigation since the discovery of fingerprints. It is incorporated in forensic routine by police of first world countries and now it has been used in forensic reports in some states of Brazil. This paper aimed to know the Brazilian context regarding this technology. Questionnaires were applied in Institutes of Criminology and DNA forensic laboratories of 20 Brazilian states. The results of this study allowed us to verify the greatest influence of DNA technique in identification processes, the professional diversity of teams and the description of the procedures, which incorporated specific knowledge from dental professionals in the examples of teams with the presence of dentists.

Keywords: forensic DNA; forensic dentistry; human identification; dental DNA.

Introduction

Post-mortem human identification is an extensive study and research area in Forensic Dentistry, a science that has been evolving in a highly significant way. It used to be based on simple methods of observation and comparison and nowadays it employs sophisticated laboratory tests, including genetic exams (OLIVEIRA⁸, 2008).

The analysis in molecular biology was introduced in forensic context and started to be used by forensic experts, dental professionals, and forensic doctors. They are associated with classical forensic techniques and result in more objective and reliable reports (SILVA et al.¹⁰, 2007).

However, the introduction of new technologies in human identification services depends on financial resources available in each state for the acquisition of equipment and/or adaptation or construction of infrastructure. Moreover, there is the necessity of creating or negotiating the nursing staff and updating techniques in order to work with new methodologies (OLIVEIRA⁸, 2008).

Thus, the mapping of the states that have already benefitted from the use of forensic DNA allows the understanding of the Brazilian context regarding that new technology, its implantation, structure, applied methodology, the categories of professionals, showing the differences in several units spread all over the country.

Objective

This study aims to verify the influence of the DNA technique in the identification processes in Brazilian identification services, checking the diversity of professionals involved in the analysis and the most common procedures.

Material and method

A questionnaire was used in data collection with the aim of establishing the centers that use DNA technique in forensic identification, types of biological samples, the existence of accreditation certificate in laboratories, number of procedures, category of professionals that belong to the team of forensic DNA, the number of dentists in the identification institutes and how many professionals work with forensic DNA.

The questionnaire was applied during the year 2008 with the of interviews with the experts who were responsible for the identification process by means of personal contact that happened during scientific events in the area, or in a complementary way after this first contact by means of telephone and/or e-mail.

Results

Contact was established with the Central of Legal Medicine Institutes in capitals of the 26 Brazilian states besides the Federal District. The questionnaire was answered by 20 Institutes and in 3 states the data were not incorporated in the discussion since the service in Rondônia was being implanted; joint venture was being renovated between Civil Police and the Federal University in Alagoas – the exams were temporarily being conducted in Bahia. The State of Pernambuco informed that it did not own a DNA laboratory and had the collaboration of the States of Paraíba and Bahia.

The States of Amapá, Amazonas, Pará, Roraima, Tocantins, Bahia, Ceará, Maranhão, Paraíba, Piauí, Rio Grande do Norte, Goiás, Minas Gerais, Rio de Janeiro, São Paulo, Paraná and Rio Grande do Sul have effectively contributed to the analysis.

The States of Acre, Sergipe, Mato Grosso, Mato Grosso do Sul, Espírito Santo and Santa Catarina; besides the Federal District did not answer or refuse to answer the questionnaire.

From the 20 States that were initially part of the sample, the dental professional is present in 11 (Amapá, Bahia, Rio Grande do Norte, Pará, Goiás, Tocantins, Rio Grande do Sul, São Paulo, Paraíba, Minas Gerais and Paraná). There is also one professional linked to the DNA laboratory in Minas Gerais and Bahia and two others in Paraíba (Graphic 1).

The DNA forensic team from the 17 States that had already implanted the service by the late 2008 consisted of 83 professionals: 37 pharmacists (44%), 31 biologists (37%), 08 biomedical doctors (10%), 04 dentists (5%), 02 chemists (3%) and 01 doctor (1%) (Graphic 2).

The type of biological sample depends on several factors, such as the condition of conservation of the donor of this sample, the type of crime. Blood is the most employed biological sample (39%) (Graphic 3).

