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Non-Metric Traits in the Japanese Crania of the Edo Period

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For population historical analyses of human skeletal remains, the informations from non-metric cranial data are as efficient as those from craniometric or cranioscopic data. Nevertheless, systematic studies on non-metric cranial traits have been so far scarcely undertaken for the Japanese materials of both prehistoric and historic ages.

As regards recent materials, the author has already furnished the non-metric cranial data on the Ainu from Hokkaido and the Japanese from the Tohoku and Kanto districts in Honshu, and has demonstrated that the incidence pattern of the non-metric traits shows some individual peculiarity in each population (DODO, 1974).

In the second stage of the author's research project, it appeared pertinent to call his attention to the population samples of historic ages. The investigation was thus carried on for the crania of the Edo period excavated from the Unkô-in temple.

The purposes of this article are to determine the incidences of 23 non-metric cranial traits in the Unkô-in series and to compare them with those in the other Japanese samples.

Material

The material consists of 157 adult male and 37 adult female crania which were excavated from the former graveyard of the Unkô-in temple at Fukagawa in Tokyo and now collected in the Department of Anthropology and Prehistory, the University Museum, the University of Tokyo.

That the age of the material can be determined to be the latter half of the Edo period (from the 18th to 19th century) through the accompanying cultural finds and the old records of the Unkô-in temple has been reported by SUZUKI et al. (1957), to whom we owe much for the sexing and the measurement of the material as well.

Incidences of the Traits

For bilateral traits, incidences are reported as determined from complete crania, and bilateral and unilateral occurrences of the traits are shown in Appendix.

1. Metopism. Remains extending over the half or more of the external frontal arc were recorded as present. The incidence in the male was 9/157 crania (5.7%) and

that in the female was 1/37 (2.7%).

2. Supraorbital nerve groove. Those grooves that were clearly discernible for a distance longer than 10 mm were recorded as present. The incidence in the male was 35/143 crania (24.5%) and that in the female was 13/34 (38.2%).

The groove occurs more frequently in the female than in the male, though the difference in the skull-incidence does not reach the level of significance. DIXON (1904), who first described the nerve grooves and examined the frequency of their occurrence in a large series of crania throughout the world, indicated that the grooves were more often present in the female than in the male in the majority of the cranial series that had been reliably sexed. The same results were given for the Japanese and the Ainu series (YAMAGUCHI et al., 1973) and again for the present series. Recent data support the opinion that the supraorbital nerve groove can be described as a feminine trait (see Table 1).

Table 1. Sex difference of the supraorbital nerve groove. (Side-incidences are given.)

Series	Male	Female	Sources
Japan:			
Unkô-in temple	48/286 (16.8%)	17/68 (25.0%)	Present study
Kanto District	25/144 (17.4)	11/42 (26.2)	DODO, 1974
Tohoku District	21/112 (18.8)	16/56 (28.6)	〃
Ainu	11/128 (8.6)	15/100 (15.0)	〃
British Columbia coast:			
Haida	22/101 (21.8)	38/71 (53.5)	CYBULSKI, 1975
Kwakiutl	16/96 (16.7)	28/96 (29.2)	〃
Nootka	6/47 (12.8)	13/37 (35.1)	〃
Coast Salish	9/52 (17.3)	21/53 (39.6)	〃
United States:			
Caucasoid	37/154 (24.0)	56/124 (45.2)	CORRUCCINI, 1974
Negroid	97/198 (49.0)	96/166 (57.8)	〃

3. Supraorbital nerve foramen. The so-called supraorbital and frontal foramina were included in this category. The incidence in the male was 81/147 crania (55.1%) and that in the female was 20/37 (54.1%).

KATO & OUTI (1962) classified supraorbital nerve foramina or notches in a lucid way on the basis of anatomical relations of the foramina or notches to the branches of the supraorbital nerve. They found that a single foramen or notch was a common passage of the medial and lateral branches of the supraorbital nerve and, in the case of two foramina or notches being present, the lateral one gave a passage for the lateral branch of the supraorbital nerve and the medial one gave a passage for the medial branch of the nerve or, on very rare occasions, for the supratrochlear nerve. They thus considered that the single foramen or notch as well as the lateral froamen or notch would be best termed the supraorbital foramen or notch, and such a term as the frontal foramen or notch would correspond as a rule to the medial foramen or notch.

