Death is Only the Beginning

Egyptian funerary customs at the Macquarie Museum of Ancient Cultures

Edited by Yann Tristant and Ellen M. Ryan
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FOREWORD

Founded in 1973, the Museum of Ancient Cultures (originally the History Teaching Collection) is now a leading museum at Macquarie University. Since its conception, the museum’s stated vision and continued purpose has been to open the ancient world to the modern mind. Archaeological materials are key to this mission, transcending temporal and socio-cultural bounds through the rich insights they offer into the complexities of ancient societies and those who lived within them. Sharing the knowledge these materials contain and encouraging the academic curiosity in students and the wider public has also formed a central tenet of the museum’s philosophy.

The project, Death is Only the Beginning, and this resultant catalogue could not be a more fitting representation of this vision. It is testament to the ongoing legacy of the museum’s founding members and Macquarie University’s expertise in Egyptian Archaeology, due in no small part to Prof. Naguib Kanawati, founder of both the Australian Centre for Egyptology and the Rundle Foundation for Egyptian Archaeology. The project, led by Dr Yann Tristant, Senior Lecturer in the Department of Ancient History and a member of the Ancient Cultures Research Centre, and Ellen Ryan, a doctoral candidate in the Department of Ancient History, details 72 Ancient Egyptian artefacts from the museum’s approximated 4700 genuine and replicated artefacts with the use of pioneering technologies such as 3D scanning and online platforms. The catalogue is authored by academic staff and students, showcasing both the expertise of Faculty of Arts academics and burgeoning student scholarship, in an original and innovative approach to creating meaningful learning experiences.

More than a mere cataloguing of items, this project is one of exploration that gives extraordinary insight to the practices of Ancient Egyptians and into their inner lives, including their theological and metaphysical conceptions about existence and mortality. The stories told therein are at times individual, at times cultural, but always enthralling in their revelation of foreign and far yet increasingly familiar lives.

This catalogue coincides with a new venture for the Faculty of Arts, the building of a new Arts Precinct and the merging of the Museum of Ancient Cultures and the Australian History Museum into one state-of-the-art museum facility. This new facility will see all collections digitized into the EMu collection management system, interactive displays created through digital technologies and online external access to the collections, creating a source of knowledge, ideas, stories and memories to inspire, educate and inform the Macquarie University community, visitors and the wider community alike.

Death is Only the Beginning is an exciting preview of the possibilities this new venture will bring through its combination of innovative technology, passionate scholarship and student skill, serving to bring the ancient past ever closer to the modern world.

Prof. Martina Möllering
Executive Dean
Faculty of Arts
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Preserving the physical body for the afterlife is one of the most fundamental aspects of ancient Egyptian ideology. Despite the relative wealth of bioarchaeological evidence, there are relatively few textual and pictorial sources that explicitly document the post-mortem physical and chemical alterations made to the human body during the mummification process. Recent scientific analysis of bioarchaeological material, experimentation on modern specimens, and the application of computerised tomography (CT) technology, have provided valuable insights into the principal preservation techniques of excerebration,\(^1\) evisceration\(^2\) and desiccation of the body. The study of mummification techniques reveals a development of methods over time, often with multiple processes being practiced simultaneously. Furthermore, advancements in artificial mummification techniques are accompanied by increasing ideological complexity surrounding the preservation of the body, the afterlife, and the funerary assemblage required to transport the individual to the afterlife.