In most cases (60%), that biological sample comes from sexual crimes (Graphic 4). In spite of that fact, in 43% of the states, the collection of saliva in bite marks, when present, is part of the forensic examination (Graphic 5). This exam is usually performed by forensic doctors, and there are no dentists responsible for this procedure in the States involved.

Regarding accreditation in the 17 operating laboratories by the late 2008, 15 of them have answered the questionnaire, and 8 affirmed not performing any tests and 7 performed tests in association with the Brazilian Genetic Society, the Ibero-American Working Group in DNA analysis or the Spanish and Portuguese Group of the International Society of Forensic Genetics.

The number of DNA exams performed until December 2008 has varied in each State from ten to more than three thousands summing up 9.480 exams. The DNA analysis services have been implanted since 1998 in Minas Gerais; 1999 in Rio Grande do Sul and Goiás; 2000 in Paraná and Pará; 2001 in the State of São Paulo; 2004 in Paraíba; 2005 in the States of Rio de Janeiro, Bahia and Roraima; 2006 in Maranhão and Amapá; 2007 in Amazonas, Rio Grande do Norte and Ceará and 2008 in Tocantins and Piauí.

Discussion

The particularity of this research when interviewing forensic official services has brought some difficulties and, due to this fact, some States did not participate, since the hierarchic characteristic of those services does not provide autonomy for their professionals to release data without the approval of those in charge. Regarding the States that did not provide information, it is known that Mato Grosso, Espírito Santo and Santa Catarina, besides the Federal District, own laboratories of DNA forensic analysis.

The relation between the dentist and molecular biology and their presence in the official services of human identification can be traced back to the Law 5.081/66, from August 24th 1966 (BRASIL³, 1966), in its article 6^o, that defines the dentist's competencies in: I – practice all the acts regarding Dentistry, derived from acquired knowledge in under-graduate or graduate courses;

IV – perform dental forensic exams in civil, criminal, labor relations and in administrative office.

It is worth citing The Resolution CFO-63/2005 (Conselho Federal de Odontologia⁴, 2005) that ruled in its 64th article the areas of performance of the Forensic Dentistry professional, among them:

“Human identification; reports in correlated evidence, including spots or fluids originated or present in oral cavity.”

The forensic techniques applied to human identification are methods that produce fully reliable results (SILVA et al.¹⁰, 2007).

The dentist who is introduced in the forensic context can be really helpful in situations where the corpse is skeletonized, carbonized or in advanced state of decomposition (SILVA et al.¹¹, 2008). In the presence of bite marks, its primary forensic approach is related to the analysis of dental characteristics presented in the victim's

injury or in the object found at the crime scene. However, when those characteristics do not produce satisfactory results, the DNA analysis obtained from the cells that are present in the oral cavity and collected from the bite mark consists an important phase to determine the individual's identity that has produced the evidence(ATSÜ et al.¹, 1998; MCKENNA et al.⁶, 2000).

The multidisciplinary character of DNA forensic exams has its evidence in the presence of six different professional categories that compose the functional staff of those services and that, according to BILGE et al.² (2003), several techniques are used to identify a corpse in complex cases.

Despite the teeth are not the biological sample of election , they appear among other biological samples as important factors in the identification process and criminology due to the high probability of the dental characteristics that are never the same in two individuals, as well as relatively high level of physical and chemical resistance of the dental structure(OLIVEIRA⁸, 2008).

In those situations, the teeth act as elective material to analysis and the extraction of the deoxyribonucleic acid (DNA) is obtained by the dental pulp, or by the tooth itself. This is due to the hardness of dental structures (enamel, cement, dentine and the alveolar bone around the tooth) that provide conditions to DNA preservation and integrity even in adverse environmental circumstances such as high temperatures (Tsuchimochi et al.¹³, 2002).

The association of classical forensic techniques in genetic exams has allowed significant evolution in forensic reports. Case investigations of sexual violence that were once limited to semen analysis of the sample, serological tests, such as blood testing , are nowadays able to produce accurate results with the possibility of analyzing genetic material extracted from fluids, capillary bulb and fetal material(GOES et al.⁵, 2002; SILVA et al.⁹ , 2004).

