

A Neonate with cut bones from Poundbury Camp, 4th century AD, England

by

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Summary

The condition of the skeleton of a new-born infant from the Romano-British Cemetery at Poundbury Camp is described. The body had been dismembered before burial. Cut marks on the neck, shoulder and hip indicate that a surgical operation had been performed to remove the baby from the mother's womb. The text of Soranus, a second century doctor, contains a description of the procedure for an embryotomy that could have been closely followed in carrying out the operation that is described here. The implications are that the population at Poundbury had access to Roman medical expertise.

The Cemetery of Poundbury Camp, immediately to the north-west of the Roman town of Durnovaria (Dorchester), Dorset, has yielded the remains of over 1400 inhumations dating from the first century to the fifth century AD. Individuals of all ages have been recovered and burial which was usually east-west was probably in family plots. This is possibly one of the earliest Christian cemeteries in England (Green 1982).

The skeleton of a neonate infant, PC 1414, was recovered from among a group of infant burials within the area of a defunct building in the eastern part of the cemetery. The building had been in use during the first quarter of the fourth century before its demolition and the expansion of the cemetery into the area (Green 1987). There is no reason to suppose that the situation of the burial was related to the former building. There were a number of nails associated with the grave implying that the infant had been placed in a coffin for burial. An unusual quantity of flints, tile, burnt limestone fragments, animal bones and pottery were associated with the grave. It was noted at the time of excavation that the preservation of the skeleton was excellent with the bones in very good condition and almost all present (fig. 1).

The body had been laid out on its back, with the shoulders to the east and the hips to the west. The skull, however, was lying at the west end and obviously had been removed from the body and placed there. The remains of the left arm — the region of the elbow — also lay at this end and possibly the distal end of a tibia was beside it. The right femur lay beyond the right scapula and what are believed to be the right radius and ulna lay in a similar position beyond the left scapula. The body had clearly been dismembered before burial (fig. 2).

PC, 79 C 1414

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Scale 1:12

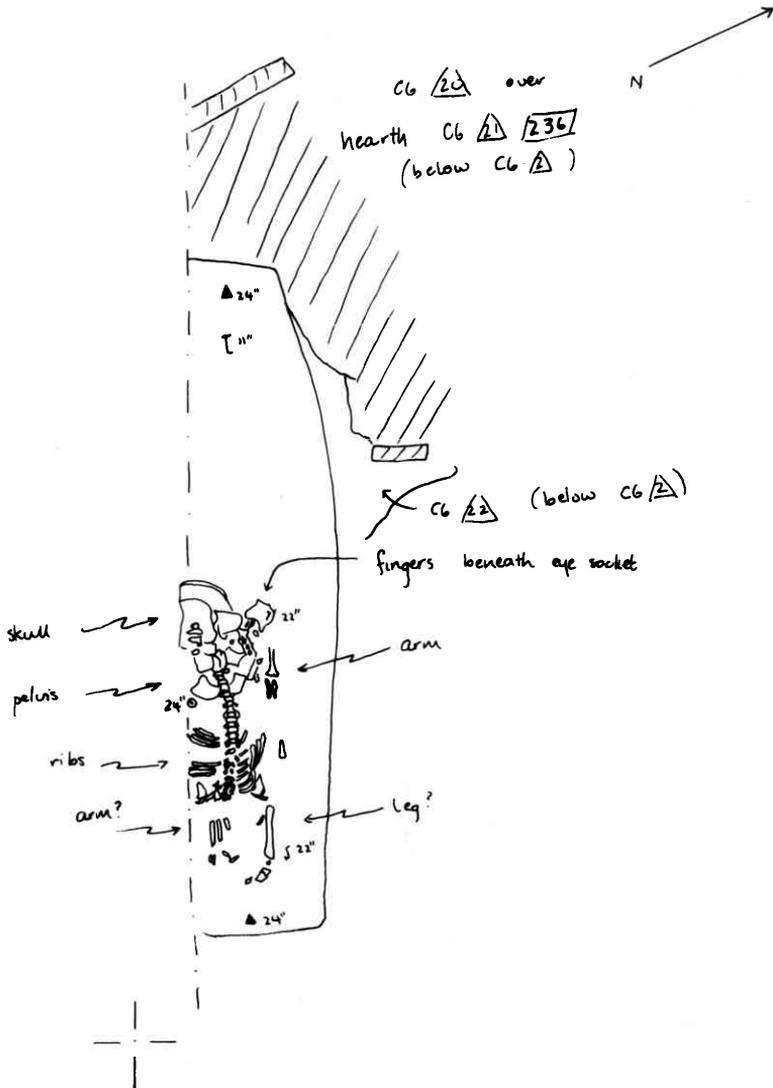


Figure 1. Field drawing of PC 1414 as excavated by Lucy Vinciguerra in 1979.