**Sources and Limitations of Evidence**

Mummification is thought to have been practiced in Egypt for a period of nearly 5000 years, yet surprisingly, no contemporary textual or pictorial evidence detailing the post-mortem surgical procedures involved in the mummification process have been found.\(^3\) Textual sources dating from the Ptolemaic and Roman periods, however, do provide some insight into the mummification process. The Rhind Magical Papyrus and two Theban hieratic papyri commonly referred to as the ‘Ritual of Embalming’ provide a number of details about rituals performed during the mummification process.\(^4\) Rare scenes of mummification can be found on the wooden coffins of Djedbasteriuankh from el-Hibe dating to approximately 500 BCE (Fig. 1). These scenes portray the corpse as a silhouette being anointed, purified, and awaiting the embalming

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\(^1\) Removal of the brain.
\(^2\) Removal of internal organs.
\(^3\) Jones et al. 2014: 12.
\(^4\) Papyrus Bulaq III and Louvre 5.158; Birch 1863; Goyon 1972; Sternberg-el Hotabi 1998 See also David 2008: 11; Shaw 2012: 79.
It is not until the works of classical authors Herodotus and Diodorus Siculus, writing in the 5th and 1st centuries BCE, that the first detailed description of the mummification process emerges, though still lacking in regards to the surgical procedures involved. The limitations of the textual and pictorial evidence highlight the critical importance of bioarchaeological remains for reconstructing the embalming and mummification process.

### Earliest Evidence of Mummification During the Predynastic and the Early Dynastic periods

Traditionally, scholarship has tended to either sensationalise or oversimplify the burial practices of the Predynastic and Early Dynastic periods. They are often viewed as pre-cursors to the development of more elaborate and sophisticated methods of artificial preservation typical of later periods of Egyptian history. However, recent excavations and studies have revealed the existence of an exceedingly complex set of burial rituals being practiced throughout the Predynastic and Early Dynastic periods, including some of the earliest known attempts at artificial mummification.

Burials dating from the early Predynastic period typically consist of simple shallow pits dug directly into the ground, the body was then placed in the foetal position lying on the left side with the head positioned south, the face orientated to the west and the contracted body often wrapped in reed or textile matting. These burials often resulted in complete skeletonisation due to their direct exposure to the desert sand and the arid Egyptian climate. However, a large number of Predynastic human remains have been found in which the soft tissues—including hair, fingernails, and internal organs—remain remarkably well preserved, possibly indicating post-mortem physical or chemical alteration. Whilst, ‘true’ artificial preservation is thought to begin in the Old Kingdom, recent analysis of data from Predynastic sites calls for a revision of the ‘origins’ of artificial mummification in ancient Egypt.

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5 Taylor 2010b: 27. The majority of coffins are now housed in the Roemer-und Pelizaeus-Museum Hildesheim.
6 Herodotus, Histories II, 86-89; Diodorus Siculus Histories I, 91.
7 For studies and experimentation in mummification techniques see Sudhoff 1911; Leek 1969, see Patterson's Appendix II in Leek 1969; see also Ikram and López Grande 2011 for details of a Middle Kingdom embalming cache.
8 Many variants occurred during this period, especially regional differences between Upper and Lower Egypt, and the positioning and orientation of the body. Unfortunately, the shallow and simple nature of many poorer Predynastic burials means they are attested less frequently. See Adams 1998: 7.
10 Jones et al. 2014.
Excavations at the Predynastic cemetery HK43 at Hierakonpolis in Upper Egypt have shed new light on the complex nature of Predynastic burial practices. A number of intact burials dating to the Naqada IIA–C period were discovered displaying evidence of post-mortem physico-chemical alterations, specifically the practice of ritual wrapping, the application of preservative resins and the manipulation of internal organs. The burials from HK43 are typical of the Predynastic period, as the bodies were wrapped in a textile shroud and placed in a flexed position within shallow pit graves lined with textile matting. But in three of these burials, nos 16, 71 and 85, 8–10 layers of rectangular pieces of resin-soaked textile were systematically layered and moulded to the base of the skull, the jaw, the chin and the hands, to a thickness of approximately 10 cm (Fig. 2). An additional three burials, nos 71, 44 and 28, display evidence of the manipulation, and possibly, early attempts at the preservation of internal organs through the careful wrapping of the organs in resin soaked textiles. Prior to this discovery, the deliberate wrapping and re-insertion of internal organs was only attested in the archaeological record in the 20th Dynasty.

