



## Research Article

### An Overview of the Field of Forensic Anthropology in Brazil: Perspectives and Challenges for the XXI Century

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#### Abstract

This work is an analysis of the current situation of the area of Forensic Anthropology (FA) in Brazil. The data was collected between 2014 and 2016 among all official forensic institutions in the country. The authors sent via email to the chiefs of agencies a questionnaire with questions regarding aspects of the infrastructure as well as the training and operation of the forensic experts in all states of the country. 88.9% of the official criminal investigation institutes of Brazil sent their responses, making this the most significant survey of its kind to date. The data were treated with descriptive statistics and revealed that FA as a field of expertise is not yet institutionalized in all federal units. Despite some advances in research and methodology in most states, there is a lack of investment in infrastructure, equipment, and technical training of the personnel. The authors identified the need to build adequate laboratories, train forensic experts and specific teams to operate in FA in all Brazilian criminal investigation units, and to dedicate a greater attention to field work when dealing with forensic cases. These measures are considered fundamental to help reduce the large number of unsolved crimes in the nation.

**Keywords:** Forensic Anthropology; Forensic Science; Legal Medicine

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#### Introduction

Violence is a phenomenon present in all societies and it is possible to note its numbers exponentially increasing. In the “Brazilian Map of Violence” the author highlights how homicides have been growing in the country especially among young people, from 15 to 29 years of age [1]. It is also possible to notice how much Brazilian number are extremely high if compared to, for example, those of Argentina the second largest country in South America, which had 1.066 deaths by gunfire in 2012, while in Brazil there were 40.077 in the same year. In this context of rapidly increase of violence, the investment in police intelligence is a must in order to seek a more efficient justice.

Forensic Anthropology (FA) is a field of interface between forensic science and anthropology that operates directly on the elucidation of criminal acts in which the victims cannot be identified by physiognomic means. Its definition has been evolving: previously understood as a technique for human identification, it is now also summoned to clarify circumstances of violence and human rights violation. Also, increasingly forensic anthropologists have been called on to analyse situations other than skeletonized human remains, carbonized bodies or bodies in advanced state of decomposition in different contexts. These professionals are also requested to identify live undocumented individuals and victims of violence of many different types [2].

In Brazil, FA is conducted exclusively under the government responsibility and has experienced a great development in the later years, especially after the work performed in the “Vala de Perus” and in the “Guerrilha do Araguaia” case - both representing severe violations to the human rights which happened against political activists executed during the military regime, between 1964 and 1986. Those works not only identified the remains of the victims but also brought justice to their relatives who could finally inhumate their dead [3].

The work performed in Vila de Perus was led by a multidisciplinary team composed of Brazilian doctors, dentists, archeologists, geneticists, bioanthropologists and forensic anthropologists. They received technical support of forensic teams from Argentina and Peru, all coordinated by the Special Secretary of Human Rights of the Ministry of Justice and Citizenship, under the special Committee on the Political Disappeared (CEMDP) in a partnership with the Municipal Secretary of Human Rights and Citizenship of São Paulo and the Federal University of São Paulo (UNIFESP) [3]. From the bones found was possible to identify many victims such as the body of the activist Dimas Antônio Casemiro, from the Tiradentes Revolutionary Movement (MRT), killed in 1971 [4].

However, despite some advances in the last decade, the full scenario of the FA services in Brazil has not been investigated. This research was designed to identify the current situation of the field of FA in Brazil by means of a detailed national diagnosis. Such diagnosis allowed the elaboration of a national panorama that should help develop policies to strengthen and value this area of science that much contributes to criminal expertise.

## Material and Methods

This was a national study performed in partnership with the Medical-Legal Institutes (IML) of all Brazilian states through the application of a specially designed questionnaire with 14 questions (8 regarding professional operation and 6 related to infrastructure issues).

After a previous contact, the questionnaire was sent via email to all official forensic institutions, addressed to the directors of the IMLs and to the coordinators of the FA departments. In the IMLs which did not have a specific FA department, the questions were answered either by the directors of the IML or the professional who carry such work.