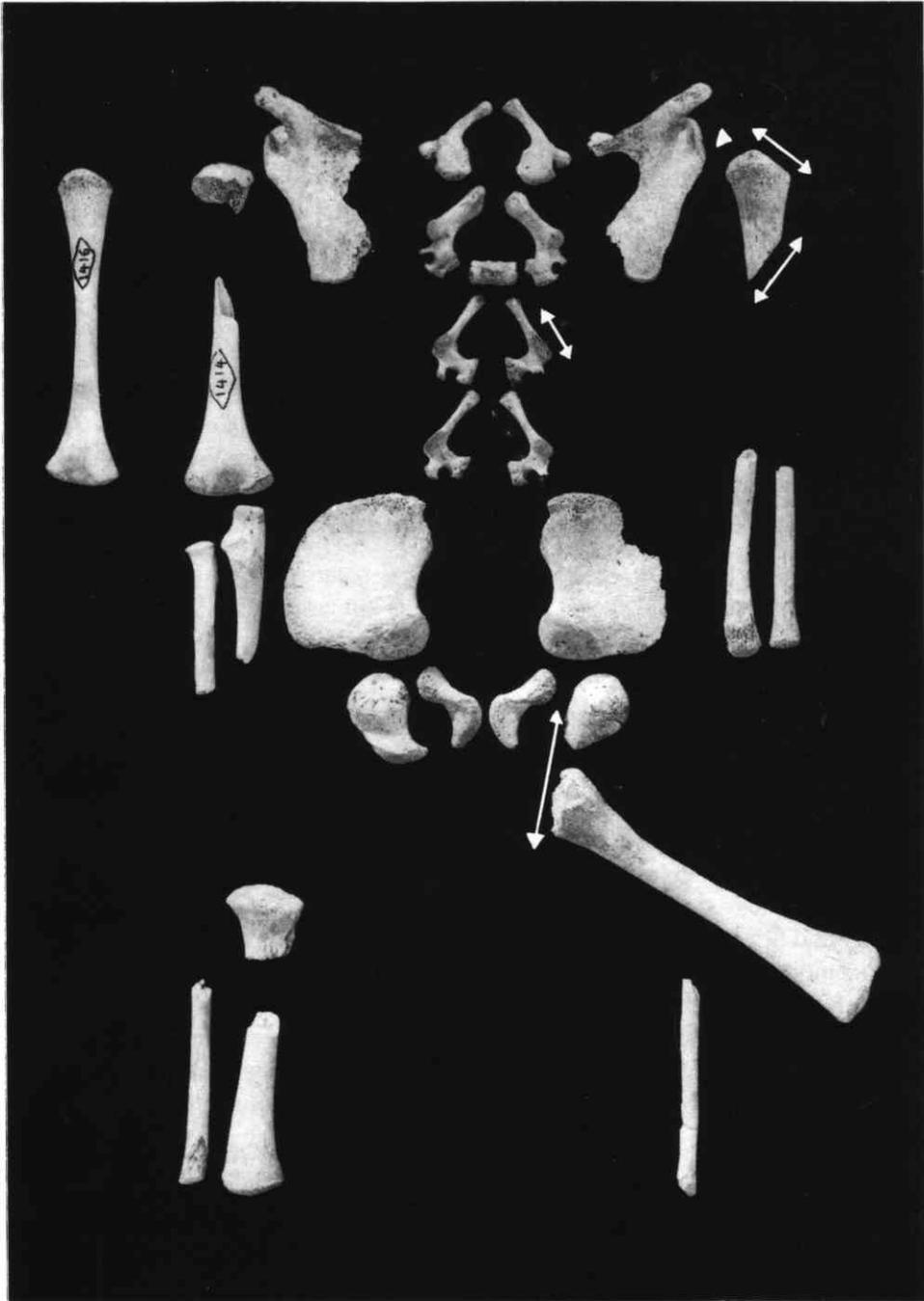


Figure 2. Reconstructed layout of the skeleton of PC 1414. The large size of the foetus is apparent when the humerus (labelled 1414) is compared to that of a normal sized foetus (labelled 1416).