Excavations at Badari and Mostagedda revealed similar evidence of the use of resin-impregnated textiles for the wrapping of the heads of 7 individuals and the application of textile padding to mould the hands of 1 individual, all of which date from the Late Predynastic period. This confirms that the wrapping of bodies in resin-soaked linen was not an isolated occurrence, but rather, appears to have been practiced at a number of sites. Microscopical and chemical analysis was conducted on the resin-impregnated textile revealed relative consistency in terms of both type and quantity of components. These ingredients contained antibacterial agents used in similar proportions to those used at the height of artificial

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14 Friedman 2002: 66.
15 Jones 2004: 984.
17 Jones 2004: 983.
18 The typical constituents of the resins consisted of a plant oil or animal fat ‘base’ with the inclusion of a conifer resin, aromatic plant extract, wax, and a plant gum/sugar. For a more detailed discussion of chemical compounds/ingredients refer to Jones 2014: 12.
mummification in later dynastic periods. As such, these examples of selective resin-soaked textile application, localised soft-tissue preservation, and manipulation of internal organs reveal early attempts at artificial preservation or ‘proto-mummification’, thus pushing back the origins of mummification in ancient Egypt by approximately 1500 years.

Evidence for the post-mortem alteration of the body during the Early Dynastic period is limited—very few bodies have survived, and early reports and studies are substantially lacking in terms of methods of scientific enquiry. Evidence of attempts at artificial mummification from this period was previously limited to the sites of Tarkhan and Saqqara. These sites contained bodies dating from the 1st and 2nd Dynasties that were found wrapped in textile bandaging, and suggest the application of resin and natron. However, a recent microscopic examination of textiles from the tomb of Djer at Umm el-Qaab, Abydos, revealed the presence of a resinous substance on the bandages. This provides the first tangible evidence that bandaging of elite individuals with resin-impregnated textiles was occurring during this period, and may possibly have been standardised practice.

The Development of Mummification Techniques During the Old Kingdom

Unfortunately, few mummies survive from the Old Kingdom, thus evidence of artificial preservation is relatively scant. However, analysis of the surviving bodies reveals that several methods of artificial preservation were used in this period. Methods range from the simple wrapping and bandaging of the body in multiple layers of linen, to the application of gypsum plaster and resin soaked linen for the modelling of the exterior features, particularly the face, limbs and genitalia. These techniques reveal that great emphasis was placed on preserving the exterior form and appearance of the body in the Old Kingdom, as seen in the mummy of Nefer from Saqqara, and the mummy of Ranefer from Meidum (4th–5th Dynasty) (Fig. 3). Yet these methods proved unsatisfactory, as under the elaborate exterior of the mummy, the soft tissues continued to decompose. A successful method of artificial preservation thus still needed to be developed. A major step in this process was the introduction of the evisceration of the abdominal and thoracic cavities, which reduced the body’s susceptibility to putrefaction. Antecedents to the preservation

19 Jones 2014: 12.
22 Petrie 1914b: 6–10; Quibell 1923: 11; 19, 28, 32, pl. XXIX.3.
23 The forearm is now housed at the Petrie Museum of Egyptian Archaeology, University College, London
26 Taylor 2010b: 32.
and manipulation of internal organs are evident from the Predynastic period.28 However, the evisceration of the corpse and the external preservation of the viscera in canopic equipment is the principal development of artificial mummification during the Old Kingdom.29