In relation to infrastructure we intended to identify which states have specific FA departments, if there are adequate laboratories, which equipments they have and what are their conditions of use, how unclaimed bones are managed, and if they have skeleton collections for reference or studies.

The goal of the questions regarding the professional operations was to identify how many FA experts there are in each federal unit, the kind of training they received, the most common forensic investigations performed, if other kinds of forensic works are performed beyond the anthropological identification and if their work is done in collaboration with field criminal investigators in the crime scene and/or in the laboratory (Figure 1).

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LINE OF RESEARCH IN GENETIC AND FORENSIC ANTHROPOLOGY  
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Research questionnaire on Brazilian Forensic Anthropology

**1 - IDENTIFICATION**

a) Name of the Center of Forensic Criminal:  
b) Unit of the Federation:  
c) coord. Dep. of Forensic Anthropology:

**2 - HUMAN ASPECTS**

a) Which and how many professionals are part of the Forensic Anthropology team?  
b) Did these professionals take specific courses in FA? (Post-graduation? Technical courses?)  
c) Are the experts in the FA Department active in other skills?  
d) Please list the types of skills performed in FA.  
e) What are the most common cases in which the experts in FA are called to act?  
f) There is some integration between the department of Forensic Anthropology with department of the forensic criminal in crime scene versus life? (in cases of bones accompanying the local team?).

**3 - STRUCTURAL ASPECTS**

a) Is there a proper laboratory for Forensic Anthropology in the Center Forensic of Criminal in question?  
b) Is the FA Department linked to IML or IC?  
d) After carrying out the investigation what is the destination of the unclaimed material?  
e) Does your Center have bone collections? How many?  
c) Does your Center have Forensic Anthropology equipment? (anthropometric material, software among others).  
d) Is there any kind of research work based on the osteological materials analyzed in your Expert Center?  
f) Are FA skills held exclusively at IML headquarters or is there a FA department in other municipalities in your State?  
g) List what changes or what needs does your skill Center need to improve FA skills?

I am forensic criminologist at the Crime Scene Against Life Department of the Renato Chaves Center for Scientific in Forensic of Criminal in Belém do Pará-Brazil, attending a Master's degree in Genetic and Forensic Anthropology at UFPA. This questionnaire composes one of the stages of my research. In this regard, I would like to thank the colleagues who are experts in my research. This questionnaire will allow us to make a clipping and visualize the current situation of Brazilian Forensic Anthropology, thus providing indicators that can subsidize public policies that favor and foster the development of expertise in Brazil. My email is maricea@bol.com.br where your response should be sent.

**Figure 1:** Questionnaire applied to the forensic experts of all states of Brazil.

following ethical standard procedures and official authorization from the forensic institutions participant in the research. The responses were returned electronically and analyzed via descriptive statistics.

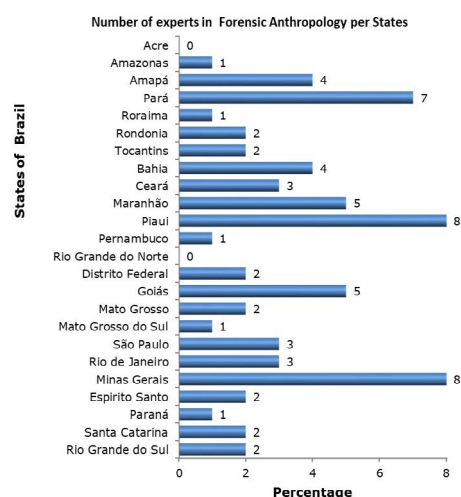
Since this is one of the first studies aiming to diagnose the situation of the field in the country, this research was fully accompanied by ABRAF which, beyond the initial support and contacts with the IMLs, also showed great interest in the research results as possible means to help develop the field of FA in the police and universities.

