

## Material report: A case report on human skeletal remains suggesting the penis removal in the Edo period

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**Abstract** This paper reports on a specific sharp force trauma observed in skeletons of the Edo period. A cut mark can be recognized at the inferior margin of the pubic symphysis and on the posterior surface of the left innominate bone of “No. 583” excavated from the Shyoken-ji site. The morphological features of this cut mark suggest that this individual suffered the removal of his penis. Some historical reports show the existence of penis removal in the Edo period. This is the first report strongly suggesting the penis removal in Japanese skeletal remains.

**Key words:** Edo, cut mark, sharp force trauma, penis removal

### Introduction

This paper reports on a specific sharp force trauma observed in skeletons of the Edo period. There are some reports about some sharp force traumas, which reveal historical and cultural traditions in ancient Japanese (Morimoto, 1987; Morimoto and Hirata, 1992; Sakaue, 2010). However, the position and direction of the cut mark reported here were very unusual, and different from any of those described in the previous studies.

### Material

The human skeletal remains with unique sharp force trauma is stored at the National Museum of Nature and Science as “No. 583” of the Shyoken-ji site, which was excavated at 24, Nangen-cho, Shinjuku-ku, Tokyo in 2003 (Taisei Engineering Co., Ltd, 2005). This individual was buried in a circular wooden coffin (*Hayaoke*), which means this individual is thought to be a townsman or samurai of the lower class in the city of Edo (Tanigawa, 2004; Sakaue, 2012). The preservation of “No. 583” is relatively good, as shown in Figures 1–2. The sex of this individual was esti-

mated as male, diagnosed by the narrow greater sciatic notch of the innominate bone and prominent supraorbital ridge and mastoid process of the skull. The age-at-death was estimated as 30–50 years old because of the macroscopic disappearance of the epiphyseal lines of the clavicle, no appearance of degenerative change in the vertebral body, and the pubic symphysis showing the morphological characteristics of Phase 4 in the Suchey–Brooks system (Brooks and Suchey, 1990).

The skull measurements of this individual are shown in Table 1. The morphological features of this skull were a relatively narrow and long face, a prominent high-bridged nose and a weak alveolar prognathism. In order to elucidate the characteristics of the skull of this individual, principal component analysis on a correlation matrix was performed with 186 male skulls of the Edo period, including 5 of the “daimyo (territorial lords),” 131 of townsmen of the Middle to Late Edo period, and 50 of “samurai” of the middle–late Edo (Sakaue, 2012). This statistical analysis was carried out with SYSTAT 13 (Systat Software Inc., 2009). The scatter plots of the second and third principal component scores are presented in Figure 3. In this plot, No. 583 (black



Fig. 1. Photographs of the skull of No. 583.

star) was an outlier for the townsmen and samurai. However, interestingly, this individual located close to the daimyo. This finding indicated that No. 583 might have had distinctive facial characteristics among the townsmen of the

city of Edo.

The other notable features of this individual were a cervical rib rising from the seventh cervical vertebra (Figure 2) and that the number of thoracic vertebrae was 11. In Japanese, the fre-

