

The mummy of a child from Hawara: comparison of its portrait with radiological examination results



Abstract: The subject of this paper is the mummy of a child with a “Fayum portrait” discovered by Petrie at Hawara and housed in the Egyptian Museum in Cairo. The research focused on three goals: confirmation of the presence of a mummified body within the wrappings; comparison of the sex and age determined by radiological examinations with those depicted in the portrait; and assessment of whether the portrait was painted from life or based on a standard type produced in a particular workshop. Radiological examinations of the mummy were carried out using radiography and computed tomography, followed by anthropological analyses. They confirmed that the body belonged to a girl, while the portrait itself does not provide clear evidence of sex. The age estimated on the basis of radiological examinations is lower than that suggested by the portrait. The overall analysis indicates that it is rather unlikely that the portrait was painted “from a model”. Since most of the so-called “Fayum portraits” were detached from mummies in the past, this study concerns a rare and valuable example of an intact child mummy still wrapped in bandages with its portrait preserved, allowing for a comprehensive interdisciplinary analysis.

Keywords: mummy, child mummy portraits, Roman Egypt, radiography and computed tomography, anthropological analysis, Petrie

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INTRODUCTION

Fayum portraits were painted on wooden panels and placed over the mummified, bandaged faces of the deceased as an integral part of their burial rites. This tradition was believed to grant the dead eternal life. Unfortunately, most of these portraits have since been separated from their original mummies (Parlasca 1966: 23–29). The detached portraits are now displayed in museums worldwide and are recognized as high-quality naturalistic paintings from the period when Egypt was a Roman province (30 BC–AD 395).¹

The term “Fayum portraits” originated from the area of their discovery; however, similar representations have been found at various sites throughout Egypt (Nowicka 1984). This led to the broader term “mummy portraits,” which is now more commonly used in scholarly literature (Corcoran 1995; Walker and

Bierbrier 1997; Svoboda and Cartwright 2020).

Mummy portraits have been extensively studied for their artistic style, painting techniques, and iconography. A key question explored by researchers concerns the extent of their naturalism: were these portraits painted from life, or created after death? This issue is further complicated by the fact that most portraits cannot be compared with the remains they once covered.

With this in mind, the mummy discussed in this article represents a rare and valuable example of an undisturbed, rhomboid-wrapped child with its portrait still in place, allowing for a comprehensive examination. The mummy is currently part of the permanent collection of the Egyptian Museum in Cairo (Cat. Gen. No. 33225) [Fig. 1].



Fig. 1. Mummy of a child, side view, CG 33225 (Egyptian Museum, Cairo | photo S. Abd El Mohesen)

1 Mummification was ultimately banned as an example of “pagan worship”; it was legally prohibited by Emperor Theodosius in his edict of 392. Cf. Cod. Theod. XVI 1.2 Imp. Theodosius, Arcadius et Honorius aaa. ad Rufinum praefectum praetorio; Pharr 1952: 473–474.

AIM OF THE STUDY

This study had three main objectives: first, to confirm the presence of a mummified body within the wrappings; second, to compare the sex and age determined by radiological examinations

(X-rays and CT scans) with those depicted in the portrait; and third, to assess the realism of the portrait in order to determine whether it was painted from life or based on a standardized model.

ARCHAEOLOGICAL AND HISTORICAL CONTEXT

The mummy of the child was discovered by William Flinders Petrie in 1888 in the cemetery near the pyramid at Hawara (Petrie 1889: 4). After its discovery, the mummy was transferred to the Egyptian Museum in the Būlāq district of Cairo and later moved to the museum building in Tahrir Square, where it is currently on display (*Journal d'entrée* 1889: 31/ n. 28437; Edgar 1905: 85). A black-and-white drawing of the child's portrait, published a year after the discovery (Petrie 1889: 4, Pl. X), appears to depict the same mummy, although the studs on

the wrappings are missing.

In his catalog entry, Campbell C. Edgar (1905: 85) described the image as the "head of a young boy" but did not provide any explanation for this identification. He also noted the absence of rivets: "bandages arranged in the usual rhombic pattern, but without studs; horizontal band a little below the panel." Klaus Parlasca refrained from specifying the child's sex, stating only that the jewelry in the portrait was similar to that seen on other boys and therefore could not be used to conclusively iden-



Fig. 2. Part of the child's mummy, CG 33225 (Egyptian Museum, Cairo | photo S. Abd El Mohesen)

tify the child as a girl.² He tentatively dated the portrait to the 1st century AD by comparing it with other portraits of children. Euphrosyne Doxiadis (1995: 136, Figs 66–68) identified the child in the portrait as a girl on the basis of a visual examination. She compared it with another mummy and a portrait of a girl in the Cairo Museum (Cat. Gen. No. 33226) and dated both mummies to the 2nd century AD (Doxiadis 1995: 136).

