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# Establishing the Identity of the Dead from their Skeletal Remains

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**Abstract:** ***Identification is establishing the individuality of a person - living or dead. The identity of the dead is an essential part of post mortem examination for civil, criminal and humanitarian reasons. In partial/ incomplete identification, only some aspects of the individual such as race, age, sex, stature etc. are determined. Taking on the lead of partial identification, the police establish absolute identification. The police from a nearby district of Uttar Pradesh had brought a bundle of bones to the Department of Forensic Medicine, Institute of Medical Sciences, Banaras Hindu University, Varanasi in the month of November, 2022. A woman had gone missing about 4 months prior to this from that town, and the husband had raised suspicion on seeing the clothes and accessories that the bones might belong to his wife. The police had approached us requesting to identify the victim, the cause of death and establish the time since death. After a thorough post - mortem examination, it was established that the bones belong to a human female of age between 21 - 24 years. The bones had nibbled edges suggesting animal bite after death. The time since death was estimated to be about 4 - 5 months, based on the skeletonized condition of the body. The bones did not show any signs of injury, so the cause of death or manner of death, or mode of death could not be deciphered. The findings of the case had matched with profile of the victim. It once again proves the power of the knowledge of forensic osteology in providing a closure to the dead.***

**Keywords:** Skeletal Remains Identification, Forensic Anthropology, Biological profile, Race, Age, Sex

## 1. Introduction

**Identification** is defined as the determination of the individuality of a person living or dead. There are *two* types of identification:

1) **Absolute/Complete/Full:** 100% identification
2) **Partial/Circumstantial/Incomplete/Probable**

Identification is *necessary* in: (i) ***Civil cases*** - E. g., Death benefits, disputed sex, inheritance etc.

1) ***Criminal cases*** - E. g., Interchange of babies in hospital, impersonation, to establish corpus delicti.
2) ***Humanitarian grounds*** - E. g., Dead person has a right to be disposed of with the ceremonies of his own religion.

Here, we will look at the mainly the forensic aspect of osteology.

## 2. Case Background

On 20th October, 2022 **Mr. K,** a police guard received news that skeletal remains were seen in the forest around the Arangi hills. He immediately filed a general diary at his police station. **Mr. P,** a police officer at the same station had a missing case of **Mrs. S (Wife of Mr. R)** under him, that was filed 3 months prior to this. **Mr. R** was informed immediately and he raised a suspicion that the skeletal remains might belong to his wife. On 22nd October, 2022, the skeletal remains were sent to a District Combined Hospital (DCH) for post - mortem examination. **Dr. Z** received the following along with the skeletal remains: - One sari, One petticoat, One mala with locket, One pair of ladies' slippers and One cloth band for hair. The doctor sent the bones along with a tuft of matted hair to BHU for expert opinion. **Mr. A** was the police officer who brought a cuboid box made of steel with an orange handle to the Department of Forensic Medicine, IMS, BHU on 18th November, 2022 for expert opinion.

## 3. Case Report

On 21st November, 2022 the box was opened and inside it we found a big white cloth which looked like a dhoti. The cloth was sealed. After it was matched with the seal sample, the seal was broken and the cloth was untied. Inside it we found 24bones (Skull - 1, Ribs - 9, Vertebrae - 8, Sacrum - 1, Femur - 2, Tibia - 2, Fibula - 1) along with a tuft of matted hair. The bones were covered in mud and leaves. The bones were disarticulated. The bones were soaked in plain tap water inside a bucket from 21st to 22nd November, 2022, and scrubbed with detergent to get rid of the mud. The second autopsy was conducted on the dried off bones on 23rd November, 2022 by 4pm.

**Post - mortem Examination:**
The weight of the dry skeleton was 1.9kgs. The bones were arranged in anatomical position, before starting the post - mortem examination.


The first milestone was to determine whether these were actually human bones[1]. On looking at the skull, it was large bulbous with a small face. Orbits are at front, and above the nasal aperture (and not on the sides). Minimal nasal and mid face projection. The foramen magnum was inferior and centrally present. Human sacrum has 5 fused vertebrae, short and broad. In animals sacrum has 3 or 4 fused sacral vertebrae, long and narrow. Even though the sacrum is broken after 3rd sacral vertebrae, it looks more like a human sacrum. Femur is the longest bone and linea aspera is a single feature in humans. In animals, linea aspera is double or plateau. In human there is separate tibia and fibula. In animals tibia and fibula are often fused. This proves that the given bones are human.

