

Transition from the Jomon to the Yayoi period in the Northern Kyushu and Yamaguchi region as viewed from ritual tooth ablation and skeletal morphology

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Introduction

The Northern-Kyushu and Yamaguchi region of Honshu Island (abbreviated NK-Y region hereafter), the area of Japan located closest to Korean Peninsula, has been considerably influenced through the introduction of peoples and cultures from the Asian continent in the past. Various morphological studies of skeletal remains from the Jomon and Yayoi periods in this region have already been carried out (Kanaseki, 1976; Ikeda, 1981; Brace & Nagai, 1982; Mizoguchi, 1988; Dodo & Ishida, 1990; Hanihara, 1991; Nakahashi, 1993; Matsumura, 1995). These studies have shown that the Yayoi people possessed a differential suite of physical characteristics in comparison with that of the Jomon people. The observed physical differences between the Jomon and Yayoi peoples has been attributed to the genetic effects of immigrants from the Korean Peninsula or China. Genetic studies of modern Asians (Omoto, 1978, 1995; Aoki & Omoto, 1980; Hinuma, 1986; Matsumoto, 1987) have also supported this so-called "hybridization theory" based on morphological studies.

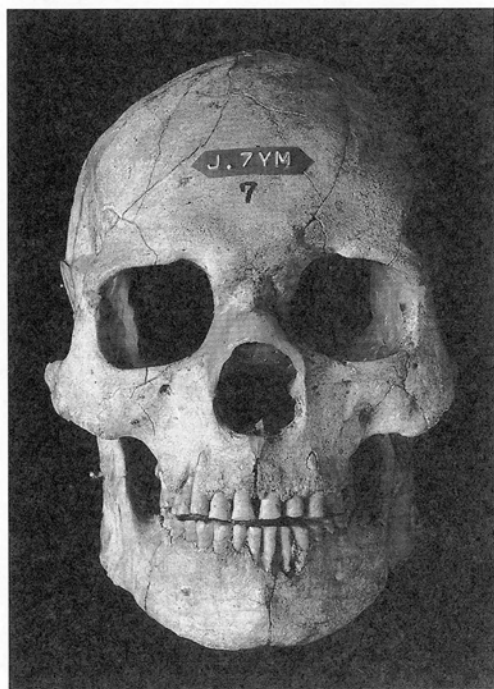
However, several important questions remain to be solved concerning the transition from the Jomon to the Yayoi peoples, especially the early stages of immigration into this region. Such an inspection might yield important clues on the origins of the Japanese.

The present review examines ritual tooth ablation in ancient Japan and China and briefly addresses some of the questions raised by new excavations in northern Kyushu which have been undertaken in the last few years.

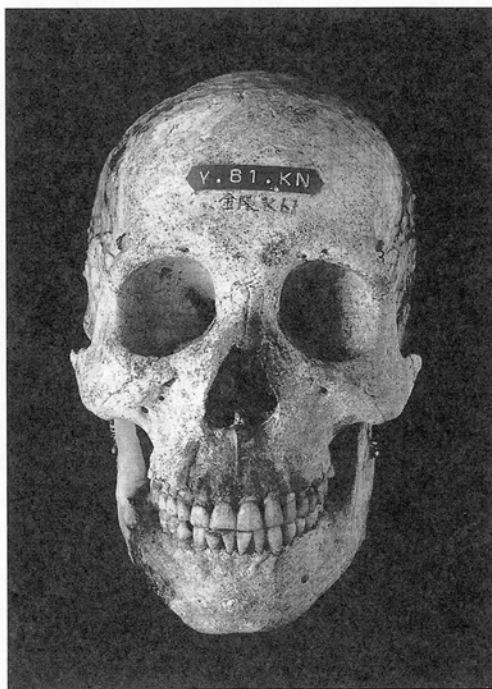
A. Human skeletal remains of the late Jomon and early Yayoi periods excavated from northern Kyushu in recent years.

[Jomon and Yayoi peoples in NK-Y region]

Figure 1-1 shows a Jomon skeleton excavated from the Yamaga site in Fukuoka prefecture, Northern Kyushu (Figure 2). As is typical of Jomon speci-



(Fig. 1-1)



(Fig. 1-2)

Fig. 1 Jomon skeleton (Yamaga site, late Jomon Period, male, Fig. 1-1) and Yayoi skeleton (Kanenokuma site, middle Yayoi Period, Fig. 1-2) in Fukuoka prefecture.

mens in other parts of Japan, this skeleton clearly shows many of the typical Jomon features, i.e. a low and wide square face, low rectangular orbits, a marked swelling at the glabella with a depression at the nasion, high bridged nasal bones, and simple and small teeth (sundadonty according to Turner, 1990). The stature is also short (male 158-159 cm; female 148-149 cm), with relatively long extremities.

In contrast to this, a Yayoi skeleton from northern Kyushu (Figure 1-1, Kanenokuma site in Fukuoka prefecture) shows significantly different features from that seen in Jomon skeletons, i.e. a very high and flat face, high round orbits, low bridged nasal bones, and large, complex teeth (sinodonty according to Turner, 1990). Compared to Jomon, the Yayoi are, in general, taller with relatively shorter extremities.