Lorelei Corcoran provided the most detailed description of the mummy to date, including its wrappings. She re-

fined Parlasca's dating by suggesting that the pattern of body wrapping indicated a "mid to late first century AD" origin (Corcoran 1995: 98). Corcoran also argued that the elaborate jewelry and the scarlet color of the chiton suggested that the child was more likely a girl.

Paul. C. Roberts (2007: 49) mentioned the portrait of the child among "recently identified ones" in 2007. He connected it with "HH" in Petrie's Notebook 36 (Petrie n.d.: 54). According to this interpretation, the child was identified as a little girl.

DESCRIPTION OF THE MUMMY AND STATE OF PRESERVATION

The study examined a mummy wrapped in linen bandages arranged in a rhomboid (or diamond) pattern (Corcoran 1995: 100). The rhomboids are formed by five layers of bandage, with an additional overlapping layer [Fig. 2].

Beneath the outer wrappings, the mummy is further protected by a linen sheet sewn together at the top of the head. The wrapped mummy measures approximately 81 cm in length, 21 cm in width, and 19 cm in depth. Several horizontal

bandages across the chest imitate a cartonnage chest band. The feet are also wrapped in a diamond pattern, but there is no additional cartonnage footrest; instead, they are shielded by a piece of linen. Unlike other mummies from this period, such as mummy No. CG. 33222 in the Egyptian Museum, no studs (gilded stucco buttons) have survived within the rhomboids of the bandages. The wrapping shows signs of damage, partly caused by resin or efflux from the mummy [Fig. 3]. It should



Fig. 3. Mummy of the child, frontal view, CG 33225 (Egyptian Museum, Cairo | photo S. Abd El Mohesen)

2 "La presenza di gioielli, attestata in altri ritratti di fanciulli, non costituisce una prova sicura per individuare nel nostro una bambina. Essendo la riproduzione poco chiara, esso va inserito soltanto con riserva nel gruppo dei ritratti infantili del I secolo" (Parlasca 1969: 38).

be noted that both the mummy and the portrait are in need of comprehensive conservation and proper display in a showcase with a suitable microclimate to protect the object from further deterioration.

Corcoran (1995: 100) noted that the bandages covering the head were composed of up to seven layers. Around the face, the outer layers form an octagonal perimeter that secures the portrait.

THE PORTRAIT

The portrait shows the head, neck, arms, and torso of a child against a light gray background [Fig. 4]. It is difficult to be more precise about the color of the background due to heavy abrasion of the paint layer and the lack of laboratory pigment analysis. The composition fills the vertical panel, with the upper part of the head partially obscured by the mummy's wrappings. The child is depicted almost frontally, with the head slightly turned to the proper left. The face

is oval, with full cheeks and prominent ears. The light complexion contrasts with the dark brown, short, slightly disheveled hair, which falls in short strands over the ears and high forehead. The eyebrows are symmetrical, and the eyes are wide open, set in deep sockets with long lashes surrounding the upper eyelids. The nose is straight with wide nostrils, while the small mouth, with full lips, is slightly turned up at the corners. The soft, painterly style of the portrait is enhanced by deep, muted tones.

The child has a relatively short, plump neck, accentuated by a semicircular wrinkle. The purple tunic with a boat neckline is decorated with dark *clavi*. Small gold earrings decorate the ears, and a collar necklace set with what appear to be emeralds and pearls encircles the neck.

The facial features do not provide a clear indication of the child's sex. While short hair is more characteristic of boys, painters of children's portraits often did not distinguish between boys' and girls' hairstyles, as in the portrait of a child (possibly the daughter) of Demos (Doxiadis 1995: 56). Both Demos (CG 33237) and her child (CG 33240) are represented by portraits currently in the collection of the Egyptian Museum in Cairo. In terms of age, the chubby face and proportions of the Demos portrait suggest a very young child, whereas the more elongated



Fig. 4. Mummy portrait, CG 33225 (Egyptian Museum, Cairo | photo S. Abd El Mohesen)

face of the mummy in this study suggests an older age—probably between six and ten years—based on visual inspection.

The portrait was painted in encaustic on a wooden panel. It shows various conservation problems, including bleaching in areas of the face and background.

There are vertical cracks, crumbling, and gaps (*lacunae*) in the pictorial layer, particularly in the *tunica clavata*, caused by warping of the underlying wooden panel and migration of extractive salts in the neck and tunic areas. The textile around the face also shows considerable loss.

RESEARCH METHODS

RADIOLOGICAL EXAMINATION METHODS

The radiological examination of the mummy was carried out using both radiography (X-ray) and computed tomography (CT). The radiographs were taken by Karim Attiya (Egyptian Museum, Cairo) using a portable X-ray machine, the Poskom VET-20 BT, equipped with a Vivid detector. Forty-two exposures were taken from different projections, and the resulting images were recorded in digital format (DICOM).

