

Early Modern Aristocrat Female Skeletons Unearthed from Ikegami-Honmonji Temple, Tokyo

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Abstract Three female skeletons were unearthed from Ikegami-Honmonji Temple in Tokyo. They belonged to Japanese aristocrats in Early Modern age, families of feudal lords. One skeleton (Enkoinden) was cremated, which obscured the morphology. Other two (Seikoinden and Koshoiden) possess an extraordinary narrow and gracile face, which was often seen in members of Tokugawa Shogunate, the highest aristocrat in Early Modern age. One (Koshoiden) of the other two skeletons demonstrates marked slenderness in all the postcranial bones, which is also common in members of Tokugawa Shogunate. It is inferred that these features were occurred due to unusually low physical stress in mastication, manipulation and locomotion during their daily life.

Key words: Human skeleton, Japanese, aristocrat, Early Modern, masticatory stress

Introduction

Historical Background

Traditional aristocracy in Japan was originally founded by the pedigrees of Emperors in the 7th century and they had a political power. But, from the 13th century, they lost their power, because Shogunate, a new military regime, emerged and Emperor became a puppet without any political power.

Japanese Early Modern age, Edo Period, was characterized by the long lasting reign of Tokugawa Shogunate (1603–1867). After the conquest of the first Tokugawa Shogunate Ieyasu, the relatives of Tokugawa Shogunate and the feudal lords who followed Tokugawa Shogunate gradually formed a new aristocracy.

Suzuki (1967, 1985) of the University of Tokyo studied seventeen skeletal remains from Tokugawa Shogunate families buried at Zohjohji Temple and reported that, during the reign of the Tokugawa Shogunate, their face gradually became extraordinary gracile and narrow, with poor development of alveolar bones and slight dental wear. He also estimated that the cause of the

change was mainly due to reduced masticatory stress by the intake of well-cooked soft food.

Moreover, Endo *et al.* (1967) pointed out that the members of Shogunate usually had slender postcranial bones, suggesting that they most likely have had no physical labor. That is, their daily life was far different from those of common people who bore considerable physical stress to survive.

Reburial of the Human Remains

Ikegami-Honmonji is a head temple of the Nichiren sect of Buddhism, in which various relatives of the Tokugawa Shogunate and other feudal lords were buried. In 1997, because of the renovation of the temple, skeletons of three aristocrat females, whose posthumous Buddhist names are Enkoinden-Nisseneiju-Taishi, Seikoinden-Myoshunichien-Taishi and Koshoiden-Myosennichiryu-Taishi, respectively, had been excavated and reburied later in the same places.

Interestingly, those burials vary a great deal in style, namely, a burial of cremated bones in two small urns, an original burial of the corpse in a wooden coffin, and a secondary burial of the

whole skeleton into a large urn. Basic descriptions of the skeletons had already been reported by the authors (Baba & Kajigayama, 2002).

In the Early Modern age, even in aristocrats, females usually had only an infant name and no adult name. They were often referred to as either daughter of someone, or mother of someone, or wife of someone.

Enkoinden-Nisseneiju-Taishi's Skeleton

Enkoinden had an infant name, "Nei-hime", which means Prince Nei. She was a formal wife of Tsunayosi Uesugi, the fifth feudal lord of the domain of Yonezawa. Her father was Mitsusada Tokugawa, one of the close relatives of Tokugawa Shogunate. Her younger brother was Yoshimune Tokugawa, the eighth Shogunate. This means that she belonged to the highest rank of aristocrats in that age. She died due to smallpox in 1705 at the age of 42. She had no children.

The tomb, in which Enkoinden was buried, is a kind of small, decorated temple constructed of

large stone blocks. The skeletal remains of Enkoinden were cremated and stored in two white urns of 25.8 cm and 13.2 cm in height. Some of the bones were taken from the urns and scattered in a stone coffin (Fig. 1).

Skeletal Remains

The bones are calcined, cracked, fragmented, shrunk, and warped, which implies that the bones were burnt with flesh attached at a high temperature (higher than 900°C) for a long time (Baba *et al.*, 1986; Krogman, 1962). The bones weigh around 1.6 kg, a little less than the weight of a usual cremated adult female skeleton, which is about two thirds of the average weight of dried female skeleton (2.9 kg; Lowrance and Latimer, 1957). So far as the identifiable bone fragments are concerned, there are no overlapping parts between bones. Thus, it is reasonable to infer that these bones belong to one individual.

Due to the change during cremation, usual morphological observations are difficult. The age at death of this skeleton is estimated as middle age (around 40 to 50 years) by the moderate de-



Fig. 1. Grave pit of Enkoinden. The cremated skeleton was stored in two potteries.

velopment of osteophytes on the bodies of vertebrae, which fits well to the recorded age at death of Enkoinden, 42 years.