The exact method by which the organs were removed still remains a mystery, as no textual or pictorial evidence has been found which provides details of the evisceration process.30 As such, information regarding this procedure has been reconstructed from bioarchaeological evidence and modern medical experimentation.31 Typically, an incision was made in the lower left abdomen, as this provided greater access to the descending colon and aided in the removal of the internal organs.32 The embalmer removed all of the internal organs excluding the heart and occasionally the kidneys. The heart was left in the body for ritual and religious purposes, whilst scholars have suggested that due to the kidney’s positioning behind the peritoneum they were often overlooked by the embalmer and thus were accidently left in the abdominal cavity. Traditionally, the lungs, liver, stomach and small intestines were removed, preserved separately and placed in canopic chests (or in later periods canopic jars), with the remaining organs either being left in the body or discarded.33 During this period the body is no longer buried in a contracted position, but rather in an extended position. This shift in positioning is believed to have directly coincided with the evisceration of the corpse, as placing the body in the extended position would have assisted in the removal of the internal organs.34

The earliest known example of evisceration and the separate preservation of the viscera in canopic equipment, dates from the 4th Dynasty Tomb of Queen Hetepheres I (G7000X).35 The tomb contained a sealed calcite box with four compartments, each of which accommodated a flat linen package that held traces of organic material, probably viscera (Fig. 4).36 Three of the four compartments contained traces of liquefied natron, a natural salt which would function as the principal dehydration

28 See HK43 above.
30 Textual sources which discuss the evisceration process are limited to the brief account provided by Diodorus Siculus in its Histories I, 91. See also Brier and Wade 2001: 120.
31 The most notable study in the process of evisceration and excerebration is that of Brier and Wade 2001.
33 Rühli et al. 2015: 105. See Dodson 1994 and Rühli 2015 for descriptions of the use of canopic equipment.
34 David 2009: 14.
agent in the mummification process of later periods. This practice is paralleled at the sites of Giza, Saqqara and Meidum and appears to have become a standardised feature in the mummification process from the Old Kingdom onwards.

The Establishment of Excerebration during the First Intermediate period and the Middle Kingdom

Mummified remains from the First Intermediate period are relatively scarce, however, the majority of those that have survived typically show evidence of evisceration, excerebration, desiccation of the body through the use of natron and the application of a thin layer of resin to the surface of the skin. The process of dehydration during this period still often remained minimal and the application of resin to the skin only assisted in partial preservation, which frequently resulted in the continued decomposition of the soft tissues. From the 6th–7th Dynasties individual bandaging of the extremities and the modelling of facial features in resin-soaked linen ceased to be practiced. Instead, mummies from the First Intermediate period and the Middle Kingdom are typically wrapped as a single bundle with only the head protruding, frequently covered by a cartonnage mask. It is from this period that the ‘classic’ mummiform figure emerges in the archaeological record.

Middle Kingdom mummified remains display a variety of artificial preservation methods. The majority of bodies show evidence of evisceration through an incision made in the lower left abdomen, however, several mummies excavated at Deir el Bahri—specifically those of Princess Henhenet and Queen Ashayet (DBXI.24 and 26)—suggest that evisceration could also be achieved via the rectum. It has been proposed that a form of oleo-resin may have been injected into the anus so as to dissolve the internal organs, a technique very similar to that which is described by Herodotus. However, this theory is controversial, as evidence of protrusion of viscera through the recta could in fact be the consequence of the partial decomposition of the body.

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37 See Reisner and Smith 1955: 22–23 for the discussion of the placement of viscera in mastaba-tomb wall niches of high officials from Meidum, either earlier than or contemporary to the calcite box in the tomb of Hetepheres I.

38 Parallel use of canopic equipment include: Queen Meresankh III G7530A displayed in the Museum of Fine Arts Boston (MFA 27.1551.1); King Pepi I from the Pyramid at Saqqara currently displayed in the Imhotep Museum in Saqqara; and Ranef er excavated at Meidum.