The CT examinations were performed on a Siemens Somatom 6 scanner by a radiographer at the Egyptian Museum, Cairo, under the supervision of Prof. Sahar Saleem. The following parameters were used: 130 kV, 23–63 mAs, pitch 0.83–1.8, FOV 350–500, slice thickness 0.6–1.25 mm, and reconstruction thickness 0.4–0.8 mm. Scanning was performed in the transverse plane. The imaging data were recorded in digital format (DICOM). The authors processed the data to produce 2D images (Multiplanar Reconstruction, MPR) and 3D images (Volume Rendering Technique, VRT) using OsiriX software v.5.5.1 (Pixmeo SARL, Switzerland). The descriptions of the CT images include the window width (WW) and window level (WL) parameters. Selected X-rays and CT scans were subjected to anthropological analysis.

A 2D facial reconstruction was performed using 660 images with a slice thickness of 0.63 mm, obtained during head scanning with a Somatom 6 (Siemens) scanner. The reconstruction was carried out after obtaining a 3D image (volume rendering technique, VRT) and multiplanar reconstructions (MPR) of the child's skull, generated using OsiriX software v.5.5.1 (Pixmeo SARL, Switzerland). A lifelike image of the face was produced using Gimp 2.10.36 software.

The position of the eye slit was determined based on the position of the lacrimal crest and Whitnall's tubercle (Angel 1978). The shape of the piriform aperture was used to determine the position and shape of the nose, modified after Gerasimov (Wilkinson 2004). The width of the nasal base was determined using measurements of the piriform aperture (Wilkinson 2004).

Selected anthropometric points (Helmert 1984) were used to place soft-tissue thickness indicators. Because no current soft-tissue data exists for children from contemporary Egyptian populations (Liu et al. 2022)—and certainly not for ancient ones—the values published by Manhein and colleagues (Manhein et al. 2000; Nerlich et al. 2020) were applied.

The first reconstruction was produced in grayscale, as no DNA analysis results

were available to predict skin, eye, and hair color, and the reconstructor was not familiar with the Fayum portrait of the child. However, based on the colors of the portrait and using artificial intelligence (OpenArt Free), a second, color reconstruction was created. Gold earrings were added in reference to those found in the analyzed portrait. In both reconstructions, the most neutral hairstyle likely to have been worn by a child of the period was selected.

ANTHROPOLOGICAL ANALYSIS

Sex determination was primarily based on the identification of secondary sexual characteristics, such as the presence of labia majora or a mummified penis. It is important to note that in children, sexual differences are not as apparent in skeletal remains, as sexual dimorphism becomes

more pronounced during puberty (Lewis 2007). Nevertheless, the shape of the mandibular arch, which is thought to differ between boys and girls and may therefore serve as an indicator of sex, was also assessed (Loth and Henneberg 2001).

Biological age was mainly assessed by age-related stages of dental and bone development. Of these two, dental development is considered the most reliable method for estimating age in fetuses, neonates, and children, as it is less influenced by environmental factors than other skeletal structures (Scheuer and Black 2000; AlQahtani, Hector, and Liversidge 2010). Skeletal age was determined from the length of the long bones. Measurements were taken from the multiplanar reconstruction (MPR) images, with each bone measured three times to calculate the arithmetic mean.

RESULTS

SEX DETERMINATION OF THE MUMMIFIED CHILD

The radiographs did not reveal a mummified penis [Fig. 5]. However, the pubic

region is covered by the child's hands in the mummified state.

Similarly, the CT images did not identify a penis, but the mummified tissue in the pubic bone area may represent the vulva [Fig. 6].



Fig. 5. Radiograph of the infant mummy; anteroposterior view of the small pelvic region, CG 33225 (Egyptian Museum, Cairo | author Karim Attiya)



Fig. 6. CT image (frontal MPR) of the infant mummy. The white rectangle marks the female external genitalia; WL: 638 WL: 3787 (Reconstruction Marta Barszcz-Boniczewska)

Detailed analysis of the CT images revealed an elongated structure (2.1 cm long $\times$ 0.5 cm wide) with heterogeneous characteristics within the pelvic cavity. It appears that this structure, which shows a visible band of low X-ray attenuation, may correspond to the child's uterus [Fig. 7].

A 3D reconstruction of the mandible showed a U-shaped body, characteristic of the female sex (Loth and Henneberg 2001) [Fig. 8].



