

## Brazilian Journal of Forensic Sciences, Medical Law and Bioethics

Journal homepage: [www.ipebj.com.br/forensicjournal](http://www.ipebj.com.br/forensicjournal)



### Recovery of Human Skeletal Remains – Various Issues During Medico-Legal Investigation

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Received 8 February 2013

**Abstract.** The examination of skeletal remains is primarily a domain of forensic anthropology. In India since there is no such fully developed specialized branch, the cases are mainly dealt by forensic medicine experts and sometimes even anatomists. Whenever there is recovery of any human skeletal remains, not only it creates a lot of speculations from the general public but also attracts a lot of media attention. Besides, it poses a great deal of difficulty during medico-legal investigation when these are subjected to autopsy since police invariably is not in a position to provide the various background information about the case. However a meticulous autopsy and careful interpretation of findings although minimum in nature; is of extreme help in providing the important clues; which sets the investigation on the right track. The paper discusses various medico-legal issues with the help of three cases which were brought for medico-legal autopsy to mortuary, All India Institute of Medical Sciences, New Delhi, India. One was primarily a case of careless disposal of bundle of bones, other suspected homicide and third although was of natural death but time since death was questionable.

**Keywords:** Skeletal remains, medico-legal autopsy, forensic anthropology, careless disposal

#### 1. Introduction

The examination of skeletal remains is primarily a domain of forensic anthropology. *Forensic anthropology can be simply understood as the examination of human skeletal remains for law enforcement agencies to determine the identity of unidentified bones.* Every time a case of human skeletal examination comes, the autopsy doctors find the work undesirable and an uphill task. This is because of our

handicap in examining such a case in routine medico-legal practice due to lack of definitive guidelines or protocols on how to conduct and handle various exhibits when there is recovery of skeletal remains. The police personnel do not provide adequate history and there exists very limited laboratory and technical assistance. Whenever a forensic pathologist is called for a case involving examination of skeletal remains, he is expected to provide inputs in the identification of race, age, sex, stature, cause of death and time since death.

Many issues arise whenever there is recovery of human skeleton. Many speculations arise from general public because of widespread media attention. It adds unnecessary burden on police personnel in establishing identity as well as solving the case. Not only investigating agencies, even the forensic experts remain under intense pressure to tackle the case without the availability of required technical assistance. We report three such cases of recovery of skeletal remains which highlight various medico-legal aspects associated with it.

## **2. Case Series**

Three cases each with different issues were dealt at mortuary, All India Institute of Medical Sciences, New Delhi. Police brought the cases and were apprehensive whether they would get requisite clues from the autopsy team for solving those cases. These were:

1. Issue of careless disposal of bones
2. Case of suspected homicide
3. Case where cause of death and time since death were questionable

### **2.1 Case 1**

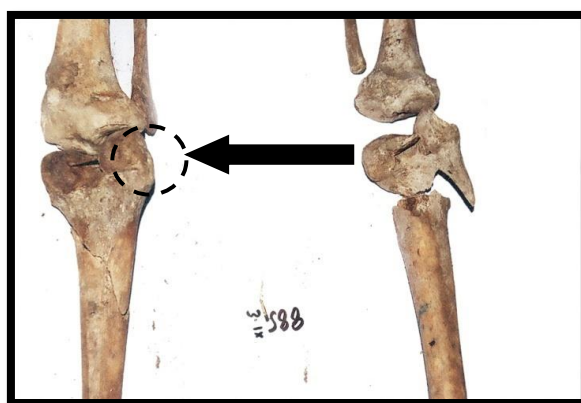
#### **2.1.1 Careless Disposal of Bundle of Bones (Figure 1)**

An Unknown, unclaimed bag containing bones were found in the dustbin by a sweeper early morning in the city. Immediately police were informed and after necessary proceedings, the bag was brought to the mortuary. Autopsy was conducted by a medical board. During autopsy, clean odorless bones, devoid of any muscles were found. A total of 36 bones were found comprising of a skull, two scapula, two humerii, two radii, one ulna, twelve ribs (seven of right and five of left side), two femurs, two tibias, two fibulas and few small pieces of bones. There was no vertebra in this bundle of bones. The right femur had a blue pen marking on it

corresponding to muscle attachment. One iron nail was present between the two trochanters of femur bone (Figure 2). Some of bones were varnished, suggesting that the bones were used by someone for study purpose. Overall the skeleton appeared to be of male aged >50 years.