## Results

A total of 24 (88.89%) of the IMLs responded the questionnaires, which can be considered quite representative of the national reality (Table 1). In the regions North, Central-West, South and Southeast 100% of questionnaires were responded. In the Northeast region the level of response was 66.66%, as three states did not reply: Paraíba, Alagoas and Sergipe (Figure 2). Both Alagoas and Sergipe informed they could not answer the questionnaire because they did not develop investigations in FA in their IML; Paraíba state did not respond even after repeated requests.

Region	Number of Institutions	Responses	%
North	7 (25.92%)	7	100%
Northeast	9 (33.33%)	6	66.66%
Central-West	4 (14.81%)	4	100%
Southeast	4 (14.81%)	4	100%
South	3 (11.11%)	3	100%
<b>Total</b>	<b>27 (100%)</b>	<b>24</b>	<b>88.89%</b>

**Table 1:** Frequency of questionnaires responded by region of Brazil.



**Figure 2:** Percentage of Forensic Anthropology experts per state in Brazil, 2017.

The questionnaires were sent out between 2014 and 2016 to the addresses made available by the Brazilian Association of Forensic Anthropology (ABRAF), these were always accompanied by an official letter of request for permission of data collection as well as analysis and publication. All data was properly collected and analyzed

The analysis by region indicates that the Northeast, North and Southeast regions are the ones with the greatest number of FA experts. The Northeast region has the higher concentration with nearly 21 professionals, followed by the North with 17, Southeast with 16, Central-West with 10, and the South region which has the lower number of professionals, with only 5 (Figure 3).

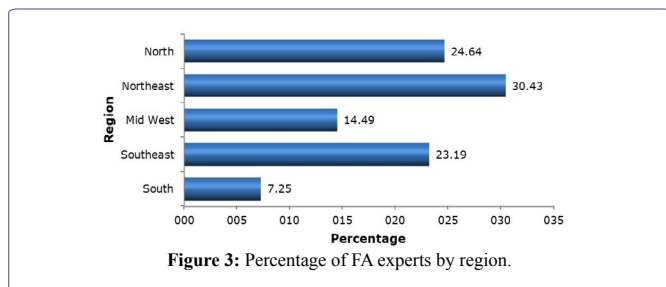


Figure 3: Percentage of FA experts by region.

Regarding the professionals that compose the FA teams it was possible to identify basically two profiles operating in the field: medical doctors and dentists. Only Ceará and Rio de Janeiro have more multidisciplinary teams with biologists that act on forensic entomology associated with anthropological analysis. There are IMLs which have only physicians in the staff, others have only dentists, and others have both (Figure 4).

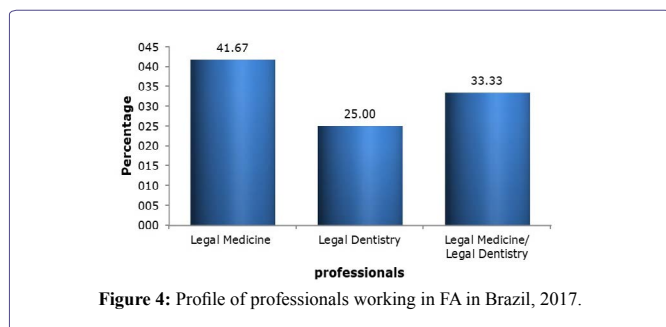


Figure 4: Profile of professionals working in FA in Brazil, 2017.

Institutions that have only coroners (physicians) represent 41.67% while around 25% have only odontologists. Proportionally we noticed a greater number of coroners operating in the field. However, 33.33% of the forensic institutions develop their work with both professionals.

When questioned if their work was developed exclusively in FA their responses showed a scenario in which only 20.83% work exclusively in FA cases while 79.17% reported that besides investigations in FA they also perform other kinds of work such as bodily injury examination and necropsy.

Regarding the more recurring kinds of investigations in FA, all respondents highlighted that besides human identification they also perform age estimation in the living, analysis of bone injuries and exams in corpses in advanced decomposing state and/or carbonized. Around 59.09% of the FA departments in Brazil do not have forensic auxiliaries, so the forensic professional is entirely responsible for developing all the investigation work.

