

**BERTILLON SYSTEM: PAST AND PRESENT**- Nishtha Sharma<sup>1</sup>**ABSTRACT**

The body of a human being is a combination of various different systems. These includes the nervous system, muscular, skeleton, limbic, and the digestive system, which come together to form one and the most complex system of the human body that is a powerful phase of potential energy in the universe. With all of the functional systems of the human body, it can also be anatomized to show a system of various basic measurements that is known as the Anthropometric Measurements. Thus, anthropometry is the systematic assemblage as well as the correlation of different measurements of the human body. This system emerged in the early 18<sup>th</sup> century, where it was basically used for the purpose of identification of the criminals or the dead who are unrecognized or left unknown. It was once a very famous technique, which was developed by a French person, Alphonse Bertillon. This system uses various tools to complete the process of measurements and also serves various purposes at the same time. It has very important relevance in the history but for the present scenario, its use and relevance has major set back due to the advancements and innovation in different techniques such as the finger printing.

**INTRODUCTION**

The human on this planet belong to the same kind of species i.e., Homo sapiens but still there is about no two person who

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are congruent or same in their measurements and physical appearance, not even the hereditrinal and genetic indistinguishable monozygotic twins are similar in all of their attributes and features of measurable traits. These attributes pass through various changes from the time of birth to death, in healthy conditions or in the sickness or some skeleton issues as the body development depends upon various factors making difference in the framework proportions of the skeleton between different areas of the body. Thus, there is a need for some means of providing quantitative statements for the dissimilarity in such kinds of features. Anthropometry thus helps in this scenario as it is a science of giving a calculable statement of the format of the human body, i.e., anthropometry refers to the measurements of the human body, whether alive or dead. Even though there are various techniques in the organic anthropology but still the anthropometry had its own unique position and it particular about the same task. The traits of anthropometry are directly connected to the gender, the shape, size and form of the human being and these features are related to each other. Thus it is the systematic collection and association of the measurements of the human being. The principle on which this system is based on, are: "Measurements of various body parts do not alter after attaining the age of 21yrs", "there are no two individual who show same measurements in all respects". This system is applicable only on the adults section of the human race.

## **FORENSIC SCIENCE**

Forensic Science, a union of two separate terms - forensics and the Science, where the first term refers to analysis and

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examination executed in public, it holds a powerful judicial connotation and the subsequent word i.e., science which comes from a latin word 'scientia' referred to as knowledge. Thus, together, Forensic Science go as in the application of scientific techniques and procedure in solving of the crime. Forensic refers to exercise of some scientific principles which can be used in the investigation of the crime. Knowledge of forensic science furnish the examiner with the power to identify chances that would not be possible in some other circumstances. Thus, forensics science plays a very crucial role in the criminal identification.

### **CRIMINAL IDENTIFICATION**

Criminal identification is dependent on various scientific structure and has gained a legendary aspect with the hel[ of the police investigation. Scientifically criminal identification has been divided into two subheads - the old and conventional ways such as the Photography and the ANTHROPOMERTY, it rely on the apprehension of the suspect, after which the photograph and his physical measurements are taken. These descriptions are further used in the coming time to recognize the person again.

(a) **PHOTOGRAPH:** In the early 1840's, to keep the tracks of the culprits or accused or the suspects, police used photographs, such photos used to word as important ingredients of the investigators.

(b) **ANTHROPOMETRY:** The science of anthropometric measurements, also known as anthropometry was discovered in the late 19th century by M Alphonse Bertillon, who was then the chief of criminal identification for the police of Paris. This system was termed as the Bertillon system and it accrued a huge amount of support, acceptance and popularity throughout the world. It

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used diligent and ultra-careful physical measurements of different body parts to create a well-explained description. In the starting, this system, was used to help the investigator in determining whether the criminal was involved in any kind of crime before in the past and it was comparatively used very less for determining the identification of an unknown perpetrators. Thus, this system is broadly used as a tool for identification of the habitual offenders. It includes taking measurements of some definite parts of the human body and then categorizing that person into certain criteria.

Anthropometry is generally looked upto as a customary sys. thus making it the very basic method of the biological anthropology, still it has a clear strong and a long bond with the forensic science an is further making its grasp in the medical areas majorly focusing on the disciplines of the forensics. It is mostly objective and is depended on the skilled and highly trained anthropometrics and a new term was proposed, “forensic anthropology”. The field of Forensic anthropology and that of a skeletal biologist are inter providing as a good forensic anthropologist must be by definition, a good skeletal biologist . In his effort to re-construct the biological nature of individuals at the time of death, he used various method such as somatometry, cephalometry, craniometry and osteometry . His experience in studying pre-historic skeletons from archaeological sites and also modern skeletons came in handy.