The presence or absence of the supraorbital and the frontal foramina was re-

corded following the criteria advocated by KATO & OUTI. The supraorbital foramen occurred in 54.4% of the male crania and in 51.4% of the female, whereas the frontal foramen occurred in only 9.5% and 2.7% of the male and female crania respectively.

Though no strict distinction was made between the supratrochlear and the frontal foramina, the former could be evidently distinguished in one male cranium and in this instance the third foramen in addition to the lateral foramen and the medial notch existed at the supero-medial angle of the left orbit.

The presence of a positive correlation between the supraorbital nerve groove and foramen has been pointed out by YAMAGUCHI et al. (1973) and the same result is obtained from the present data (see Table 2(a)).

Table 2. Correlation between the supraorbital nerve groove and the supraorbital nerve foramen. (Incidences are based on all available sides.)

		Groove (+)	Groove (−)	Total	
a) In the Unkô-in series:					
Male	Foramen (+)	29 (24.8%)	88	117	$\chi^2=6.77$,
	Foramen (−)	22 (12.9%)	149	171	$p<0.01$
Female	Foramen (+)	10 (40.0%)	15	25	$\chi^2=4.74$,
	Foramen (−)	7 (16.3%)	36	43	$p<0.05$
b) In the combined series of the Unkô-in, Kanto and Tohoku crania:					
Male	Foramen (+)	52 (24.2%)	163	215	$\chi^2=9.27$,
	Foramen (−)	46 (13.9%)	284	330	$p<0.01$
Female	Foramen (+)	28 (42.4%)	38	66	$\chi^2=15.58$,
	Foramen (−)	15 (15.0%)	85	100	$p<0.001$

Such a relationship becomes more conspicuous in the combined data of the three Japanese cranial series from Eastern Honshu (see Table 2(b)). In the male the incidence of the groove in the foraminated sides is 24.2%, while that in the unforaminated, or notched sides is only 13.9%. The grooves are nearly two times as often present in the foraminated sides as in the notched sides. In the female the incidence in the foraminated sides is 42.4% and almost three times as high as that in the notched sides where the incidence is only 15.0%. Moreover, the nerve grooves in the foraminated sides occur much more frequently in the female than in the male, while those in the notched sides show much the same incidences in the two sexes, consequently the marked sex difference of the nerve groove as described avove being due mostly to the difference found in the foraminated sides.

Since those relations between the two traits appear to give some clue for explaining the trait-formation, there will be need of further investigation on them.

4. Meningo-orbital foramen. Only those foramina that pierced the greater wing of the sphenoid bone were recorded as present. The incidence in the male was 51/94 crania (54.3%) and that in the female was 7/22 (31.8%). Though a higher incidence is shown for the male than for the female, the difference between the two sexes does not reach the level of significance.

5. Medial palatine canal. The medial palatine grooves were bridged in 7/106 male crania (6.6%) and in 2/23 female crania (8.7%).

6. Pterygo-spinous foramen. The foramen occurred in nine of the 123 male crania (7.3%), while it did not occur in any of the 28 female crania. Since in various population samples the male predominates over the female in the incidence, the pterygo-spinous foramen must be regarded as a masculine trait (see Table 3).

Table 3. Sex difference of the pterygo-spinous foramen. (Side-incidences are given.)

Series	Male	Female	Sources
Japan:			
Unkô-in temple	11/246 (4.5%)	0/56 (0%)	Present study
Kanto District	5/146 (3.4)	0/42 (0)	DODO, 1974
Tohoku District	1/112 (0.9)	0/58 (0)	〃
Kinki District	6/376 (1.6)	3/340 (0.9)	AKABORI, 1933
Ainu	12/174 (6.9)	2/146 (1.4)	DODO, 1974
Mongolia	6/244 (2.5)	1/130 (0.8)	SHIMA, 1941
Thailand	2/60 (3.3)	0/40 (0)	SHIMA, 1942
Australia	5/502 (1.0)	1/342 (0.3)	YAMAGUCHI, 1967
British Columbia coast:			
Haida	12/108 (11.1)	3/71 (4.2)	CYBULSKI, 1975
Kwakiutl	6/96 (6.2)	6/94 (6.4)	〃
Nootka	5/47 (10.6)	2/40 (5.0)	〃
Coast Salish	8/52 (15.4)	3/56 (5.4)	〃
United States:			
Caucasoid	4/154 (2.6)	3/124 (2.4)	CORRUCCINI, 1974
Negroid	1/198 (0.5)	0/166 (0)	〃

Table 4. Sex difference of the foramen of HUSCHKE. (Side-incidences are given.)

