MULTIDISCIPLINARY WORK BY THE FORENSIC TEAM ON IDENTIFICATION AND CAUSE OF DEATH: A CASE STUDY

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CRIMINALISTICS UNIT AGAINST THE VIOLATION OF FUNDAMENTAL RIGHTS

CARACAS
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ABSTRACT

In this particular case, the study of a body in state of skeletonization, each of the areas that offer scientific support to Forensic Science participated in a coordinated manner. These areas are: Anthropology, Dentistry, Genetics, Radiology, and Forensic Pathological Anatomy. The results guarantee convincing expert reports in the clarification of the criminal offense. This team work represents an important contribution to the resolution of the case, which we will analyze later. It is expected that this study would contribute to the better management of forensic cases, and thus get better results in the Criminal Investigation.

Objective: In the following article we analyze the contribution of criminal investigation, focused on a multidisciplinary forensic work, which ultimate goal was the identification and establishment of the cause of death of a body in state of skeletonization, through the study carried out by the team of forensic professionals from the Criminalistics Unit against the Violation of Fundamental Rights of the Metropolitan Area of Caracas. To this end, the evaluation of the abovementioned body was taken as a reference. The body was found in a wooded area of the city of Barquisimeto, state of Lara.

Methodology: The methodology applied complied with the guidelines and procedures set forth in the national and international protocols for case studies of bone remains, employing the comparison of pre mortem and post mortem records, the interviews made to relatives, morphologic and morphometric evaluations of the bones, and, finally, the hereditary biological filiation, through the analysis of genetic profiles.

Discussion: In light of the state of skeletonization of the body, the forensic team included the work of experts in the areas of Anthropology, Dentistry, Pathology, Radiology, and Genetics, which allowed to compare, corroborate, and complete all the criminalistically relevant elements that determine with accuracy both the identity and the cause of death, elements that were later registered on the expert reports issued by each of the experts.

Conclusions: Team work of the different forensic professionals contributed in a suitable and effective manner to the identification of the body and, as a consequence, to the drafting of the expert reports.

KEY WORDS:
Human identification, cause of death, forensic team
Introduction

The identification and establishing of the Cause and Data of Death are objectives of Forensic Sciences that are characterized by their complexity. It has been proven in many field investigation works made at this Criminalistics Unit that it is only through team studies, and with the integration of different Forensic Science disciplines, that the goals set on the scientific investigation can be achieved. The scientific identification of bodies involves a series of studies performed by experts that comprise the Forensic Team, such as the Anthropologist, the Dentist, and the Geneticist.

The participation of the multidisciplinary team was relevant in this case. On the side of the corresponding bodies of the state of Lara, an investigation had already been started for the inquiry of a criminal offense, related to the disappearing of a young man who had been detained at a police facility of the location.

The beginning of this investigation took place after the denounce made by a citizen of the state of Lara, who reported the disappearance of her 18 year-old son, who was detained at a police station of a government institution. The investigation revealed the location in a wooded area of the city of Barquisimeto of a body in state of skeletonization, which anatomic characteristics matched that of human bones. It was later moved to the Criminalistics Unit of Caracas, with the aim of making the corresponding studies to establish the identity and cause of death.

It is very important to point out that the identity, as a biological and social-juridical characteristic, allows, through the characteristics of every person, to individualize and recognize them in a certain moment.

In order to positively identify a body in state of skeletonization, a set of signs have to be typified that differentiate this body from any other, in order to study and compare with the known information of the victim, whether it is obtained from the post mortem findings, interviews of relatives, record of claims of missing persons, medical and dental records, and fingerprints, ways and habits of the subject when they were alive and that leave scars in bones, pathologies, old fractures, asymmetries, which when compared to the information provided by relatives achieve an effective comparison and a positive identification of the alleged victim or of the person being searched.

Achieving the individualization of a subject is not always easy, as the bodies may be found under circumstances that difficult their individualization, where their distinctive physical, morphological and dental characteristics have been altered, or the body has been partially or completely transformed, for instance: carbonized, quartered, as well as bodies in a state of advanced decomposition, and fragmented bones, (YasarIscan, 1989).