## **HISTORY**

It was the 18<sup>th</sup> century that marked the rise of some scientific measurement techniques. By this time the people of scientific community had a great focus on the general differences and changes in the human beings which was due

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to the inspection and accommodation of the foreign lands. Various studies were done by the people of European countries which also led to a lot of development in the field of science, art and culture. Also within the domain of the scientific studies, a French scientist raised known as Alphonse Bertillon.

In the year 1883, Alphonse Bertillon was a pioneer who nominated a system of identification, known as the Bertillon system or the anthropometric measurements or anthropometry, which include a series of different body measurements and the physical description, it was also used as standard techniques for the purpose of criminal investigation. Anthropometry is the process of acquiring systematic measurements of the body of a human. The anthropometric measurements such as the size include height, weight, volume, composition of bones and muscles, description of the structure of the human body. Bertillon system throughout time had various scientific as well as pseudo-scientific manifestations, the measurements of the size, volume of the skull, study of different kinds of fossils, biological anthropological study, measurements of any jolt in the head or skull in order to forecast the mental attributes, general look and styles characteristics and shape, symmetry and size of face and the relational among different anthropometry as well as personal identification of any individual. The applications of bertillon system is hardly non controversial, it ranges from accurate scientific description and epidemiological analysis and efforts of rationalization of eugenics and overtly racist social movements.

Bertillon gave an analyzed report informing about his system but it didn't caught the interest and attention of the Prefecture, hence, they ignored it assuming that it was some kind of joke. In the winter of the year 1881, the retirement of the prefecture took place and it's substitution gave the accord by agreeing to execute the system. This system was officially acquired by the police of Paris, in the year 1882 and it spread with an incredible speed all

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over France, Europe and the other parts of the world. In the year 1887 it was launched in the United States by Major R.W. McClaughry, he was the warden of the Illinois State Penitentiary. Thus standardization of this system in the whole world basically meant that it is the first in the history where any person who has been properly classified can be identified at any later date.

Thus, Alphonse Bertillon developed and started the very well known system of the Bertillonage, also it is based on the very fact that there is the presence of several structures of bones in the human body and the system of this structure also provides a group of different measurements to every person who commits crime and such measurements often includes the height, stretch, head length, foot, ear, check width, bust, the cubit and the middle finger. This system of bertillonage was adopted by various European systems of justice, even if this system was helpful and famous but still it had many difficulties riddles in it.

**CASE:** Using Bertillon measurements a criminal under arrest was measured, evaluated and photographed. The complete task was made as a card and was indexed and was then place in the specific kind of categories. These categories are related to various offender and offence, therefore there was no difficulty to compare the new records to the already present ones and if any match was found, a new offence was thus entered into that criminal's card.

## **TYPES**

Anthropometry can be subdivided into Somatometry which includes Cephalometry and Osteometry which includes Craniometry

### **Somatometry**

It is in simple term the measurement of living body and the cadaver including head and face .Somatometry is considered as a major tool in the study of human biological variability including morphological variation .In the studies of morphological variations by nature a focus is in the variations within an among populations. Somatometry is useful in the study of age

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estimation based on body measurement in a given set of individuals assembles useful study should be dessembled selected will be well documented . The description can vary from specimen to specimen shall include data such as a bird death, age sex ending group, geographical occasions, social economic status etc. and point of note is that age shall be expressed in days upto the age of one month then after the decimen of year should be used applying if necessary tables further commutation. Atala and marshal described a method to estimate the chronological age of british boys and girls from different body segments using somatometric techniques. seven body measurement were used to estimate the chronological age of a child and the accuracy of the estimation and discussed applicability of the method on both live individuals as well as on cadavers. According to Olivier 19, Weiner and Lourie<sup>10</sup>, Lohman et al<sup>20</sup>, Hall et al<sup>21</sup> all the somatometry measurements including the measurements of the head and face can be used for estimating stature from different body segments.

### **Osteometry**

Is the measurements of the skeletons and its various parts i.e. the bones and skull and can be defined as a technique to take measurements of the skeleton system . Using this system the forensic scientist can compare the variations of skeletons systems and its measurements of different populations . Throw this techniques a forensic scientist can compare the measurements of the bonny skeletons in various populations it has been successfully used in the estimation of stature, age, sex and race in forensic as well as legal cases . These four parameters i.e. age, sex, race and stature are considered as the “Big Fours” of forensic anthropology. and various study have and are being done in this regard.