Series	Male	Female	Sources
Japan:			
Unkô-in temple	60/270 (22.2%)	23/62 (37.1%)	Present study
Kanto District	33/146 (22.6)	14/42 (33.3)	DODO, 1974
Tohoku District	34/112 (30.4)	12/58 (20.7)	〃
Kinki District	99/376 (26.3)	124/340 (36.5)	AKABORI, 1933
Ainu	23/200 (11.5)	30/154 (19.5)	DODO, 1974
Korea	62/460 (13.5)	41/190 (21.6)	ONISHI, 1941
China	24/168 (14.3)	6/32 (18.8)	〃
Mongolia	25/274 (9.1)	22/142 (15.5)	〃
British Columbia coast:			
Haida	18/108 (16.7)	40/71 (56.3)	CYBULSKI, 1975
Kwakiutl	28/98 (28.6)	40/95 (42.1)	〃
Nootka	6/48 (12.5)	13/40 (32.5)	〃
Coast Salish	5/54 (9.2)	22/56 (39.3)	〃
United States:			
Caucasoid	34/154 (22.1)	30/124 (24.2)	CORRUCCINI, 1974
Negroid	50/198 (25.3)	60/166 (36.1)	〃

7. Foramen ovale incomplete. The foramen ovale that showed a communication with the foramen spinosum was reckoned as present. The incidence in the male was 1/122 crania (0.82%) and that in the female was 1/29 (3.4%).

8. Foramen of HUSCHKE. The foramina, or tympanic dehiscences were present in 42/135 male crania (31.1%) and in 14/31 female crania (45.2%).

The trait occurs more frequently in the female than in the male, though the difference in the skull-incidence does not reach the level of significance. The same tendency is recognized in various different population samples (see Table 4). Thus, the foramen of HUSCHKE can be regarded as a feminine trait at least in the recent materials.

9. Aural exostosis. The same criteria as defined elsewhere (DODO, 1972) were employed. The incidence in the male was 2/136 crania (1.5%) and that in the female was 0/31. Both of the exostoses found in the present material are those of medium size developing on the posterior wall of the external auditory canal.

10. Third occipital condyle. 128 male and 31 female crania were examined, but the third occipital condyle of the facet type did not occur in any of them. On the other hand, knobby bony projections at the mid-point of the anterior border of the foramen magnum, that may be classed as the so-called third occipital condyle of the process type, were present in two male crania (1.7%).

11. Precondylar tubercle. Two types of the precondylar tubercle were distinguished as described by BROMAN (1957). Isolated tubercles (BROMAN's Type I) were found in seven (5.6%) of the 126 male crania, but in none of the 28 female, while linguiform tubercles continuous with the antero-medial margin of the occipital condyle (BROMAN's Type II) were present in two male crania (1.6%) and in one female cranium (3.6%). When both types are dealt with as a single trait, the incidence in the male is 9/126 crania (7.1%) and that in the female is 1/28 (3.6%).

12. Paracondylar process. The processes were reckoned as present only when they exceeded the level of the mid-point of the articular surface of the occipital condyle. The incidence in the male was 3/90 crania (3.3%) and that in the female was 1/24 (4.2%).

13. Hypoglossal canal bridging. The hypoglossal canals were completely bridged in 20/124 male crania (16.1%) and in 6/31 female crania (19.4%).

14. Clinoid bridging. 104 male and 27 female crania were examined. Clinoid bridgings were found only in the male series. The bridgings of the anterior and middle, and the anterior and posterior clinoid processes were present in five crania (4.8%) and in one cranium (0.96%) respectively. That uniting all the three processes occurred also in one cranium (0.96%). The incidence of the clinoid bridging as a whole is thus 7/104 crania (6.7%) in the male and is 0/27 in the female.

15. Epipteric bone. The incidence of such ossicles as being in contact with all the four cranial bones forming the pterion (os epiptericum proprium) was 11/95 crania (11.6%) in the male and was 4/22 (18.2%) in the female. When any ossicle at the pterion is reckoned, the incidences reach to 29/95 crania (30.5%) in the male and

7/22 (31.8%) in the female.

The fronto-temporal articulation, another unusual condition of the pterion, occurred in 3.2% of the male crania and 4.5% of the female.