The morphological differences between Jomon and Yayoi have long been a main subject for discussion of the origins of the Japanese, and at the present, which have been mainly attributed to the genetic influence of immigrants from the Korean Peninsula or China as previously mentioned. However, important questions concerning the early stages of the immigration into this region remain.

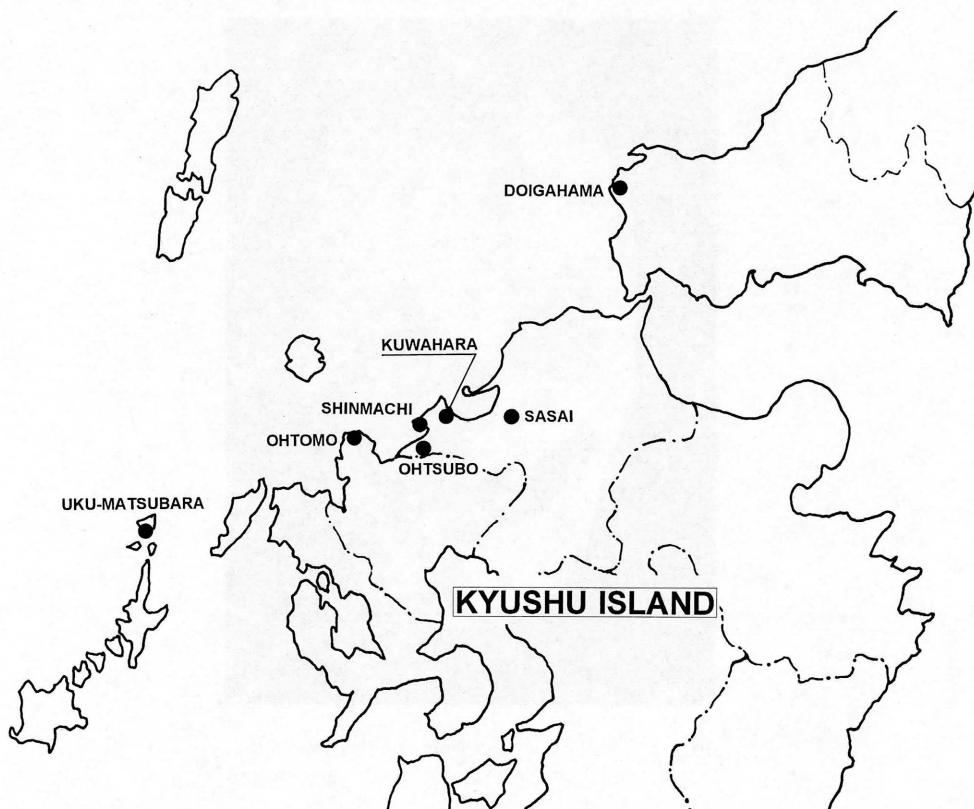


Fig. 2 Location of the sites in northern Kyushu, where human skeletal remains were recovered.

[Who were the first rice agriculturalists in Japan?]

The main question concerning the transition from the Jomon to the Yayoi Periods in the NK-Y region has been the lack of skeletal materials belonging to the time immediately between the two periods, i.e. the final Jomon and the early Yayoi Period. Most of the Yayoi skeletons collected so far in this region represent the middle Yayoi period. Material from the early stage of the Yayoi Period or final stage of the Jomon Period is totally lacking. Therefore, we know few details of the transition period. For example, it is unclear when the new physical features associated with the Yayoi people, described above, first appeared in this region, or who the first rice agriculturalists in Japan were. Clarification of the people who are associated with the new culture, i.e. the Yayoi Culture, is critical when attempting to discuss the origin of the Japanese.

[Dolmen Site]

Several years ago, a human skeleton from a Dolmen burial site at Shinmachi,

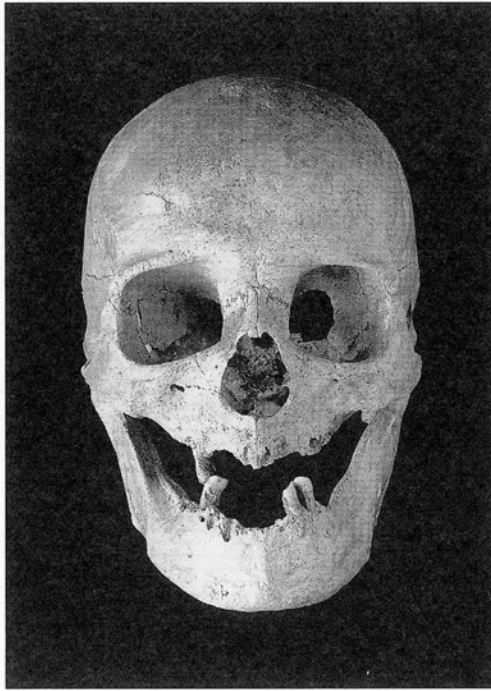


Fig. 3 Skull excavated from the Shinmachi dolmen site in Fukuoka prefecture (beginning of the early Yayoi Period).

