

The Head of Pavia

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Abstract

The excellent conservation and remarkable accuracy of the embalming of an Egyptian mummy's head, kept from 1818 at the Museum of the Institute of Archaeology at the University of Pavia, prompted further study using medical and anthropological analyses. Standard X-rays, computerized axial tomography, ¹⁴C analysis, sex attribution using aDNA from bone, and human biological typification through microscopic analysis of hair were performed. Based on our research, the mummy does not show evidence of pathological alterations. It appears to be an adolescent male. It is likely that he lived before the 18th dynasty and belonged to a North African area of Caucasian population, and to a high social class.

Introduction

In 1818 the Royal Imperial Government of Austria decreed the institution of two chairs in archaeological disciplines, defined at the beginning with the unusual name of "Numismatic, Antiquity, Diplomatic and Araldic", for the two Universities of Padua and Pavia. In Pavia, from the outset, it was decided to establish a small Archaeological Museum into the newborn Institute, mostly for teaching purposes. Consequently a consistent amount of archaeological material from different ancient civilizations was bought. Many of these finds, as well as many more donated or bought over time, are still at present part of the collection of the Museum.

Among the other finds a mummy head, of unknown origin, stands out for its surprising state of preservation and accurate embalming. The head lies under a glass bell on a

wooden base covered with a linen cloth, probably obtained from the mummy's bandage (Fig. 1).

To reach a better comprehension of the clinical, anthropological, and social conditions of the investigated subject a wide series of analysis and examinations were performed.



Fig. 1 - The appearance of the head of Pavia.

Objective physical analysis

The specimen is represented by an embalmed head whose actual dimensions are those of an eleven year old child. The eyelids are closed and the eyelashes are present, the cheekbones are pronounced and the thin half-open lips allow part of the first three teeth of the superior right arcade to be seen. The thin and sharp nose assumed, as frequently happens in mummies, a slightly aquiline profile, with empty nostrils. The auricles of the ears appear entire and moderately deformed. The two angles of the mandible are pronounced and the left one is clearly visible due to the loss of skin in that region.

The hair appears a bit woven, quite thick, about 3 cm long and reddish colored, probably due to a dye. In the nose-

orbital area it is possible to observe a fissure of the tissues about 1-2 mm wide and 3-4 mm long. Except for this lesion, due to the time, the head displays a considerable physical integrity. The color is almost uniformly dark-brown, except in the temporo-zygomatic zone, where a dark-red coloration, probably due to cosmetics, can be seen.

In the lower part it is possible to see that the head was separated from the rest of the body with a sharp cut between the fourth and the fifth cervical vertebrae.

X-Ray investigation

The cranium is entire with bilateral breakage of the ethmoidal lamina. The pituitary fossa has a juvenile aspect and appears regular. The structures at the base of the cranium are preserved. In the back of the cranial cavity a mass of fibrotic amorphous material, with some calcification, attributed to the remains of parietal meningeal tissue, is present. It is possible to see the remains of both the optic nerves. The eye-balls are in their position, still protruding, though a bit hypotrophic.

The dental arcades are complete and in good condition of preservation with the eights erupted. The paranasal pneumatic cavities are both regular. The nasal septum is aligned, but is diagonally fractured in the middle third. The atlas and the axis are well defined and still articulated (Fig. 2). The third and the fourth cervical vertebrae are also visible and they appear regular. The structures of the internal ear are also present, although not well defined.



Fig. 2 - X-ray image of the cranium.

Sex identification

A small amount of bone (about 0.5 g) was taken from the fourth cervical vertebra to perform molecular DNA

analysis to identify the sex of the subject. To estimate preservation of ancient biomolecules, amino acid racemization rate was measured. Results obtained from racemization of aspartic acid (D/L Asp = 0.0479), glutamic acid (D/L Glu = 0.0104) and alanine (D/L Ala = 0.0192) are compatible with the successful amplification of DNA and this is confirmed by good yields from PCR (Poinar *et al.*, 1996). The sample analysed reported a typical male allelic profile for the genes of amelogenine and SRY (Tab. 1), even if in some amplification allele dropout was observed (Santos *et al.*, 1998).