16. Trace of the transverse zygomatic suture. Posterior traces discernible for a distance of 5 mm or more were reckoned as present. The incidence in the male was 9/75 crania (12.0%) and that in the female was 4/20 (20.0%). As has been indicated in the Japanese series from the Kanto and Tohoku districts (DODO, 1974), a slightly higher incidence is given for the female than for the male. In the combined series of those three Japanese materials, the incidence in the male is 18/195 (9.2%) and that in the female is 14/67 (20.9%), the difference between the two sexes being significant at the level of 0.05. Therefore, the trace of the transverse zygomatic suture may be classed as a feminine trait at least in the Japanese samples.

The complete suture, or os japonicum, occurred in 2.7% of the male crania and in 5.0% of the female.

17. Parietal notch bone. The incidence in the male was 34/131 crania (26.0%) and that in the female was 4/29 (13.8%). The parietal notch bone tends to occur more frequently in the male than in the female, but the difference between the two sexes is not at all statistically significant.

18. Ossicle in the occipito-mastoid suture. The asterionic bone and the occipito-mastoid wormians were included in this category. The incidence in the male was 28/115 crania (24.3%) and that in the female was 6/31 (19.4%). When those ossicles are dealt with as two separate traits, the incidences of the asterionic bone are 13/115 crania (11.3%) in the male and 5/31 (16.1%) in the female, and those of the occipito-mastoid wormians are 19/115 (16.5%) and 3/31 (9.7%) in the male and in the female respectively.

The presence of a positive correlation between the two traits was pointed out in the previous study, that being the main reason to deal with them as a single trait (DODO, 1974), but the present data do not suggest any such trend. However, since the size of the sample does not seem large enough to draw final conclusion concerning the inter-trait correlation, further examination will be required.

19. Remain of the biasterionic suture. Remains discernible for a distance of 10 mm or more from the vicinity of the asterion were recorded as present, thus a few cases of the Inca bone being included in this category. The incidence in the male was 27/156 crania (17.3%) and that in the female was 3/36 (8.3%).

Though the difference does not reach the level of significance, the trait tends to occur more frequently in the male than in the female. The same tendency was recognized in the Japanese series from the Kanto and Tohoku districts as well as in the Ainu series (DODO, 1974). In the combined series of those three Japanese samples, the incidence in the male is 51/284 crania (18.0%) and that in the female is 7/84 (8.3%), the difference between the two sexes being significant at the level of 0.05. Employing the same criterion as that in the present study, YAMAGUCHI (1967) also reported the same sex difference pattern for the Australian Aboriginal crania. Thus, the remain

of the biasterionic suture may possibly be classed as a masculine trait.

20. Os incae. The following are the types of the os incae that could be recognized in the present material.

Os incae proprium	2 males
Os incae medium simplex	1 male
Os incae medium simplex et laterale sinistrum	1 male
Os incae laterale dixtrum	1 female
Os incae tripartitum*	1 male
(*somewhat modified by additional partitions of lateral components of both sides)	

The incidence of the os incae as a whole is thus 5/151 crania (3.3%) in the male and is 1/37 (2.7%) in the female.

21. Ossicle at the lambda. The incidence in the male was 17/151 crania (11.3%) and that in the female was 2/37 (5.4%). Among these ossicles, those supposedly classed as the os apicis were present in five crania (four in the male and one in the female).

22. Foramen of VESALIUS. The incidence in the male was 55/121 crania (45.5%) and that in the female was 13/29 (44.8%).

23. Condylar canal absent. Condylar canals were absent either bilaterally or unilaterally in 65/118 male crania (55.1%) and in 22/30 female crania (73.3%). The incidence in the female is slightly higher than that in the male, but the difference does not reach the level of significance.

As for the emissary foramina, patency of the foramen was tested with a fine wire.

Comparison of the Incidences

The author described elsewhere that in both sexes the incidence patterns of non-metric cranial traits were substantially the same between the two Japanese series from the eastern part of Honshu, the main island of Japan (DODO, 1974). Those Japanese series consisted of the crania representing the recent indigenous inhabitants of the Kanto and Tohoku districts. On the other hand, the crania of the Unkô-in series can be dated back to the second half of the Edo period, or the 18th to 19th century, thus being in average a century or more older than the Kanto and Tohoku crania, and they can be regarded as representatives of the inhabitants of the Kanto district or its vicinities in the Edo period.