Northern Kyushu (Figure 2), was recovered (Nakahashi & Nagai, 1987). The Dolmen burial pattern, which dates to the beginning of the Yayoi period, has been traced to the Korean Peninsula. People buried in this manner are believed to have been among the first rice agriculturalists to reach Japan. Thus, the skeleton from the Shinmachi Dolmen site is very important for addressing the transition from the Jomon to Yayoi Periods.

Contrary to our expectation, the skeleton from this site exhibits morphological similarities to the Jomon and the native Yayoi specimens from north-western Kyushu (Figure 3) and also exhibits tooth ablation similar to these groups.

Although only one or two skeletons are available from the Shinmachi site, other skeletal specimens have been excavated from other Dolmen sites at Otomo and Uku-matsubara in north-western Kyushu. Specimens from these sites also show similarities to the Jomon people in both their morphological features and in the custom of tooth ablation (Matsushita, 1981; Matsushita & Itani, 1983). Therefore, current evidence indicates that the Dolmen pattern of burial at the beginning of the Yayoi period was practiced by Jomon-like people, rather than by typical Yayoi people, who are well documented, on later than the middle Yayoi period

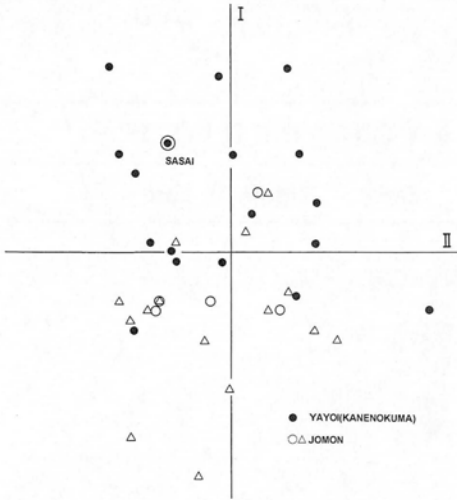


Fig. 4 Principal component analysis for a female skeleton unearthed from the Sasai site in Fukuoka prefecture (middle stage of the early Yayoi Period).

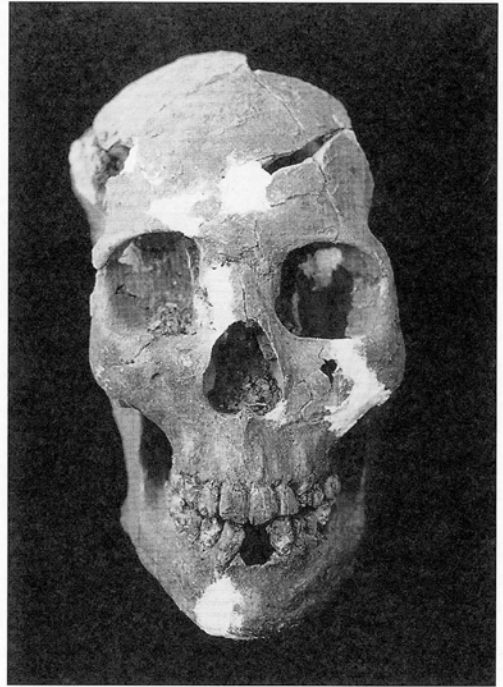


Fig. 5 Skull excavated from the Sasai site.

in the NK-Y region.

Although it is difficult to draw firm conclusions from these new findings, several possibilities can be considered. For example, the people buried in the Dolmen do not represent immigrants, but are native people who were buried in the custom prevalent on the Continent. Secondly, the early immigrants from the Korean peninsula were Jomon-like people. Another possibility is that, because of the small sample size, these findings are due to chance.

Any conclusions at the present time would be premature. To understand thoroughly the drastic social change that occurred in Japan around this time, many more skeletal remains belonging to the final stage of the Jomon period and the early Yayoi period in northern Kyushu are needed.

[Skeletal remains from the early Yayoi Period]

Recently, new skeletal remains were excavated from two sites, Ohtsubo and Sasai in Northern Kyushu, which belong to the middle stage of the early Yayoi period. Although the skeletal material from Ohtsubo are restricted to teeth, they are considerably larger and resemble those of the Yayoi people in the NK-Y region (Matsumura, 1995).