PCR	First extraction	Second extraction
1	112/106	n.d
2	93	112
3	112	112/106/93
4	n.d	106/93
5	112/106/93	n.d
6	112/106/93	112/106/93

Tab. 1 - Amelogenin profile for sex identification from six amplifications of two different DNA extractions.

Microscopic examination of hair

The examination was performed on fragments about 2 cm in length, cut from the region above the right mastoid process. Many gray-blackish particles were present that in some cases included small tufts of hair (Fig. 3). They seem to be made of particles of dust mixed with dye and fragments of hair. Hairs were observed with a optic microscope (75 x), with

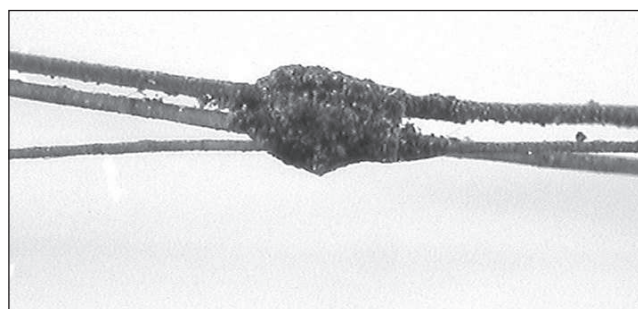


Fig. 3 - Microphotography of a gray-blackish particle made of small tufts of hair and dust mixed with dye.

white polarised light, and with a stereomicroscope (20 x). The hair color was middle-brown and the pigment density was middle. Medium-large size pigment aggregates were more frequently randomly distributed in the peripheral areas. The cuticle could not be distinguished, probably damaged by time. The cortical presented some fringes, microfibrillar organisation was preserved, even if not uniform. Medullar was absent.

Measure of the maximum and minimum diameter, taken in the middle third of the stem, showed they have a marked elliptical section. Based on the phenotypic characteristics of the sample the subject could be identified as a Caucasian coming from southern Europe or northern Africa.

¹⁴C DATING

The analysis was performed on small bone fragments taken from the fourth cervical vertebra using the AMS method. Calibration was done with the OXCAL software by Bronk Ramsey.

Results (Fig. 4) show the head can be dated at a relatively late period of the Roman epoch, the most probable dates are between 50 and 140 AD.

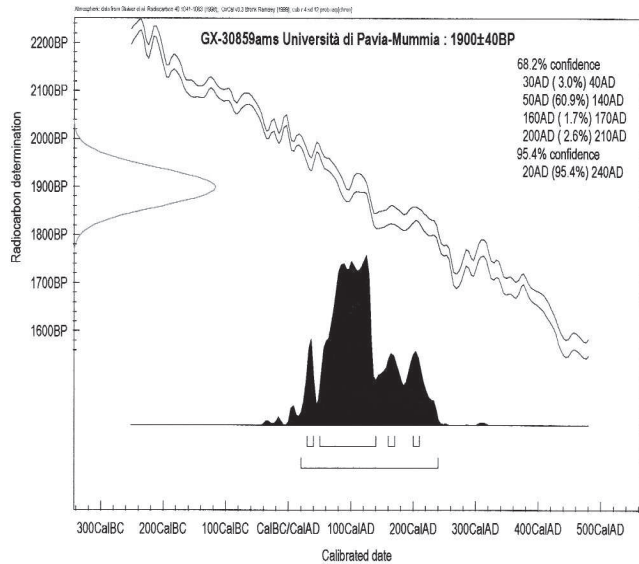


Fig. 4 - ¹⁴C profile of the analysed specimen. Analysis by Geochron Krueger Enterprises Inc. (Massachusetts, Usa).

Conclusions

According to our results the examined head belonged to a young Egyptian male, 13 to 16 years old, living between 50 and 140 AD. The accuracy of embalming, particularly in an epoch in which that practice was decaying in terms of frequency and quality, and the use of cosmetics on the face, suggests he was a member of the upper class, may be of the higher aristocracy.

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