The sex is determined as female by overall gracility, weak muscle attachments of the bones, and the presence of a deep preauricular sulcus, which implies several pregnancies (Igarashi, 1992). According to the record, however, Enkoinden had no children (Sakazume, 2002). This contradiction might be explained by the assumption that, since the preauricular sulcus is formed not only by childbirth but also by miscarriage after the middle stage of pregnancy, she might have had many miscarriages and no children. Otherwise, the record might be false. No traces of injury or disease were observed in the bones.

Seikoinden-Myoshunichien-Taishi's Skeleton

Seikoinden was a concubine of Mitsunao Hosokawa, the second feudal lord of the domain of Kumamoto, and the mother of Tsunatoshi Hosokawa, the third feudal lord of the domain of Kumamoto. She was a daughter of Tajima Utsui, a chief retainer of the lord of Hosokawa. Her infant name is "Kichi". She died in 1710 at the age of 92.

The skeletal remains were unearthed from a large wooden coffin stored in a large stone tumulus, resembling a small temple. She was laid to rest on her back, with her knee joints flexed, (Fig. 2). Besides the skeleton, there were very rich tomb furnishings, such as various lacquer boxes,

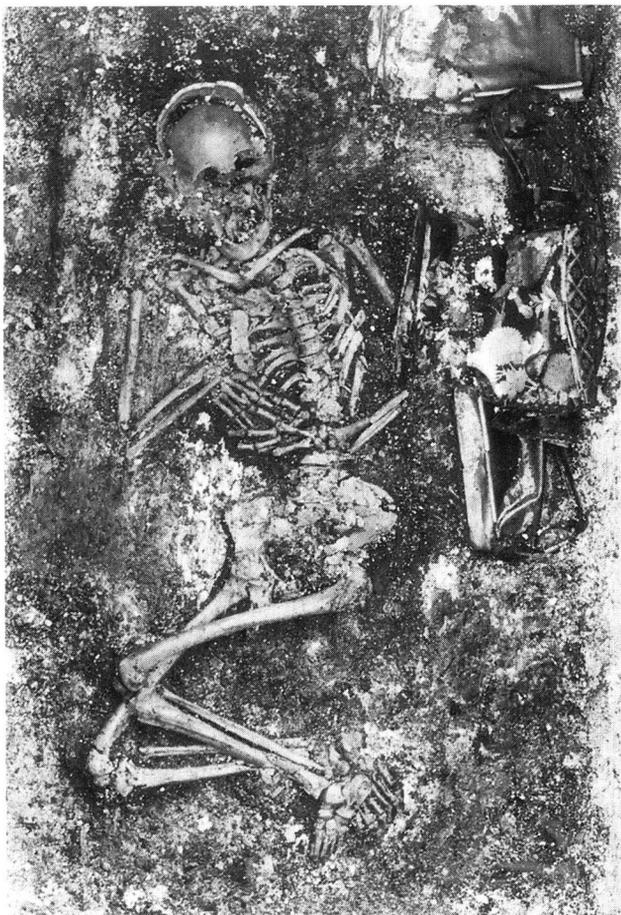


Fig. 2. Grave pit of Seikoinden. The whole skeleton was laid, with various grave goods, in a large wooden coffin.

incense sets, many ceramic puppets and so on. The skeleton looked to be well preserved in the coffin. But the bones were actually very fragile, consequently most of the facial bones and small postcranial bones were lost.

Craniofacial Skeleton

Main parts of the vault bones were present, such as the frontal, left parietal, left temporal and occipital bones (Fig. 3). But the frontal bone is not in contact with the parietal and temporal bones. The sagittal and lambdoid sutures are completely fused, which indicates the age of this individual was very old.

In the sagittal outline, the frontal bone is strongly curved, with projecting frontal tubers. Neither metopic suture nor its remnant are present. The left parietal tuber is pointed. The left temporal line is weak and situated low. The left supramastoid crest does not form a clear ridge. The left external acoustic meatus is small. These features suggest that this skeleton is a female.

The nuchal area is narrow and shows no clear relief for muscle attachment. There is no external occipital protuberance. However, the area between the superior nuchal line and the supreme nuchal line is projected, forming a low rounded mount, 4 cm wide transversely and 1 cm high superiorly. This mount is not like the occipital transverse torus caused by strong nuchal muscle development, as is seen in *Homo erectus* and archaic *Homo* skulls (Weidenreich, 1943). The cause of the formation of this mount might be related to certain stimulations by a hard pillow or habitual tying up of hair.

Above the orbits, the glabella and superciliary arches do not develop, showing female characteristics (Krogman, 1962). The zygomatic processes of the frontal bone are thin and do not protrude laterally but incline inferiorly. The superior borders of the orbital openings are curved, concave upwards. Inferiorly, most of the zygomatic bones were lost. The maxillae are fragile and fragmented. The zygomatic processes of the maxillae are thin, possessing a concave inferior border. The palate is long and narrow. It looks shallow due to

the absorption of alveolar bones.

The mandible is relatively well preserved. Only the right ramus was broken off. The corpus is high anteriorly and low posteriorly, indicating the feature in recent age (Kaifu, 1997).