The Sasai site is located near the Itazuke site, which is widely regarded as

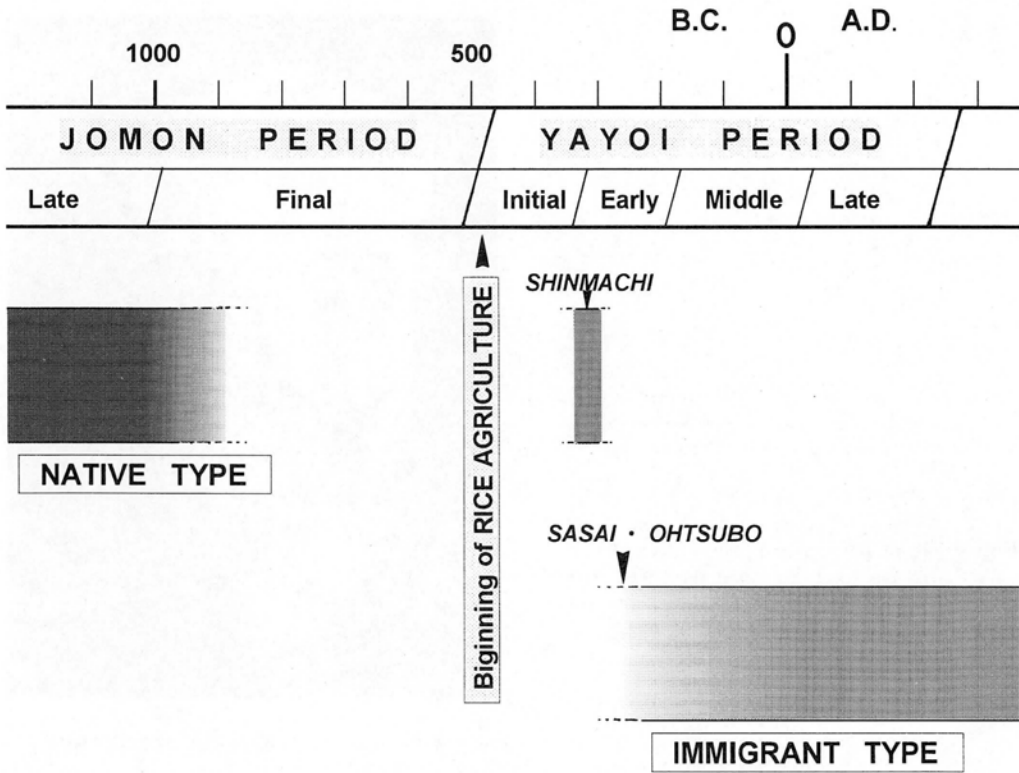


Fig. 6 Time scale in northern Kyushu.

one of the earliest rice agriculturalist village in Japan. Cultural materials excavated from this site, including earthenware, stone tools, and wooden tools for farming, are similar to those from the Itazuke site. Therefore, the individuals buried at this site provide appropriate material for examining the origin of the first rice agriculturalists in Japan.

The results of principal components analysis of a female skeleton unearthed from the Sasai site in 1994 (Figure 4) clearly show features that correspond to those of the Yayoi people in NK-Y region, which differ morphologically from Jomon and native Yayoi skeletons. However, the ritual tooth ablation observed in this individual, involving the upper canines and lower incisors, is more like that practice during the late Jomon and Yayoi Periods (Figure 5). That is, there is a discrepancy between the morphological features exhibited by the skeleton and the form of tooth ablation. Although there is no logical explanation for this finding at present, it at least shows that the appearance of immigrant-type people can be traced back to the middle of the early Yayoi period, and also that there are still unanswered questions concerning the transition from the Jomon to the Yayoi period in this region (Figure 6).

B.Origin of ritual tooth ablation of Yayoi people in the NK-Y region.

[Form of tooth ablation in the Doigahama Yayoi people]

The Doigahama Yayoi people, or their relatives have been regarded as representing an immigrant group since the study by Kanaseki et al. (1960). The Doigahama Yayoi are also known to have practiced ritual tooth ablation frequently. In Japan, this custom was very popular among the people of the Jomon period. The discrepancy between the morphological features and Jomon-like customs of the Doigahama people has long been a subject for discussion, because it questions the origin of the Yayoi people in the NK-Y region.

As shown in Figure 7, tooth ablation in the Doigahama people focused mainly on the canines, especially in the upper jaw, and about 80 % of individuals at Doigahama show evidence of this type of tooth ablation (Nakahashi, 1990). This suggests that the Doigahama people engaged a cultural practice attributable to Jomon people. However, the upper lateral incisors were also frequently (54 %) extracted in the Doigahama people, and this feature distinguishes the Yayoi peoples of Doigahama and Northern Kyushu from the Jomon and native Yayoi people in North-west Kyushu.

Another aspect of tooth ablation which differentiates the Doigahama skeletons from the Jomon and North-west Kyushu native Yayoi peoples is the low frequency of occurrence of extracting the mandibular front teeth. The mandibular incisors are frequently extracted in Jomon skeletons. Overall, the type of ritual tooth ablation at Doigahama and in northern Kyushu is very different from that seen in the Jomon skeletal remains, a finding which parallels the results of morphological analysis mentioned earlier. The type of tooth ablation observed in the Doigahama skeleton may be similar to ancient Chinese. Han and Pan (1981) have reported that ancient Chinese favored ablation of the upper lateral incisors, but rarely the mandibular incisors. Clues to the origin of the ritual tooth ablation observed in the Doigahama Yayoi people may be elucidated through comparison of tooth ablation in ancient China and Japan.

[Ritual tooth ablation in ancient China]

According to Han and Nakahashi (1996), ritual tooth ablation in China was practiced principally in the eastern-southeastern coastal regions of ancient continental China and Taiwan, with a high concentration in the Neolithic sites of the Shandong-north Jiangsu region.