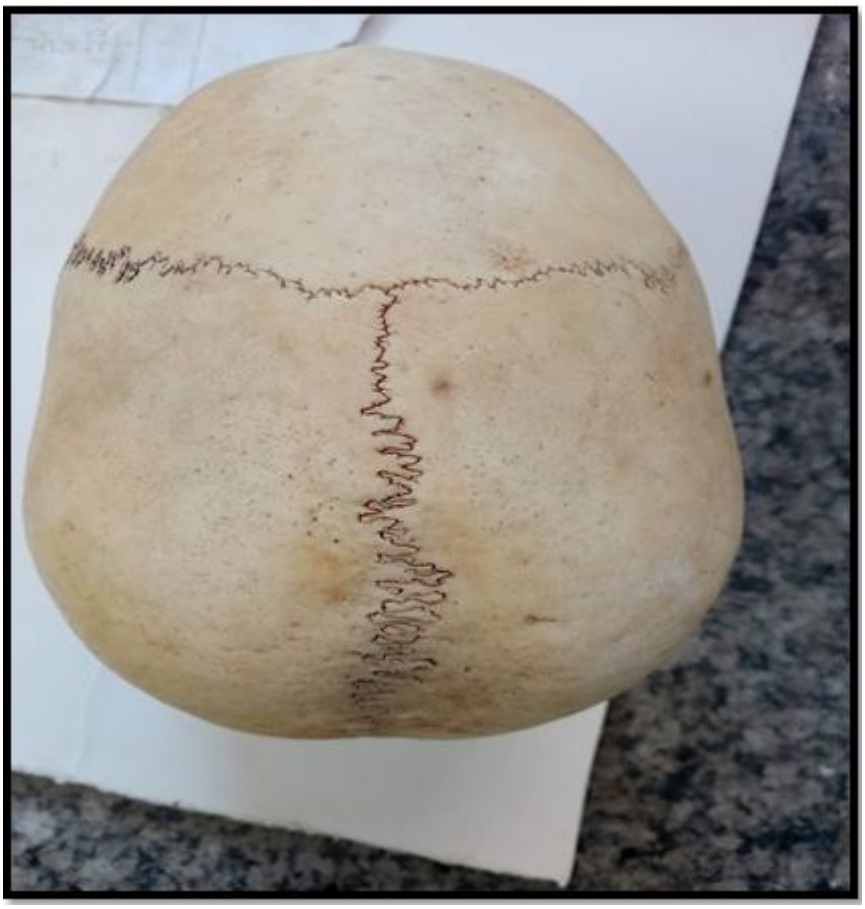
The second milestone was determining the sex from the bones[2, 4]. According to American anthropologist Wilton Krogman (1903 - 1987) the percentage accuracy of determining sex when long bones and skull is present is 96%[3]. On looking at the skull, forehead was fuller and rounded; a small glabella; orbital margins sharp; less prominent supra - orbital ridges; large frontal and parietal eminences; medially directed apex of the mastoid process; shallow digastric groove; small occipital condyles and parabolic shaped palate. The sacrum was short and wide with sacro - iliac articulation extending to 2 - $2^1/_2$ veretebrae. The Corpo - basal index of the sacrum= (Breadth of 1st sacral vertebra/ Anterior Superior Breadth of Sacrum) X 100 = (4.2/10.9) X100= 39. The Bicondylar width of femur is 54mm and it's Trochanteric Oblique Length is 375mm. Therefore, the bones belong to female.