**Figure 1.** Bones arranged in anatomical position and inspected at table



**Figure 2.** Varnished bones with arrow pointing at the nail.

On measuring the length of both humerii, it was found that both were of different individuals. Femur had a tuft of hair present around it, which were preserved for DNA analysis if required and handed over to investigating officer. It was opined that the skeleton had been used for anatomical teaching or study as evident by various markings. Thus the opinion about time since death as well as cause of death became useless in view of findings.

## **2.2 Case 2**

### **2.2.1 Suspected Homicide**

One unsealed plastic bag tied with a gauze piece was found unclaimed, at roadside near a farmhouse. Bag was emitting foul smell and found tied with a white cloth having a hole of size 30x14cms; with burnt edges. Investigating officer suspected

homicide due to suspicious recovery of bag. On examination, the inner aspect of bag was smeared with foul smelling brown stain and some plant material. Also attached to inner bag, was a tuft of hair. Inside the bag, all clothes were found smeared with brown stains emitting foul smell. The knickers bore a label “SPORTS KING” and the vest bore a label “DOLLAR, COMFORT 80cms” (Figure 3-A and 3-B). Spindle-shaped tears were present on vest over left chest region (4x2cm), inter-scapular region (11.5x6 cms) and three tears in the inter-scapular region on upper left side of size 1.5x0.5cm, 0.8x0.3cm and 0.3x0.2cm. An underwear was found wrapped around the hip bone (Figure 4).



A. Inner shorts

B. Inner banian

**Figure 3.** A and B. Exhibits found along with bones in bag.



A. Thoracic area of vest

B. Flank area of vest

**Figure 4.** A and B Arrows pointing towards spindle shape tears present on vest.

### 2.2.2 Examination of bones

On opening the bag following bones were found- Skull, all lumbar vertebrae with sacrum, left hip bone, both femurs and left tibia.

### 2.2.3 Skull examination

There was no obvious fracture, dental examination revealed upper jaw having- Right canine, Right 1<sup>st</sup> & 2<sup>nd</sup> molar both side erupted, and there was partially erupted 3<sup>rd</sup> molar on both side of maxilla. Lower jaw (mandible) was missing. Bone examinations also revealed the following features: Ridges –prominently marked, glabella prominent, forehead was steeper, fronto-nasal angle showed distinct angulation, orbits were square-shaped, along with prominent supra orbital ridge and prominent Zygomatic arch. Also frontal and parietal eminences were found to be prominent. Occipital protuberance was prominent. Mastoid processes were large, round and blunt with large occipital condyles. Palate was large, broad & U-shaped.

Examination of Left hip bone showed muscle attachment sites to be well marked, Pre-auricular sulcus directed laterally, acetabulum directed laterally, greater sciatic notch was smaller, narrower and deeper and ischial tuberosity was inverted. Pubis was triangular, ischiopubic-rami and suprapubic-rami were everted and subpubic angle was V-shaped. Examination of Sacrum revealed longer, narrower and well-marked promontory. Examination of femur bone revealed femur head to be larger, neck shaft angle as obtuse, condyles–Half a sphere and larger. On taking measurement with an osteometric board, length of femur bone of right side was 45.5cm and left side was 44.5cm and length of tibia as 37.7 cms with large condyles and well-marked muscle ridges suggesting overall features of a male. Radiological examination was also conducted which showed fusion of both upper and lower end of femur, upper and lower end of left tibia fused and eruption of 3<sup>rd</sup> molar i.e. age above 17 years<sup>1</sup>. Medial & lateral condyles, greater trochanter, head of left femur and lower end of left tibia were partially missing with animal gnawing and nibbling marks (Figure 5).

Stature was calculated using Eq. (1)<sup>2</sup>:

Stature = Multiplication Factor (M.F) x bone length wherein:

$$M.F = \frac{\text{Average height of the body}}{\text{Average length of the bone}} \quad (1)$$



**Figure 5.** Arrow points to show nibbling marks at ends of bones.

Multiplication factors used in India are based on works of Pan (1924), Nat (1931) and Siddiqui and Shah (1944)<sup>2</sup>. The multiplication factors used for a male for calculation of height, using different bones available in this particular case were as follows: Femur: 3.7, Tibia: 4.48<sup>2</sup>.

#### **2.2.4 Opinion**

Bones were of human origin, belonging to a male, aged more than 17 years and of approximate height 67.3 cm (as calculated with the formula for all three long bones and taking average of all readings). Cause of death was given by excluding blunt trauma to the supplied bone and probability of stab wound in view of findings of examination of clothing was kept.