In relation to the qualification of the forensic experts, Brazil presents the following reality: there are many professionals who did not have any specific courses and the ones who had. A total 40.90% of the respondents stated that even though their center performs anthropological investigations they have never attended a specific course.

Other issue raised during data analysis is related to the level of interaction between the FA departments and the investigation departments in cases of crimes against life. The interest for that matter exists because it is in the field that the primary informations for the work of

the forensic anthropology can be found. The path chosen to understand such question was to ask the professionals working on FA what is their relation with investigators of places of crimes against life and if there is any sort of assistance from the forensic anthropologists in such places when is known that the material can benefit from this kind of analysis.

The data suggest that the situation presented by a survey of some states conducted by Lessa between 2003 and 2004 has practically not changed [5]. Only 18.18% of the forensic units reported having any sort of relation to the department of crime against life. However, such relation does not go beyond information Exchange after the material arrives in the laboratory or wherever the FA conducts the work. 81.82% informed that they do not have any kind of interaction with professionals who perform analysis in crimes scenes, but reinforced that they seek such experts any time needed to pursue information that helps the analysis.

Regarding infrastructure, it was possible to identify that not all Brazilian states have FA departments. The data about laboratories by region can be found in (Table 2).

Region	FA Department	
	YES	NO
North	66.66%	33.33%
Northeast	66.66%	33.33%
Central-West	75%	25%
Southeast	100%	
South	100%	

Table 2: Distribution of Forensic Anthropology departments by region of Brazil, 2017.

Around 18.18% of IMLs in Brazil do not have FA departments. The regions North and Northeast are the ones with the lower number of departments (Table 2). Only 66.66% of such units have a specific section in FA which shows that the institutionalization of the field is not a reality in almost a third of the IML of North and Northeast of Brazil. In the Central-West region this number is a little higher (75%) and in the South and Southeast FA departments are present in 100% of the IMLs.

Regarding the existence of specific laboratories was possible to determine that many IML do not have forensic anthropology laboratories and that the work is performed most often in the necropsy rooms. Around 37.5% of the forensic units do not have laboratories or equipments specifically destined for identification of human remains in advanced stage of decomposition, which leads to a considerable difference among the regions of the country (Figure 5). According to our experience, in many circumstances, due to the specificities of the work with heavily decomposed remains (smell, fluids, associated fauna, potential health hazards), the work has to be conducted outside the main facility, in places with precarious conditions of infrastructure, ventilation and equipment.

The Northeast and North regions can be seen as the ones with the lower number of FA laboratories. The South, Central-West and Southeast are better served.

Regarding equipments to perform forensic work, even though 83.33% of the IMLs reported they have the proper material, 25%

informed that their laboratories only present such material because the professionals acquired equipments with their personal resources. This means that, in reality, the number of specific equipments institutionally destined to FA in the laboratories of the Brazilian services is much lower than reported. Furthermore, many coordinators highlighted that the conditions of some equipments are extremely poor because they are old and in need to be replaced for more modern and efficient ones.

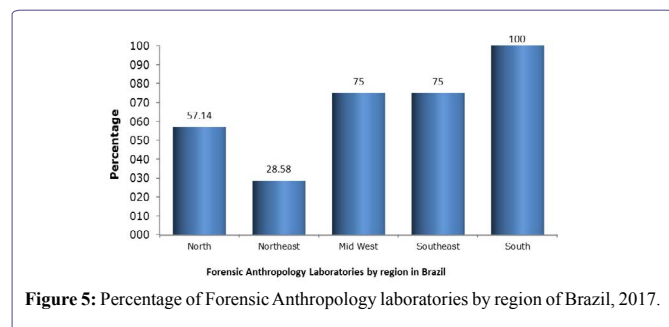


Figure 5: Percentage of Forensic Anthropology laboratories by region of Brazil, 2017.