Fig. 7. CT image (sagittal MPR) of the child's mummy. The black circle marks the structure corresponding to the child's uterus; WL: -213 WW: 2472 (Reconstruction Marta Barszcz-Boniczewska)



Fig. 8. CT image (3D reconstruction) of the mandible of the mummified child, bottom view (Reconstruction Marta Barszcz-Boniczewska)

AGE DETERMINATION OF THE MUMMIFIED CHILD

Analysis of dental development from the radiographs was challenging due to the lack of panoramic images. Nevertheless, a complete set of erupted milk teeth was observed. The radiographs show fully developed crowns and roots (including apical closure) of the upper and lower primary incisors (tooth numbers according to ISO standard: 51, 52, 61, 62, 71, 72, 81, 82). The crowns of the deciduous canines are fully formed, but the roots remain open (ISO tooth numbers: 53, 63, 73, 83). The development of the primary molars is less clear in the radiographs, but they appear to be fully formed. Permanent incisor buds are visible (ISO tooth numbers: 11, 12, 21, 22, 31, 32, 41, 42) with crowns formed and roots still developing. The radiographs also show the stage of development of the first permanent molar buds (ISO tooth numbers: 16, 26,

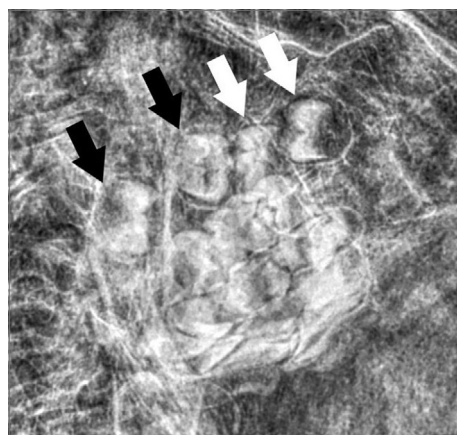


Fig. 9. X-ray of the child's mummy; fragment of the facial skeleton. White arrows – crowns of the first maxillary molars (ISO numbers: 16, 26); black arrows – crowns of the first mandibular molars (ISO numbers: 36, 46) (Karim Attiya and Marta Barszcz-Boniczewska)

36, 46), while no buds are present for the second premolars. CT images with MPR reconstruction revealed premolar buds in the maxilla and mandible (ISO tooth numbers: 14, 15, 24, 25, 34, 35, 44, 45). The overall odontological picture suggests that the child was approximately 3.5 years old [Figs 9–12]. Table 1 illustrates the arrangement of the child's deciduous and permanent teeth in the maxilla and mandible.

The assessment of the skeletal system was carried out following the den-

tal analysis. Measurements of the lower limb bones were taken three times in series, and average values are presented

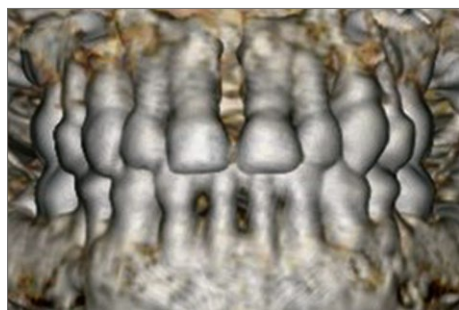


Fig. 10. CT image (3D reconstruction) of the facial skeleton of the mummified child. Arrangement of deciduous teeth in the upper and lower jaws, front view; WL: 289 WW: 155 (Reconstruction Marta Barszcz-Boniczewska)

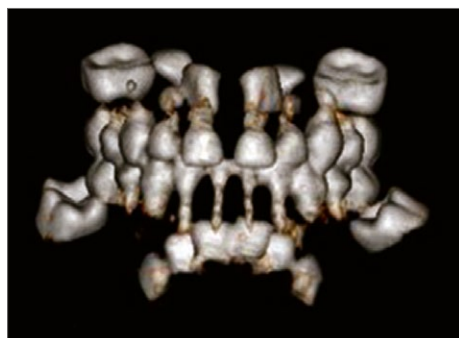


Fig. 11. CT image (3D reconstruction) of the mummified child's deciduous and permanent teeth, front view; WL: 1039 WW: 83 (Reconstruction Marta Barszcz-Boniczewska)

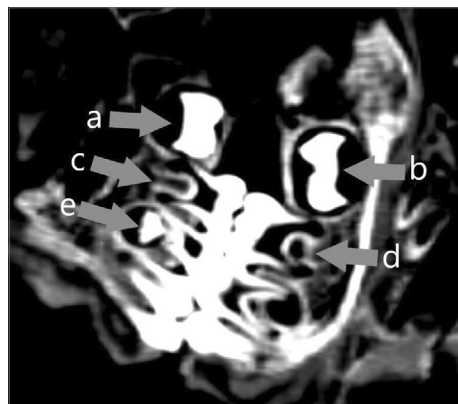


Fig. 12. CT image (sagittal MPR, right side). Arrows mark the buds of permanent teeth: a – crown of the first maxillary molar (ISO number: 16); b – crown of the first mandibular molar (ISO number: 46); c – crown with developing root of the second maxillary premolar (ISO number: 15); d – crown with developing root of the second mandibular premolar (ISO number: 45); e – crown of the first maxillary premolar (ISO number: 14); WL: 281, WW 1362 (Reconstruction Marta Barszcz-Boniczewska)



Fig. 13. X-ray of the child's mummy; anteroposterior view of the pelvic area. Developing greater trochanter marked with an arrow (Karim Attiya and Marta Barszcz-Boniczewska)

in *Table 2*. These were used to estimate age according to the classifications proposed by Boccone and colleagues (2010) and Bernert, Évinger, and Hajdu (2007). Both classifications yielded an age range of 1 to 2.5 years.