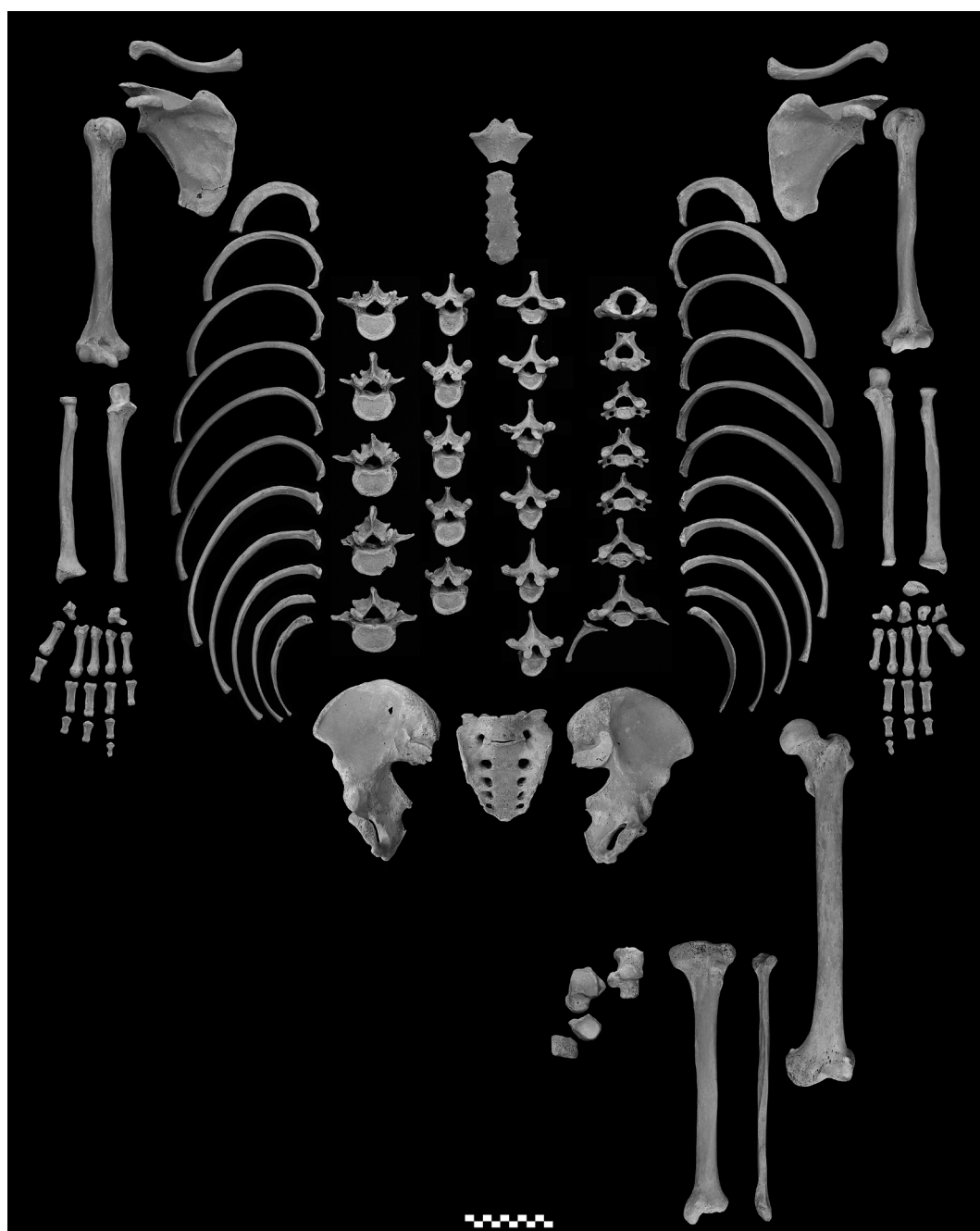


Fig. 2. Photographs of the postcranial bones of No. 583.

quency of individuals with cervical ribs is 2.0% (4 out of 200) (Matsui, 1942), and those with 11 thoracic vertebrae is 0.8% (2 out of 246) (Takeuchi, 1980). This abnormality may be related to no facet for 1st and 2nd costal cartilages in the

manubrium of sternum in this individual.