### **2.3 Case 3**

#### **2.3.1 Time since death and Cause of Death**

A mentally-ill, 80 years female, living alone was suspiciously not seen since previous winters by her neighbors. She was discovered in completely skeletonized manner in her bedroom in the month of summer season i.e. August (India). She was last seen alive almost 8-10 months back. Examination of clothing (blanket, multiple layers, socks) gave a clue towards the season prevailed at the time of her death to be winter (Figure 6).





**Figure 6.** Arrow points to multiple layers of clothing along with blankets.

### 2.3.2 On Examination

All larger bones were intact whereas the smaller bones like phalanx were reduced to earth (Figure 7-A and B). There were no injuries, soft tissues were completely disintegrated and the whole skeleton was odorless. Grey colored scalp hair was found separated and found in-situ along with the skull on the pillow (Figure 8). Long bones were kept for extracting DNA for identification.



**Figure 7.** Skeleton found intact without any bony injuries.



**Figure 8.** Skeletal remains arranged in anatomical position and part of it reduced to earth (arrows).



**Figure 9.** Arrow points towards loosened scalp hair lying alongside complete skeletonized body.

### 3. Discussion (Medico-Legal Issues)

#### 3.1 Case 1

In present case, available skeleton had been used for study purpose and marking had been made by a medical student to remember anatomy. However it brings to fore the importance of proper disposal of bones used for anatomical study purpose. Medical teacher especially anatomists should teach students that they should not throw away human bones carelessly. There is also a need for proper guidelines for disposal of such bones, otherwise it will make the public suspicious and law enforcing agency will come in picture unnecessary<sup>3</sup>. Present case also created superfluous exercise to police and medical personnel. There were futile proceedings like formation of medical board and autopsy by a team of doctors. Throwing away of body parts is illegal & a person can be charged as per Section 297 of Indian Penal Code which reads as “Whoever act as a depositor for the remain of dead or offers any indignity to any human corpse shall be punished with imprisonment of either description for a term which may extend to one year or with fine or both”<sup>4</sup>.

#### 3.2 Case 2

Importance of meticulous autopsy along with examination of the clothing as well as other exhibits found with the body that provided significant clue towards the identity of remains as well as probable cause of death can't be overemphasized. In this



particular case, the manner of recovery of the skeletal remains in a bag found dumped on the farm clearly rules out accident and suicide. Considering homicide to be the manner, it was possible to rule out blunt trauma as there were no bony injuries. Since the clothing showed tears having clean cut margins, the possibility of stab wound to thoracic and flank region were kept.

### 3.3 Case 3

In this case the main issue was time since death apart from identification, cause and manner of death. As the person was living alone, wearing female dress, along with the scalp hair and the bony features pointing towards an elderly female, the focus of attention was time since death. It could be deduced from the clothing-blankets, socks and winter clothes that the person would have died during winter period. In India the winter period usually persists from November to February. Since the dead body was recovered in month of August; a rough idea could be made about time since death by retrospective calculation. Probably, the person might have succumbed to death during the winter season which corroborates with the dress material she was wearing and also the period of her being *last seen alive*. Skeletonisation had taken place and absence of odour suggested time since death to be at least 3 months<sup>5</sup>. Considering all the circumstantial evidences, it was opined that time since death would be around 6-9 months. Long delays in the discovery of bodies in houses often occur because the deceased will be socially isolated in life<sup>6</sup>. Regarding the cause of death, it was found that the scene was undisturbed and no external entry was detected by the crime branch officers. Whole skeleton was found intact along with the clothes and beddings undisturbed; no signs of foul play; the autopsy was therefore an exercise of exclusion where the focus was to search for signs of injury, and to identify manner of death which was most likely to be natural<sup>7</sup>.

### 4. Conclusions


Importance of proper disposal of *academically used* anatomical bones should be emphasized. This will avoid unnecessary attention from the public or media as well as added burden on police personal, doctor, laboratory & other associated workers; who are already overburdened with the cases. Medical students should be taught to not throw bones used for study purposes in careless manner and it should be properly disposed-off as per prevalent practice in the country/ region/ area and in India may be burnt as per *Hindu* rituals of cremation. Every civilized person must

show respect to the dead. Meticulous autopsy should be conducted in such cases with careful interpretation of circumstantial evidence including clothing, bones and other exhibits found at the crime scene. Examination should preferably be done with assistance from an anthropologist, anatomist and a forensic odontologist.

### Acknowledgement

The authors are highly thankful to Dr. Sunay Mahesh and Dr. Manish Goyal, Ex-senior residents who were part of the medical board which conducted the autopsy in these cases. Conflict of Interest: None

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