Table 1. Arrangement of teeth of the mummified child (51–81 – deciduous teeth, 11–46 – permanent teeth in various stages of development)

16	15	14	13	12	11	21	22	23	24	25	26
	55	54	53	52	51	61	62	63	64	65	
	85	84	83	82	81	71	72	73	74	75	
46	45	44	43	42	41	31	32	33	34	35	36

Table 2. Measurements of maximum diaphyseal length of lower limb bones [mm]

Bone	Measure 1	Measure 2	Measure 3	Mean
Right femur	146.4	145.6	147.9	146.6
Left femur	141.4	141.4	143.7	142.2
Right tibia	116.4	118.6	117.5	117.5
Left tibia	118	119.4	119.6	119
Right fibula	116.9	114.1	115.7	115.6
Left fibula	114.3	115	116	115.1



Fig. 14. CT scan (3D reconstruction) of the knee joints showing no ossification of the patella: a – bone window; b – cartilage window (Reconstruction Marta Barszcz-Boniczewska)

The developmental stage of the greater trochanter suggests an age between 2 and 5 years [Fig. 13].



Fig. 15. Radiograph of the child's mummy; anteroposterior view of the legs. Arrows indicate Harris lines (Karim Attiya and Marta Barszcz-Boniczewska)

Assuming the individual is female, skeletal development indicates an age between 2 and 4 years (Schaefer, Black, and Scheuer 2009), as evidenced by the presence of the navicular bone, intermediate cuneiform bone, greater trochanter, and proximal epiphysis of the fibula. This is indicative of the early stages of patella development, suggesting an age range between 3 and 4.5 years (Schaefer, Black, and Scheuer 2009) [Fig. 14].

The presence of Harris lines —transverse sclerotic layers in the long bone epiphyses— was also observed [Fig. 15]. These lines are thought to indicate episodes of growth disturbance caused by adverse conditions such as nutritional deficiency or rapid disease progression (Kwiatkowska 2017).

Overall, the radiological assessments (X-rays and CT scans) strongly suggest that the remains belong to a female individual aged approximately 3.5 years (*Infans I*). Despite discrepancies between dental and skeletal age estimates, dental age is less affected by environmental fac-

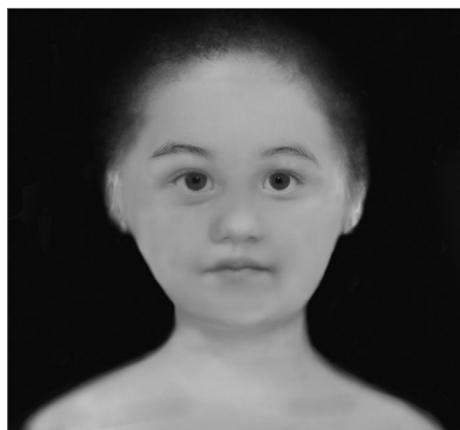


Fig. 16. Facial reconstruction of the child from Hawara in grayscale (Reconstruction by Marta Barszcz-Boniczewska)

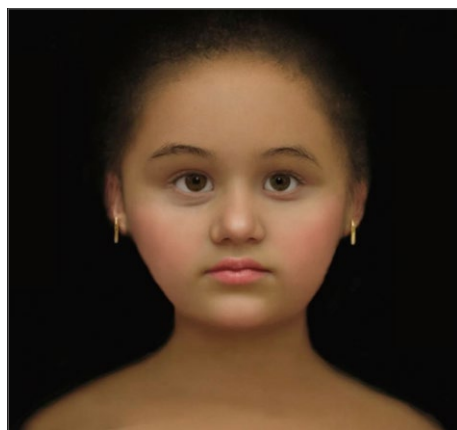


Fig. 17. Facial reconstruction of the child from Hawara in color (Reconstruction by Marta Barszcz-Boniczewska)

tors than bone age (Scheuer and Black 2000). The presence of Harris lines may reflect environmental stress that impeded the child's growth, potentially leading to a lower skeletal age estimate. Further investigation would require isotope analysis and pathogen testing.

In summary, the anthropological assessment supports the conclusion that the mummified child is a girl, while the sex of the portrait remains unclear, although the jewelry may suggest a female (Corcoran 2021). The age estimated from the anthropological measurements is approximately 3.5 years, whereas the portrait suggests an older child (at least six years of age).

FACIAL RECONSTRUCTION

Two facial reconstructions were performed based on the VRT data [Figs 16, 17]. When comparing the proportions and placement of facial features between the lifelike facial reconstruction and the Fayum portrait, the analysis focused on the right side, as the portrait

was painted in right-side profile. This makes direct comparison somewhat difficult [Fig. 18].

