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Research Article

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Evolution of Forensic Anthropology in Uruguay: A Comprehensive Analysis of Cases Over Three Decades (1992-2023)

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Abstract

The article provides an updated quantitative analysis of forensic anthropology cases in Uruguay spanning the period from 1992 to 2023. The number of cases has shown a significant and steady increase over three decades, rising from 14 cases in 1992 to 75 cases in 2023, with peak years observed in 2006 and 2013 at 91 cases each. The total number of cases processed by the Laboratory of Forensic Anthropology at the Judicial Morgue of Montevideo City during this period has reached 1752.

Established in 1992 to address a backlog of cases, the Laboratory has played a crucial role in the medico-legal system. All analyzed remains underwent assessments for sex, stature, and age at the time of death, with a focus on positive identification. In instances of positive identification, forensic anthropology analysis was conducted. This paper aims to delineate the role of forensic anthropology in the Uruguayan medico-legal system, trace the evolution and increase in case numbers from 1992 to 2023, and highlight its efficacy in the identification of human remains. The findings underscore the growing importance of forensic anthropology in Uruguay and its valuable contribution to the resolution of medico-legal cases.

Keywords: Forensic Anthropology Cases, Forensic Anthropology Laboratory, Identification, Uruguay, Skeletal Remains, Medico-Legal System, Positive Identification, Evolution of Cases, Backlog Resolution, Forensic Anthropologist

Introduction

Forensic anthropology had been one of the fastest growing of all forensic sciences, and its scope has been described by several authors [1-3]. Its growth in the US has been attributed to scholars such as Wilton M. Krogman and J. Lawrence Angel [4, 5]. T. Dale Stewart carried out much of the pioneering research, and Krogman defined the field [6, 7]. Other forensic anthropologists have also appreciated the importance of research and practical needs globally. The field´s growth has been recorded in many countries [6, 8-16].

The study of the facial surface has always been of high interest to forensic anthropologists when identifying human skulls [17]. Digital superposition is a standard method of identification used by forensic anthropologists worldwide [18]. The technique of skull-photo superimposition has been used to assist in the identification of numerous victims and is accepted in courts in many countries [19-33]. The scientific principles of this method were very well described in specialized literature [34-41]. Adding a computer to this technique dramatically improves it, adding several advantages and new possibilities [42-51].

In the last 30 years, forensic anthropology has been an active part of Uruguayan legal system [52, 53]. The Forensic Institute at Montevideo City assigns medico-legal studies to the Forensic Medicine Department. Autopsies and other types of forensic studies, such as anthropological, are carried out at the Judicial Morgue of Montevideo City by the resident forensic anthropologist [54]. The number of forensic anthropological cases has increased considerably since the 1992 inclusion of a forensic anthropologist to the medico-legal team. This eventually led to a higher rate of skeletal remains identification [16].

Since its establishment in 1992, the Laboratory of Forensic Anthropology has given assistance to the coroner´s office and legal authorities in several criminal cases involving the study of human skeletal remains [16].

Generally, forensic anthropology cases are submitted to forensic anthropologists by coroner´s office and legal authorities. When an identification is made based on a forensic anthropologist´s official report, the coroner signs the death certificate. Therefore, since 1992 the forensic anthropologist is an official consultant of the Forensic Medicine Department at Montevideo City [16].

It is crucial to note that before 1992, all recovered skeletal remains were buried with no name and any anthropology´s examination was made by the pathologist or the medical examiner. Since the creation of the Forensic Anthropology Laboratory at the Judicial Morgue of Montevideo City in 1992 more than 250 people have been identified by skull-photo comparison using digital superimposition technique. These identifications were later corroborated by dental or DNA studies.

The purpose of this paper is to present an update of forensic anthropology in the Uruguayan´s medico-legal system, the higher amount of cases and to show successful of skull-photograph comparison techniques to identify human skeletal remains.

Materials and Methods

The period analyzed was from 1992 to 2023. All cases were analyzed at the Forensic Anthropology´s Laboratory of the Judicial Morgue of Montevideo City. From 1992 until 2023, 1752 forensic anthropology cases were analyzed. The human remains came from all over the country, including Montevideo City. All cases were assessed for the estimation of age at death, stature, sex, racial affinity, cause of death, and eventually its identification. The condition of the remnants regarding decomposition and whether or not an identification was made was also noted. Most of the human remains were found in woods, fields, parks, rivers, and lakes. Another remains were recovered from others locations like burned cars, septic tanks, highways, construction sites, and abandoned houses. Those recovering the remains were typically police or civilians. Identifications when available were made from the Forensic Anthropology Laboratory at the Judicial Morgue of Montevideo City using skull-photo comparison techniques or by comparison of dental records. According to skull-photo superimposition techniques, two photographs showing frontal and lateral views are required for an accurate identification by this method. Photographs were then placed under the video camera and illuminated by white fluorescent lamps. The image was adjusted on the computer monitor, and it was digitized by the video mixer unit and stored in the computer a JPG file using a capture card device. Then, using a computer and an appropriate software, some critical facial anatomical landmarks were traced [55]. Moreover, eight examining lines introduced by Cai and Lan were considered [39]. Respecting these landmarks and lines are captured using an application of the digital mixer outside of an appropriated software. The skull is illuminated by fluorescent lamps and placed under the video camera. It is then manipulated by a servo motor until its position is seized in that of the individual in the picture. After the skull has been adjusted in the optimal position, a photograph is captured and adjusted to fit as closely possible to that of the individual of the picture. Afterwards, the image of the skull is digitized using the digital video mixer unit and then stored as JPG file in the computer. Then, both images are stored in the computer (skull and photo) and superimposed using an appropriated software for a more detailed comparison. This technique permits the desired combinations of skull-photo appraisal, including removal of soft tissue to view the underlying skeletal structures such the auditory canal, zigomatics, jawbones, nasal root, dentition, chin, skull contours and so on. The entire process may be the recorded by the computer unit and good quality photographs can be made by a computer printer to be attached to a forensic report.