Although the details of when and where tooth ablation originated in China remain unclear, one of the oldest examples known thus far is from the early Dawenkou Neolithic site of Shandong province, which dates back to at least 6500

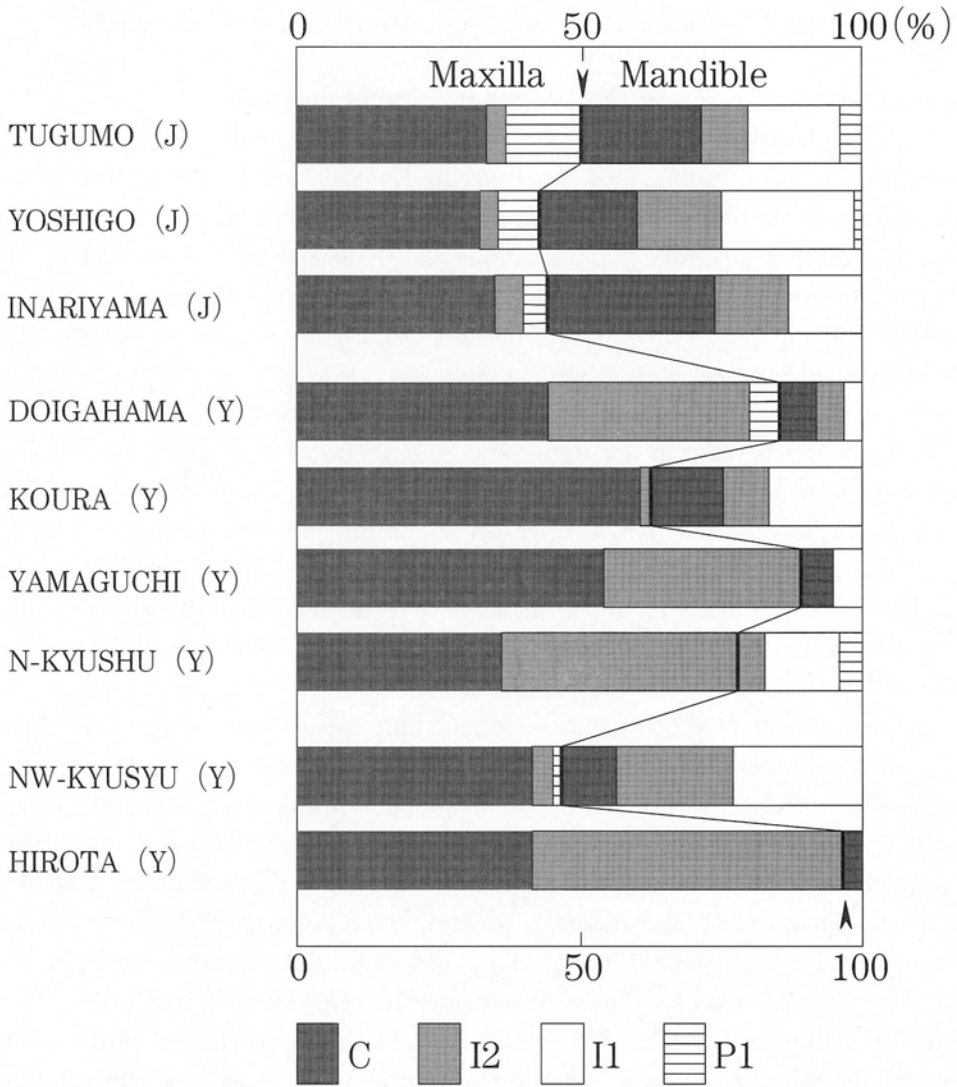


Fig. 7 Comparison of teeth extraction patterns. Males and females are combined (Nakahashi, 1990).
(J: Jomon, Y: Yayoi)

years. However, considering the fact that this custom flourished by the Neolithic period in China, it is very likely to predate this date although examples from the Chinese Paleolithic period have yet to be reported.

This custom subsequently became very popular among the people of the Dawenkou culture of coastal China. However, toward the end of the Dawenkou period or at the beginning of the Longshan period, approximately 4000 years ago, this custom declined suddenly. By the Chou and Han periods, it had disappeared completely. In Japan, on the other hand, tooth ablation was performed extensively

among the people of the late-final Jomon period. Thus, there is a time lag of about 2000 years in the practice of tooth ablation in China and Japan, ablation in China considerably predating that in Japan.

Tooth ablation in China was characterized by a preference for the upper lateral incisors, whereas teeth in the mandible were seldom extracted. This type of tooth ablation in China is the predominate form of ablation from its inception until it disappears. With the exception of one small group, there was no remarkable temporal or regional changes in tooth ablation in China after its inception. In contrast, ritual ablation in Japan was generally represented by extraction of the canines and incisors, the style being more complex and showing marked temporal and regional differences (Watanabe, 1966, 1967; Harunari, 1983; Ikeda, 1981).

[Origin of ritual tooth ablation in Japan]

Watanabe (1966, 1967) has proposed the “spontaneous theory” to explain the origin of ritual tooth ablation in Japan. Figure 8 taken from Watanabe (1967), for example shows the temporal and regional distribution of this custom in Japan. In this figure, he indicated that one of the earliest types of tooth extraction in Japan was the removal of the upper lateral incisors. This type of extraction is reported for the Tohoku region at sites dated to the end of the Middle Jomon Period, but not in western Japan. Later, this custom spread to western Japan.