Preserved teeth are shown in the following dental formula.

×	7	×	×	×	○	○	1	○	2	3	×	×	×	×	×
×	×	6	×	4	3	2	×	×	2	3	4	5	×	×	×

×: lost antemortem

○: lost postmortem

More than half of the teeth were lost antemortem and the alveoli were fused. For her advanced age, she possessed many teeth. All of the remaining teeth are only slightly worn (Broca's 1–2).

Postcranial Skeleton

The vertebrae and ribs are not well preserved. The clavicles are preserved only in diaphyses (Fig. 3). They are a little thicker than those of the means of Early Modern females (Table 1). Scapulae are not well preserved. The humeri lost the epiphyses. The diaphyses are medium in thickness and the deltoid tuberosities are flat.

The radii are also not well preserved. Their thicknesses are comparable to those of the average Early Modern females (Table 1). The interosseous borders of the radii are not projected. On the distal articular surface of the right radius, some osteophytes are seen. Only partial diaphyses are preserved in the ulnae. Their thicknesses are equivalent to those of the means of Early Modern females. The interosseous borders are partly projected, probably due to hyperostotic change in advanced age.

The pelvis is preserved poorly. The sciatic notch is wide, a female characteristic coxa. There is a clear medium-sized preauricular sulcus, which fits well to the records that she had two children (Igarashi, 1992; Hashizume, 2002).

In both femora, articular heads are missing. Their maximum lengths are estimated as about 395 mm, a little longer than the means of Early Modern females (Table 1). The stature was estimated from the maximum length as 150 cm by