The third milestone was determining the race from the bones[2, 4]. Cephalic Index/ Index of breadth is the ratio of the maximum width (B) divided by its maximum length (L). It was introduced by Andres Retzius in 1842. It is measured by spreading callipers. Spreading Callipers was made by Paleo - Tech Instruments, Wheeling, Illinois, United States in 1999.

| | | |
|---|---|---|
| **Cephalic Index=** | **Maximum Breadth (Right Angle to Sagittal Plane)** / Maximum Length (Summit of Glabella to Furthest Occipital Point) | **X 100** |

= (11.7/16.4) x100 = 71 (Dolicocephalic)

The fourth milestone was determining the age of the person at the time of death from the bones[2, 4]. On looking at the skull, the metopic suture was fused; the coronal suture, saggital and lambdoid suture had not started fusing ectocranially; the basi - occiput had fused with the basi - sphenoid and the 3rd molar had erupted on both sides. The sacral vertebraes had started fusing with one another but there is lapsed union between $S_1$ - $S_2$ vertebrae. The lower end of femur has united with shaft. The upper end of tibia had united with the shaft. Therefore, the age was determined to be between 21 - 24 years of age.



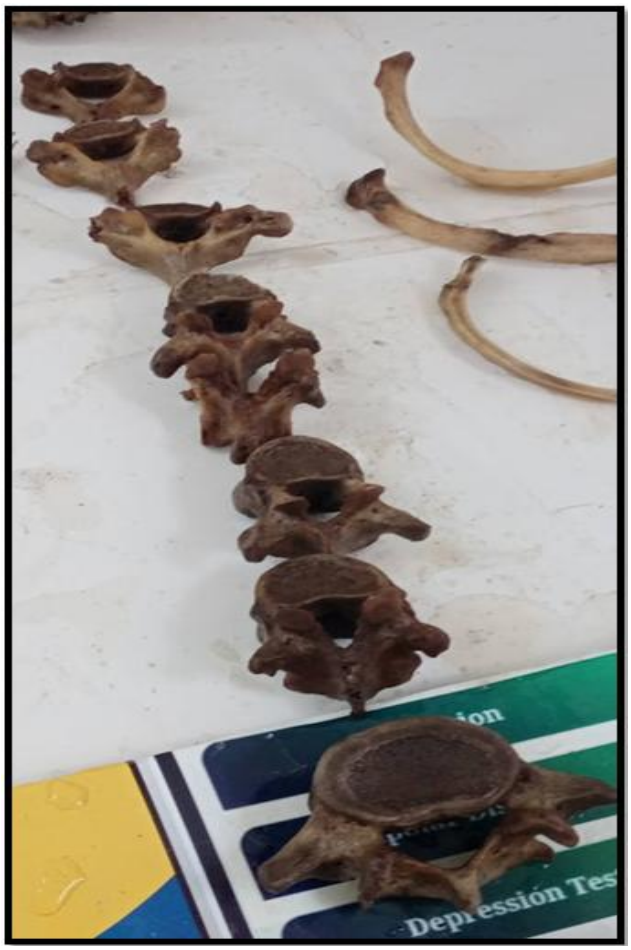
The fifth milestone was calculating the stature of the person from the bones[2, 5].

Stature= [3.6 x Length of femur] + 2.5cm (soft tissues)
= [3.6X 37.5] + 2.5 cm
=137.5cm= 4ft 6inches.

On studying the dentition, the dental charting was[2, 4]:

| Right | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16<br>32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 | Left |
|---|---|---|

This is on the basis of Cunningham's/ Universal notation (1883), which was without the use of grids. The teeth showed $A_1$. The teeth present is 16/0. The left molar 1, 2 and 3; and, right premolar 2 and molar 1, 2 and 3 are present.



The 8 vertebrae consisted of 2 cervical vertebrae, 3 thoracic vertebrae and 3 lumbar vertebrae. The broken edges of bones showed signs of gnawing.8cm of the sacrum was available, length of left tibia was 29.3cm, length of right tibia was 28.4cm and length of left fibula was 29.2cm.

## 4. Conclusion

The skeletal remains belong to a human female of age between 21 - 24years of age. The cause of death, manner of death (natural/accidental/ homicidal/suicide), mode of death (coma/ syncope/asphyxia) could not be ascertained. The bones have been disarticulated, devoid of soft tissues, along with signs of animal bites. The bones showed no signs of injury. The matted hair and a tooth has been sent for DNA analysis to Forensic Science Laboratory, Lucknow. We had advised the police to widen the parameter of their search, so that they could find the remaining bones.

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