

Skeletal Identification

Report of a case

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The criminal investigation for bleached bones has been as yet by many authors. The observation and examination on the size of bones, condition of teeth, appearance of ossification centers, epiphysial union, suture closure, transformation of pubic symphysis, and vertically sectioned plane of humerus etc. have been carried out for the purpose of assuming age, especially from a skeleton. The authors here deal with a case that an attempt was made to presume age by means of X-ray photograph of the proximal end of humerus.

CASE REPORT

A cadaver of bleached bones was found at the mountin in N city, who was unidentified. The scene was a slope facing the south and the surrounding were well grown with shrubs and weeds. The bones were kept separate one from another and the clothes in rags and tatters there were found together.

The bones from which were collected without reserve were almost complete though one part of bones was lacked and the overlaping among them was not found at all. They were grey white or pale dirty brown in color and entirely dried up. Soft tissues were not remained.

IDENTIFICATION OF SEX

1) Skull

The skull having somewhat round appearance was slender on the whole. The mastoid processes are less prominent and the digastric groove less deep. The superciliary ridges are less pronounced. The result compared between the values measured on this skull and those of male and female skull in Japanese (according to Morita⁵⁾) is shown in Table 1. This skull was assumed to be the female taking the measured values and morphological features into consideration.

Table 1. Measurements of Skull and Lower Jawbone (mm)

	this case	mean of Japanese	
		male	female
length of skull	169	178.9	170.8
breadth of skull	149	140.3	155.9
height of skull	135	138.1	132.5
circumference of skull	500	513.7	493.7
median sagittal arch	357	371.7	357.6
breadth of cheek bone	129	132.9	124.9
height of face	115	123.8	115.0
breadth of jaw	92	96.9	90.3
height of jaw	57	62.6	57.6
angle of jaw	135°	127°.7	131°.3

2) Pelvis

The left and right pelvic bone and sacrum were jointed loose, so, after a suitable piece of cork was inserted to pubic symphysis and pelvis was restored to the original state, the measurement was made on it's various parts. The whole aspect of pelvis was felt light in construction; it's height is less, and the splay of it's walls less pronounced. The pubic arch was wider and rounder. The great sciatic notch was much wide, the sulcus prae-auricularis was broad and deep, and the sacrum was short and wide. Moreover, this pelvis was judged as being the female even from the mesured various values. (Table was omitted)

3) Humerus and femur

Humerus and femur were considered to be the female, because the diameter of head, neck, and condyles, and the length of the external condyle were more smaller and smoother than those of male.

ESTIMATION OF AGE

1) X-ray photograph of the proximal end of humerus

As shown in Fig. 1, the authors took X-ray photograph of humerus for the purpose of estimating age. Humerus generally was rich in the radio-translucency and the degenerative changes were found showing atrophy and rarefying of the bony tissues. In head, the rarefying of bony tissues was slightly found, it was possible to pursue each of the individual shadows of trabeculation. In tuber major region, the bony tissues were loosely connected and became sparse. In diaphysis, the radio-translucency increased and the structureless medullary cavity extended to

near epiphysial line beyond surgical neck and metaphysis. The lateral and medial aspect of proximal epiphysis was of cylindrical shape.



Fig. 1. Roentgenogram of the proximal end of humerus.

2) Observation on the vertically sectioned plane in proximal end of humerus

The degenerative changes were found showing atrophy and rarefying of substantia spongiosa, and the enlarged bone marrow formed a cylindrical shape in proximal end when humerus was vertically sectioned and observed.

3) State of bodies of vertebrae

The radial wrinkles were not observed on the bodies of vertebrae from cervical to lumbar vertebrae.

4) State of teeth

The incisors were lacked both upper and lower jaw. The alveolar bone of left and right molar and right 2nd premolar on lower jaw shrank into the shallowness. Therefore, we took it for granted that these teeth were lost before long when one lived. For the attrition of occlusal surface of remaining teeth, the spotted attrition attending to dentine was noticed.