### Description

A cut mark on this individual can be recog-

Table 1. cranial measurements and Indexes of No. 583

| Martin No. | Variables                       | Male   |                   |      |                  |      |
|------------|---------------------------------|--------|-------------------|------|------------------|------|
|            |                                 | No.583 | Hayaoke (N = 131) |      | Kamekan (N = 50) |      |
|            |                                 |        | Mean              | S.D. | Mean             | S.D. |
| 1          | Maximum length                  | 170.2  | 181.5             | 6.4  | 177.4            | 6.1  |
| 5          | Basion-Nasion length            | 97.9   | 101.8             | 4.5  | 99.9             | 4.2  |
| 7          | Foramen magnum length           | 31.7   | 35.8              | 2.2  | 35.3             | 2.4  |
| 8          | Maximum breadth                 | 127.2  | 138.5             | 4.5  | 141.3            | 5.3  |
| 9          | Least frontal breadth           | 88.0   | 93.5              | 4.2  | 94.4             | 4.9  |
| 10         | Maximum frontal breadth         | 106.0  | 114.7             | 4.2  | 117.2            | 5.4  |
| 11         | Biauricular breadth             | 113.4  | 126.0             | 4.3  | 125.0            | 4.3  |
| 12         | Biasterionic breadth            | 114.9  | 108.5             | 4.6  | 108.2            | 5.2  |
| 13         | Mastoid width                   | 99.1   | 103.2             | 4.7  | 102.2            | 4.8  |
| 14         | Minimum cranial breadth         | 63.4   | 68.7              | 3.5  | 69.7             | 4.0  |
| 16         | Foramen magnum breadth          | 26.5   | 29.6              | 2.0  | 29.9             | 2.2  |
| 17         | Basion-Bregma height            | 130.4  | 136.2             | 4.7  | 138.0            | 5.7  |
| 23         | Horizontal circumference        | 481.5  | 518.2             | 13.9 | 514.9            | 13.0 |
| 24         | Transverse arc                  | 295.5  | 312.8             | 9.4  | 321.0            | 11.7 |
| 25         | Total sagittal arc              | 353.0  | 370.4             | 13.3 | 370.2            | 12.5 |
| 26         | Frontal sagittal arc            | 118.5  | 125.9             | 5.7  | 126.9            | 5.3  |
| 27         | Parietal sagittal arc           | 125.0  | 126.3             | 8.1  | 125.7            | 8.3  |
| 28         | Occipital sagittal arc          | 109.5  | 118.2             | 8.3  | 117.7            | 5.4  |
| 29         | Frontal sagittal chord          | 106.8  | 110.6             | 4.4  | 110.8            | 4.4  |
| 30         | Parietal sagittal chord         | 110.0  | 112.7             | 6.4  | 112.2            | 6.5  |
| 31         | Occipital sagittal chord        | 87.7   | 98.4              | 5.3  | 99.3             | 4.1  |
| 40         | Basion-Prosthion length         | 97.8   | 99.3              | 4.9  | 96.0             | 6.0  |
| 43         | Outer biorbital breadth         | 102.2  | 104.7             | 4.0  | 104.0            | 4.0  |
| 43a        | Bifrontal breadth               | 94.8   | 97.3              | 4.0  | 96.8             | 3.7  |
|            | Nasion subtnce (calculated)     | 13.4   | 14.1              | 2.4  | 14.5             | 3.1  |