41 Ikram and Dodson 1998: 113.

42 Taylor 2010b: 33.


44 Herodotus, Histories II, 88; Diodorus Siculus Histories I, 91; Ikram and Dodson 1998: 115.

The greatest advancement in artificial preservation techniques during this period is the establishment of the practice of excerebration—the removal of the brain. It was previously thought that excerebration was not practiced until the New Kingdom, in the mid to late 18th Dynasty. However, two Middle Kingdom skull specimens from Lisht and two from Dashur display clear evidence of the practice of excerebration. All four specimens have sustained substantial damage to the nasal passage and septum whilst the ethmoid bone and cribriform plate have clearly been perforated. Small remnants of brain tissue remain in the cranial cavity of all four specimens, whilst the cranial cavities of the two specimens from Dashur contain the remains of resin-soaked linen packing. From these examples it is clear that excerebration was being practiced during the Middle Kingdom, even if the techniques of brain removal were not perfected until the New Kingdom.

Second Intermediate period and the New Kingdom—The ‘Classic Phase’ of Mummification

Mummified remains dating from the Second Intermediate period are limited, however, of the few examples that have survived, excerebration, individual bandaging of the limbs and the application of excessive amounts of resin and oils appear to have been the principal post-mortem preservative techniques employed. The beginning of the New Kingdom marked what scholars term the ‘classic phase’ of mummification—techniques and procedures employed by the ancient Egyptian embalmer achieved some of the greatest results in terms of soft tissue preservation. As a result, the New Kingdom provides a wealth of bioarchaeological evidence for analysis. It is during this period that mummification became highly monopolised, and a number of varying forms appear to have been simultaneously practiced on both royal and non-royal individuals. Bioarchaeological evidence from this period largely corresponds to the three forms of mummification described by both Herodotus and Diodorus Siculus, with principal differences being the quality and level of expenditure associated with preservation techniques.

In the New Kingdom, the practice of excerebration was widely established. Herodotus specifies the use of an “iron hook” (Fig. 5) and the injection of some form of drugs via the nasal passage to aid in the

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46 The specimens excavated from Lisht are currently housed in the Department of Anthropology at the Smithsonian Institution, whilst the specimens from Dashur were excavated by the German Archaeological Institute in Cairo (Strouhal 1986: 142–144).
48 See Leek’s discussion of skulls from Giza (4th Dynasty) that may show evidence of experimentation with excerebration (Leek 1980: 37, 44). Note that there is some question about their provenance. See also Strouhal 1986: 146.
49 Ikram and Dodson 1998: 117.
50 Ikram and Dodson 1998: 118; Papageorgopoulou et al. 2015: 982.
removal of brain tissue. Both bioarchaeological evidence and medical studies conducted on modern specimens largely confirm Herodotus’ description. Access to the cranial cavity is thought to have been achieved via the nasal passage through the perforation of the ethmoid bone. The brain was then macerated using a form of wire hook and the cranial cavity was irrigated to facilitate the drainage of the brain tissue via the frontal lobe and the openings created in the nasal cavity. Once drained, the cranial cavity was then swabbed clean with linen. This method of excerebration became standard practice from the 18th Dynasty onwards.

The location of the evisceration incision gradually changed during the New Kingdom whilst suturing (the stitching together of a surgical incision), the application of resin, and the use of incision plates to seal the abdominal opening, became increasingly common (Fig. 6). Typically, the internal organs were removed and treated with natron, spices and resin before being individually wrapped and placed in canopic vessels. However, from the 20th Dynasty onwards, the preserved viscera began to be returned to the body cavity. The body was then washed with water and palm wine, and filled with a combination of: natron for desiccation, ground myrrh and cassia to mask the smell of putrefaction, linen for the absorption of bodily fluids, and resin for its antibacterial properties. Following this, the body was then embalmed in natron for a period of 70 days.

Modern studies and experimentation of ancient Egyptian techniques of soft tissue preservation have revealed that although the body would be far from desiccated at day 30 of the dehydration process, the most significant changes to the soft tissues occurred within the first 25–38 days of their exposure to natron. Histological and biomolecular analysis of the soft tissues of a lower limb artificially preserved in natron demonstrated that fluid was gradually removed from the soft tissues by the surrounding natron. This process of artificial dehydration prevented the post-mortem decay of the body, and the biological deterioration of the skin and soft tissues through fungal and bacterial attack. This supports the procedure described by Diodorus: in that the body would

Fig. 6. Evisceration incision on the lower left abdomen which has been sutured closed (Smith 1906: pl. XI, fig.1).