In accordance with the aforementioned, the Comprehensive Handbook for the Chain of Custody of Physical Evidence, in force since 2012, allows and corroborates the proper handling of
evidence, as a juridical instrument to guarantee the objectivity and transparency of the technical-scientific procedures, in order to prevent its modification, alteration or contamination, from the time of its location at the site of the event, their trajectory through the different facilities of criminal investigation, the delivery of the results to the corresponding authorities, until the end of the criminal process.

To each of the disciplines that work on the scientific investigation, added to their relevance as sciences, the Comprehensive Handbook for the Chain of Custody of Physical Evidence, independently, assigns to them a value as proof, so they can jointly contribute to the clarification of a criminal offense.

In this case, this handbook highlights the importance of the different disciplines that participate in the identification and in establishing the cause of death of a body found under the circumstances previously described, to solve the cases related to the violation of human rights, common crimes and massive disasters.

In this particular case, the identification constituted a key to the development and clarification of the facts investigated, where disciplines such as Forensic Anthropology, Forensic Dentistry and Forensic Genetics tackled the study and identification of the body in state of skeletonization.

The identification of an individual, whether dead or alive, is made through comparison, in the case of genetics, with indubitable reference samples that may belong to the individual (taken previously or from personal effects), and/or from their relatives. For the anthropologic identification, the first requirement is the general variables, such as: gender, age, ethnic group, and height of the individual. These variables are the basic elements from general Biology.

As said before, identification is a comparative and reconstructive process that has the objective of locating an unknown person in a known biosocial universe. This universe is simply a set of individuals sharing a territory, a common origin and similar morphometric and genetic characteristics. This referential biosocial, biogeographic or population framework represents the base of the identification process. The reference population is comprised by a set of male and female individuals, of different ages, from different population origins, different heights, and the combination of individual traits (Cuenca, 2004). These elements will provide the base to establish the proper comparisons with the information provided by relatives, which will be very useful for the full identification.

The **Forensic Anthropology** studies in bodies, besides the determination of the aforementioned general variables, include several analysis, such as: excavations of contemporary or old bone remains in burial; establishing of the time elapsed since death; facial reconstruction (bi, tri, or tetra dimensional); graphic and vector illustration of particular characteristics (facial deviations or asymmetries); identification through frontal sinus, detection of anatomic variants, analysis of lesions and medical treatments that leave behind scars on the bone tissue (treated or untreated bone fractures, advanced syphilis, barrel-shaped ribcage, pectusescavatum, Schmorl’s nodules, among
others); laterality or common use of one hand or another (ambidexterity). All this is corroborated through a statistical analysis with software SPSS version 17, and SPAD version 13. The Anthropologic study offers a significant contribution to non-routine identification, and this is an area of interest jointly with Dentistry in the Identification in Forensic Sciences. Today, with these disciplines, the identification of countless human remains has been achieved.

**Forensic Dentistry** contributes to obtain the individuality and identity of a living or dead subject. In the case of bodies in the different stages of decomposition, teeth, due to the morphological characteristics of their crowns and to the chemical composition of their tissues, specifically the enamel, made of hydroxiapatite, which covers the totality of the crowns on the teeth, offer great resistance to the agents that cause the destruction of soft parts, such as: decomposition, trauma, physical agents (carbonization, among others), and chemical agents. Scientifically, it could be demonstrated that due to size factors and dental form, no two persons have the same dentition. If we add to this other conditions, such as alteration due to bacterial agents, dental treatments and fractures, it is impossible to find two dentitions that are identical, even in totally edentulous persons. Bone reabsorptions, size of dental ridges, mandibular bodies, intercondylar distances make a great difference in individualization and identity, which is why Forensic Dentistry constitutes an essential element in human identification. The procedure is performed comparing the *post mortem* radiographic studies, and the *pre mortem* data gathered from relatives, friends, or from the dentist that treated the individual. The data collected may be: number of teeth or absence thereof, restautation work, dental prosthetics, and abnormal forms. Forensic Dentistry is of great medical-legal interest, in the determination of the species, ethnic group, and gender, (El Najjar and Williams, 1977).