Because, as mentioned earlier, upper lateral incisor extraction was the principal type of tooth ablation found in ancient China, there is a scope for further study on the origin of this custom in Japan. Further, because human skeletal remains from the early phase of the Jomon Period are still rare, especially in western Japan, any conclusion based on the material currently available would be premature.

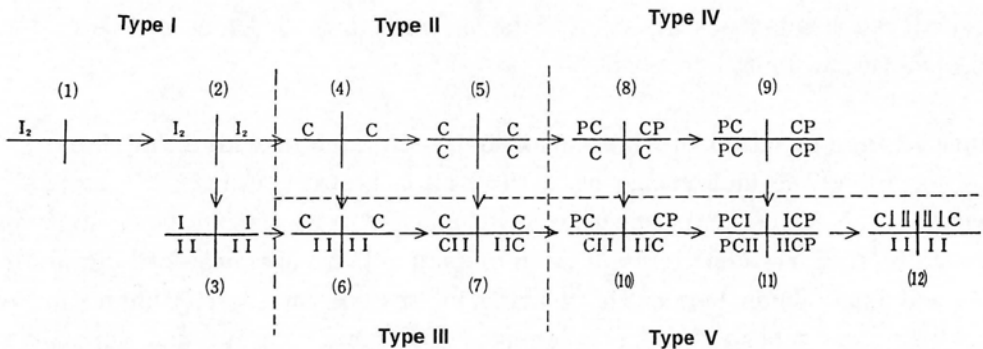


Fig. 8 Temporal transition of teeth extraction style (Watanabe, 1967).

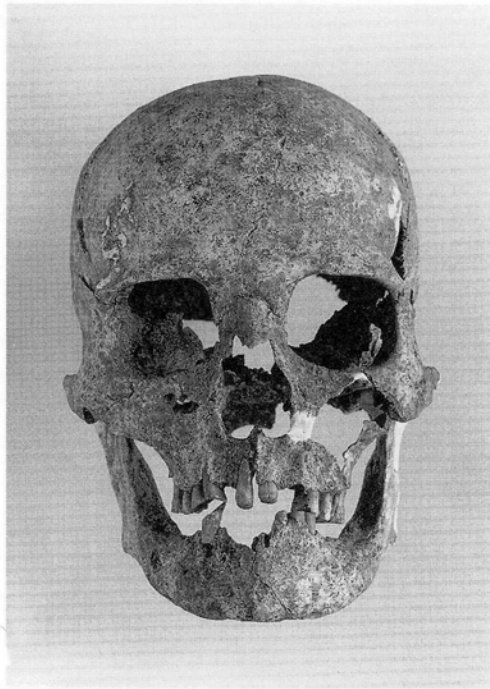


Fig. 9 Skull excavated from the Kuwahara site in Fukuoka prefecture (late Jomon Period).

For example, two years ago, a male skeleton was excavated at the Kuwahara site, dated to the beginning of the late Jomon period in northern Kyushu (Figure 9). Interestingly, there is evidence of tooth ablation in this skull with the removal of the upper lateral incisors bilaterally, the pattern seen in the Neolithic Chinese. A similar finding in material from Hokkaido was reported by Hattori et al. (1996). Although further examples of tooth ablation in the early Jomon Period are needed, the spontaneous theory of Watanabe regarding the origin of this custom in Japan is drawn into question.

[Interchange of ritual tooth ablation between ancient China and Japan]

Regarding the interchange of tooth ablation between China and Japan, the derivation of canine, and especially lower incisor, extraction in Japan must be given attention. These patterns of tooth extraction became widespread during the late and final Jomon Periods, particularly in western Japan. It is interesting to note that these types of tooth ablation have also been found in China, although at only a few sites in the coastal region, such as Jiaoxian Sanlihe and Boxian Fuzhang in Anhui. Although this types of tooth ablation probably did not become the

prevalent type in mainland China, it is noteworthy that it appeared between the final phase of the Dawenkou culture and the beginning of the Longshan culture, about 4000 years ago. This corresponds roughly to when this form of tooth ablation appears in western Japan, or, in other words, there is no marked time lag between the appearance of this new style in the two locations.

The results of multivariate analysis applied to Q-mode correlation coefficients based on the relative frequency of tooth extraction show some similarities between these new types of tooth ablation observed in China and those of the late to final Jomon Period in western Japan (Figure 10). Although there is insufficient material to show any direct connection between the two groups, these results indicate the need for further research on the relationship between this custom of tooth ablation after the Dawenkou Period in China and tooth ablation in Japan.

[Origin of the ritual tooth ablation in the Yayoi people of the NK-Y region]

The remarkable increase of upper lateral incisor ablation observed in the Yayoi people of Doigahama and northern Kyushu provides evidence for the possible influence of this custom from China. This type of tooth ablation is not only rare in the late Jomon Period, when tooth extraction in general was the most prevalent, but, as mentioned earlier, it is also the principal form of tooth ablation observed in ancient China. The results shown in Figure 10 suggest some relationship between ancient China and the northern Kyushu and Yamaguchi region in the style of tooth extraction.