Close examination of the excavated remains revealed cut marks on four or five bones. The inferior articular process of the right neural arch of the third cervical vertebra has been severed cleanly without damage to the neural arch of the fourth vertebra. The shaft of the right humerus is cut through obliquely medially just about the proximal third to below the surgical neck laterally. There is also a cut across the humerus head and there may be a nick mark on the glenoid area of the right scapula. The right femur has been severed at the proximal end with a cut that must also have removed the tuberosity of the right ischium (fig. 3).

Since most of the skeleton of this baby is preserved it is possible to assess its size, stage of development and sex. The stage of development of the basi-occipital which is wider than it is long, and of the temporal bones in which the petrous and squamous parts are fused indicate that PC 1414 was a full-term foetus. The annular rings of the external auditory meatus have not fused. This normally occurs shortly after birth. The cusps of the lower deciduous second molar have just united and the crown of the lower deciduous second incisor is not complete, so that the stage of dental development also points to a full-term neonate.

The baby was large for a neonate especially as regards the limb bones (compare the size of the two humeri shown in figure 2, the humerus of PC 1414 on the right, that of a more normal sized neonate PC 1416 on the left). Crown-heel length is estimated to have been about 54-56 cm, following the method of Fazekas and Kósa (1978). The ilium was particularly large (table 1).

In that the sciatic notch is long, shallow and symmetrical the baby was probably female. Radiological examination of the skeleton showed no bone abnormality.

Given the large size of the baby it seems to us that the best interpretation of the cut marks on the bones is that they were sustained as a result of an embryotomy performed to remove, from the womb of the mother, her baby that had died during delivery and become wedged in the pelvis. That the operation was performed implies that the mother was still alive and it is to be hoped that she survived her ordeal, certainly she is not buried with the baby. Removal of the foetus to comply with the ancient Roman Law of Numa Pompilius would surely have been carried out in a much simpler fashion if the mother were already dead; and elsewhere in the cemetery there is at least one female buried with a foetus *in situ* (e.g. PC 812).

Several of the limb bones are broken, but the nature of the break on the left humerus in particular and possibly the left tibia raises the question as to whether these bones had been broken during the attempts to deliver the baby. The photograph of the skeleton as excavated shows them to have been broken already at this stage. By contrast the bones of the skull are not crushed. Fracture of the clavicle or the humerus may occur in difficult breech delivery, particularly if the arms are extended, while fracture of the femur may occur during attempts to bring down extended legs (Llewellyn-Jones 1986).

