

Investigation of forensic anthropology

Kevin Howley

20078896, 20078896@mail.wit.ie

Abstract

This paper gives an explanation as to what forensic anthropology is all about. I explain how the anthropologist works. It starts with identification followed by collection, analysis and finally presentation. In identification we see how the evidence is identified and deemed suitable for further research. The collection section shows how the anomalies are collected and prepared for analysis. In analysis we see how the anthropologist works to deduce as much information as possible from the remains. Then we see how the findings are written up and presented. In the case study, I go through a case that I researched and saw how the anthropologist plays an important part in finding out as much as possible in a real-world case. This paper gave me a great insight into the world of forensics and how such a specific role can be a real key to finding out what happened with the small amount of evidence at hand.

Keywords: forensic; anthropologist; anthropology; science

Introduction:

This paper will be looking at the field of forensic anthropology. Forensic anthropology is the application of anatomical science and its various subfields in a legal type setting. When human remains are found or perhaps it's a suspected burial, the anthropologist is called to gather what he or she can from the situation. Forensic anthropology is a very important field as it can determine from small amounts of remains that might be mutilated to a point that may be otherwise unrecognisable. There are many techniques used in this field to determine age, sex and lots of other identifying properties of a dead body and during this paper I'm going to discuss the most used ones. I will go through a case study to put some material to the theory I'll be discussing.

Identification:

The forensic anthropologist is called on to help in the identification of skeletal remains. Their knowledge of many identifying features is what makes them so useful. The anthropologist is well versed in the field of osteology which is the study of the structure of and function of bones in the skeletal system. As well as this they collect hair and traces of fibers. The scatter pattern of blood can also be organized to give more

information. The first thing the anthropologist does is try to determine if it is bone that they have found. Many things can be mistaken for bone when it has been sitting and gathering dirt for some time. Things like ceramic pieces can easily be bone without close inspections. To make sure that it is bone, the object in question is carefully cleaned and examined. Sometimes if necessary, the item is taken away to be investigated further under magnification.

The next logical step is to determine what they are dealing with is human remains. Sometimes this can be difficult because most mammals share a similar skeletal structure. By examining the size, shape and the general structure of the bone the anthropologist can determine if it's a human or not.

The next step is to determine what are the bones present. The bones found are normally laid out on a table in an anatomical position. This is useful because the anthropologist can work in a systematic manner. They can go through each bone and examine them for damage from trauma. The bone can also give clues to pathology and other historical traits from the body in question. Laying the bones in an anatomical position has more benefits. It allows the anthropologist to easily spot what is missing from the remains too, be it entire bones or just pieces.

These are the steps that are usually taken to identify bones on a scene. The next step which is

collection of data depends on whether it's a crime or not.

Collection:

Autopsy and DNA collection are the main methods that a forensic anthropologist uses to collect information. If the body found is intact, an autopsy is carried out to try and determine the circumstances that lead to the person's end. This is usually done by a pathologist but the anthropologist can oversee it to get some specific information they might need. An autopsy is useful because the investigator can get an insight to the person's health before death.

DNA collection is often used if the remains that have been found are suspected to be linked to a missing person. Hair and fibers are some common samples to take. The DNA is extracted and tested. By comparing the tests to what is on file they can make and identification of the DNA.

When an autopsy can't be carried out because of deterioration, the bones that remain will be used to collect what information they can. Trauma to the bone can indicate that some blunt blow was the cause or a deciding factor in the death. The anthropologist can also collect information on wounds that might have been sustained in the past. With the information they collect, it can be compared with what was found on the scene, possibly finding the cause of death.

Analysis:

The forensic anthropologist uses different approaches to analyze the bones that have been collected.

Usually they analyze what they've found to determine the gender of the person who's been found. The pelvis is probably the most useful bone structure in this examination. The anthropologist is looking for distinctive sexual dimorphisms. The pubic arch is the most telling feature along with the sacrum. In the male pelvis, the pubic arch is narrower and the sacrum is longer. In the female pelvis, the pubic arch is wider and the sacrum is shorter and pushed further back.