| 44         | Biorbital breadth               | 95.7   | 97.9              | 3.8  | 97.3             | 3.7  |
| 45         | Bizygomatic breadth             | 127.5  | 134.9             | 4.5  | 133.1            | 5.1  |
| 46         | Bimaxillary breadth (zm)        | 92.7   | 99.9              | 4.7  | 97.3             | 5.0  |
| 46b        | Bimaxillary breadth (zm:a)      | 95.7   | 99.9              | 4.7  | 97.6             | 4.9  |
|            | Subspinale subtnce (calculated) | 23.8   | 22.7              | 3.3  | 23.9             | 2.9  |
| 48         | Upper facial height             | 72.4   | 72.2              | 4.2  | 73.7             | 3.3  |
| 48H        | Upper facial height (Howells)   | 68.4   | 68.3              | 4.0  | 69.9             | 3.2  |
| 48d        | Malar height                    | 22.8   | 24.3              | 2.5  | 23.7             | 2.5  |
| 49a        | Interorbital breadth            | 17.0   | 21.0              | 2.0  | 20.7             | 2.1  |
| 50         | Anterior interorbital breadth   | 14.0   | 16.9              | 2.1  | 16.9             | 2.1  |
| 51         | Orbital breadth                 | 43.6   | 43.3              | 2.0  | 43.4             | 1.8  |
| 52         | Orbital height                  | 34.2   | 34.1              | 1.9  | 35.6             | 1.9  |
| 54         | nasal breadth                   | 24.6   | 25.6              | 1.9  | 24.5             | 1.7  |
| 55         | nasal height                    | 52.7   | 52.3              | 3.1  | 53.6             | 2.6  |
| 56         | Length of nasal bone            | 23.6   | 24.4              | 2.8  | 24.9             | 3.0  |
| 57         | Least nasal breadth             | 6.2    | 7.3               | 1.6  | 7.2              | 2.0  |
| 57(1)      | Maximum breadth of nasal bone   | 14.0   | 18.2              | 1.9  | 17.7             | 1.6  |
|            | Nasal subtnce (calculated)      | 3.2    | 2.5               | 1.0  | 2.6              | 1.1  |
| 60         | External palate length          | 53.8   | 52.3              | 3.0  | 50.4             | 3.5  |
| 61         | External palate breadth         | 67.1   | 65.7              | 3.8  | 65.5             | 3.8  |
| 62         | Internal palate length          | 45.0   | 45.5              | 2.7  | 44.7             | 2.7  |
| 63         | Internal palate breadth         | 45.3   | 40.7              | 3.3  | 39.5             | 3.3  |
| 65         | Bicondylar breadth              | 109.7  | 121.6             | 5.7  | 120.8            | 5.8  |
| 65(1)      | Bicoronoid breadth              | 92.1   | 97.4              | 4.8  | 98.1             | 5.2  |
| 66         | Bigonial breadth                | 99.1   | 100.2             | 5.8  | 98.9             | 5.9  |
| 67         | Bimental breadth                | 48.6   | 47.5              | 2.5  | 47.4             | 2.5  |
| 68         | Projective length of mandible   | 63.0   | 70.7              | 5.0  | 69.8             | 4.9  |
| 69         | Height of mandibular symphysis  | 34.0   | 35.6              | 3.2  | 36.0             | 3.1  |
| 69(1)      | Mandibular body height          | 30.7   | 31.6              | 2.7  | 32.1             | 2.4  |
| 69(2)      | Mandibular body height at M2    | 25.7   | 26.8              | 2.5  | 26.5             | 2.7  |
| 69(3)      | Mandibular body breadth         | 14.5   | 13.2              | 1.4  | 12.5             | 1.4  |