**Forensic Radiology** is the branch of Medicine that relates Radiology to Law, and is closely related to Anthropology, Dentistry and Forensic Pathology. Its contribution to criminalistics is the documentary value of the radiological studies at the time of performing the Autopsies or exhumations. It is also very helpful for the anthropologist and the dentist to establish the Identity, when there is a previous record of the subject studied, whether alive or dead (congenital malformations, bone deformities, old fractures, surgeries, among others), and it also collaborates to clarifying the cause of death in the anatomic-pathologic study (presence of fractures or foreign bodies, such as projectiles, among others). For the characteristics of the epiphyseal nuclei of long bones, it would be helpful for the Forensic Anthropologist on establishing the bone age. It also contributes to identification through frontal sinuses, bi-dimensional and tridimensional reconstruction of the face, as well bone scars that would identify the subject. Mouth radiology would help the Forensic Dentist in the characterization of the teeth. Another parameter established by the Forensic Dentist through Radiology is the age of the subject, (Gilbert, 2005).

One of the methodologies that has revolutionized the process of human identification is the analysis of Deoxyribonucleic Acid or DNA (Genetic Identification), based on the high level or variability or polymorphism there is between different regions of the DNA, which generates a very high number of possible genotypes, allowing for a high level of discrimination of an individual
within a particular population. DNA is unique for each individual, and is present in all nucleated cells, and so it is possible to analyze it in different types of samples, such as: blood, saliva, semen, hair and corneal appendages, sweat, muscle tissue, bone tissue, and in teeth. The genetic material is of biparental origin, where each of the parents contributes 50% of the DNA, which allows establishing filiations between individuals that are biologically related. In very old biological samples, or in samples that have been exposed to adverse conditions that degrade the genetic material, the study of mitochondrial DNA allows establishing the individuals that belong to the same maternal line. Since this DNA comes from a small molecule and is present in hundreds of copies per cell, is more stable, and it is the mother that contributes the mitochondria in the fertilization process, they are inherited by the offspring, but are only transmitted to the descendants by the daughters, (Butler, 2005).

In the genetic identification, it is necessary to consider that, since it is a comparative study that allows to exclude or establish a common origin between biological samples, or a filial relationship between individuals, it is very important to consider that in case studies of old bone remains and/or that have been exposed to adverse conditions, every evidence that could be contributed by the anthropological and dental studies on the individualization and identification of such remains is necessary, in order to confirm and/or support the findings gathered with this test, (Goodwin and others, 2007).

The anatomopathologist establishes three essential aspects in the medical-legal autopsy, which are: establishes the data of death, specifies the probable mechanism of death, and helps to specify the identity. All these elements will be recorded in a medical-legal document called Autopsy Protocol. For the determination of the data of death the post mortem changes are necessary, called Cadaveric Phenomena (initial and late). Through Forensic Entomology the Postmortem Interval in cadavers with advanced decomposition will be optimized. In terms of the contribution to identification, the pathologist will verify traumas and bone abnormalities, decorative tattoos, old scars, among others, (Seijas, 2008).

In the context of the criminal investigation and in the face of a piece of evidence such as the body (bones in state of advanced decomposition, carbonized, among other causes of death), the following questions arise: identity, cause of death, data of death, and place where the death took place, (Gilbert, 2005). For this reason, the support between the different forensic professional, namely anthropologist, dentist, radiologist, geneticist, forensic physician and forensic anatomopathologist, will allow optimizing all the criminalistics elements of certainty in the resolution of a criminal offense. This criminal investigation shall be performed in a methodic, technical, and scientific fashion, offering valuable support to the judicial body through the expert testimonies, which in turn contribute to achieve a swift administration of justice. The expert test is the particular means to transmit and contribute to the process notions, techniques, and scientific recommendations. To this end, special knowledge and technical capability are required. It is obvious that the serious repercussions of the forensic reports make it necessary to work as a team, that is not limited to the time of the study of the body, but that later requires an evaluation and supervision of
the experts’ activity. Only then will it be possible to produce coherent, consistent and solid expert reports, as are required to provide a proper base in a court of law. For all these reasons, it is important to insist in the need of having a team that works together in the different disciplines of forensic sciences, in the clarification of a criminal offense.

