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Forensic Anthropology: Advancements in Conventional Field in New Millennium

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Abstract:

An overview of the function of forensic anthropology (FA) in the new millennium is provided in the following brief review. In this review paper author describe the role and novel developments of the area, with specific reference to the last five years, following an introduction that deals with the increasing definition of the discipline as well as the question of professionalism and training. Such advancements are covered in detail, with a distinction made between the function of research in forensic anthropology subfields that deal with human remains and subfields that deal with the living. It is important to note the developments and roadblocks that remain in the "human remains" arena in terms of determining species, postmortem intervals, sexing, aging, and attribution of ancestry. Standards in facial reconstruction and positive identification by bone morphology are required, and the anthropologist's expanding roles in spotting symptoms of trauma are also emphasized. Last but not least, the relatively new role of the forensic anthropologist in the field of identification of the living is described, despite the fact that research in this area is still underrepresented. These studies focus on the development of methods for recognizing faces (for example, in the case of crimes recorded by video surveillance systems), aging living people, or children depicted in pedo pornographic material).

Keywords *- Forensic Anthropology, Development, Recent Research, Identification, Human Remains*

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Introduction

It is crucial to define clearly what is meant by "forensic anthropology" before discussing the topic of recent research and breakthroughs in the field. Unfortunately, the phrase still conjures up images of sliding callipers and osteometric boards, which is an outdated image in the modern world. No matter who conducts anthropological techniques on human remains of forensic significance (a pathologist, an anthropologist, or a biologist), it must be acknowledged that forensic anthropology is a developing and diverse science, just like forensic pathology. One could even claim that it is the area of study that complements forensic pathology when it comes to human remains. The anthropologist must deal with the search and proper retrieval of the skeleton (using sub disciplines like forensic archaeology) as well as issues like identification and detection of signs of trauma which may lead to establish cause and manner of death in the same way that the pathologist deals with the human cadaver from the scene of the crime to determining time and cause of death. However, anthropological knowledge is increasingly needed in the identification and ageing of living people, in addition to its involvement in the study of the dead. All of this has been observed in the past few years when experts applied anthropological concepts to ageing juvenile offenders, identified bank robbers caught on camera, and determined whether alleged pedo pornographic victims were minors.

Since the definition of forensic anthropology is "the application of physical anthropology to the forensic context," it is obvious that the field is asked to address a range of issues that extends from human physiognomy to osteology, keeping in mind that the field is becoming more and more multidisciplinary and that working with other specialists is, in fact, essential **(Cunha *et al.*, 2006).**

Consider the case of human skeletal remains. The scientific and forensic communities have realised that there is a gap when human remains are discovered in a forensic scenario. For example, most forensic pathologists lack an anthropological and osteological formation, and classical anthropologists may not be accustomed to working with human remains that still contain soft tissue or that are discovered in a contemporary criminal setting. If we exclude ethnographists, cultural anthropologists, and geneticists who study human variation (although even here, the disciplines occasionally overlap), physical anthropologists have long been regarded as specialists in human osteology **(S. Black *et al.*, 2000).**

Therefore, the anthropologist's contribution to anything that comes from the forensic scenario "traditionally" deals with ageing, sexing, determining ancestry or race, stature, etc.; in other words, anything that is similar to what the anthropologist's task is when studying skeletal remains of ancient populations. Traditional anthropology, however, is insufficient in the forensic environment. Identification and cause of death are issues that forensic anthropologists must address. As a forensic discipline, forensic anthropology cannot be compared to forensic toxicology, forensic odontology, forensic botany, or forensic entomology. The body or specific body parts are all involved in these final few examples, or more generally, biological phenomena related to other sciences.

If we include the more recent uses of forensic anthropology, such as the identification of the living, the area of interest becomes even more. It may be thought of as a normal anthropological task to judge the similarity of two faces and identify the characteristics that would result in a positive identification that will hold up in court based on science; nevertheless, relatively few physical anthropologists are trained in the study of physiognomy **(Cristina *et al.*, 2000).**

Literature Review

Development of Forensic Anthropology in Modern Forensic Medicine

The two main areas of forensic anthropology's interest: the study of human remains and the identification of the living are summarized here in brief.

The study of human remains:

This area includes –

- **Search and recovery of human remains**

However, forensic anthropology becomes a key tool when it comes to recovering human remains from crime sites. In the case of skeletonized or partially skeletonized remains, severely burned bodies, and buried bodies, physical anthropologists are crucial personnel. The person assigned to watch, register, recover, and generally "take care" of remains that are quasi-skeletal, skeletal, or burned that are discovered on the "surface" must have experience in osteology. Lack of such knowledge could result in major mistakes like failing to recover skeletonized bones that wildlife had spread around the surface. It is vital to be able to swiftly complete an inventory of all human bones and be familiar with their identification in order to recover the full skeleton **(Lasseter *et al.*, 2003).**

- **Species identification—is it human?**

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- **Postmortem interval (PMI) and taphonomy**

In the past, **(Yoshino *et al.*, 1991)** used microradiography, electron microscopy, and microscopic spectrophotometry (to reveal UV-fluorescence) to evaluate the postmortem alterations in human compact bone. According to their hypothesis, a buried body begins to skeletonize five years after deposition, and histological changes to compact bones often start at about the same time. They established regression models for calculating the time since death using UV-fluorescence analysis. The potential for determining PMI from bone tissue has also been investigated using luminol testing. This technique is based on luminol's reactivity with blood remnants. Analysis of the chemiluminescence's intensity was done to determine how long it had been since death. The results revealed a relationship between intensity and time since death, but the technique needs to be applied to a larger sample in order to conduct a statistical test and determine its statistical significance, according to the authors.