The image from the lifelike reconstruction indicates female sex, which is clearly confirmed by radiological examinations. However, based on the portrait alone, this could not be determined with certainty. The age estimated from the radiological examinations is lower than that suggested by the physical features visible in the portrait. Moreover, the younger age indicated by the radiological data may be supported by the child's short hair, which is not long enough to be arranged in the pinned-up hairstyle typically depicted in portraits of slightly older girls.

The ratio of the transverse dimension of the face at eye level to the vertical dimension in the reconstruction, based on the CT scan of the skull, is 1:1.3. The same ratio in the portrait is 1:1.7, indicating a notable difference: the face depicted in the portrait appears considerably "thinner".



Fig. 18. Comparison between the reconstructed face and the Fayum portrait (Marta Barszcz-Boniewicz and S. Abd El Mohesen)

The position of the right wing of the nose and the base of the nose corresponds closely to the proportions observed in the portrait. The reconstructed position of the lips and the difference in height between the upper and lower lips (with the upper lip being higher) are likewise reflected in the Fayum portrait.

The distance between the eyes is slightly smaller in the portrait than in the reconstruction. The spacing of the corners of the right eye corresponds to

that depicted in the portrait of the child. However, there is a difference in the orientation of the right eye slit. According to the morphology of the right orbit reconstructed from the CT scan, the medial corner is positioned lower than the lateral corner, whereas in the Fayum portrait it is the opposite. The position of the left eye slit in the ante-mortem reconstruction matches that of the right eye and corresponds to the representation in the Fayum portrait.

DISCUSSION

In the debate over the lifelike representation of faces in Fayum portraits, some researchers argue that these portraits were painted while the sitters were still alive and were later attached to their mummies. Petrie supported this theory on the basis of a piece of string found on one of the portraits he discovered (British Museum No. 1889.1018.1)³ (Petrie 1889: 10, Pl. XII; Cormack 1997: 69–70, Pl. 19). Fayum portraits often depict young, attractive individuals, perhaps reflecting a tendency to idealize the deceased. However, repetitive elements in pose, facial proportions, costume, and jewelry (Borg 1996: 93–94; Prag 2002) suggest that a formulaic approach was used, subsequently adapted to the features of each deceased individual (Borg 1996: 38–40).

Both the “paint-from-life” and “paint-at-death” theories have their supporters and detractors. Jeremy Hartnett (2012: 18) captures the likely reality: different processes were probably employed in creating the portraits. He argues:

All too often scholars stitch together individual scraps of scattered evidence, try to reconcile them into a coherent fabric, and assume that it can be draped unproblematically over all cases. The truth is that what we’re probably witnessing is a variety of different processes for the portraits’ creation. Life is messy; culture is complicated; and all-encompassing explanations rarely satisfy.

In the case of children, would families have anticipated the death of their young offspring and thus commissioned portraits early in their lives? If the portraits were to be realistic, they would have needed to be updated frequently to reflect children’s rapid growth. Alternatively, workshops may have employed standard portrait templates, modifying them after a child’s death (Walker and Bierbrier 1997: 15).

If the portrait examined here had been removed from the mummy, the child would appear to be at least six years old. The sex of the child has long been debated by scholars. Edgar (1905: 85) identified the child as male, while Parlasca (1969: 38)

3 https://www.britishmuseum.org/collection/object/G_1889-1018-1 (accessed: 16.12.2022).

avoided specifying the sex. Corcoran (1995: 98) and Doxiadis (1995: 136) considered the child to be female. The jewelry in the portrait supports the latter interpretation, although the cropped hair might suggest a boy, as girls typically wore longer hair, often pinned up. This is exemplified by a portrait of a girl in the Egyptian Museum in Cairo (Cat. No. 33226), where her hair is styled and secured with a diadem.

Determining sex from hairstyles can be challenging, especially from a modern perspective. An illustrative case is the child mummy with its portrait still attached, housed in the Staatliches Museum Ägyptischer Kunst in Munich. This mummy, excavated by Petrie at Hawara (Nerlich et al. 2020: 169), provides a valuable point of comparison. The portrait depicts a child with thick, curly hair styled in two plaits at the top of the head. With facial features such as large, almond-shaped eyes, well-defined eyebrows, a delicate nose, and cupid's-bow lips, the child appears to be a girl aged 6–8 years. However, CT scans revealed that the child was approximately 3–4 years old (Nerlich et al. 2020: 176) and had male genitalia.

Facial reconstruction based on 3D CT scans confirmed that the portrait was an accurate representation of the child's appearance, although earlier assumptions about the child's age, hairstyle, and sex were incorrect. It is particularly surprising that a child of three or four years had such thick hair, styled in a manner that modern viewers might associate with girls.