Furthermore, in the Doigahama Yayoi people, there is a clear sex difference in the form of tooth extraction (Nakahashi, 1990). That is, the canines of males were extracted unilaterally, the right side in almost all cases, whereas in females the canines were extracted bilaterally. A similar finding was observed for the form of extraction of the upper lateral incisors. This sex difference in tooth ablation appears to be unique in the ancient people of Japan.

Interestingly, Kanaseki (1960) has described five male skulls from the Chengtzuai site in Shandong, China, which belong to the period of the Warring States, as clearly showing traces of extraction of the right upper lateral incisors, as seen in the Doigahama people. Moreover, a male skull showing evidence of this custom was reported in skeleton from the Yean-ri site at the southern end of the Korean Peninsula. A male skull from this site, which belongs to the Kofun period, has a trace of tooth extraction at the position of the upper right lateral incisor (Kim et al., 1993).

Additionally, as is well known, the morphological features of the Doigahama people show several similarities to the Neolithic people of China and Korean Peninsula, whereas they are markedly different from the Jomon people. Also, the

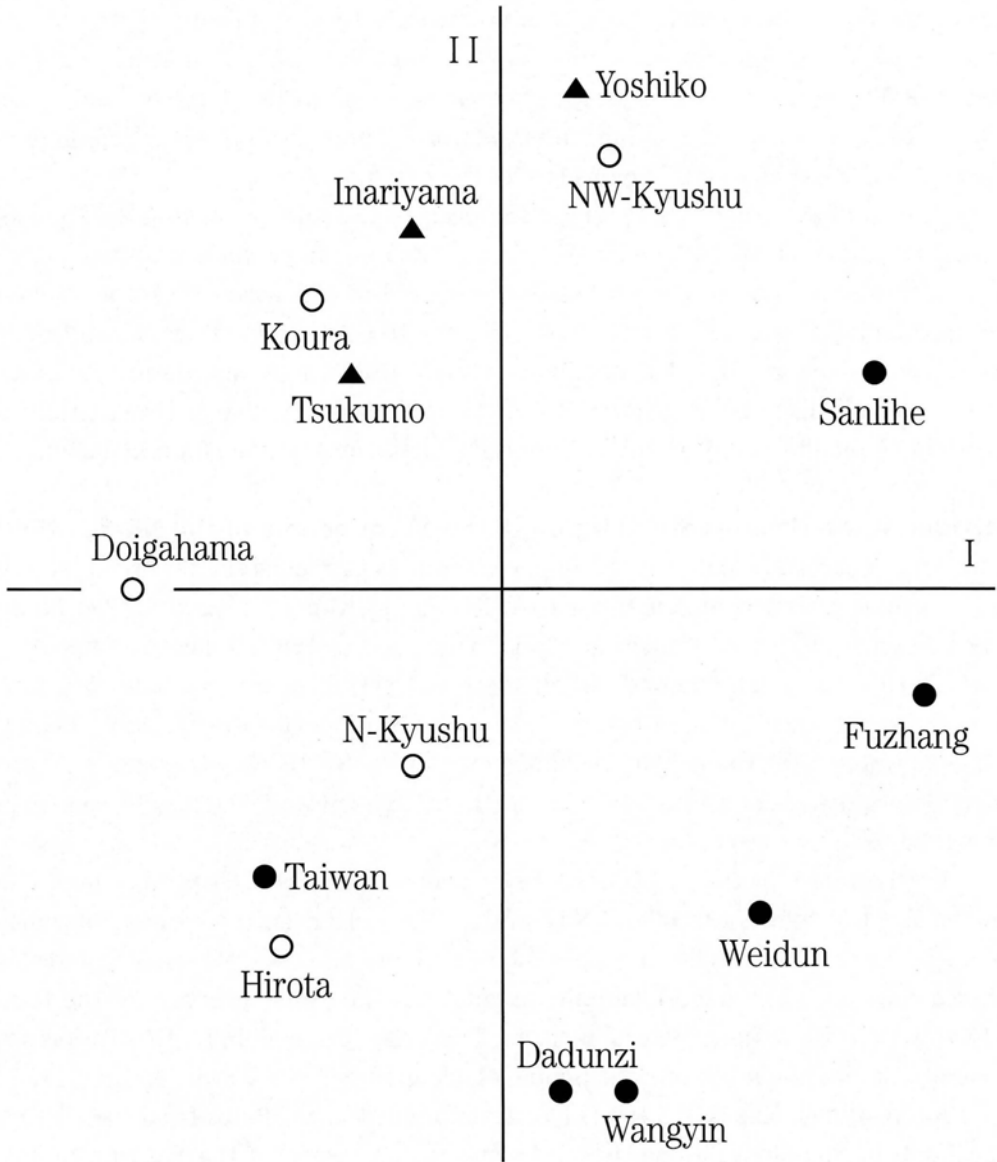


Fig. 10 Two dimensional scattergram of MDS applied to the Q-mode correlation coefficients based on the relative frequency of tooth extraction. Contribution rate in the 1st axis is 44.7% and 2nd axis is 28.7% (●: China, ○: Yayoi, ▲: Jomon; Han and Nakahashi, 1996).

coastal area from Shandong to the lower Long River in China has been suggested as a possible place of origin of rice agriculture, which was introduced into Japan during the Yayoi Period. Archaeologists have noted other connections between this region and ancient Japan.