It was also possible to identify that 62.5% of the laboratories do not use any kind of software to superimpose and compare images while only 37.5% reported that the institution acquired some of the programs available in the market. This means that only 9 out of the 24 forensic units participating in this research have properly equipped laboratories, being 2 of them in the North, 2 in the Northeast, 1 in the Central-West region, 2 in the Southeast, and 1 in the South.

63.65% of the IMLs informed that all the materials analysed but not identified are stored in the institution's ossuary for future identification. However, considering the procedures determined by law, it often occurs that after the legal deadline of 30 days the bones are buried in common graves and those individuals remain unidentified.

The access to the anthropological identification service was also considered and it was noticed that 99% of the institutions offer their services exclusively in the capitals of the states. Only the state of São Paulo pointed out that on the IML of the interior of the state the forensic experts on duty are able to perform anthropological identification. In other states, this service is operated exclusively in the capital.

## Discussion

Hundreds of thousands of individuals remain disappeared; many are possibly already dead and - as practiced during the military dictatorship - inhumed in common graves, by the criminals or the official services as seen above, so their families will never know their whereabouts and their criminals will never be punished.

This research showed that there are a low number of experts in FA per institution in Brazil and this appears as an important issue that needs to be solved urgently by the public authorities.

Considering the high crime rates in Brazil, it is clear that the country needs a significant increase in the number of forensic experts and facilities. This lack of professionals can have a number of consequences on the progress of anthropological investigations such as work overload, delays in forensic analysis and the consequent delay in identification and closure of police investigations of missing people and/or unidentified victims, incomplete, inadequate or inconclusive investigations, and ultimately even the impunity of criminals.

Regarding the professional profile of the professionals who work in the area it was observed that the majority come from the health area (medicine and dentistry). This is directly related to the fact that FA in Brazil has always been linked to the Legal Medicine, but may also be due to a sort of requirements that several institutions demand regarding forensic skills. A forensic expert in dentistry, for example, not only performs investigations in Legal Dentistry, but can also act in other demands such as ballistics, DNA, forensic medical examination, verification of non-hospital death and others. With very few exceptions, almost all Brazilian forensic experts work in more than one specialty, and most do not work exclusively for the IMLs. Only in the states of Mato Grosso, Minas Gerais, Rio de Janeiro and São Paulo there are exclusive experts for FA.

Roraima, Pernambuco and Paraná have a very low index of forensic experts - there is only one in each department. The lack of professionals can become an even bigger problem in these states considering that this professional needs to develop other forensic, technical and administrative attributions in addition to their anthropological role.

This tradition of multiple functions attributed to the analysts demonstrates that Brazilian institutions choose to hire professionals who can act simultaneously in several fields besides FA, specially Legal Medicine and Legal Dentistry.

In general, we concluded that the vast majority of forensic experts currently in operation in the country come from medicine and dentistry, and many work only part-time. However, it is also possible that the lack of a broader conception regarding the different roles of FA can also influence the choice of one particular professional profile over others.

The participation of other professionals in the departments is still quite low. Only in Rio de Janeiro and Ceará the FA team is more multidisciplinary. In these two states the teams are also composed by an entomologist, which already brings a different perspective to the objectives and possibilities of analysis. In other states the partnership is only between physicians and odontologists.

The General Institute of Forensics (IGP) of Rio Grande do Sul presents a very interesting arrangement: the team is formed by coroners and several professionals from other areas. They develop complementary activities related to FA, such as 3D facial reconstruction. However, these works are not developed in the FA Department, although they are linked to it since they complement their analyses.

Overall, it was observed that there is no fixed pattern or even a preferred format on the composition of a FA team in Brazil. Each institution defines its team based on its convictions, the human material and equipments available, and the interests of its professionals. In addition, these teams are composed almost exclusively by forensic experts.

Few institutions reported the presence of necropsy and/or radiology auxiliaries in their teams. In some cases, Legal Medicine assistants are also available for anthropological identification.