Expecting that no small change in the non-metric cranial features had taken place during the intervening some 100 years, the author attempted comparisons of the incidences of the traits among those cranial samples.

Since distinct difference in the incidences was not recognized between the two recent materials, they were combined into a single series in order to increase the sample size, and the incidence of each trait in the Unkô-in series was compared with that in the combined series of the Kanto and Tohoku crania, as shown in Table 5. In order to

Table 5. Comparison of the skull-incidences of the 23 traits between the Unkô-in series and the combined series of the Kanto and Tohoku crania. (In parentheses the numbers of crania examined are shown.)

Trait	Male		Female	
	Unkô-in	Kanto-Tohoku	Unkô-in	Kanto-Tohoku
1. Metopism	5.7%(157)	10.0%(130)	2.7%(37)	6.0%(50)
2. Supraorbital nerve groove	24.5 (143)	28.1 (128)	38.2 (34)	38.8 (49)
3. Supraorbital nerve foramen	55.1 (147)	52.3 (130)	54.1 (37)	62.0 (50)
4. Meningo-orbital foramen	54.3 (94)	53.0 (115)	31.8 (22)	53.5 (43)
5. Medial palatine canal	6.6 (106)	8.5 (129)	8.7 (23)	6.3 (48)
6. Pterygo-spinous foramen	7.3 (123)	3.9 (129)	0 (28)	0 (50)
7. Foramen ovale incomplete	0.82 (122)	0.77 (130)	3.4 (29)	4.0 (50)
8. Foramen of Huschke	31.1 (135)	34.9 (129)	45.2 (31)	38.0 (50)
9. Aural exostosis	1.5 (136)	3.1 (127)	0 (31)	0 (49)
10. Third occipital condyle (facet type)	0 (128)	0 (128)	0 (31)	0 (50)
11. Precondylar tubercle	7.1 (126)	10.9 (128)	3.6 (28)	4.0 (50)
12. Paracondylar process	3.3 (90)	7.3 (124)	4.2 (24)	0 (44)
13. Hypoglossal canal bridging	16.1 (124)	16.2 (130)	19.4 (31)	10.0 (50)
14. Clinoid bridging	6.7 (104)	3.9 (127)	0* (27)	6.0 (50)
15. Epipteric bone	30.5 (95)	37.0 (108)	31.8 (22)	34.8 (46)
16. Transv. zygomatic suture (trace)	12.0 (75)	7.5 (120)	20.0 (20)	21.3 (47)
17. Parietal notch bone	26.0 (131)	37.3 (126)	13.8 (29)	32.6 (46)
18. Ossicle in the occipito-mastoid suture	24.3 (115)	24.0 (125)	19.4 (31)	18.8 (48)
19. Biasterionic suture (trace)	17.3 (156)	18.8 (128)	8.3 (36)	8.3 (48)
20. Os incae	3.3 (151)	3.1 (128)	2.7 (37)	2.2 (46)
21. Ossicle at the lambda	11.3* (151)	4.7 (128)	5.4 (37)	2.2 (46)
22. Foramen of Vesalius	45.5 (121)	43.8 (130)	44.8 (29)	55.1 (49)
23. Condylar canal absent	55.1 (118)	49.6 (129)	73.3* (30)	42.9 (49)

* Significant at the level of 0.05.

test the difference between the two series, each proportion was transformed into an angular value θ in degrees such that $\theta=\sin^{-1}\sqrt{p}$, and the statistic $(\theta_1-\theta_2)^2 n_1 n_2/(n_1+n_2)/820.7$, referable to the chi-square with 1 degree of freedom, was calculated for each trait.

In the male the ossicle at the lambda shows a significant difference between the two series, occurring more frequently in the Unkô-in series, and in the female the clinoid bridging and the condylar canal absent show significant differences between the two, the former occurring more frequently in the Kanto-Tohoku series and the latter in the Unkô-in series. However, the statistically significant difference found in the incidences of the clinoid bridging must be viewed with some reservations, because the angular transformation is not necessarily valid when p is near or at 0 (e.g., Snedecor & Cochran, 1967). In both sexes, though the differences do not reach the level of