Based on these observations, it is reasonable to speculate that some conti-

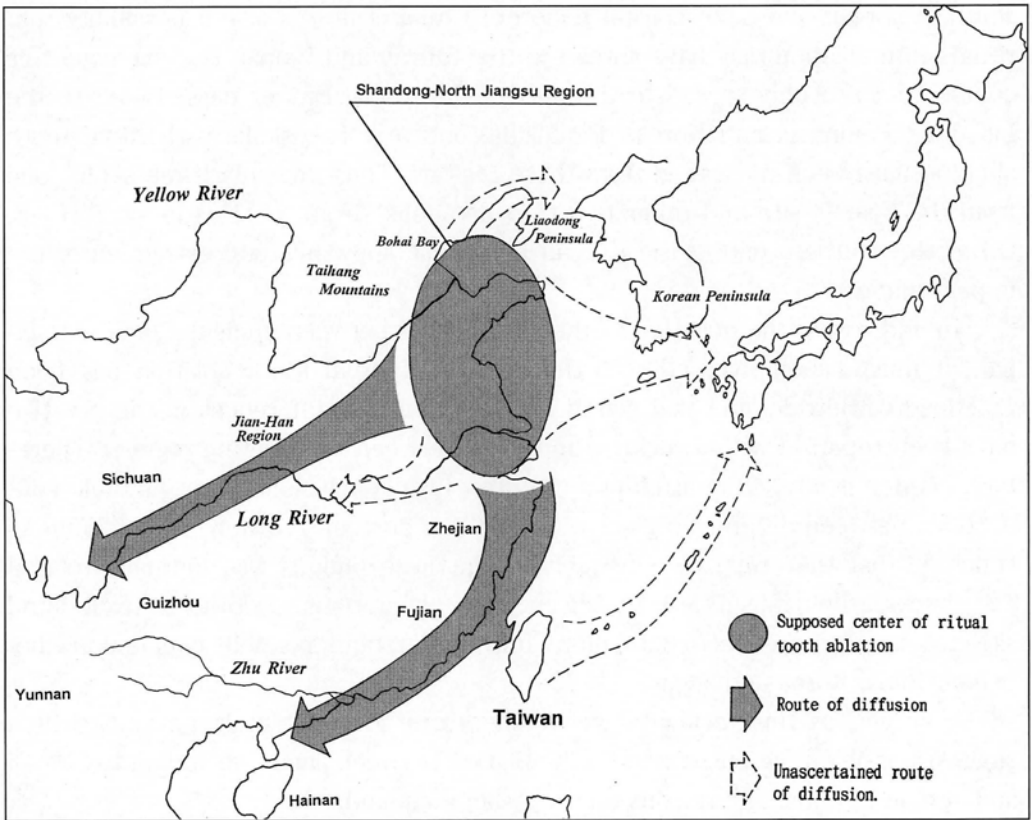


Fig. 11

mental influence lies behind the remarkable increase of extraction of upper lateral incisors in the Yayoi people of Doigahama and Northern Kyushu, although it is still difficult to show a definite relationship between these regions because there is a long time lag (about 2000 years) between the prevalence of this custom in China and Japan, and materials from China and the Korean peninsula contemporary to the Yayoi period are totally lacking.

The speculated course of the spread of tooth ablation in China is shown in Figure 11. The Shandong-north Jiangsu region is tentatively regarded as the center of ritual tooth ablation in China, because of the antiquity of the Dawenkou culture in Shandong, and the prevalence of tooth ablation in this region. As mentioned earlier, however, the origin of this custom in China is still not known. There are still many regions in China from which skeletal remains have not been excavated, especially in the southern coastal area.

Further, as shown in Figure 11, the custom is speculated to have spread to the west through the region between the Yellow River and the Long River. To the

south, it spread along the coastal region of China. There is also a possibility that ritual tooth ablation may have spread to the Taiwan and Hainan regions along this course, and probably spread to the north along Bohai Bay or passed over to the Liaodong Peninsula and Korean Peninsula, but very few skulls with ritual tooth ablation have been unearthed from these regions. Thus far, only three skulls, one from the Yean-ri site and other two (female skulls) from the Nukdo site (1C. B. C.) at the southern end of the Korean Peninsula, show bilateral extraction of the upper canines.

In addressing the question of the relationship between ancient China and Japan, it must be emphasized that the custom of ritual tooth ablation has been practiced worldwide, and that significant variation and differences in the practice have been reported within regions, and even between neighboring regions. Therefore, caution is advised in attempting to draw firm conclusions about possible connections between different regions based on this custom. For now, it is difficult to conclude that the origin of tooth ablation in these regions was mutually related and necessarily transmitted to succeeding generations. Additional well-dated skeletal samples are needed to more fully understand possible connections between China, Korea and Japan.

However, as this review suggests, there are several tantalizing clues which suggest possible relationships in tooth ablation between Japan, including the Yayoi and Jomon Periods, and regions on the Asian mainland.

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