However, if the pelvis isn't present, the skull also has some telling features. Male skulls are almost always larger and thicker, while the opposite is true for the female skull. The ridges of the temporal line of the skull are also more pronounced on male also. It's very important for the anthropologist to go through all the determining features because there are

always going to be outliers when compared to what's expected of male or female remains.

The issue with analyzing the remains to determine gender is that most of the defining features don't appear until after puberty. This obviously implies that children can be very difficult to identify.

Also, the determination of age is also a part of analysis. Identifying children is usually not that difficult depending on the completeness of the remains. The bones in children haven't completely fused so when there are bones, it's a quick identifier of a child. To get the age of the remains to a more accurate number there are some other techniques used.

For example, the clavicle doesn't usually fully fuse until a person is roughly 25, therefore the person can be easily identified as 25 or older and vice versa. To determine the age of someone who is predicted to be under 21, the teeth are examined.

Determining the age of a fully-grown adult is the most difficult. One way is to examine the osteons of the bone under a microscope. These are constantly formed by the bone marrow even after the bones are fully grown. Older people normally have more an abundance of osteon fragments that are smaller and the opposite is true for younger people.

These are some of the ways that the forensic anthropologist analyses the remains they've collected.

Presentation:

The forensic anthropologist usually comprises a report to summarise their findings. In this report they say what they did, how they did it and what they think this evidence shows. The report is a critical part of the investigation because it must explain to a judge and perhaps a jury what the results of the investigation mean. The judge or jury wouldn't have been able to attend the crime scene and see the investigation first hand so the information must be 100% accurate. There's no real protocol that a report follows but the following scientific format:

- Report summary
- Background (how the author became involved in the case)
- Qualifications (why the author is qualified to give this report)
- Methods and material (they may include limitations)
- Results
- Interpretation

- Conclusions
- Bibliography

This is the report that is presented in court so it imperative that the information is correct and the report contains everything that needs to be contained.

Case Study

The case study that I have researched has not yet been solved but the forensic anthropologist still played a major role in finding out what they do know. I will explain in the coming paragraphs how this is so.

In 2004 a woman skidded off a motorway in New York, ending up in some thick bushes. After checking that she and her 3-year-old son were unscathed, she stepped out to try and contact some emergency services and a recovery truck. She had no phone so she knew she needed to flag down another moving vehicle. After stepping out she stepped on a skull. Following this she flagged down a vehicle on the Northern State Parkway, the necessary people were contacted and soon a forensic team was on site to investigate the remains.

Before long they had uncovered a fully clothed skeleton stuffed into a plastic bag. Their best bet to make progress was to try and make out how long the body had been there. The jacket that he was wearing a jacket from the 1980s; a Members Only jacket. The anthropologist on the case was called to try and determine what age and gender these remains represented. By examining the skull and skeletal structure the remains were associated with a male. Although when the skeleton was first recovered, they believed it was a child because he only would have stood at five feet one inch tall. This was later disproven. An examination of the skull and dental examination by the forensic anthropologist gave him an age between 35 and 55. Also upon further examination of the skeleton, he was found to have only a 26" waist.

The only clue to his identity was the Members Only jacket he was wearing. What was also presumed important was the watch he had too. It was an expensive piece so there was a theory that he might have been a jockey. This was reported to Thomas Hughes, the senior investigator. They got in contact with the race tracks, Aqueduct and Belmont, but they came up with nothing. They reckoned that his height would help the investigation given that he would've been shorter than 99% of American males.

To this day no one has solved the case. It is said that the body might have been buried in the 80s. Back then there were very few computer based records so the authorities have had to sift through warehouses worth of paper records.

The point of this case study is to show how the anthropologist could determine the age, gender, stature and even waist size. I personally find this very interesting because so much information can be deduced just from examination of what bones remain.

Comparison with forensic pathology:

Forensic anthropology and forensic pathology differ in a few ways. I will discuss this in the coming paragraphs. Although they work differently, it's often to achieve the same goal as an anthropologist, to determine the cause of death of a body.