Results

From the analysis period (1992-2023), the number of forensic anthropology cases increased from 14 in 1992 to 75 in 2023. About 59% of the cases from this period came from Montevideo Department, the smallest and most populated of the 19 Departments in Uruguay, having almost 2 million people within its scope 41% were from the rest of the country [56].

Forensic anthropology cases increased in the period analyzed (1992-2023) from 12 cases in 1992 to 75 in 2023, reaching a higher number of cases from 2006 and 2013 with 91 from each year. All instances where human skeletal remains were identified using skull-photo comparison techniques assisted by a computer as well as dental records reached 240 cases.

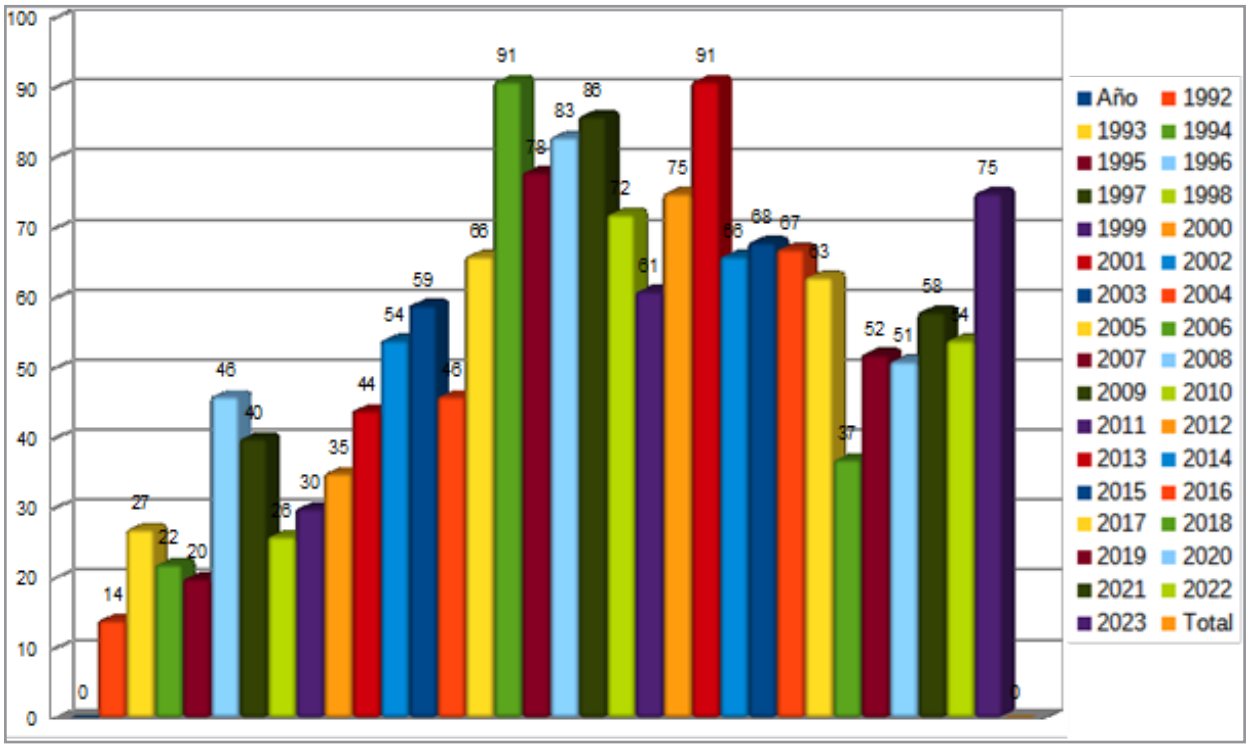

Figure 1: Forensic Anthropology Cases in Uruguay (1992-2023)

Discussion

The only accurate indicator of assessing a specific method's contribution to the field is to quantify its practical application. Before 1992, forensic anthropological studies were not given serious consideration in Uruguay. Human remains, when discovered, were analyzed by coroners or medical examiners with little or no training in forensic anthropology. Most considerations were reduced to the determination of possible cause of death. Generally, remains could not be positively identified, so they were buried as unknown. To solve this problem, the Forensic Anthropology Laboratory was created at the Morgue Judicial of Montevideo City in 1992.