### **PURPOSE**

The most ultimate and most important aim of the forensic anthropometry or

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using anthropometry in the field of science is to provide help to the legal enforcement and law agencies in arriving to define the “personal identification”, in the case where there is the scenario of unknown human remains. The anthropometry or anthropometric measurements are generally used to evaluate the shape, size and other different composition of body of a human being. There are certain common methods that are used to ascertain these measurements such as the BMI, the Skin- fold test, the bioelectrical impedance and the waist-to-hip ratio. The goal of forensic anthropometry is to examine and evaluate the age of an individual at the time of death, the stature, the type of body i.e., whether samatotype, sex of the person and any more features bases on various physical and the skeletal measures in order to indentify the deceased person.

Anthropometric measurements are found helpful in many different fields. Like for the athletes it is understood that their body size and body composition are very important factors when it comes to their sports performances. Different sports coaches also tend to use these anthropometric measurements to keep track of the body of an athlete, so that they can make sure that the athletes stay at the best level of the physical shape.

There are certain or we can say almost all the professional health care takers depends on these measurements of the body to record and examine the overall health of their patients. For example, the BMI or known as the Body Mass Index, is the measured value that is derived from the mass and height of the person. It is the mass of the body divided by the square of the height of the body and is expressed in  $\text{kg/m}^2$  as units. Different agencies like the agencies that provide Health care, the government agencies and the insurance agencies often uses the BMI regulate whether a person is obese, undersized or bulky. Anthropometric measurement can also be a life saving technique as it includes different measurements that may sometimes be

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linked to some atrocious diseases, like diabetes or heart diseases or certain form of cancers.

The system of anthropometry can also be used while doing the study of the group of people. This benefits and creates a broader approach to allow researchers to examine and record the health conditions and various concerns relating to health among different populations. For example- the anthropometric measurement i.e., the scientific evaluation of human body was used to record and evaluate the nutritional aspects and conditions of children in various countries which are considered as under developed. Such measurements also have some other use like to determine the presence of the undernutrition and examine the requirements for nutritional support. The Bertillon system had numerous benefits to police agencies and it also can have certain effects to deplete the hierarchy of the professional offenders, however some can be excessively optimistic or premature.

### **Anthropometric Tools**

The anthropometric measurement is used in various kinds of positions such as:



a) Standing position- 

b) Sitting position- 

c) Supine position- 

### **Tools**

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To acquire the anthropometric measurements, various specific kinds of specialised and exclusive tools are used.

- i. Anthropometers: these are used to measure the length and the circumference of the various segments of the body.
- ii. Stadiometers: these measures the height of an individual
- iii. Biocondylar callipers: this instrument is used to measure the bone diameter
- iv. Skinfold callipers: this measures the subcutaneous fat and the thickness of the skin
- v. Scales: measure the weight

These instrument looks as if they are very simple in its use but a very high level and special kind of training is required to reach an accuracy and valid results of these measurements

### **Factors to be considered**

1. Descriptive data- this includes factors that can be described in an individual such as:
  - Colour of skin
  - Colour of iris
  - Colour of hair
  - Shape of nose, chin and the ears
2. Body marks- this tells about any marks which are present on the body of human that can help to identify a person. For eg.
  - Tattoo marks
  - Birth marks

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- Moles
- Scars

### **Complications and Demerits of Bertillon system**

#### Complications

The anthropometric measurements often results in some kinds of complications. These complications includes a very common one i.e., the error in recording or measurements as it is evidential to make mistakes in measurements of weights as generally the abdominal obesity is in high in proportion in the population of obese. Such errors can occur due to the difficulty in evaluating the bony structural landmarks in the patients of obesity. Other cause of any kind of error in the measurements might be the non-uniform manner of accessing the measurements.

#### Demerits

There are few demerits of the anthropometric measurements such as:

- Limited scope after attaining certain age.
- It has now been replaced by the finger print system .
- This system has now been outdated and the only measurements still made as a routine is the weight and height of the individual.

### **The relevance of Anthropometric Measurements in Historical scenario**

Ancient anthropometry includes the civilisation of ancient Rome, Greece and Egypt using the anthropometry to measure the cultural purpose to describe the beauty , strength and other various attributes of the human,.