Case study

Below we describe the procedures and methodologies applied by the multidisciplinary team of forensic professionals, assigned to the Forensic Science Division of the Criminalistics Unit against the Violation of Fundamental Rights of Caracas, in the resolution of a concrete case, such as the finding of the body in a state of skeletonization, which identity and cause of death are unknown.

The subject is a set of bones found in a wooded area (outdoors), in the western region of Venezuela. These bone remains were moved to the Criminalistics Unit with their corresponding Registration Form of Chain of Custody of Physical Evidence, to be studied by the team of Experts assigned to the Forensic Science Division. First, photographic recordings were taken of the corpse; and then the following studies were performed: radiologic, anthropological, dental, genetic, and anatomopathological.

For the identification of the body, the following methods were implemented: comparison with pre mortem data (studies of radiological and photographic images); interviews and taking of biological sample (analysis of genetic profiles) of a direct ascendantrelative (mother). An individual that had disappeared around the same date in the area was taken as a reference, who is presumed to be the body found.

An inventory was made of the remains and subjected to routine cleaning treatment. The remains were found in a regular state of preservation, free from any soft tissue and ligaments, with characteristics corresponding to bone remains, exposed to the elements, and devoid of cadaveric fauna. At the level of the lower mandible there was loss of bone substance, which compromises the right side ramus and the mandibular condyle. In the postcranial skeleton, at the level of the vertebrae and bones of hands and feet were not complete, (see image N° 1).

The methodology used was adjusted to the guidelines and procedures set forth in national and international protocols, in cases of study of bone remains for Forensic Anthropology.

In order to determine the bone age, evident morphological changes in the bone system were evaluated, based on the ossification process of the sternum, costal arches, long bones, and coxal bone, which offer relevant points for the bone age as a diagnostics criteria. Also, the conformation, harmony, height and ridge of vertebral bodies were studied;articulating surfaces, ridges, and articulating veneers on external sides (sternal) off the clavicles, (Image N° 2).
For the identification of the gender, differential characteristics were evaluated, both morphological and metric, such as: muscular insertion observed in the cranial bones (occipital bone and iliac region), mandible, as well as on the post-cranial skeleton; bone robusticity, shape of the forehead and glabellar process; distribution and course of the nasal-frontal suture; general shape of the mandible (region of the symphysis menti, robusticity of the mandibular body); general shape of the bones of the pelvic girdle; shape of the greater sciatic notch and of the subpubic angle. In terms of the metric characteristics that could guide the differential diagnostic of gender, the following were analyzed: transverse and anteroposterior diameter of the diaphysis of long bones, subpubic angle, and the metric characteristics specified in the lower mandible, (Image N° 3).

The determination of the height was made based on the maximum lengths of the fragments of long bones, which were subjected, according to author White and others (2012), to the regression formulas for height in incomplete long bones, through which the height was calculated by reconstruction in centimeters of the living subject.

For the diagnosis of the racial affinity: it was determined based on the differential morphological and metric characteristics evaluated in the remains, which characterize the three (03) racial branches: Caucasoid, Negroid, and Mongoloid, concomitant to the variability found in mixed populations such as the Venezuelan. Among the elements evaluated, we could mention: morphologic and metric characteristics of the lower mandible; metric and morphologic characteristics analyzed on the postcranial skeleton (long bones).

For the physical build, the muscular insertions reconsidered, robusticity observed on the bone set in general, as well as the metric indexes that corroborate such character.

For the dental study, evaluations were made of the lower mandible, which presented a robust general state. The symphysis menti was observed to be robust, with portion to the middle point of the chin. The mentonian ridge describes a silhouette of intermediate form, between quadrangular and rounded, of etiology to be specified by the pathologist. A physical evaluation was made of the lower and upper mandibles, periodontal evaluation and radiological studies with radiopaque images offered by a relative. In this sense, from the study of both mandibles it was estimated that both match the images shown on the X-rays provided by a relative of the victim; as well as with the pre mortem information.