Regarding specific training, what has been identified is that these professionals acquired their knowledge mostly through short courses or only during their training period at the academy when they joined the forensic career. Few experts have specific qualifications in FA,



such as specialization, masters or doctorate, and the number of forensic experts without specific training is quite alarming.

Although some professionals reported they have masters and doctorates, it was not possible to identify this percentage numerically or their field of graduate studies because of lack of data.

An issue that has been highlighted and needs to be overcome concerns the integration between field and laboratory forensic experts. Traditionally the investigations in places of crimes against life (field) - where there are victims of violent death - are conducted by experts in this area. Frequently we face cases in which the victim is found in an advanced state of decomposition, with several skeletal anatomical parts or even with the whole body skeletonized, or accidentally or purposely modified. These cases deserve special attention, since the manipulation of disjointed bone tissue can cause loss of material and loss of information. This issue has been raised since 2005 [5], when it was identified that the collection of osteological material is commonly performed by firefighters or police officers attending the scene in most of Brazilian capitals.

Based on that, we tried to identify the current situation regarding the forensic anthropology on the field, where the osteological findings need to be removed with specific techniques. The results showed that perhaps one of the biggest challenges is to convince all subjects involved in police work that forensic anthropology does not begin when the material arrives at the laboratory, but when (and where) it is found.

Some institutions reported that only rarely the transportation of FA experts to sites where anthropological material is found. Two serious issues should be raised in this context: the absence of specific FA experts in places where the removal of bones occurs - with crime scene investigators having full responsibility for this stage of work - and the removal of bones by untrained individuals such as firefighters or police officers. That said, it is imperative that the removal of human remains be carried out by a trained professional who understands all the details of the work [6-8].

On the other hand, many bodies are found by ordinary people who trample the graves and may even move the material out of curiosity. Even when police authorities are called, there are still cases in which the primary characteristics of the crime scene were changed before the arrival of the forensic experts. Corroborating this study, Lessa points out that regarding the collection of *in situ* osteological material there is a great lack of training of the professionals most commonly involved in crime scenes [8]. A direct consequence of the technically inadequate collection is the arrival of materials at the IML completely decontextualized and with much information lost, greatly hampering the possibility of solving the case. Associated with the lack of training, the lack of interconnection between investigation departments and forensic professionals can reveal a paradigm that has prevailed throughout Brazil where it is believed that the work carried out by these groups is completely different and that the work of FA should be restricted to laboratory analysis.

That the presence of FA in the field occurs only in cases of mass disasters, when the need for human identification is urgent. For most Brazilian medical institutions, the osteological material arrives at the laboratories in plastic bags or in boxes collected by a number of persons, what restricts the forensic expert analysis to the traces left only

in the bones. Unfortunately, at present, most crime scene experts do not have any type of preparation to carry out osteological or bioanthropological analysis in the field, there are no specific protocols, nor investments in courses that guide how to proceed. As stated by Lessa “the work done by forensic criminalists, although of total importance, is not complete since it does not contemplate the excavation, documentation and proper removal of the bones” [5].

The existence of FA Departments in Brazil is not yet a reality in all states and this certainly reflects on the degree of resolution of crimes in these units of the federation.

According to the participants, even though there are FA Departments in some IML, this does not necessarily mean that the infrastructure in these locations is appropriate. The lack of investment in laboratories and the acquisition of equipment in several states ultimately demonstrate how the forensic field is treated by the governments, as well as reflect the importance given by the state when it comes to the need of solving crimes and other cases of human rights violations. However, it is also demonstrated that the non-existence of a FA departments in a unit does not mean such work is not carried out; especially if we consider that throughout all areas of Brazil there are victims that need to be identified. Therefore, formally, on the legal and professional perspectives, every IML in Brazil is able to operate on forensic anthropology cases, even though this may occur precariously and without specialized training. That is why several states reported they do not have specific departments, but they perform such procedures.

Almost all forensic units are linked to the structure of the IML. Only in Belém, in the state of Pará, the Coordination of Legal Dentistry and Forensic Anthropology is under the Institute of Criminalistics, operating on the IML premises. This is seen as a way of reducing or even eliminating the potential interference of the police on the technical results of the cases.