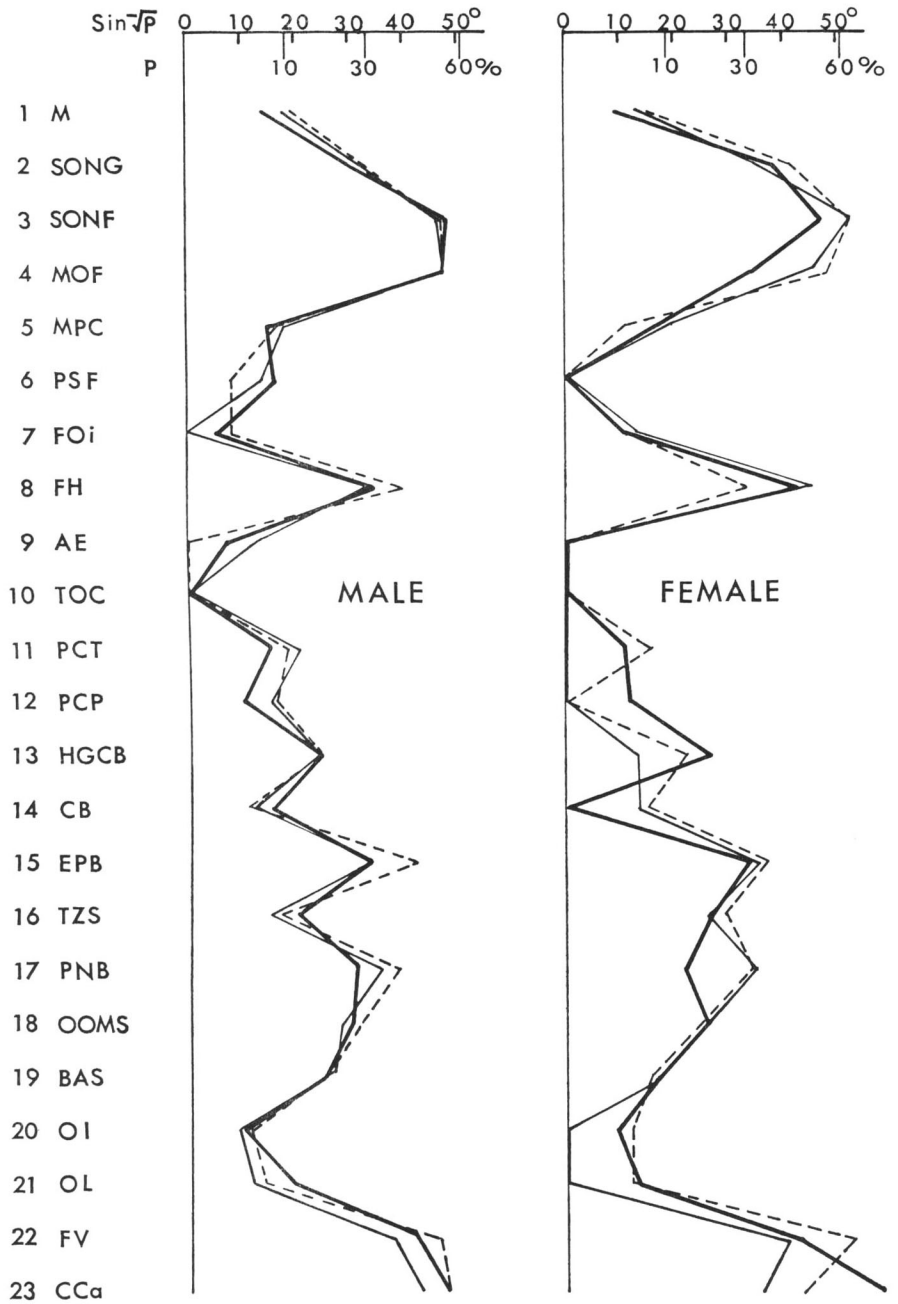

Fig. 1. Incidence patterns of the non-metric cranial traits in the three Japanese samples from Eastern Honshu. —— Unkô-in; —— Kanto; - - - Tohoku. (See Table 5 for abbreviations showing the traits.)

significance, the parietal notch bone tends to occur more frequently in the Kanto-Tohoku series than in the Unkô-in series.

But on the other hand the incidences of the remaining 21 traits in the male and 20 traits in the female never suggest significant differences between the Unkô-in and the Kanto-Tohoku series. The measures of discrepancy of the incidence patterns between the two series are estimated at 20.32 for the male and 25.33 for the female by the statistic $\sum^{23}(\theta_1-\theta_2)^2 n_1 n_2/(n_1+n_2)/820.7$, referable to the chi-square with 23 degrees of freedom. Both of the measures do not at all reach the level of significance. It is obvious that the incidence pattern of the traits in the Unkô-in series is much similar to that in the Kanto-Tohoku series. Thus, so far as non-metric cranial features are concerned, hardly any change seems to have taken place for the period from the early modern to the present time.