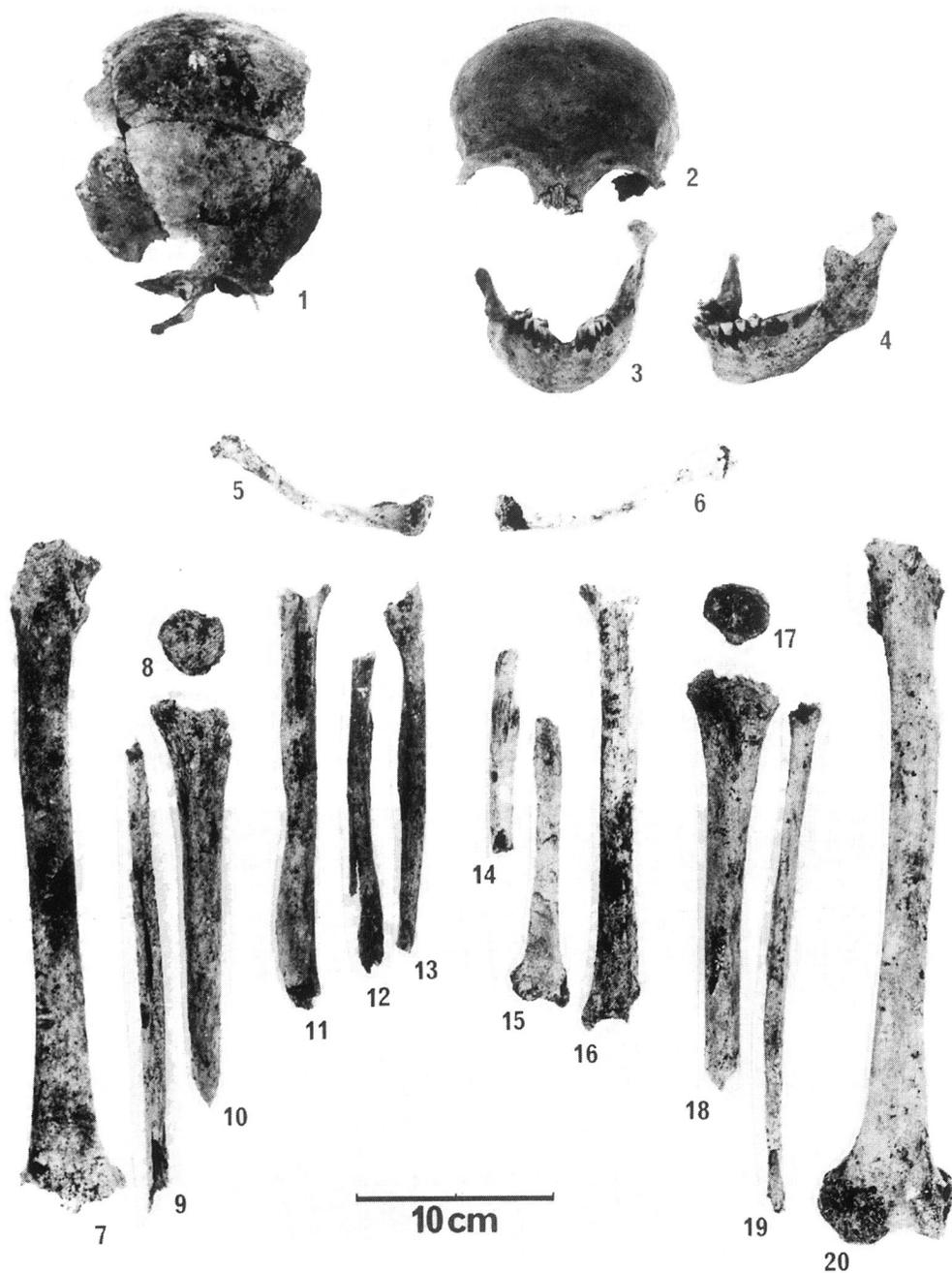


Fig. 3. Bones of Seikoinden. 1: left lateral aspect of the left parietal and temporal bones, 2: anterior aspect of the frontal bone, 3: anterior aspect of the mandible, 4: left anterior oblique aspect of the mandible, 5 & 6: superior aspect of the right and left clavicles. From 7 to 20 are in anterior aspects. 7 & 20: right and left femora, 8 & 17: right and left patellae, 9 & 19: right and left fibulae, 10 & 18: right and left tibiae, 11 & 16: right and left humeri, 12 & 15: right and left radii, 13 & 14: right and left ulnae.

Table 1. Comparison of postcranial bone measurements between aristocrat and common females (mm).

Items		Koshoinden		Seikoinden		Shogunate wives Endo <i>et al.</i> (1967) Mean	Early Moderns Endo <i>et al.</i> (1967) Mean	Recent Japanese See below Mean S.D.	
		left	right	left	right				
Clavicle	Max. length	—	(135)	—	—	129.8	128.0	130.0	8.9
	Vert. diam. middle	9.7	9.0	9.8	8.9	7.4	8.9	8.4	1.3
	Sagitt. diam. middle	11.4	12.8	—	12.1	10.6	10.4	10.8	1.4
	Circumference middle	32.0	33.0	33.0	34.0	32.3	31.0	33.2	3.4
	Cross. idx. middle	85.1	70.3	85.2	73.5	80.5	86.0	79.3	13.9
Humerus	Max. length	—	—	—	—	266.4	269.7	272.4	15.4
	Max. diam. middle	21.0	17.0	18.2	16.8	19.6	19.6	19.7	1.7
	Min. diam. middle	14.5	13.4	14.7	15.4	16.6	14.9	14.7	1.1
	Biepicond. width	51.3	50.5	—	—	50.9	50.8	—	—
	Least circumference	49.0	48.0	53.0	51.0	50.4	54.1	54.1	3.3
	Cross. idx. middle	75.9	78.8	80.8	91.7	69.4	76.6	75.1	5.7
Radius	Max. length	(200)	(202)	—	—	190.0	199.8	202.1	11.3
	Transv. diam. middle	12.6	13.1	14.8	13.5	12.9	13.5	14.1	1.3
	Sagitt. diam. middle	9.0	9.2	10.0	10.0	8.9	10.0	10.1	0.7
	Least circumference	30.0	31.5	—	34.0	32.0	34.5	34.7	1.8
	Cross. index middle	71.4	70.2	67.6	74.0	63.1	68.4	67.4	6.0
Ulna	Max. length	(215)	(218)	—	—	210.7	223.4	218.7	11.5
	Sagitt. diam. shaft	10.0	9.9	11.0	11.5	9.7	10.5	10.7	0.8
	Transv. diam. shaft	13.1	13.3	15.0	15.0	13.8	14.1	13.9	0.8
	Olecranon width	21.0	20.5	—	—	20.6	21.4	22.0	1.5
	Olecranon height	17.0	16.0	—	—	16.2	19.1	18.0	1.4
	Cross. index shaft	76.3	74.4	73.3	76.7	71.1	75.1	76.9	5.2
Femur	Max. length	(395)	—	(395)	—	368.9	377.9	381.8	18.0
	Sagitt. diam. shaft	21.5	21.9	23.0	23.0	23.4	24.8	24.5	1.7
	Transv. diam. shaft	23.2	22.2	23.5	25.0	22.4	24.1	23.0	1.7
	Circumference middle	70.0	70.0	72.0	75.0	70.6	76.9	73.8	6.0
	Cross. index middle	92.6	98.6	97.8	92.0	105.0	103.1	107.3	8.8
	Transv. diam. up. shaft	29.4	30.5	27.0	28.0	26.4	26.5	27.9	1.8
	Sagitt. diam. up. shaft	20.4	20.3	20.0	20.5	22.6	25.5	22.4	1.8
	Cross. index up. shaft	69.4	66.7	74.0	73.2	85.5	97.3	80.9	6.5
Tibia	Max. length	—	(320)	—	—	298.3	301.5	298.0	16.2
	Max diam. middle	25.7	26.0	23.5	22.5	23.6	25.3	25.7	1.9
	Sagitt. diam. middle	17.9	17.0	18.0	16.5	17.4	18.9	20.3	1.6
	Cross. index middle	69.6	65.3	76.6	73.3	74.0	72.4	78.7	6.7
	Max. diam. nut. for.	28.0	28.8	27.0	25.5	27.3	28.8	29.0	2.5
Fibula	Max. length	—	(315)	—	—	296.0	296.1	301.7	16.7
	Max diam. middle	12.3	12.9	13.0	13.0	13.2	12.8	13.6	1.2
	Min. diam. middle	9.3	9.2	12.0	12.0	9.0	9.4	9.5	0.9
	Circumference middle	31.0	30.0	40.0	40.0	36.7	37.3	39.0	3.2
	Cross. index middle	75.3	71.4	92.3	92.3	68.7	72.3	70.1	7.2