After the anthropologic and dental evaluation, a DNA extraction was performed from a tooth corresponding to the second lower left molar, which was found in good state of preservation. The extraction of the dental pulp, the dentin, and the radicular canal was made without damaging the external structure of the tooth. Purification of the DNA was made using the PrepFiler Kit with BTA (Applied Biosystem), while the reference sample of the alleged relative, which consisted of blood contained in a FTA support, was made following the manufacturer’s protocol (Whatman). The amplification of the samples was made using the IndentiFiler Plus kits (Applied Biosystem), and PowePlex 16HS (Promega), in thermal cycler MasterCycler Pro (Eppendorf), and a Genetic Analyzer 3130XI (Applied Biosystem) was used for the allocation of alleles. The Maternity Index
was calculated, and the probability of Maternity (in absence of the father), statistical calculation made
with PatPCR software, using the frequencies for the Venezuelan population described in the
literature.

Likewise, bone remains being studied were subjected to a detailed observation, in search of
traumatic injuries and their origin, so as to establish the possible cause of death.

**General Results of the Analysis of Bone Remains**

The Forensic Anthropological study of the characteristics of the bone remains allowed to
establish that the individual was a male, with an incomplete ossification process, consistent with a
subject that has not reached bone maturity, proper to young individuals, with a bone age that ranges
between 16 and 18 years, with an average age of 17 years at the time of death. The estimated height
calculated by regression formulas was 175 centimeters, approximately. The racial affinity was
established to be mixed, and of medium build in terms of physical constitution, but with a tendency
to robust. Table N° 1 shows a comparative summary between the *pre mortem* data provided by the
relative, and the osteoanthropologic diagnosis of the *post mortem* study.

The Forensic Dentistry analysis of the mandibles allowed to establish that the bone remains
studied showed characteristics consistent with a male body. In the physical evaluation of the
mandibles for identification and to determine possible traumatic injuries, on the upper mandible a
loss of bone tissue of traumatic origin was observed, corresponding to the right anteroposterior
portion, of the whole alveolar ridge of the Upper Mandible, with ascending fracture lines that reach
the upper end of the mandible sinuses. On the anterior portion, also, fracture lines are ascending
and reach the nasal septum, with a total loss of the nasal bones. On the left quadrant there was a loss
of bone tissue, corresponding to the whole extension of the alveolar ridge, until the first upper left
molar. The second molar was intact and an empty alveolus that corresponded to the third molar.
This tooth was out of its alveolus, and as an interesting detail, there was a lack of consolidation of its
apical thirds. Also, the lower mandible showed a mandibular body of moderate size, fractured at the
level of the middle line of the symphysis menti, and both parts are completely intact. Visible
periodontal clinical signs found on both mandibles at the level of the alveolar crests of the alveolar
ridge, as well as minor abrasion on its clinical crowns, the lack of consolidation of the apical third of
the third molar, the inclusion of the third lower right molar are common for an individual that at the
time of his death was approximately 17 years old, with a six-month tolerance, (Image N°4).

The upper mandible on the right quadrant showed four teeth described next: First molar
with rampant caries throughout its coronal extension, with a carved cavity class I, where it is
presumed was an amalgam filling. Second and third molar, which were included with partial eruption
of their crown, and radicular remains corresponding to the canine. The old *pre mortem* lack of the
First Premolar generates an edentulous space. *Post mortem* exodontias of the following teeth were
observed: first premolar, lateral incisive, central incisor. On the left quadrant: there was evidence of four teeth: the second and third molar, fractured radicular remains at the level of the medium third of the crown, corresponding to the canine and first premolar. An edentulous space of approximately 1.00 centimeters was observed in the posterior area, which corresponds to a pre mortem exodontia of the first lower left molar. Empty alveoli were observed, corresponding to post mortem exodontias of the following teeth: central incisor, lateral incisor, and second premolar.