52 Herodotus, Histories II, 87.
53 For experimentation in methods and techniques of excerebration, see Brier and Wade 2001.
54 Brier and Wade 2001: 120–121.
55 Ikram and Dodson 1998: 118.
56 Ikram and Dodson 1998: 118–119.
57 Ikram and Dodson 1998: 119.
58 Herodotus, Histories II, 87. This period of embalming of 70 days is also stated in the The King’s Tale, pBerlin 13588; Ikram and Dodson 1998: 119.
59 Papageorgopoulou et al. 2015: 982.
60 Papageorgopoulou et al. 2015: 986.
be placed in natron for approximately 35 days, and was then washed and rubbed with cedar oil, natron, wax and gum and dusted with spices. The nose was often plugged with resin, pieces of linen were often placed under the eyelids, and the body was coated with a final layer of resin, bandaged with linen and left for another 40 days, allowing the stabilisation of the soft tissues. This meticulous treatment of the skin resulted in a superior level of tissue preservation which is characteristic of New Kingdom royal mummies.

The most significant innovation during this period was the subcutaneous packing of the body. This process involved making a number of minor incisions over the body, facilitating the dissection of the plane between the skin and the underlying muscles (Fig. 7). This would create a space between the two which could then be filled with foreign material, giving the corpse a full and lifelike appearance. It was previously thought that this practice first began in the 21st Dynasty. However, recent studies have confirmed evidence of subcutaneous packing in royal mummies dating from the 18th to the early 20th Dynasty. The Rhind Magical Papyrus lists 17 incisions which were to be made in the body to facilitate the subcutaneous filling, although the majority of mummies examined only display five. The CT scan analysis of 13 New Kingdom royal mummies revealed that subcutaneous packing frequently varied in terms of homogeneity and CT density, which suggests that the filling consisted of a combination of materials including resin, linen, sawdust, and a form of semi-liquid mud. These mummies showed no evidence that the soft tissues sustained any damage from the subcutaneous packing, which strongly suggests that the filling of the corpse was done whilst the skin was relatively supple, prior to desiccation.

The Technical Peak of Mummification and its Subsequent Decline from the Third Intermediate Period to the Graeco-Roman Period

The Third Intermediate period is often regarded as the period in which artificial mummification reached its technical peak. This period

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62 Saleem and Hawass 2015: 301.
64 Saleem and Hawass 2015. 301. Including Amenhotep III, Tutankhamun, Seti I and Ramesses II.
65 The 17 incisions are to be placed as follows: 7 in the face and head, 4 in the chest, 2 in the legs, 2 in the arms, 1 in the abdomen and 1 in the back.
67 Saleem and Hawass 2015: 305.
sees a continuation of New Kingdom practices of excerebration, evisceration, subcutaneous packing and desiccation of the corpse, which resulted in an exceptional level of soft tissue preservation and a strikingly lifelike appearance of the corpse. It is thought that the restoration of royal mummies which occurred during the 21st Dynasty sparked greater innovation in preservation techniques. The Third Intermediate period thus saw further steps being taken to cosmetically enhance the corpse. These include: the addition of artificial eyes, hair extensions, detailed painting of facial features, the painting and dying of the skin, and the tying of finger and toe nails onto the digits so as to secure them during the desiccation process—all of which further heightened the lifelike appearance and natural bodily form of the corpse.68

After the Third Intermediate period, there is a general decline in mummification techniques. Although packing of the body cavity continued to be practiced, the subcutaneous packing of the face and extremities gradually became less common.69 Excerebration and evisceration largely continued, however, the brain was frequently left in the cranial cavity, whilst the viscera were placed on top of the thighs rather than being returned to the body.70 Furthermore, from the Late period onwards mummies are frequently found with no abdominal evisceration incision, rather, the removal of the viscera via the anus began to become increasingly common.71 Overall, the Late period can be characterised by a general decline in techniques, with mummification being increasingly performed in a somewhat hasty and careless manner.