During the period of Renaissance, i.e., the period of the rebirth of the cultural, artistic, economic and political scene of European countries,

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following the middle ages. It can be basically described as the time period from 14<sup>th</sup> to the 17<sup>th</sup> century. This period defines the relocation of the philosophy art and the literature, the anthropometry was applied to the different artistic kinds of work by the way of applying to human proportions. There are certain examples by of the use of anthropometry in the period of the renaissance, where on the one side is the work of the very famous artist Leonardo da Vinci who measured the human body by scrutinizing the corpse and on the other side, the other artists depended on the live model and the achievements of the history to acquire the anthropometric measurements. In the early 18<sup>th</sup> century, stature was mostly used as the replacement or we can say that it was used as an anthropometric measurement for the purpose of military, slavery or any other beneficial purposes. It was found that the emigrants of the North America displayed the stature of a shorter nature as compared to the others born on the land of America. Further, this discovery leads the people to the use of anthropometry to evaluate the health, nutrition and various other consequential socioeconomic factors, in particular to the time of the development and growth. As these factors like nutrition, hypoxia, pollution, infectious factors and many more other forms of psychological factors leading to stress are consociated with the different patterns of growth. In a way, the size of the stature accurately indicates information about the growth and development of the country and its people. Thus, the taller the stature is, it indicates the more of the increased wealth, whereas the weight in the modern population is the indicator of poor economic and social status. The anthropometric measurement, originated at the time when the, study of human biology and the evolution of the cultural aspects, energized and vitalised the interest in the organised portrayal of both the populations: the living and the extinct. Later, in the 19<sup>th</sup> century, the data collected under

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anthropometry was applied, by different scientist like social scientist in order to support the theories that were connected to the human biology and their race with other aspects of intellectual and different cultural growth and development. Also, a psychiatrist and sociologist of Italy: Cesare Lombroso, used the anthropometric measurements for the purpose of evaluating and categorising the inmates in the prison by looking at the physical evidence of the criminals. There is a wide range where the anthropometry was applied in the history, which includes:

- The anthropology of the biological human evolution.
- The Paleoanthropology
- The phylogeographical attributes such as the craniofacial and craniometry
- The purpose of criminology and the Forensic science
- The mental typology and personality development

These anthropometric measurements were used for various purposes such as to collect the epidemiological data, scientific information and also for the socio racist and eugenic agendas.

### **The relevance of Anthropometric Measurements in present scenario**

The anthropometry in the twentieth century, have various sub-disciplines one of which is known as the ‘morphometric’ which was demonstrated to depict difference in the size and the shape of humans within distant. This method of anthropometric measurement includes the use of multi adaptable statistics to evaluate the biological marks to gain the different characteristics of shape or angles. Now-a-days, the use of the computing technologies has helped a lot in the field of the evolution of the morphometrics geometry, which uses the strong computational methods to evaluate different characteristics. At

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present, the famous application of this is, analysing the bone density. The anthropologists and the criminologists still uses these anthropometric measurements which conferring the study of evolution of the human body with the level of competition to the fossils remains for the purpose of archiving the specimens and the forensics. Also its currents applications are:

- Architecture
- Industrial design
- Clothing
- Ergonomics
- Medicine

In such industries the data of the anthropometry is very valuable to optimize products and evaluate the various changes that works in response to the genetic, ethic and other factors of the lifestyle.

According to the report of W.H.O., the anthropometry is the one and only most valuable, portable and accepted and applicable to the whole universe, also being inexpensive as well as non-invasive technology for examining the size and composition of the body of a human being. It informs about the health and the stats of the nutrition level of the body and forecasts the performance as well as the health of the human being. Thus, this report represents the conclusions of the WHO Expert Committee for the present time and gives the recommendations to follow in the future and at last the interpretation of the anthropometric measurements. Due to various other advancements and innovation in the technologies at present, such as the finger printing, the facial recognition, retina scans etc, the methods of anthropometry has gone old school and some how have lost their uniqueness and its importance. Such advancements have led to the set back of the anthropometric measurements in the field of forensic science. Thus, mostly

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in the present scenario, this method and techniques of the anthropometry are not of much use.

## SUGGESTIONS

The suggestions are that, this system of anthropometry must not be thrown away, just because there are some new techniques in the market as this is unfair. Even this technique can be useful in some or the other matters where the recent available techniques can't be used like, in the absence of the dermal layer it is not possible to gain finger prints, thus the anthropometric measurements come in use. Thus, this technique with some advancements can also be used in the present scene.

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