Clavicle: Takano (1958), Humerus: Nishihara (1953), Radius & Ulna: Ebina (1951), Femur: Ohba (1950), Tibia: Suzuki (1961), Fibula: Hukuda (1961).

Fujii's formula (1960) and 149 cm by Pearson's formula (1899). The diaphyseal thicknesses of the femora correspond to those of Early Modern females. In both diaphyses, the *linea aspera* is projected, forming a low pilaster.

In the tibiae, most parts of the diaphyses are preserved. They are moderately thick, a little less

than those of Early Modern females (Table 1). No sign of diaphyseal flattening is seen. In the fibulae, almost all of the diaphyses are preserved. They are a little thicker than those of Early Modern females and show clear muscle relief.

Koshoinden-Myosennichiryu-Taishi's Skeleton

Koshoinden was a daughter of Ihei Tsukiya-ma, a higher retainer of the lord of Hosokawa. She had two infant names, "Ben" and "Yuu". She became a concubine of Toshishige Hosokawa, the first feudal lord of the domain of Kumamoto. She was a mother of Nobunori Hosokawa, the fourth feudal lord of the domain of Kumamoto. She died in 1721 at the age of 69.

Her skeleton was stored in a large urn, 97.5 cm high, 85.5 cm wide, with some small grave goods, pieces of charcoals and mud (Fig. 4). The pottery was laid in charcoal layers in the grave chamber made of large stones. Since the skeletal remains were moved from a certain temple and reburied here in 1910, some parts of the skeleton were missing.

Craniofacial Skeleton

The cranium is almost complete, except that the right zygomatic arch is broken off and the mandible is deformed postmortem (Fig. 5). In the

superior view, the outline of the vault is rhomboid, with markedly projected parietal tubers. The coronal suture is not fused in outer and inner tables. In the sagittal and lambdoid sutures, the outer table is partly fused and the inner table is completely fused. The parietal foramen is not present in both sides.

In the lateral aspect, the frontal squama is strongly curved with marked frontal tubers, so that the forehead stands erect. The temporalis lines are faint and situated low. The supramastoid crests are not developed. The mastoid processes are short and thin. The external acoustic meatuses are elliptic and small. The suture pattern at the pterion is H in the right side, holding a small pterionic bone, and X in the left side.

In the occipital aspect, the outline is pentagonal, due to the narrowness of the cranial base (biauricular width: 119 mm) relative to the maximum cranial width (147 mm) which is situated very high (Table 2). This feature is also clearly seen in the skull of Seikanin (biauricular width: 112 mm, maximum cranial width: 144 mm), the wife of 14th Shogunate Iemochi Tokugawa, and



Fig. 4. Grave pit of Koshoinden. The bones were stored in a large pottery.

Table 2. Comparison of skull measurements between aristocrats and common people (mm).