The forensic pathologist is a fully qualified medical doctor who has decided to specialize in forensic pathology. A forensic anthropologist doesn't always need the full doctor qualification.

The pathologist usually works with mostly intact bodies while the anthropologist only works with bones and skeletal remains. The pathologist does autopsies so that's where the full medical qualifications are required. They must be fully competent to know where organs are supposed to be, what intact ones look like and what to look for in discovering anomalies that might lead to some essential information in the case at hand. They must try to determine the manner of death based on what sent them to their death. This can be difficult if it is something like a poisoning. For argument's sake, let's say it's a bullet wound to the head. In this case they will try to determine whether it was a homicide, suicide or an accident. If they are unable to come to a conclusion, they may report it as undetermined.

Similar to an anthropologist, the pathologist will also document any wound that were previously undocumented. Such incidents may arise only under autopsy such as the discovery of signs of internal bleeding or perhaps bruising.

The pathologist has a very important job in any case where someone has caught their end. They differ from the anthropologist as they usually deal with bodies that haven't been left to decay as long. That's why the anthropologist still has a very relevant job because they are better at deducing from just skeletal remains in most cases when compared to the pathologist. So, to conclude this section, you can see that the two roles are both imperative, just in different cases.

Conclusion:

To finish up this paper I will leave with a few points. We can see from this investigation that the forensic anthropologist is an important cog in the metaphorical forensic science machine. We saw how they identify, collect, analyze and present their findings. The case study I researched showed how some of the topics I discussed can be applied to real life situations. Lastly, the anthropologist was compared to the pathologist, perhaps the most notorious field in forensic science. I personally found the anthropology field one of the most interesting because they can obtain so much information just from skeletal remains, be they ancient or relatively recent. I hope some of the interest can be portrayed to you, the reader too.

References

En.wikipedia.org. (2017). *Forensic anthropology*. [online] Available at: https://en.wikipedia.org/wiki/Forensic_anthropology [Accessed 2 Oct. 2017].

Qrius. (2017). *Forensic Anthropology*. [online] Available at: <https://qrius.si.edu/explore-science/jump/forensic-anthropology> [Accessed 2 Oct. 2017].

What Do Forensic Anthropologists Do? | Forensic Anthropology Center. 2017. *What Do Forensic Anthropologists Do? | Forensic Anthropology Center*. [ONLINE] Available at: <https://fac.utk.edu/what-do-forensic-anthropologists-do/>. [Accessed 02 October 2017].

Simon Fraser University Museum of Archaeology and Ethnology; and Teaching and Learning Centre. 2017. *Anthropology / Resources / INVESTIGATING FORENSICS*. [ONLINE] Available at: http://www.sfu.museum/forensics/eng/pg_media-media_pg/anthropologie-anthropology/. [Accessed 03 October 2017].

Actforlibraries.org. 2017. *Forensic Anthropologists Evidence Collect Evidence | Actforlibraries.org*. [ONLINE] Available at: <http://www.actforlibraries.org/forensic-anthropologists-evidence-collect-evidence/>. [Accessed 04 October 2017].

Autopsy - Wikipedia. 2017. *Autopsy - Wikipedia*. [ONLINE] Available at: <https://en.wikipedia.org/wiki/Autopsy>. [Accessed 05 October 2017].

Sex differences in human physiology - Wikipedia. 2017. *Sex differences in human physiology - Wikipedia*. [ONLINE] Available at: https://en.wikipedia.org/wiki/Sex_differences_in_human_physiology#Skeleton_and_muscular_system. [Accessed 05 October 2017].

NBC News. 2017. *New York mom steps on a skull, and opens a murder case - NBC News*. [ONLINE] Available at: <https://www.nbcnews.com/news/other/new-york-mom-steps-skull-opens-murder-case-f8C11422441>. [Accessed 07 October 2017].

Forensic pathology - Wikipedia. 2017. *Forensic pathology - Wikipedia*. [ONLINE] Available at: https://en.wikipedia.org/wiki/Forensic_pathology. [Accessed 07 October 2017].