Since its establishment as a section of the Morgue Judicial, the number of anthropological cases analyzed has been increasing. Thus, an upward trend is best illustrated by a modest number of 20 cases in 1992 that had gone up in a moment to 75 cases in 2023, reaching 91 cases by 2006 and 2013. Therefore, forensic anthropology has become an integral part of the medico-legal disciplines and its investigative branch worldwide. The scientific contributions of forensic anthropology to identifying human remains and solving crime have been written up in literature by many scientists. It has been shown that participation of a trained forensic anthropologist can contribute considerably to the speedy identification of unknown cases and resolution of the crimes.

This paper shows that in Uruguay, the number of cases receiving expert evaluation has risen yearly over the last 30 years. This is due to the establishing of a forensic anthropology laboratory in the medical examiner's complex. Without a doubt, this increase in case studies can be attributed to the familiarity of the service this new field can offer to law enforcement agencies and coroners. The location of the laboratory at the Morgue Judicial of Montevideo allowed to medico-legal officers to have an easy access to this service. The rate of identification has also improved considerably is comparable to other statistics in the USA [57].

According to the judicial forensic anthropology´s files found at the Morgue of Montevideo City there were 1752 forensic anthropology cases from 1992 to 2023. In the majority of cases the remains were found by police or civilians in forests, fields, parks, lakes, or rivers. Some were found in burned cars on highways, or in abandoned houses. All of the forensic anthropology cases were analyzed to determine the number or people, age at time of death, sex, stature, racial affinity, stage of decomposition of the remains (fresh, advanced decomposed, burned, or skeletonized), and eventually when it is possible an identification was made. Skull-photo digital superposition was used for identification purposes with available equipment at the Morgue Judicial of Montevideo City, together with other methods like DNA, radiography, or dental studies. However, skull-photograph comparisons by digital superposition assisted by computers were the most helpful method used in identifying human skeletal remains in Uruguay from 1992-2023. This included a total of 240 cases which were solved and identified these techniques and, the number of people identified with skull-photo comparison techniques can be easily compared to that provided by others [57, 58]. This comparison of results confirms that the establishing of the Forensic Anthropology Laboratory at the Judicial Morgue of Montevideo has vastly enhanced the scientific community's ability to identify human skeletal remains in Uruguay.

However, the rate of identification in Uruguay depends of several facts. First, law enforcement agencies may not be knowledgeable about what pieces of data are relevant to help obtain an

identification. Second, identification may be difficult when no missing people have been reported. Factors of individualization are the process whereby a set of unique skeletal characteristics is matched with those of a missing person [2]. Therefore, an identification could not be established when there are no comparative records. Third, dental records are complicated to obtain in Uruguay, as well as many other countries in Latin America. This is because dental health is poor and minimally maintained by most people due to the high cost. However, forensic anthropological work has made a significant positive contribution to the medico–legal system in the last 30 years in Uruguay. The cases increased to a level obtained in other more technologically advanced countries [57, 58].

Conclusion

Today, forensic anthropology has been integrated into forensic teams in most of countries around the world. It is also working its way into medico-legal systems around the world. Scientific literature has described numerous times in which forensic anthropology has solved crimes or identified skeletal remains. It is essential to have a well-trained forensic anthropologist available when human skeletal remains are found, and identification must be made. The number of forensic anthropology cases has growth in Uruguay over the last 30 years, from 14 cases in 1992 to 75 in 2023, reaching the higher number in 2006 and 2013. Hopefully, in future cases, there will be an even higher percentage of identifications. All anthropological forensic investigations were commencing with initial observations about the sex, age, race and stature, time since death and cause of death. Skull-photo comparison was made by the digital superimposition using a computer. It showed sufficient consistency between the skulls and the facial photographs submitted for comparison. But the success in identification of human remains using skull-photo comparisons depends upon the quality of the submitted photograph as well as correct positioning of the skull and mandible. Although the remains were identified by skull-photo superimposition, results of another technique were used as evidences and incorporated in the final report, such as radiography, dental or DNA studies. The latter were consequently found to be agree with the identification based on skull-photo comparison. Forensic anthropological contributions to the Uruguayan medico-legal system have increased in the last 30 years. The number of cases in which identifications have been reached is similar to those of the US and European countries. It should be noted that according to actual tendencies, forensic anthropology cases are increasing. Among the reasons that explain this increase are the following:

a) The creation of the Forensic Anthropology Laboratory at the Judicial Morgue of Montevideo City in 1992, made it easier for medical examiners and coroners to contact the resident forensic anthropologist when needed.
b) Creating a full-time Resident Forensic Anthropologist position at the Laboratory in 1992.
c) The ability to have a trained forensic anthropologist working in a forensic team with medical examiners, coroners, dentists, and radiologists.
d) A better knowledge of the scope of this modern branch of forensic science by the medico-legal system as a whole.
e) The high percentage of positive identifications carried out by the Forensic Anthropology Laboratory from 1992-2023.

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