Items	Koshoindein	Early Moderns	Shogunate wives	Recent Japanese	
		Suzuki (1967) Mean	Suzuki (1967) Mean	Mean	S.D.
1 Max. cranial length	179	175.4	171.4	170.8	6.8
5 Basion-nasion lth.	101	97.7	95.8	95.6	—
8 Max. cranial width	147	136.8	140.2	135.9	3.9
8: 1 Length-width index	82	78.1	82.2	79.7	3.9
9 Least frontal width	88	91.3	89.7	91.0	4.3
9: 8 Transv. fr-pa index	60	67.0	64.0	66.9	3.7
10 Max. frontal width	108	114.0	114.8	113.7	5.4
11 Biauricular width	119	120.9	120.4	118.8	5.3
12 Biasterionic width	111	120.9	106.6	118.8	4.1
13 Bimastoid width	111	99.2	96.8	97.6	4.3
15 Basioccipital width	24	—	—	—	—
16 Width of foram. mag.	29	28.3	26.1	28.4	1.9
17 Basion-bregma hgt.	135	133.3	135.0	132.5	4.6
17: 1 Length-height index	75	75.8	79.3	77.7	3.1
24 Transverse arc	340	313.8	—	313.2	10.6
40 Basion-prosthion lth.	96	96.7	93.0	94.4	5.9
43(1) Biorbital inner width	86	91.2	81.8	90.8	—
44 Biorbital width	88	95.9	92.7	94.1	3.4
45 Bizygomatic width	127	126.1	122.7	124.9	5.7
46 Bimaxillary width	90	94.8	89.5	93.5	4.4
47 Nasion-gnathion hgt.	115	—	117.6	115.0	5.7
48 Nasion-prosthion hgt.	72	59.5	68.2	67.1	4.0
46: 45 Zygomaxillary index	93	94.8	73.1	93.5	—
47: 45 Kollman's facial index	93	—	96.0	92.2	5.1
47: 46 Virchow's facial idx.	129	—	131.1	123.3	7.0
48: 45 Kollman's upper f. idx.	58	53.0	55.5	53.8	3.3
48: 46 Virchow's upper f. idx.	80	—	76.4	70.6	3.6
51 Orbital width	36	42.0	40.4	41.1	1.5
52 Orbital height	38	34.9	36.7	33.8	1.8
52: 51 Orbital index	106	83.3	90.9	82.4	4.4
54 Nasal width	27	25.1	24.8	24.5	2.0
55 Nasal height	54	49.5	51.6	49.0	2.7
54: 55 Nasal index	49	50.9	48.1	50.2	4.5
57 Least nasal width	8	6.8	7.5	7.1	1.7
57(1) Max. nasal width	19	17.5	16.7	17.5	1.7
57: 57(1) Nasal bone width idx.	42	39.1	46.5	40.7	9.7
65 Bicondylar width	(112)	119.8	115.5	115.7	6.2
66 Bigonial width	(95)	94.8	85.7	90.3	4.5
68 Mandibular length	69	71.4	66.1	—	—
70 Height of ramus	51	58.3	60.2	57.6	4.9
71 Width of ramus	30	31.1	31.5	31.1	3.3
71: 70 Mandibular ramus idx.	59	51.3	52.6	54.3	6.0

other female skulls of the highest aristocrats (Suzuki, 1967). The external occipital protuberance is not developed. The nuchal area is narrow and muscle attachments display faint relief.

Anteriorly, neither metopic suture nor its remnant is present. In the supraorbital region, the glabella and supraorbital arches are not developed at all. The zygomatic processes of the frontal bone do not protrude laterally but rather

incline inferiorly. There are supraorbital foramina in both sides. No *cribra orbitaria* is seen. While the nasion-gnathion facial height is 115 mm, the bimaxillary width is only 90 mm, resulting an extremely narrow face (facial index: 128), as in those of the other highest aristocrats, such as wives of the Shogunates (Table 2).

The orbital openings are extraordinary narrow, namely, it is higher (38 mm) than it is wide (36

mm), which is not seen even in Shogunate wives (Table 2; Figs. 5, 6). Although, the nasal bones are preserved only in the upper part, the bones might be high and narrow. The recess at the nasion is weak and the nasal bridge is nearly flat. The nasal aperture looks large for the overall size of the face. The nasal height is 54 mm, higher than the means of Shogunate wives and common Early Modern females (Table 2). The nasal width is 27 mm, a little wider than the means of other females. The nasal index is 50, intermediate between those of the wives and common females in Early Modern age.

The maxillae and zygomatic bones are small and gracile, with concave canine fossae and superoinferiorly narrow zygomatic processes. The remaining anterior teeth incline and project forwards, demonstrating marked alveolar prognathism, probably due to poor development of the alveolar bones.

The mandible became wider postmortem by unknown cause. There are many transverse cracks in the inner surface probably made due to the widening process. In the present condition, the bicondylar width is 140 mm, but originally the width might be around 112 mm, because the width between the right and left ectoglenoid processes of the skull is 118 mm.

The mandibular length is 70 mm, shorter than those of common females and longer than Shogunate wives (Table 2). The height of the ramus is 51 mm, much lower than those of the means of the other females. The width of ramus is 30 mm, equivalent to those of the comparative females. The mandibular angle is 146° , far larger than those of the others. This feature is interpreted as such that the mandibular ramus to which masticatory muscles attach is low and the face is high, consequently the mandibular angle becomes large. Severe alveolar prognathism is seen in the mandible, as in the maxillae.

About half of the teeth were lost antemortem, as shown in the following dental formula.

×	7	○	×	×	3	○	1	1	×	○	×	×	○	○	×
×	×	×	5	4	3	2	1	1	2	3	4	5	×	×	×

×: lost ante-mortem

○: lost post-mortem

The teeth are only slightly worn (Broca's 1–2), for her advanced age.

Postcranial Skeleton

Both clavicles are well preserved (Fig. 5). The bones are longer than the mean of the common female. The thicknesses of the bones are equivalent to those of the common females. Both scapulae are preserved only in the upper part. The scapulae of Koshoinden are narrow compared to those of common Early Modern females. The acromia are slender and show considerable hyperostotic change.

In both humeri, the articular heads are missing. The diaphyses are extremely thin, compared to the other females (Table 1). The deltoid tuberosities do not protrude at all. The radii are well preserved. The diaphyses are very thin and the radial tuberosities are narrow. The interosseous borders do not project. The ulnae are also completely preserved in both sides. The bones are thin and the interosseous borders are not projected, as in the radii.