Now, it can be concluded that the three Japanese samples from Eastern Honshu are considerably homogeneous in the incidence pattern of the non-metric cranial traits (see Fig. 1).

Estimation of Population Distances

Interpopulational distances based on the skull-incidences of the non-metric traits were tentatively estimated for all the 21 pairs among seven recent Asian Mongoloid samples.

The non-metric data of the Japanese from the Kinki district were given by Akabori (1933), and those of the Koreans, Northern Chinese and Mongols by Onishi (1940; 1941). Since material sizes were inadequetly small in some of the female series, the analysis was attempted only for the male series. The traits available for comparisons were 14 in all and are shown in Table 6. As a distance coefficient, the mean of squared differences was chosen, which is given as: $\sum^{r}(\theta_1-\theta_2)^2/r$, where $\theta=\sin^{-1}\sqrt{p}$ and r is the number of the traits.

Table 6. The traits available for the distance analysis.

1.	Metopism
2.	Supraorbital foramen, not including the frontal foramen
3.	Medial palatine canal
4.	Foramen of Huschke
5.	Precondylar tubercle
6.	Hypoglossal canal bridging
7.	Epipteric bone
8.	Os japonicum
9.	Parietal notch bone
10.	Asterionic bone
11.	Occipito-mastoid wormians
12.	Os incae proprium
13.	Ossicle at the lambda
14.	Condylar canal absent

The results are shown in Table 7.

As might be expected, the measures are much smaller in the pairs among the Unkô-in, Kanto and Tohoku series from Eastern Honshu. However, equally smaller measures are obtained in the pairs between the Unkô-in and Kanto series from Eastern Honshu and the Kinki series from Western Honshu. The lowermost measure is observed between the Kanto and Tohoku series, and the next lowest measure between the Kanto and Kinki series. Reciprocal distances among the four Japanese samples are schematically represented in Fig. 2. The non-metric distance pattern closely corresponds to the geographic relations among the samples.

Table 7. Measures of distance based on the skull-incidences of the 14 non-metric cranial traits among the seven male Asian samples.

	a)	b)	c)	d)	e)	f)	g)
a) Tohoku District	—	14.25	22.36	38.79	44.18	66.27	76.85
b) Kanto District	14.25	—	16.94	15.47	29.34	39.67	58.37
c) Unkô-in temple	22.36	16.94	—	16.40	24.03	25.18	33.32
d) Kinki District	38.79	15.47	16.40	—	35.92	29.55	57.51
e) Korea	44.18	29.34	24.03	35.92	—	25.37	24.85
f) North China	66.27	39.67	25.18	29.55	25.37	—	31.21
g) Mongolia	76.85	58.37	33.32	57.51	24.85	31.21	—