Table 1. Continued

| Martin No.     | Variables                     | Male   |                   |      |                  |      |
|----------------|-------------------------------|--------|-------------------|------|------------------|------|
|                |                               | No.583 | Hayaoke (N = 131) |      | Kamekan (N = 50) |      |
|                |                               |        | Mean              | S.D. | Mean             | S.D. |
| 69b            | Mandibular body breadth at M2 | 16.5   | 17.1              | 1.6  | 16.6             | 1.3  |
| 70             | Height of mandibular ramus    | 66.5   | 64.9              | 4.4  | 64.8             | 4.3  |
| 71a            | Minimum width of ramus        | 34.3   | 34.7              | 3.3  | 32.4             | 2.6  |
| 71(1)          | Condylar-cornoid breadth      | 35.8   | 36.2              | 3.2  | 33.4             | 3.9  |
|                | Mandibular condyle breadth    | 19.2   | 20.7              | 2.0  | 20.6             | 1.9  |
| 72             | Total profile angle           | 84.3   | 83.3              | 3.1  | 84.4             | 3.6  |
| 74             | Alveolar profile angle        | 74.6   | 64.8              | 6.3  | 67.5             | 6.7  |
| 75             | Profile angle of nasal bone   | 45.3   | 63.4              | 6.0  | 62.2             | 5.5  |
| 79             | Mandibular angle              | 127.2  | 124.5             | 6.9  | 126.5            | 6.9  |
| 8/1            | Cranial index                 | 0.75   | 0.76              | 0.03 | 0.80             | 0.04 |
| 17/1           | Index                         | 0.77   | 0.75              | 0.03 | 0.78             | 0.03 |
| 17/8           | Index                         | 1.03   | 0.98              | 0.04 | 0.98             | 0.04 |
| (1 + 8 + 17)/3 | Modulus                       | 142.6  | 152.03            | 3.54 | 152.24           | 4.09 |
| 9/10           | Index                         | 0.83   | 0.82              | 0.03 | 0.81             | 0.03 |
| 9/8            | Index                         | 0.69   | 0.68              | 0.03 | 0.67             | 0.04 |
| 8/12           | Index                         | 1.11   | 1.28              | 0.05 | 1.31             | 0.06 |
| 40/5           | Index                         | 1.00   | 0.98              | 0.04 | 0.96             | 0.05 |
| 16/7           | Index                         | 0.84   | 0.83              | 0.06 | 0.85             | 0.06 |
| 27/26          | Index                         | 1.06   | 1.00              | 0.07 | 0.99             | 0.07 |
| 28/26          | Index                         | 0.92   | 0.94              | 0.08 | 0.93             | 0.06 |
| 29/26          | Index                         | 0.90   | 0.88              | 0.02 | 0.87             | 0.02 |
| 30/27          | Index                         | 0.88   | 0.89              | 0.02 | 0.89             | 0.03 |
| 31/28          | Index                         | 0.80   | 0.83              | 0.03 | 0.84             | 0.02 |
| 43/8           | Index                         | 0.80   | 0.76              | 0.03 | 0.74             | 0.03 |
| 46/45          | Index                         | 0.73   | 0.74              | 0.03 | 0.73             | 0.03 |
| 48/45          | Index                         | 0.57   | 0.54              | 0.03 | 0.55             | 0.03 |
| 48/46          | Index                         | 0.78   | 0.72              | 0.04 | 0.76             | 0.04 |
| 9/45           | Index                         | 0.69   | 0.69              | 0.03 | 0.71             | 0.03 |
| 45/8           | Index                         | 1.00   | 0.97              | 0.04 | 0.94             | 0.04 |
| 50/44          | Index                         | 0.15   | 0.17              | 0.02 | 0.17             | 0.02 |
| 52/51          | Index                         | 0.78   | 0.79              | 0.04 | 0.82             | 0.05 |
| 54/55          | Index                         | 0.47   | 0.49              | 0.04 | 0.46             | 0.03 |
| 54/55(1)       | Index                         | 0.71   | 0.87              | 0.10 | 0.80             | 0.08 |
| 57/57(1)       | Index                         | 0.45   | 0.40              | 0.09 | 0.41             | 0.11 |
| 61/60          | Index                         | 1.25   | 1.26              | 0.08 | 1.30             | 0.10 |
| 63/62          | Index                         | 1.01   | 0.90              | 0.08 | 0.87             | 0.16 |
| 68/65          | Index                         | 0.57   | 0.58              | 0.04 | 0.58             | 0.05 |
| 69(3)/69(1)    | Index                         | 0.47   | 0.42              | 0.05 | 0.39             | 0.05 |
| 69b/69(2)      | Index                         | 0.64   | 0.64              | 0.07 | 0.63             | 0.08 |
| 71/70          | Index                         | 0.52   | 0.54              | 0.05 | 0.50             | 0.05 |
|                | Frontal index of flatness     | 0.14   | 0.14              | 0.02 | 0.15             | 0.03 |
|                | Zygomatic index of flatness   | 0.23   | 0.23              | 0.03 | 0.25             | 0.03 |
|                | Simotic index                 | 0.51   | 0.34              | 0.12 | 0.37             | 0.13 |

"Hayaoke" and "Kamekan" data were cited from Sakaue (2012)

nized at the inferior margin of the pubic symphysis in the left innominate bone (Figure 4). This defect has the same color as the surface of the surrounding bone, and has characteristics of sharp force trauma such as "linearity," "a well-defined clean edge," and "a flat smooth cut surface" on macroscopic observation (Boylston,

2000). This cut mark is limited to the posterior surface of the left pubic bone (Figure 5). The maximum length of this cut mark was 8.2mm and the maximum depth was 1.2mm when measured in a 3D scanner (Keyence VR-3000) (Figure 6).