The pelvis is poorly preserved. The sciatic notch is wide. There are many osteophytes around the lunate articular surface.

In the femora, some parts of the epiphyses are broken (Fig. 5). The estimated maximum length of the left bone is 395 mm, a little longer than the means of the other comparative females (Table 1). The diaphyses are thinner than those of the other females. Anterior curvature is slight in both diaphyses. The *linea aspera* does not project, consequently the cross-sections of the middle diaphyses are ellipsoid, a little flattened anteroposteriorly. There are many hyperostotic changes around the condyle articular surface, demonstrating the condition in advanced age. Both patellae are preserved, showing some hyperostotic changes.

The tibiae are well preserved, except the distal epiphysis of the right bone. The bones are longer and narrower than those of the comparative females. Muscle relief is not clear. The fibulae are

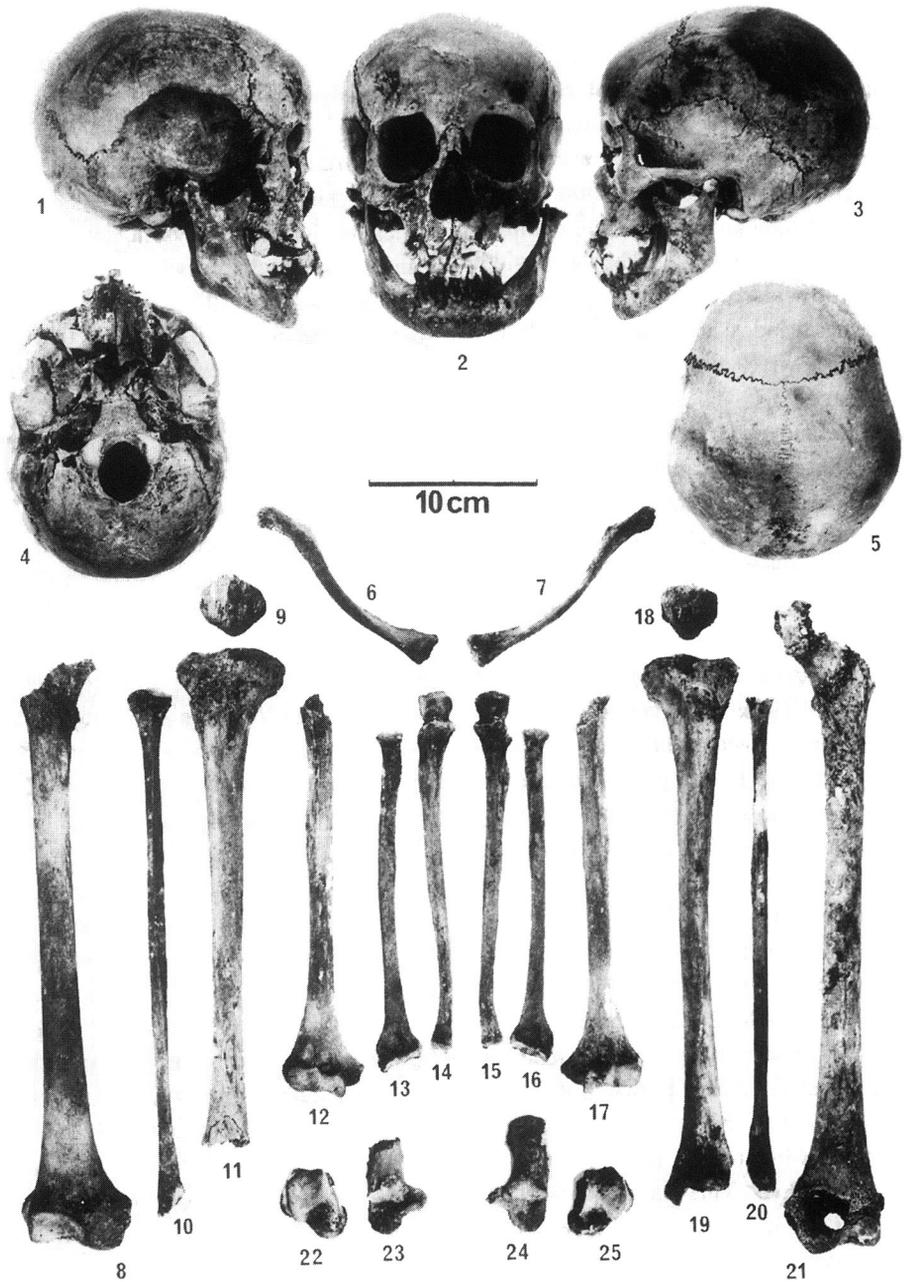


Fig. 5. Bones of Koshoiden. 1: right lateral aspect of the skull, 2: anterior aspect of the skull, 3: left lateral aspect of the skull, 4: inferior aspect of the skull, 5: superior aspect of the skull, 6 & 7: superior aspects of the right and left clavicularae. From 8 to 21 are in anterior aspects. 8 & 21: right and left femora, 9 & 18: right and left patellae, 10 & 20: right and left fibulae, 11 & 19: right and left tibiae, 12 & 17: right and left humeri, 13 & 16: right and left radii, 14 & 15: right and left ulnae, 22 & 25: superior aspects of the right and left tali, 23 & 24: superior aspects of the right and left calcanei.