The Graeco-Roman period saw further decline in techniques of preservation specifically in relation to the preservation of the underlying body. Instead, emphasis was placed on the exterior presentation of the mummy through the practice of elaborate and stylised bandaging patterns, gilding, the use of painted mummy portraits, and the heavy application of resin in an attempt to prevent the putrefaction of the underlying corpse (Fig. 8).72 In the 3rd–4th centuries CE, excerebration and evisceration ceased completely; instead the body was simply coated

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72 Taylor 2010b: 35–36.
in a thick layer of resin.73 Mummification continued in this simplified fashion throughout the Coptic period until the Arab invasion in 64 CE. This saw the introduction of Islam to Egypt, the political and religious shift that this brought about, saw 5000 years of experimentation and practice of techniques of artificial mummification gradually disappear from the archaeological record.74

Egyptian mummies continue to be a source of public fascination and scientific enquiry. The curiosity as to what lies beneath the wrappings has driven mummy studies for nearly 200 years. Through age at death, morphological affinity, stature and body mass, but also the post-mortem history of the individuals, in an attempt to assess the lives and deaths of these ancient Egyptians, and how their bodies were treated after death for eternity. The project also contributes to a broader discussion on the ‘modern history’ of ancient Egyptian artefacts in museum collections, specifically the journey of these ancient individuals from Egypt to Australia.

For more information: Tristant et al 2014

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STRANGERS IN A STRANGE LAND

The aim of the project is to undertake scientific investigation of the Australian Museum’s Egyptian human remains housed in the Museum of Ancient Cultures at Macquarie University, using non-invasive techniques, especially high resolution CT scanning. Designed to be an interdisciplinary project, it aims to enhance the research partnership between the Department of Ancient History at Macquarie University, Macquarie Medical Imaging and the Australian Museum. The project has already yielded some important observations concerning a single mummified human head and a mummified human body. Gross morphological and radiological analyses of the specimens have yielded new information regarding gender, age at death, morphological affinity, stature and body mass, but also the post-mortem history of the individuals, in an attempt to assess the lives and deaths of these ancient Egyptians, and how their bodies were treated after death for eternity. The project also contributes to a broader discussion on the ‘modern history’ of ancient Egyptian artefacts in museum collections, specifically the journey of these ancient individuals from Egypt to Australia.

For more information: Tristant et al 2014

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Fig. 9.
CT scan analysis of a mummy from the Australian Museum at Macquarie Medical Imaging, Macquarie Hospital, for the Strangers in a Strange Land project.

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73 David 2008: 17.
74 David 2008: 17; Taylor 2010: 36.
these studies, the complex origins and the gradual development of techniques of mummification have been revealed. CT scan technology has revolutionised the study of Egyptian mummies, facilitating non-invasive methods of investigation (Fig. 9). With continued advancements in methods of scientific analysis, the nature of mummy studies continues to evolve whilst greater insights into the techniques employed by the ancient Egyptian embalmer continue to be brought to light.