The smooth surface of this cut mark was

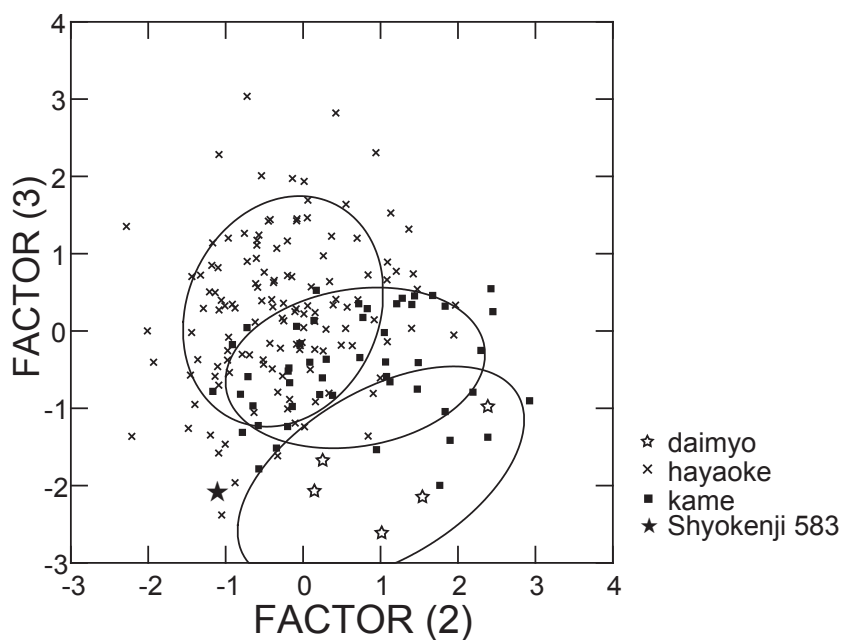


Fig. 3. Plot of the second and third principal component male scores.  
The ellipses represent the 68.27% confidence interval for each group.

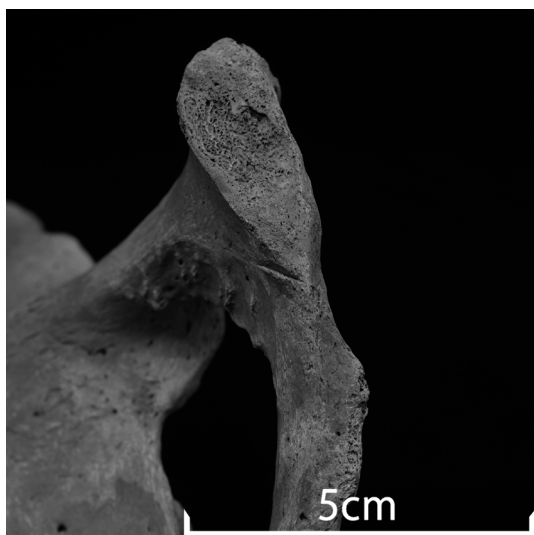


Fig. 4. Photograph of the cut mark at the inferior margin of the pubic symphysis in the left innominate bone.