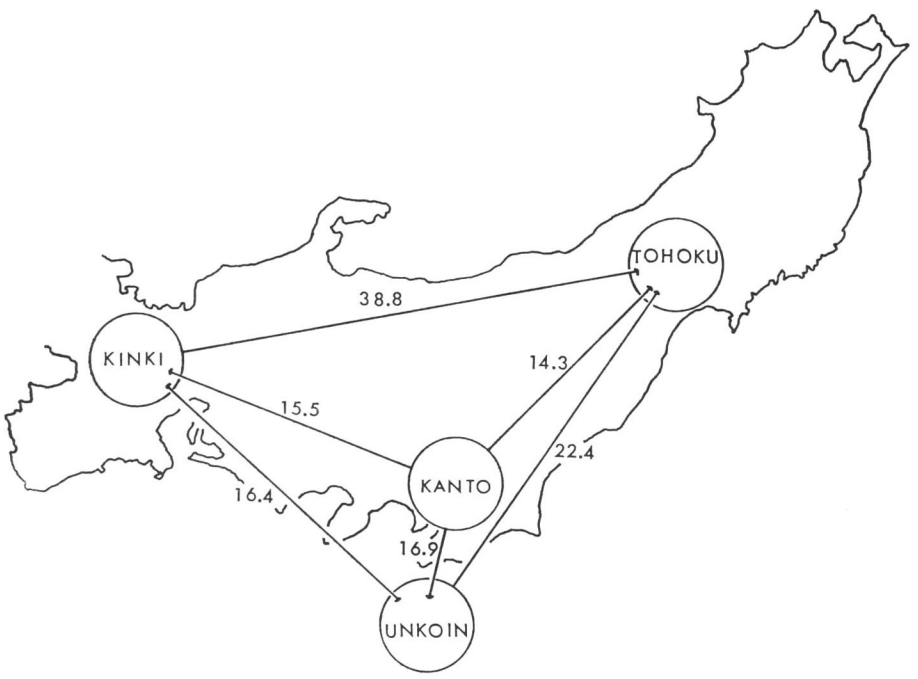

Fig. 2. A schematic representation of the non-metric distances among the four Japanese samples from Honshu.

There seems to be a high positive correlation between the non-metric and the geographic distances, and the measure of non-metric distance amounts to the maximum between the Tohoku Japanese and the Mongolian series, which are geographically remotest from each other as well.

More systematic distance analyses of Asian populations will be attempted in another occasion, but it would be properly concluded from the evidence shown here that those four Japanese samples from Honshu are closely related with each other concerning the occurrence of the non-metric cranial traits.

Summary

Twenty three non-metric traits were investigated in the Japanese crania of the Edo period excavated from the Unkô-in temple at Fukagawa in Tokyo.

The incidence of each trait was first determined. Sex difference patterns and inter-trait associations were reviewed for some of the traits.

Out of the 23 traits, 21 in the male and 20 in the female never suggested significant differences in the incidences of the traits between the Unkô-in series and the combined series of the recent Eastern Honshu crania.

Relatively small measures of non-metric distance were obtained not only in the pairs among the Eastern Honshu samples but also in the pairs between the Eastern and the Western Honshu samples.

These results induced us to conclude that the four Japanese samples taken from Honshu are closely related with each other concerning the occurrence of the non-metric cranial traits.

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Appendix. Bilateral presence (RL), unilateral presence (RO or OL) and bilateral absence (OO) of the non-metric traits in the crania from the Unkô-in temple.

Trait	Male				Female			
	RL	RO	OL	OO	RL	RO	OL	OO
2. Supraorbital nerve groove	13	11	11	108	4	4	5	21
3. Supraorbital nerve foramen	34	20	27	66	8	5	7	17
Supraorbital foramen	32	21	27	67	8	4	7	18
Frontal foramen	2	6	6	133	0	1	0	36
4. Meningo-orbital foramen	26	12	13	43	5	1	1	15
5. Medial palatine canal	2	2	3	99	1	0	1	21
6. Pterygo-spinous foramen	2	3	4	114	0	0	0	28
7. Foramen ovale incomplete	0	0	1	121	0	1	0	28
8. Foramen of HUSCHKE	18	13	11	93	9	1	4	17
9. Aural exostosis	0	0	2	134	0	0	0	31
11. Precondylar tubercle	1	2	6	117	0	1	0	27
BROMAN's Type I	0	1	6	119	0	0	0	28
BROMAN's Type II	1	1	0	124	0	1	0	27
12. Paracondylar process	1	2	0	87	0	1	0	23
13. Hypoglossal canal bridging	4	7	9	104	1	2	3	25
14. Clinoid bridging	2	5	0	97	0	0	0	27
Anterior-middle	1	4	0	99	0	0	0	27
Anterior-posterior	1	0	0	103	0	0	0	27
Anterior-middle-posterior	0	1	0	103	0	0	0	27
15. Epipteric bone	12	10	7	66	2	2	3	15
Os epiptericum proprium	2	6	3	84	1	1	2	18
Fronto-temporal articulation	0	3	0	92	0	1	0	21
16. Transverse zygomatic suture (trace)	4	1	4	66	2	1	1	16
Os japonicum	1	1	0	73	1	0	0	19
17. Parietal notch bone	9	13	12	97	1	3	0	25
18. Ossicle in the occipito-mastoid sut.	12	10	6	87	1	2	3	25
Asterionic bone	5	2	6	102	0	1	4	26
Occipito-mastoid wormians	3	12	4	96	0	2	1	28
19. Biasterionic suture (trace)	8	9	10	129	1	2	0	33
22. Foramen of VESALIUS	18	12	25	66	4	5	4	16
23. Condylar canal absent	22	21	22	53	7	5	10	8