On the lateral right radiological study provided by a relative, on the lower mandible there was a radiopaque image that matches a metallic filling with amalgam, which is found as class I, according to the Universal Classification of Glickman Black, located on the first lower right molar. On the second lower right molar, there are no images matching pathological processes, and on the third molar there is an image that matches coronal formation. The periodontal evaluation allowed establishing that the alveolar crest of the lower mandible has a horizontal reabsorption all along the alveolar ridge. Also, there are no traumatic or pathological injuries on the crowns of the teeth. The images shown on the X-rays provided by the relative of the victim are completely coherent in terms of the clinical observations present on the lower mandible, and so the pre mortem dental information provided by therelative of the deceased on the interview, and the radiographic study of the body, are completely coherent. On Table N°2 there is an identifying comparative summary of pre mortem dental records with post mortem dental studies.

On the other hand, the genetic profile obtained from the doubtful sample corresponding to the dental piece proved that the amplification of two alleles of the gene of the amelogenin, which is related to gender, and so the bone sample corresponded to a male individual. The allocation of the alleles was achieved for the 18 markers analyzed, both for the bone sample (doubtful), and for the reference blood sample (indubitable), and a match was observed between alleles of the two samples analyzed, for a filial relationship of mother and son. After the calculation of the Maternity Index, there was a probability of maternity of 99.944164%, which is a very high value when the Maternity Index is calculated without the father. This way it was concluded that there is a mother-son biological filiation between the bone remains and the mother of the missing person.

From the point of view of Pathologic Anatomy, two wounds caused by the shooting of one single projectile from a firearm were observed: 1) Entrance wound located on the base of the cranium, at the level of the temporal and clivus of the right side of the occipital, and exit wound on the left parietal bone, following an upward trajectory, from the front to the back, from right to left. 2) The entrance wound has an irregular shape, located on the base of the cranium, and with exit wound on the left parietal bone, with an upward trajectory, front to back, and right to left.

From the aforementioned information it was established that the cause of death was Severe Cranioencephalic Trauma, due to wounds produced by the passing of a single projectile shot by a firearm, (Image N°5).
Analysis

Anthropologic, dental, radiologic, genetic and pathological studies in the investigation of the case were essential, as they provided scientific evidence that contribute to establish the identity of the body, as well as the cause of death, after knowing and after the denounce about the victim’s disappearance was made.

From the comparative anthropologic-dental analysis of the bone remains and of the pre mortem data, there was enough conclusive evidence for the positive anthropologic and dental identity, where the coincidences between the general pre mortem and post mortem variables – gender, age, height, ethnic group, physical build – and particular and individualizing decisive elements of the anthropologic and dental identity – shape of the face, shape of the chin, shape and characteristics of cheekbones, nose and forehead -, as well as the findings of the dental study, match the pre mortem information provided by the relative (mother). This filiation is confirmed through genetic studies.

The anthropologic and dental analysis was of great importance, since through the selection of the most adequate bone sample the DNA analysis was made, taking into consideration that the collection and selection of a good sample allows the genetic analysis to yield a genetic identification profile to establish the hereditary-biological filiation, with a high level of certainty.

Additionally, the methodology for the extraction of DNA was developed by Forensic Dentist Victor Avidad, a Professional Expert of this Criminalistics Unit, which allowed obtaining the genetic material from the tooth, without damaging its structure, and preventing the presence of potential inhibiting components for the DNA amplification reaction. This demonstrates the importance of the work of the team and the search for solutions that can result in a scientific development.

Finally, the Severe Cranioencephalic Trauma was established as the Cause of Death, due to the injuries produced by the passing of a single projectile shot from a firearm to the head.