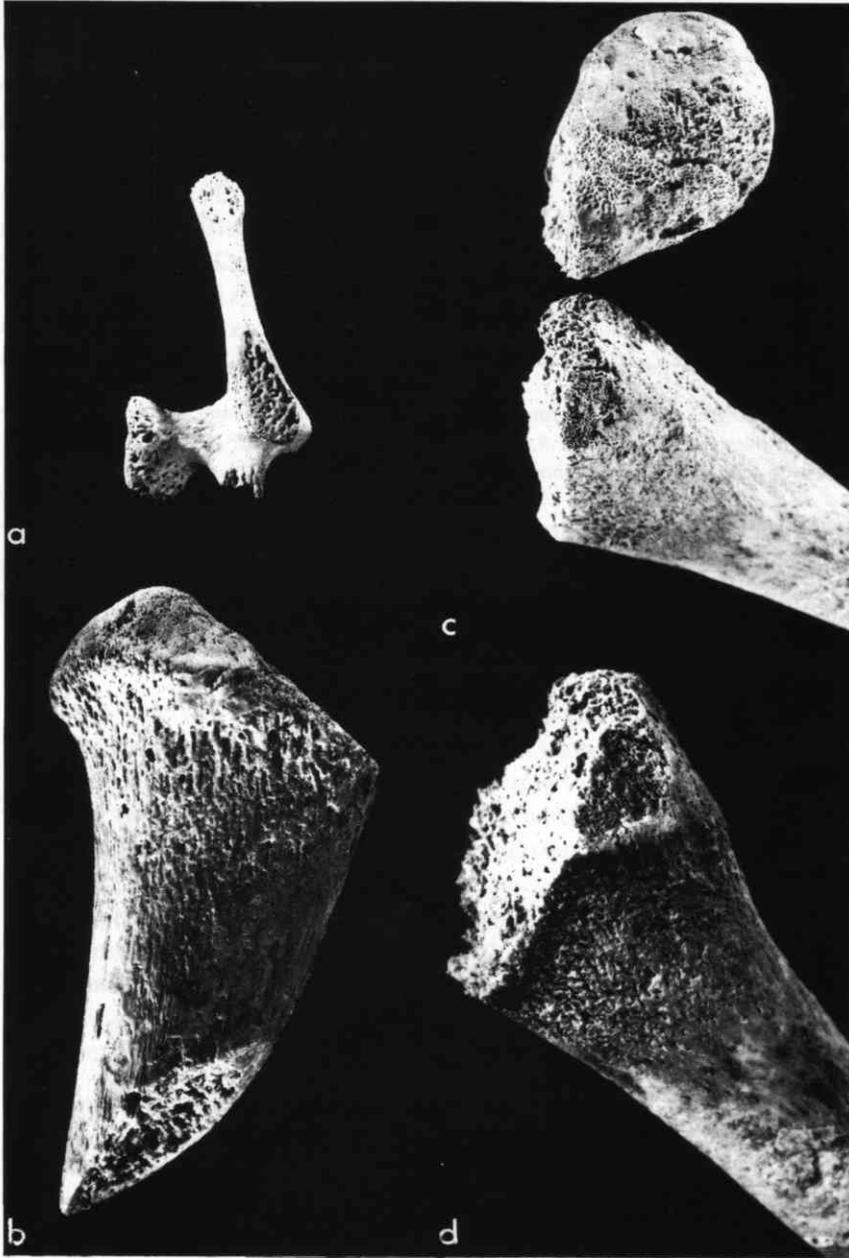


Figure 3. Cut marks on bones from the skeleton of PC 1414.

- a) the right neural arch of cervical vertebra 3.
- b) right humerus.
- c) right ischium and femur.
- d) right femur.

Table 1. — Bone dimensions of PC 1414 from Pouldbury Camp, England.

Bone	Length mm	Width mm	Crown-heel length cm**
Basi-occipital	13.04 (12.69)*	16.35 (15.39)	$\times 42.97 - 5.86 = 50.14$
Mandible	51.94		$\times 30.96 + 5.94 = 56.46$
Humerus metaphysis	35.47	18.63	$\times 10.78 - 1.73 = 54.26$
Ilium		39.79	$\times 28.30 + 3.95 = 56.67$
			$\times 14.24 + 4.05 = 54.55$
			$\times 15.07 + 6.23 = 66.19$

* Figures in parentheses are the mean for the rest of the Poundbury perinatal infants. The mean crown-heel length for this group is 49.65 ± 1.8 cm

** Formulae for crown-heel length from Fazekas & Kósa (1978).

A description of the procedure that should be followed in carrying out an embryotomy is given by Soranus, a Greek gynaecologist who worked in Rome during the second century AD. An extract is given here of relevant parts of his text (Soranus 11(63)) :

« If the foetus is already dead, one should throw a piece of cloth over it to prevent it slipping and draw it forward slightly. Then depressing it in order that the parts lying above may become more visible, one should amputate at the shoulder joint ... Then one should turn the rest of the body with the fingers and deliver by inserting the hooks ... If however the impaction is caused by too big a head ... one should split it with an embryotome or a knife for removing polypi, covered during its introduction between the forefinger and the little finger. If, however, because of the large size of the whole body, the foetus does not respond even if so pulled ... one must plunge the knife into the jugular region until it has penetrated deeply into the foetus. For when the blood is drained off, the body becomes thin.

If the foetus is dead and of excessive size, it is dangerous to morcellate it entirely within the uterus. It is better to cut each of the parts as it presents. In these cases amputations at the joints are indicated, for at their ends even the bones are easily freed from their connections. But it is necessary to put together the removed parts and to pay heed lest (any) have been left behind».

(Extracts from Soranus gynaecology book IV. III (XIX) on extraction by hook and embryotomy. Translation by O. Temkin (1956). A copy of the manuscript by Muscio is in the National Library Brussels-MS 3714 IX-X century).

The cut on the cervical vertebra would then have occurred when the knife was plunged into the jugular vein to drain the blood. The other cuts at the shoulder and hip are perfectly compatible with the separation and removal of the limbs one by one.

The position of presentation, normal or breech is difficult to deduce, but given the angles of the cuts and assuming that the surgeon was right-handed, the back would have been uppermost and the head presented first. This is the normal position for delivery.

Sources indicate that most doctors, indeed most professional men — apothecaries, teachers, etc., practising in Rome in the early Roman Empire were Greek or Greek trained. The Romans revered Greek science and its practical application in the field of medicine was assimilated into Roman culture and therefore became widespread by the later Roman period.

The importance of this embryotomy in historical terms is that it shows that Roman medical theory had been adopted in Roman Britain by the fourth century, possibly even that the native population already had the knowledge and used it.

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