The results reaffirm the fact that sexual violence is the one that mostly employs techniques of genetic investigation, however, human bite marks, evidence that is frequently found in such crimes, are discarded by a great number of institutes. DNA from saliva found in those bites is sometimes fundamental to find the aggressor (Sweet et al.¹², 1997).

In a study, Walsh et al.¹⁴ (1992) proved the efficacy of human saliva as an adequate biological material to forensic analysis after evaluating the reliability of DNA extraction in different biological materials, including saliva and saliva spots.

If compared to blood puncture, saliva presents advantages since it is simple to collect biological samples and it presents less probability of contamination. It is a non-invasive, painless and non-traumatic method and in cases of paternity, children are able to collaborate with it (NICOLÁS; CANELA⁷, 1999).

Regarding laboratory accreditation, one may observe low adherence in services possibly because such tests have not been mandatory yet in Brazil and there are not representative organizations to apply those tests. A second motive derives from the fact that official services are subjected to public trust. Anyway, proficiency from international organizations such as GEP-ISFG gives credibility to the tests and protects the Institution in case the results are contested.

Contribution of every State in the sum of exams performed varies and reflects the chronological differences in service implementation.

Conclusion

The techniques of genetic identification are important tools introduced in forensic practice to solve questions that were once considered unsolvable to Criminalistics, Medicine and Forensic Dentistry. The multidisciplinary character of the forensic practice and the experience of fewer States where the dental professional has already been practicing in the DNA forensic team suggest that the presence of a dental professional in the team is fundamental.

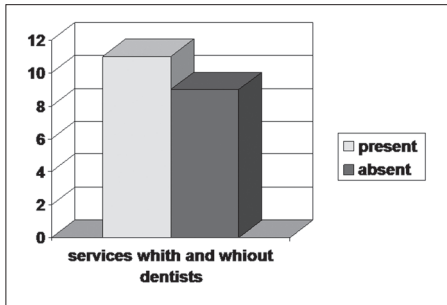
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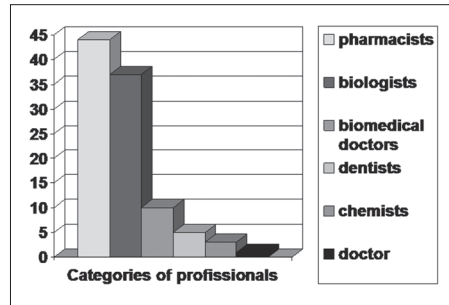
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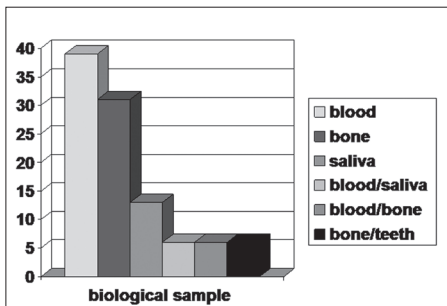
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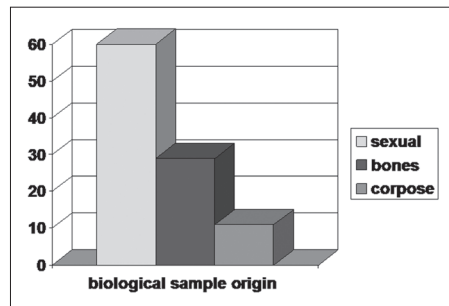
Graphic 1 – Presence of a dentist in Criminalistic Institutes



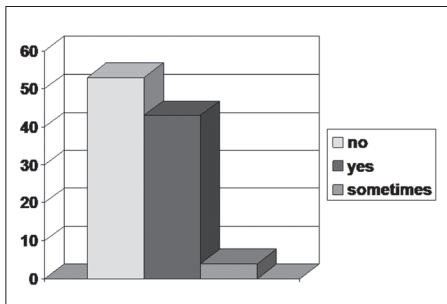
Graphic 2 – Categories of professionals present in the DNA forensic team



Graphic 3 – Biological sample of election



Graphic 4 – Biological sample origin



Graphic 5 – Performance of suabe in bite marks