This highlights the importance of using 3D CT technology for accurate facial reconstruction.

In addition, CT scans of children from the tomb of Aline, also excavated at Hawara by Richard von Kaufmann in 1892,⁴ revealed inconsistencies between the sex of the mummified children and the portraits. These portraits, painted on the wrappings rather than on wooden panels, make it unlikely that they were mismatched by mistake.⁵ For example, the portrait of Aline's younger child initially appeared to be a boy based on facial features and hairstyle (short hair combed over the forehead and styled with some curls at the back).⁶ However, the presence of a lunula pendant—a crescent-moon amulet traditionally worn by girls (Fluck and Finneiser 2009: 9; Borg 1998: 20, Fig. 23)—and the exposed left arm, which symbolizes femininity (Helmbold-Doyé 2017), suggest that the portrait actually depicts a girl. Despite this, CT scans confirmed the child's male sex, raising the question of why a girl's portrait was placed on a boy's mummy.

Taken together, these examples show that child portraits did not always correspond to the sex or age of the mummified individual. It is important to remember that the visual assessments of modern observers may differ from those of individuals living in Roman Egypt. Estimates of the age and sex of the deceased, as well as the time of the portrait's creation, are based on interpretations of the clothing, jewelry, and hairstyle of the person depicted.

4 Today, it is in the holdings of Ägyptisches Museum und Papyrussammlung, Staatliche Museen zu Berlin. Cf. Germer, Kischkewitz, and Lüning 1994: 86.

5 Researchers estimate that the portraits date to the early 1st century, that is, to the time of Tiberius (Parlasca 1966: 95), or to the early 2nd century, during the reign of Hadrian (Borg 1998: 20).

6 Museum ID No. AM 11413.

CONCLUSIONS

With regard to the mummy examined, analyzed, and presented in this paper, it can be concluded that radiological examinations have made it possible to clearly determine the sex as female, whereas this could not be established on the basis of the portrait alone. The age estimated from the radiological examinations is lower than the age suggested by the physical features visible in the portrait. The proportions of the facial skeleton also differ, suggesting that the portrait was unlikely painted "from life". Several common features

were noted. This may corroborate the opinion of some researchers that painters used template portraits that were individualized. It should be emphasized that a comprehensive anthropological analysis was made possible through the use of computed tomography.

DECLARATION OF COMPETING INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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References

- AlQahtani, S.J., Hector, M.P., and Liversidge, H.M. (2010). Brief communication: The London atlas of human tooth development and eruption. *American Journal of Physical Anthropology*, 142(3), 481–490
- Angel, J.L. (1978). *Restoration of head and face for identification*. Paper presented at the 30th Annual Meeting of the American Academy of Forensic Sciences, St Louis, MO
- Bernert, Z., Évinger, S., and Hajdu, T. (2007). New data on the biological age estimation of children using bone measurements based on historical populations from the Carpathian Basin. *Annales Historico-Naturales Musei Nationalis Hungarici*, 99, 199–206
- Boccone, S., Micheletti Cremasco, M., Bortoluzzi, S., Moggi-Cecchi, J., and Rabino Massa, E. (2010). Age estimation in subadult Egyptian remains. *HOMO*, 61(5), 337–358
- Borg, B. (1996). *Mumienporträts: Chronologie und kultureller Kontext*. Mainz am Rhein: Philipp von Zabern
- Borg, B. (1998). *“Der zierlichste Anblick der Welt—”: ägyptische Porträtmumien*. Mainz am Rhein: Phillip von Zabern
- Corcoran, L.H. (1995). *Portrait mummies from Roman Egypt (I–IV centuries A.D.): With a catalog of portrait mummies in Egyptian museums (=Studies in Ancient Oriental Civilization 56)*. Chicago: The Oriental Institute of the University of Chicago
- Corcoran, L.H. (2021). “They leave behind them portraits of their wealth, not themselves”: Aspects of self-presentation in the dress of the deceased in mummy portraits and portrait mummies from Roman Egypt. In A.J. Batten and K. Olson (eds), *Dress in Mediterranean antiquity: Greeks, Romans, Jews, Christians* (pp. 125–137). London–New York: T&T Clark
- Cormack, R. (1997). *Painting the soul: Icons, death masks, and shrouds*. London: Reaktion Books
- Doxiadis, E. (1995). *The mysterious Fayum portraits: Faces from ancient Egypt*. New York: H.N. Abrams
- Edgar, C.C. (1905). *Catalogue général des antiquités égyptiennes du Musée du Caire. Nos 33101–33285: Graeco-Egyptian coffins, masks and portraits*. Cairo: Institut français d’archéologie orientale
- Fluck, C. and Finneiser, K. (2009). *Kindheit am Nil: Spielzeug, Kleidung, Kinderbilder aus Ägypten in den Staatlichen Museen zu Berlin*. Berlin: Skulpturensammlung und Museum für Byzantinische Kunst, Staatliche Museen zu Berlin
- Germer, R., Kischkewitz, H., and Lüning, M. (1994). Pseudo-Mumien der ägyptischen Sammlung Berlin. *Studien zur Altägyptischen Kultur*, 21, 81–94
- Hartnett, J. (2012). *Faces past: Ancient imaginations and the craft of social history*. The 33rd LaFollette Lecture. Retrieved from https://www.wabash.edu/news/docs/2012_Hartnett.pdf (accessed: 10.03.2025)
- Helmbold-Doyé, J. (2017). Das Mädchen mit dem Mumienporträt. In J. Helmbold-Doyé (ed.), *Aline und ihre Kinder: Mumien aus dem römischen Ägypten (=Ägypten im Blick 2)* (pp. 50–51). Wiesbaden: Reichert