In many states, FA is performed without adequate structural conditions and without laboratories specifically designed for this purpose. Performing forensic analysis on osteological material or on material in decomposition in an inappropriate place may have as a direct consequence the contamination of the material, the impossibility of further analysis, the loss of information and, potentially, the disabling of the material as a criminal evidence or impossibility of identification of the examined. Particularly the professionals working in states such as Pará, Espírito Santo, Rondônia, Pernambuco, Maranhão and Mato Grosso do Sul face difficulties due to the absence of a suitable place to perform the procedures, even though they are linked to FA departments.

It is also evident a scenario of great inequalities between the different regions of the country regarding structural issues of the forensic field. The Northeast region has the lowest number of laboratories followed by the North. However, it should be noted that even in these states the service is offered only in the capitals, leaving other cities uncovered.

In relation to the existence of equipments to carry out anthropological analysis such as pachymeters, osteometric boards and other anthropometric instruments, and the existence of specific softwares that help the comparison of images and other investigations, the situation is also worrying since most units do not have adequate tools and

equipments. The lack of updated equipment limits the accomplishment of quality FA work. Additionally, the lack of adequate infrastructure interferes in the development of academic research in most institutions. This is a fact to be considered when thinking of personnel training, since many institutions, such as The IML of the states of Goiás, Federal District, Mato Grosso, Bahia, Rio de Janeiro, Paraná and Rio Grande do Sul have a considerable amount of osteological material stored in their laboratories, and if they had properly equipped laboratories it would be possible to develop academic research, which would, in turn, reduce the difficulties of analysis currently faced because of the lack of data on the national population.

When it comes to access to FA services, it became clear that this service is almost entirely restricted to the state capitals. This is also an issue of great concern, since conducting this type of examination only in the capitals can result in the non-achievement of many possible anthropological analysis and lead to fewer case resolutions. In the North region, for example, where there are states bigger than many European countries, the distance may represent the failure to perform various forensic anthropological identifications. Two tragic direct consequences are the impossibility for family members to recover and bury their loved ones, and justice to act on the punishment of the criminals.

## Final Considerations

This is the first fully national survey of FA in Brazil. The results demonstrate that there is little institutionalization as well as FA professionalization in all of the states. It is possible that this relates directly to the low efficiency noted on the Brazilian judiciary system. As some of the issues reported here have already been presented on previous studies on a limited number of states, it is possible to note that very little has changed in the last decades [5,8]. Our perspective is that public security improvement and crime reduction are both intelligence matters and need to be made with better investigation and prevention, rather than with guns and repressive actions.

In Brazil, there is an emergencial need for investments on specific training for FA - at the technical level, and at undergraduate and graduate programs - to enable professionals to reach the expertise necessary, since doctors and dentists do not receive specific training regarding forensic materials during their regular course of studies. Examples of such courses in forensic anthropology can be found on the masters and doctorate programs offered by USP, UNICAMP, UNB, and UFPA.

It is urgently necessary to increase the number of professional available. Currently there are only 60 forensic experts operating in FA in Brazil to a population of over 200 million people, which is an extremely low number in a country where criminality grows exponentially. In order to solve a greater number of crimes it is necessary to assure a greater number of professionals as well as to give the proper recognition to FA as an independent crime area and not only as an ancillary to Legal Medicine. Finally, more investments are also needed both related to materials available and technological devices since the infrastructure is still inadequate.

Despite many difficulties, in recent years FA has been growing by means of increased research, training courses, debates and discussions offered by the Brazilian Forensic Anthropology Association (ABRAF), which has been using the data presented by this research to develop public policies to improve the field.

As a matter of national urgency to help reduce the epidemic of crime and violence in Brazil, the quality of the work performed both in the Vala de Perus and in the Guerrilha do Araguaia cases are examples of a set of advances that need to be distributed to all the national territory.

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