Jacinta Carruthers
# Chronology and Map of Ancient Egypt

<table>
<thead>
<tr>
<th>Period</th>
<th>Time Span</th>
<th>Events</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Palaeolithic Period</strong></td>
<td>700,000-10,000 BCE</td>
<td>Early Neolithic, c. 8500-6100 BCE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Middle Neolithic, c. 6100-5400 BCE</td>
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<tr>
<td></td>
<td></td>
<td>Late Neolithic, c. 5400-4500 BCE</td>
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<tr>
<td></td>
<td></td>
<td>Final Neolithic, c. 4500-3550 BCE</td>
</tr>
<tr>
<td><strong>Neolithic Period</strong></td>
<td>c. 8500-3350 BCE</td>
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<tr>
<td><strong>Predynastic Period</strong></td>
<td>c. 4400-3085 BCE</td>
<td>Badarian, c. 4400-3800 BCE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Naqada IA-IIB, c. 3800/3750(?)-3450 BCE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Naqada IIIC-D, c. 3450-3325 BCE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Naqada IIIA-B, c. 3325-3085 BCE (= Dynasty 0)</td>
</tr>
<tr>
<td><strong>Early Dynastic Period</strong></td>
<td>c. 3085-2686 BCE</td>
<td>1st Dynasty, c. 3085-2867 BCE (= Naqada IIIC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2nd Dynasty, c. 2867-2686 BCE (=Naqada IIID)</td>
</tr>
<tr>
<td><strong>Old Kingdom</strong></td>
<td>2686-2160 BCE</td>
<td></td>
</tr>
<tr>
<td><strong>First Intermediate Period</strong></td>
<td>2160-2055 BCE</td>
<td>9th and 10th Dynasties, 2160-2025 BCE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11th Dynasty (Thebes only), 2125-2055 BCE</td>
</tr>
<tr>
<td><strong>Middle Kingdom</strong></td>
<td>2055-1650 BCE</td>
<td>11th Dynasty (all Egypt), 2055-1985 BCE</td>
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<td></td>
<td>12th Dynasty, 1985-1773 BCE</td>
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<td>13th Dynasty, 1773-1650 BCE</td>
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<td></td>
<td></td>
<td>14th Dynasty?, 1773-1650 BCE</td>
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<tr>
<td><strong>Second Intermediate Period</strong></td>
<td>1650-1550 BCE</td>
<td>15th Dynasty (Hyksos), 1650-1550 BCE</td>
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<tr>
<td></td>
<td></td>
<td>16th and 17th Dynasty, 1650-1550 BCE</td>
</tr>
<tr>
<td><strong>New Kingdom</strong></td>
<td>1550-1069 BCE</td>
<td>18th Dynasty, 1550-1295 BCE</td>
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<td>19th Dynasty, 1295-1186 BCE</td>
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<td></td>
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<td>20th Dynasty, 1186-1069 BCE</td>
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<tr>
<td><strong>Third Intermediate Period</strong></td>
<td>1069-664 BCE</td>
<td>21st Dynasty, 1069-945 BCE</td>
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<td></td>
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<td>22nd Dynasty, 945-715 BCE</td>
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<td>23rd Dynasty, 818-715 BCE</td>
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<td>24th Dynasty, 727-715 BCE</td>
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<td>25th Dynasty, 747-656 BCE</td>
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<tr>
<td><strong>Late Period</strong></td>
<td>664-332 BCE</td>
<td>26th Dynasty, 664-525 BCE</td>
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<td></td>
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<td>27th Dynasty (First Persian Period), 525-404 BCE</td>
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<td>28th Dynasty, 404-399 BCE</td>
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<td>29th Dynasty, 399-380 BCE</td>
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<td></td>
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<td>30th Dynasty, 380-343 BCE</td>
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<tr>
<td></td>
<td></td>
<td>Second Persian Period, 343-332 BCE</td>
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<tr>
<td><strong>Ptolemaic Period</strong></td>
<td>332-30 BCE</td>
<td>Macedonian Dynasty, 332-305 BCE</td>
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<td></td>
<td></td>
<td>Ptolemaic Dynasty, 305-30 BCE</td>
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<tr>
<td><strong>Roman Period</strong></td>
<td>30 BCE-CE 395</td>
<td></td>
</tr>
<tr>
<td><strong>Byzantine Period</strong></td>
<td>CE 395-CE 642</td>
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</tbody>
</table>

Chronology adapted from Shaw 2000; Dee et al. 2013; Hendrickx 2014; Stevenson 2016
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