Conclusions

Team work performed by the forensic professionals and by the experts from the different areas of criminalistics allows the attorneys of the Attorney General’s Office to support the conclusive acts of the criminal investigation being processed, taking into consideration that, basically, the investigation reconstructs, determines and obtains a positive or negative certainty on the verification of a criminal offense, and during the commission of such crime, things and people leave behind traces and prints.
In the case studied, the identity and cause of death of an individual were established, achieving the immediate and ultimate goal of every criminal process, that is, establishing the truth of the facts by legal means, which is enough to demonstrate the extraordinary importance of the intervention of different professionals from different areas, that participate in every investigation process, from a criminalistics investigator to forensic professionals, attorneys from the Attorney General’s Office, and the judge, who has the power to reach a verdict with his/her decision, which shall be sufficiently motivated and based, precisely, on the conviction generated, among other things, by the work made by each of the experts.

However, the different situations and difficulties found during the criminal investigation, which starts from the unknown, through a complaint, can only get to the realm of what is known with the help of a team of humans, using to this end arguments and a logical methodology to establish the truth.

Considering that nowadays multidisciplinary studies are essential and indispensable for the investigation, the contribution of every expert in the areas of anthropology, dentistry, genetics, pathological anatomy, among others, is extensive in the study of skeletonized remains and decomposing bodies, and in complex cases such as massive disasters, and very especially in cases of violations of human rights. The multidisciplinary analysis yields, as its finished product, the most accurate and complete expert testimonies that provide evidence to the investigation of criminal offenses. This is possible only through the team work of the different disciplines, where the general atmosphere is one of understanding, and that pushes forward with increasing force in the search for the acknowledgement of weaknesses and errors, in the search for solutions to reach the implementation of safeguarding measures in the quality of expert, individual and team practice.

From all the information above, we highlight the importance that has to be allocated to the techniques implemented by these professionals when, in certain cases, it is not possible to apply the regular methods of identification, given the circumstances of the facts and the conditions under which the bodies or human remains are found, as every individual has a set of internal and external physical characteristics that allow to differentiate them at a certain point in time. To identify is to individualize these elements and compare them to other indicators obtained from the relatives of the victims.


<table>
<thead>
<tr>
<th>POST MORTEM RECORDS</th>
<th>PRE MORTEM RECORDS</th>
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<tbody>
<tr>
<td>Diagnostic Data gathered from the <em>Post Mortem</em> OsteoAnthropologic Study</td>
<td>Interview with the mother of the missing person</td>
</tr>
</tbody>
</table>

**Gender:** Male  
**Bone age:** the ossification process of the remains studied reflects a bone age proper to young individuals, which have not yet completed their ossification process, with a bone age between 17 and 19 years, and with an average age of 18 years.  
**Age at the time of death:** “according to the testimony of the mother, 18 years old.”  

**Reconstructed height:** about 171 centimeters.  
**Height:** “He was tall. About 170 centimeters tall.”  

**Ethnic group:** Mixed  
**Complexion:** olive-skinned.  

**Physical build:** bone remains that characterize an individual of lean physical build.  
**Physical build:** “He was skinny, but not weak.”  

**General shape of the head:** Medium: rounded with anteroposterior (brachycephalic). Medium height in norma posterior (mesocephalic).  
**General shape of the head:** “Medium.”  

**General shape of the face:** Medium face (mesopsida)  
**General shape of the face:** “It was medium.”  

**Forehead:** the forehead is steep, medium height and width. (Mesometopo). With moderate development or pronouncing of the frontal sinuses. Intermediate shape, between trapezoidal and rectangular.  
**Forehead:** “The forehead was medium, rectangular.”  

**Glabella:** the glabellar region or the space between the eyebrows, shows moderate pronouncing.  
**Glabella or space between the eyebrows:** “moderate.”  

**Shape of the orbits:** quadrangular and descending in the external lower angle (lower).  
**Shape of the orbits:** “they were quadrangular.”  

**Nose:** it is only possible to describe the bones of the nose (root and nasal crest). The bones of the nasal crest are robust, high and with medium length. The nasal root is high and deep. The nasal opening cannot be described, due to the loss of bone substance affecting the region.  
**Nose:** “the nose was big, but straight. What you call the crest is strong and not too long. The wings of the nose were narrow…”  

**Malar region (cheekbones):** pronounced bone development. Descending cheekbones and to the back. Also, it is necessary to specify projection or bulkiness on the central portion of the anatomic area described, which makes of this a notorious element of the living subject.  
**Malar region (cheekbones):** “they are moderate, but they showed…”  

**Chin:** projected, with moderate projection of the **Shape of chin:** “it was pronounced and tall, a
symphysis menti. The mental ridge describes an intermediate silhouette between quadrangular and rounded.