5) State of suture closure

The sagittal and coronal sutures moved to near complete closure in a part and palate suture was of the same degree as those mentioned above.

ASSUMPTION OF STATURE

The measurement was made on the bones of arms and legs and the stature was estimated applying these measured values to Ando⁶⁾ and Koshinaga's⁷⁾ formula. The stature was approximately 150 cm in length.

ESTIMATION OF POSTMORTEM TIME

The factors regarding postmortem time, such as the bleached degree of bone, disintegrated state of clothes, circumstance, and season in the present time etc. was investigated first of all and from the result, postmortem time was assumed to be more over 3 months.

CAUSE OF DEATH

As postmortem changes were remarkably progressed and there was nothing but hard tissues, it was impossible for the cause of death to clear, but the fractures of bones were not found at all.

DISCUSSION

Judging from the morphological features and the measured values of skull and pelvis, this skeleton was considered to be the female and the stature was estimated to be approximately 150 cm in length.

The estimation of age in case of adults has been carried out about the attrition of occlusal surface of teeth, enlargement of bone marrow of proximal end of humerus, and radial wrinkles of the bodies of vertebrae. In this case, several teeth containing incisors have been already lost. Therefore, the number of remaining teeth was not enough to assume age according to the attrition of teeth. The union of head of humerus, being said normally to complete at 19 to 22 years old, was perfectly accomplished. The union between sternum and processus xiphoideus, being said normally to complete at over 40 years old, could not be observed owing to the corrosion of lower end of sternum and the loss of processus xiphoideus. The sagittal and coronal sutures moved to near complete closure in a part, but the degree of these suture closure seems to have wide individual variation.

Merkel¹⁾ has reported that the radial wrinkles in bodies of vertebrae are seen until 30 years old. Those of this case have been already vanished from the bodies of vertebrae until the lower part of lumbar. In the next, the investigation concerning bony tissues and enlargement of bone marrow of humerus is essential to the estimation of age. According to Koshinaga,²⁾ the age that in case of Japanese female, medullary cavity attains to epiphysical line is approximately 55 years old. In this case, medullary cavity has attained epiphysical line when humerus was vertically sectioned and observed. Hansen³⁾ indicated that the mistake in the assumption of age is caused in order that substantia spongiosa may be lost even on the perfectly bleached bones in the course of preparing the vertically sectioned plane of humerus and recommended the estimation of age by means of X-ray

photograph. Kanbe⁴⁾ took X-ray photograph in head of humerus of the healthy male and female and decided a available standard for the assumption of age, viz. being classified the state of union of epiphysical line into 6 types and the change of inner structure into 10 periods. In this case, head of humerus was rich in the radio-translucency. The atrophy and rarefying of bony tissues were also recognized as mentioned above. This bone was the equal of that of 8 period classified by Kanbe and the photograph was in accordance with those of the 41 to 48 years old female bones.

SUMMARY

This skeleton must have been the bone of a body and was identified to be human's one judging from the morphological features. The sex distinction was assumed to be the female taking the conditions of skull and pelvis and the various measured values into consideration. On the other hand, the matters mentioned below was each assumed: stature was approximately 150 cm in length, postmortem time was more over 3 months, and age was about 45 years old. The cause of death could not be assumed, because postmortem time was remarkably progressed and there was nothing but hard tissues.

REFERENCES

- 1) Merkel, H.: *Dtsch. Z. gerichtl. Med.*, **10**: 256, 1927.
- 2) Koshinaga, J.: *Jap. J. Legal Med.*, **5**: 113, 1951.
- 3) Hansen, G.: *Wiss. Ztsch. d. Humboldt Universität zu Berlin*, **3**: 1, 1953-1954.
- 4) Kanbe, T.: *Nagasaki Med. J.*, **38**: 820, 1963.
- 5), 6) and 7) cited from 8)
- 8) Hojio, H. et al.: *Hoigaku*, Kanehara Publishing Co. Tokyo, 1958.