Finally, research in recent years has concentrated on (a) seasonal effects of decomposition up to skeletonization; (b) observation of macroscopic features of bone verified the presence of features they never found present in bones less than 50 years old); and (c) the assistance of other sciences, such as forensic botany and marine zoology But if we look at the skeleton as a whole, the only way to determine PMI from bone is using chemical techniques that are currently being researched, like radionuclides and trace elements or synthetic radiocarbon **(Verhoff *et al.*, 2004).**

- **Building the biological profile**

The determination of age, sex, race, size, diseases, and other anomalies in order to establish a biological profile, or in other words, to produce the osteobiography, is one of the most traditional areas of interest for forensic anthropologists. Research in this area appears to have been fairly repetitively focused on validating traditional approaches among various populations. Regarding sex, papers discussing sexual dimorphism that may be found on many skeletal populations' bones, such as the patella, the tibia, and the foramen magnum, are still very common One intriguing study examined observer differences while utilising conventional sexing techniques like Phenice's triad Measurements and metrics of tibiae, femurs, sacral vertebrae, and coccygeal vertebrae (more interesting) of various populations are still frequently the focus of significant publications on stature estimation.

Similar observations can be made about race, though undoubtedly more research is needed in this area. Studies on racial variation in the mandible **(Buck *et al.*, 2004)** pelvis **(Patriquin *et al.*, 2005)** teeth **(Edgar *et al.*, 2005)** cranial non-metric traits **(Weinberg *et al.*, 2005)** cervical spinous processes **(Duray *et al.*, 1999)** and femur **(Wescott *et al.*, 2005)**have been interesting and do help with the challenging task of determining the ancestry of human remains. In conclusion, a future objective for the anthropological community should be to establish working groups to coordinate all research that uses traditional methods on various populations, especially with regard to sexing, ageing, and stature estimation, so that results may be gathered and published in a uniform and coherent manner.

- **Cranio-facial reconstruction**

This method, which is best known as "facial approximation," which can be carried either manually or using computer software, should only be used to pique the public's curiosity and lead to a suspicion of identity.

In the last five years, there has been a noticeable increase in the number of amusing and helpful publications that attempt to validate the utility of face approximation and improve its accuracy. Interesting information about the validity of forensic anthropology and the frequently observed absence of a relationship between facial approximation and improve its accuracy. Interesting information about the validity of forensic anthropology and the

frequently observed absence of a relationship between facial approximation and likeness assessments has been published by Stephan and Henneberg **(Stephan *et al.*, 2006**) and Stephan **(Stephan, 2002).**

- **Positive identification of human remains.**

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In light of this, it will be possible to compare the morphology of the skeletal elements visible on the radiograph with the same osseous elements belonging to the human remains if antemortem radiographs of the various osseous districts (for example, head, thorax, limbs, abdomen, etc.) are available (working both on the actual osseous elements and on their radiographs).

- **The study of the living**

The challenges of pedopornography, age determination, and living person identification are three areas where forensic anthropology is demonstrating its expanding potential.

- **Identifying the living**

Anthropologists are becoming increasingly frequently involved in cases involving the identification of the living.

These situations frequently occur if the only information available for identifying a suspect is two-dimensional photos from video surveillance systems (showing robberies, assaults, etc.).

This is a completely independent branch of forensic anthropology, which studies human variability and aims to confirm the morphological and metric traits that distinguish one person's physiognomy from another.

- **Determining the age of individuals for reasons of imputability**

Living subjects without any form of identification are the situation here. They are frequently detained and claim to be minors. Depending on the crime and the country, an anthropological, radiological, and odontological assessment is needed to determine if they are likely overage or underage Although this topic relates to radiology, auxology, and paediatrics, it also falls under the category of anthropology because it touches on a traditional area of anthropology like ageing. In addition, the question of ancestry should be considered because geographic provenance may have an impact on growth rates. As a result, estimating an African's age using techniques that have been developed for northern European populations may introduce additional errors in the age interpretation process **(Prieto *et al.*, 2004).**

- **Determining the age of sub-adults in photographic material (pedopornography)**

Once more, medico-legal/anthropological evaluation can be used to evaluate two-dimensional pornographic imagery. The age of the kid or adolescent is commonly questioned, depending on the nation and applicable laws (if, for instance, they are under 10, 14, 16, or 18 years old). Given the high variability of facial and secondary sexual traits and the fact that they do not always correspond to chronological age, this is a novel and exceedingly challenging component of age estimate.

In fact, experts have warned against using common puberty stages, including the Tanner ones **(Rosenbloom and Tanner, 1998)**, to calculate chronological age since the late 1990s **(Greil and Kahl, 2005)** Additionally, an increasing number of scholarly articles **(Sun *et al.*, 2002; Parent *et al.*, 2003)** highlight the variations in sexual maturation rates across different geographic regions.

Result and Conclusion

In conclusion, this brief overview of contemporary anthropological applications demonstrates that forensic anthropology is expanding its reach into new and exciting topics in addition to establishing solid research in well-known areas.

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