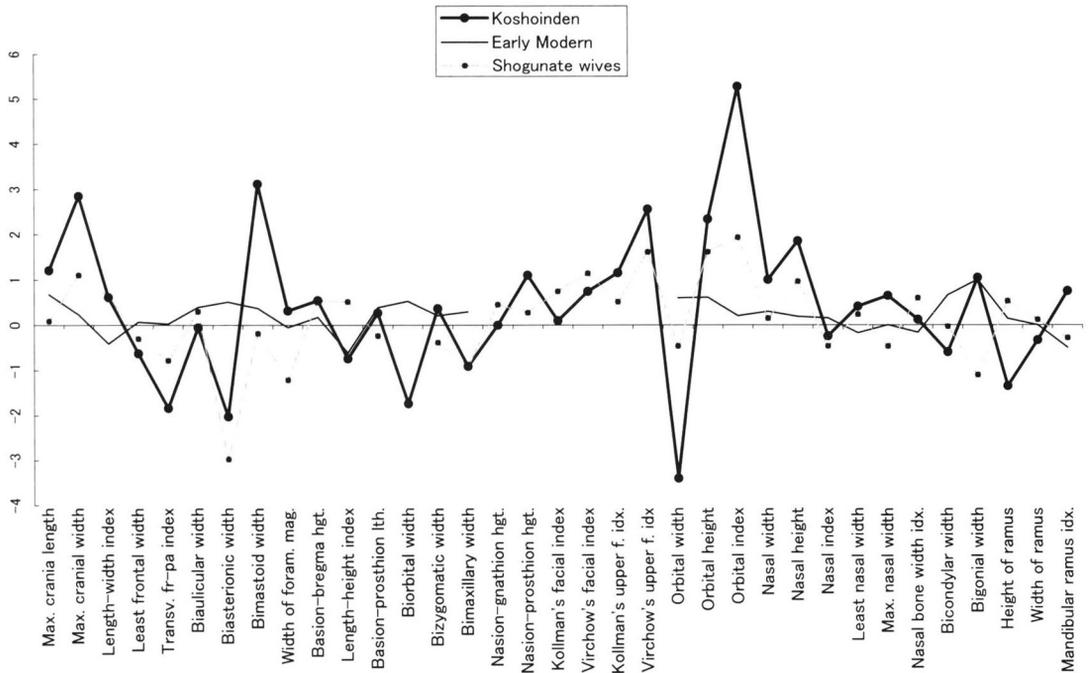


Fig. 6. Deviation graph of the measurements of Early Modern female skulls from the means of recent Japanese female skulls.

also well preserved, and very thin. In the tali, clear squatting facets are observed.

The estimated stature from the left femur is 150 cm by Hujii's formula and 149 cm by Pearson's formula, which are coincidentally same as in Seikoinden.

Discussion and Conclusions

Since the skeleton of Enkoinden was cremated and does not show morphological features in detail, here we compare the morphological features of the skeletons of Seikoinden and Koshoindein with other female specimens.

So far as the craniofacial skeletons are concerned, both individuals had almost identical characteristics, similar to those of Shogunate wives reported by Suzuki (1967, 1985) and differ from those of common females (Table 2, Fig. 6). Namely, they had slender faces. Especially the face of Koshoindein is high, narrow and gracile, with marked alveolar prognathism, narrow mus-

cle attachments and slight dental wear. These features most likely were caused by poor development of the masticatory muscles, due to the special dietary habit of eating extraordinarily soft, well-cooked foods, as suggested by Suzuki (1967).

The limb bones of Seikoinden and Koshoindein are, however, different with each other. While the limb bones of Seikoinden are almost the same as those of Early Modern common females in their slenderness, the limb bones of Koshoindein are much thinner than those of the comparative females, including Shogunate wives, and possess weak and narrow muscle attachment areas (Table 1). This means that, even though both Seikoinden and Koshoindein grew up in aristocrat families, as suggested by their narrow and gracile faces, their life styles were much different from each other. Koshoindein should have had a typical aristocratic life style, without any labor, the same as those in the family members of Shogunate. In contrast, Seikoinden might have had an ordinary life style

the same as those in common people, except for dietary habits.

In some respects, the above cranial features in Seikoinden and Koshoinden and other Shogunate families correspond to the features seen in some of the youth in the present time. Moreover, Suzuki (1967, 1985) already declared that the Shogunate face might predict the face of the people in the future.

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