- Helmer, R.P. (1984). *Schädelidentifizierung durch elektronische Bildmischung: zugleich ein Beitrag zur Konstitutionsbiometrie und Dickenmessung der Gesichtswichteile*. Heidelberg: Kriminalistik-Verlag
- Kwiatkowska, B. (2017). Wyznaczniki stresu fizjologicznego na materiale szkieletowym (Indices of stress on the skeletal material). In A. Siniarska and M. Kopczyński (eds), *Budowa fizyczna człowieka na ziemiach polskich wczoraj i dziś* (pp. 131–146). Warsaw: Muzeum Historii Polski
- Lewis, M.E. (2007). *The bioarchaeology of children: Perspectives from biological and forensic anthropology* (=Cambridge Studies in Biological and Evolutionary Anthropology 50). Cambridge: Cambridge University Press
- Liu, J., Wilkinson, C., Roch, A., Zesch, S., Mussauer, A., Paladin, A., and Zink, A. (2022). *Facial depiction of a Roman period mummy with portrait from the Fayoum Oasis, Egypt*. Poster presented at the 10th World Congress on Mummy Studies in Bolzano
- Loth, S.R. and Henneberg, M. (2001). Sexually dimorphic mandibular morphology in the first few years of life. *American Journal of Physical Anthropology*, 115(2), 179–186
- Manhein, M.H., Listi, G.A., Barsley, R.E., Musselman, R., Barrow, N.E., and Ubelaker, D.H. (2000). In vivo facial tissue depth measurements for children and adults. *Journal of Forensic Sciences*, 45(1), 48–60
- Nerlich, A.G., Fischer, L., Panzer, S., Bicker, R., Helmberger, T., and Schoske, S. (2020). The infant mummy's face—Paleoradiological investigation and comparison between facial reconstruction and mummy portrait of a Roman-period Egyptian child. *PLoS ONE*, 15(9), e0238427. <https://doi.org/10.1371/journal.pone.0238427>
- Nowicka, M. (1984). Z problematyki portretów mumiiowych (On the subject of mummy portraits). *Archeologia*, 35, 33–50
- Parlasca, K. (1966). *Mumienporträts und verwandte Denkmäler*. Wiesbaden: Steiner
- Parlasca, K. (1969). *Repertorio d'arte dell'Egitto greco-romano. Serie B, I*. Rome: "L'Erma" di Bretschneider
- Petrie, W.M.F. (1889). *Hawara, Biahmu, and Arsinoe*. London: Field & Tuer, The Leadenhall Press
- Petrie, W.M.F. (n.d.). *Notebook 36, Hawara*. Unpubl. manuscript in the Petrie Museum Archives
- Pharr, C. (ed.). (1952). *The Theodosian code and novels and the Sirmondian constitutions*. Princeton, NJ: Princeton University Press
- Prag, A.J.N.W. (2002). Proportion and personality in the Fayum portraits. *British Museum Studies in Ancient Egypt and Sudan*, 3, 55–63
- Roberts, P. (2007). An archaeological context for British discoveries of mummy portraits in the Fayum. In J. Picton, S. Quirke, and P. Roberts (eds), *Living images: Egyptian funerary portraits in the Petrie Museum* (pp. 13–72). Walnut Creek, CA: Left Coast Press
- Schaefer, M., Black, S.M., and Scheuer, L. (2009). *Juvenile osteology: A laboratory and field manual*. Amsterdam: Academic Press

- Scheuer, L. and Black, S.M. (2000). *Developmental juvenile osteology*. San Diego, CA: Academic Press
- Svoboda, M. and Cartwright, C.R. (eds). (2020). *Mummy portraits of Roman Egypt: Emerging research from the APPEAR Project*. Retrieved from <https://www.getty.edu/publications/mummyportraits/> (accessed: 10.03.2025)
- Walker, S. and Bierbrier, M.L. (1997). *Ancient faces: Mummy portraits from Roman Egypt*. London: British Museum Press
- Wilkinson, C. (2004). *Forensic facial reconstruction*. Cambridge: Cambridge University Press