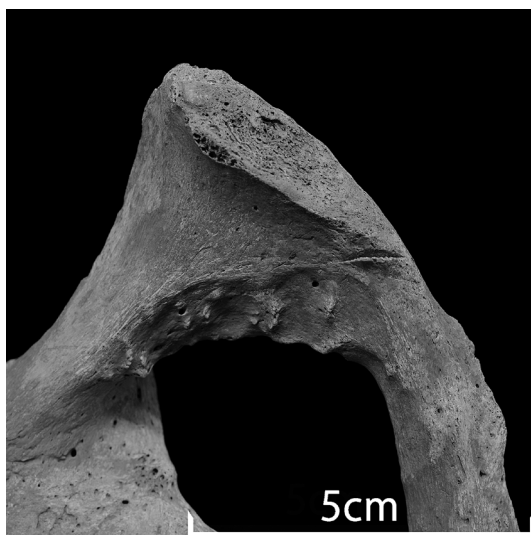


Fig. 5. Posterior view of the left innominate bone.

placed in coronal plane and faced in an almost posterior direction, which indicates that the blade of a sharp instrument was used on this individual to scrape the bone surface downward from the

superior to the inferior. Because it was on the posterior surface of the pubic bone, it was possible that this cut mark was made by the insertion of a sharp instrument from the pelvic cavity side

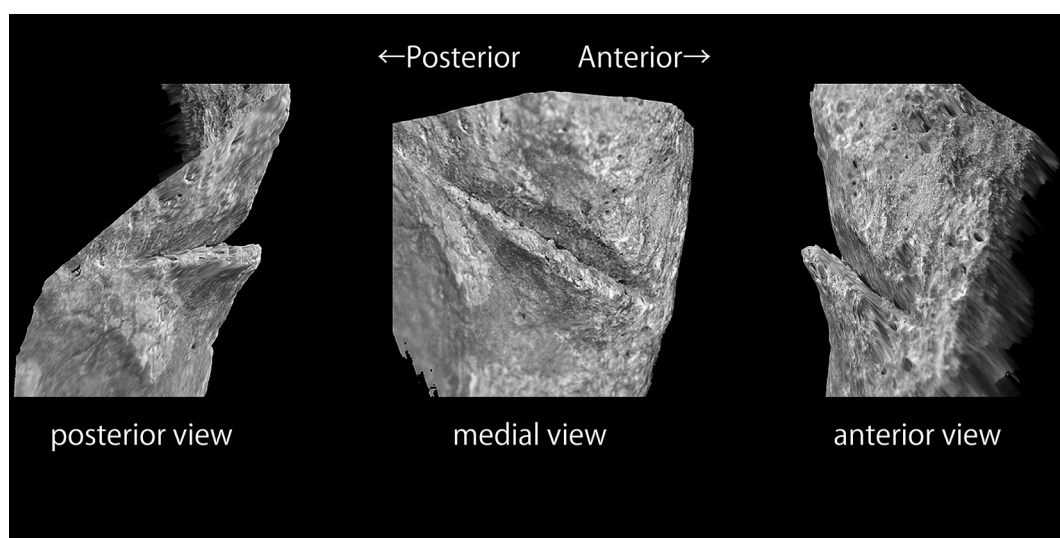


Fig. 6. 3D images of the cut mark reconstructed in Keyence VR-3000.

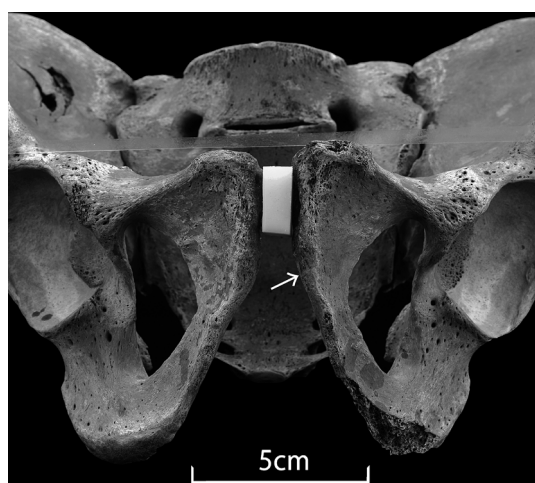


Fig. 7. Anterior view of the reconstructed pelvis.  
The arrow in the picture shows the position of the cut mark.