Table N°2. Identifying Comparative Of *Pre Mortem* And *Post Mortem* Dental Records

<table>
<thead>
<tr>
<th>POST MORTEM RECORDS</th>
<th>PRE MORTEM RECORDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostic data gathered from the post mortem dental study</td>
<td>(Testimonies provided by relatives of the missing person)</td>
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<td><strong>Dental Study conducted on</strong>: bone remains corresponding to the Upper Mandible and one Lower Mandible.</td>
<td><strong>Name of the deceased</strong>: unidentified case.</td>
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<td><strong>Gender</strong>: Male</td>
<td><strong>Gender</strong>: Male</td>
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<tr>
<td><strong>Dental age</strong>: the wear in the occlusal faces of the teeth present, as well as the moderate horizontal reabsorption of the alveolar crest of the mandibular body, the color of the dental enamel, and the cracks on the dental crowns, the lack of consolidation of the radicular apex of the third upper left molar, the impaction of the third lower right molar, reflect a dental age compatible with an individual of about 17 and a half years of dental age.</td>
<td><strong>Age at the time of death</strong>: 18 years old at the time of death.</td>
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<td><strong>Post mortem study</strong>: the first lower right molar shows rampant caries on the occlusal face.</td>
<td><strong>Relative testimony</strong>: remembers that the victim suffered from severe pain on the lower right region, caused by caries on the first lower right molar.</td>
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<td><strong>Clinical finding</strong>: on the first lower right molar there is a class I caries, with loss of calcified substance (caries).</td>
<td><strong>Radiographic study</strong>: on the radiography provided by the deceased’s relative, a radiopaque image was observed on the right cephalic normalateralis, compatible with an amalgam filling on the occlusal face of the first lower right molar.</td>
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IMAGE N°1: SHOWING: A) GENERAL VIEW OF THE SET OF BONES STUDIED; B) THE CRANIAL SET, WITH THE ABSENCE OF SOME BONE PORTIONS THAT AFFECT ANATOMIC REGIONS OF THE FACIAL MASSIF, SPECIFICALLY THE UPPER MANDIBLE AND THE FRACTURE OF THE LOWER MANDIBLE. ALSO, IT IS POSSIBLE TO OBSERVE FRACTURE LINES THAT CROSS DIFFERENT AREAS OF THE CRANIAL SURFACE.

IMAGE N°2. ELEMENTS EVALUATED FOR AGE: A) STERNUM; B) VERTEBRAE; C) PELVIS; D) FEMUR; E) HUMERUS AND SCAPULA; F) SACRUM; G) LONG BONES.
IMAGE N°3. THE PICTURE SHOWS ON A) PARTICULAR ELEMENTS OF THE PELVIC WAIST, SUCH AS PREDOMINANCE OF HEIGHT COMPARED TO WIDTH, SHAPE OF THE SACRUM, STRUCTURE OF THE ILIAC CRESTS, AMONG OTHER DISCRIMINATING ELEMENTS OF MALES. ON B) THERE IS THE STRUCTURE OF THE GREATER SCIATIC NOTCH, CHARACTERISTIC OF MALE SUBJECTS.

IMAGE N°5. VIEW A) FRONTAL, AND B) LEFT LATERAL, INDICATING, WITH THE HELP OF A GUIDE OR BALLISTICS ROD, THE INTRAORGANIC TRAJECTORY OF A WOUND CAUSED BY FIREARM, DESCRIBED FROM FRONT TO BACK, FROM BELOW AND UP, AND FROM RIGHT TO LEFT. ESTABLISHING THE FOLLOWING CAUSE OF DEATH: CRANIOENCEPHALIC TRAUMA DUE TO WOUNDS CAUSED BY THE PASSING OF SINGLE PROJECTILE, SHOT FROM A FIREARM.