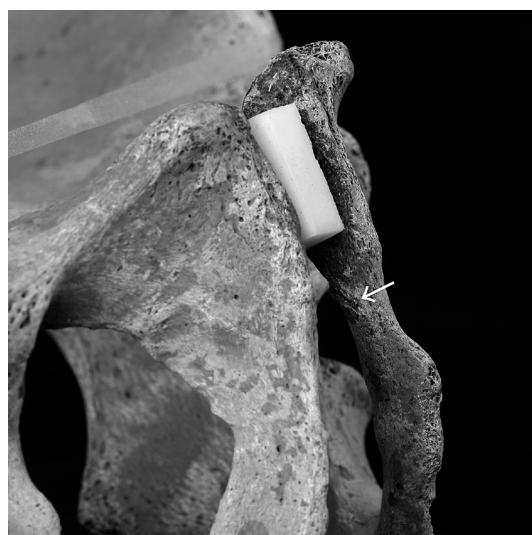


Fig. 8. Right anterior view of the reconstructed pelvis.  
The arrow in the picture shows the cut mark.

after removal of the pelvic viscera as part of a surgical operation, dissection, or mutilation of the corpse. But this is unlikely, considering the lack of other cut marks on this individual and the rarity of surgical operations and dissection in the Edo period. Additionally, this cut mark could not be made by someone's occasional attack from his front in conflict because this wound cannot be

seen in the frontal view of the reconstructed pelvis (Figure 7). Moreover, this is the only cut mark observed in this individual. In case of homicide or mayhem by using sharp-edged weapons, cut marks are often observed on the skull, ribs, and upper extremities. This cut mark is located on the internal surface of the left pubic bone, which is just below the pubic symphysis



Fig. 9. Illustration for the insertion of thin sharp instrument in the reconstructed pelvis.

A steel scale with a breadth of 10mm was placed its long side on the extension of the long axis of the cut mark and its flat surface on the smooth face of the cut mark.

(Figure 8). This area is considered to be too narrow for a sharp-edged weapon with the width of over 10mm to have been inserted without any damage to the right pubic bone. Therefore, a thin sharp instrument was inserted from the right anterior to the left posterior of this individual as seen in Figure 9, and moved a little from superior to inferior almost along the frontal surface of the body.

At the point of this cut mark, the arcuate pubic ligament attaches. The ischiocavernosus muscle, the left crus of the penis, the sphincter muscle of the urethra, and the transversus perinei profundus muscle are close to this area. And, most importantly, the root of the penis is around this area. A series of cutting movements estimated from the abovementioned cut mark seem to match the penis removal. The specific options that account for the evidence seem to be one of the following:

- 1) He cut off his penis himself with a thin sharp instrument like a razor or knife in his right hand;
- 2) Someone cut his penis off while holding it in his or her right hand and sharp instrument in the left hand. In both cases, the force applied to the sharp-edged weapon was strong enough to injure the bone. No trace of healing in this wound indicated that the removal of his penis caused his death or was performed soon after his death.

Interestingly, there are some historical records on the penis removal in the Edo period. Ryoo DOKAKU (了翁道覚, 1630–1707) was a monk of the Obaku sect of Buddhism and a contributor to religious social activities such as education, culture, social welfare, and public utilities. Legend has it that he cut off his own penis in order to escape all carnal desires (Kimura, 2007). The penis removal was performed as a surgical operation (penectomy) for patients with

syphilis by Hanaoka Seishu (華岡青洲, 1760–1835) and his disciples (Kure, 1971; Matsuki, 1996). Moreover two incidents regarding the removal of penis where two wives cut off those of their husbands were reported in “Wagakoromo (我衣),” written by Kato Ebian (加藤曳尾庵, 1763–?) (Tanigawa, 1971) and “Fujioka-ya nikki (藤岡屋日記)” written by Sudo Yoshizo (須藤由蔵, 1793–?) (Suzuki and Koike, 1989). Thus, it is possible that the cut mark observed in No. 583 was caused by the penis removal in the Edo period. This is the first report strongly suggesting the penis removal in Japanese skeletal remains.

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