

The Human Brain in Ancient Egypt

A Medical and Historical Re-evaluation
of Its Function and Importance

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ARCHAEOPRESS PUBLISHING LTD

Summertown Pavilion

18-24 Middle Way

Summertown

Oxford OX2 7LG

www.archaeopress.com

ISBN 978-1-80327-477-5

ISBN 978-1-80327-478-2 (e-Pdf)

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Acknowledgements

This study was made possible by the support of many exceptional people. I want to begin by thanking my supervisors Dr Konstantina Drosou and Dr Jenefer Metcalfe for their guidance, outstanding knowledge, and expertise. I am eternally grateful to both.

Thank you to Dr Robert Loynes for sharing his medical expertise and generosity with his time.

Thank you to my friend Dr Ammar Al-Chalabi, Professor of Neurology and Complex Disease Genetics.

This research would not have been possible without access to the IMPACT database. For this my gratitude goes to Dr Andrew Nelson. Thank you for his support throughout the study and completion of this book.

Many institutions made this study possible. I want to extend my gratitude to: Museum of World Treasures, Royal Ontario Museum, Southern Baptist Theological Seminary, Wayne County Historical Museum, Leiden University, Robert Hull Fleming Museum, Boonshoft Museum of Discovery, UQUAM (Montreal), Archaeological Museum of Zagreb, University of Richmond, Maidstone Museum, Chatham – Kent Museum, University Museums of Padua, Redpath Museum, Western University, National Museum of Antiquities (Leiden).

Thank you, to my family for their love, unwavering support and putting up with my long absences.

Finally, a huge thank you to my publishers at Archaeopress Publishing Ltd.

Abbreviations

CSF	Cerebrospinal Fluid
CT	Computed Tomography
I	Indeterminate
NK	New Kingdom Period
pEbers	Papyrus Ebers
pEdwin Smith	Papyrus Edwin Smith
P	Ptolemaic
R	Roman
TBI	Traumatic Brain Injury
TFC	Transforamen craniotomy
TIP	Third Intermediate Period
TNC	Transnasal craniotomy

Chronology

The chronology used throughout this study is Shaw (2000: 479-483)

PERIOD	DYNASTY	DATE
Predynastic		4500 – 3000 BCE
Early dynastic	1 – 2	3000 – 2686 BCE
Old Kingdom	3 – 6	2686 – 2181 BCE
First Intermediate	7 – 11	2181 – 2055 BCE
Middle Kingdom	11 – 14	2055 – 1650 BCE
Second Intermediate	15 – 17	1650 – 1550 BCE
New Kingdom	18 – 20	1550 – 1069 BCE
Third Intermediate	21 – 26	1069 – 664 BCE
Late Period	26 – 30	664 – 332 BCE
Ptolemaic		332 – 30 BCE
Roman		30 BCE

Chapter 1

Introduction

The human brain is a remarkable and highly complex structure of innumerable networks of neuronal synapses. Together with the spinal cord it makes up the central nervous system and controls every process that regulates the body such as breathing, temperature, movement, and cognition. It is a wrinkled, lipid rich organ, protected by three layers of membranes collectively known as meninges. It lies enclosed within the cranial vault, floating in cerebrospinal fluid. This fluid provides cushioning and maintains homeostasis of the central nervous system (Pollay, 2010; Brinker *et al.* 2014). Although the brain is not exposed to the external world, it creates our reality through an extraordinary process of electrochemical communication between cells. If one organ was worth preserving, and taking to the afterlife, it should have been the brain. Yet it is vehemently argued in the literature, that during the mummification process, the ancient Egyptians went to great lengths to rid the body of the brain. The functions of the brain, it is argued, were assigned to the heart and therefore preservation of the brain was deemed unnecessary (Brier, 2001; Wade, 2012; Ikram, 2013).

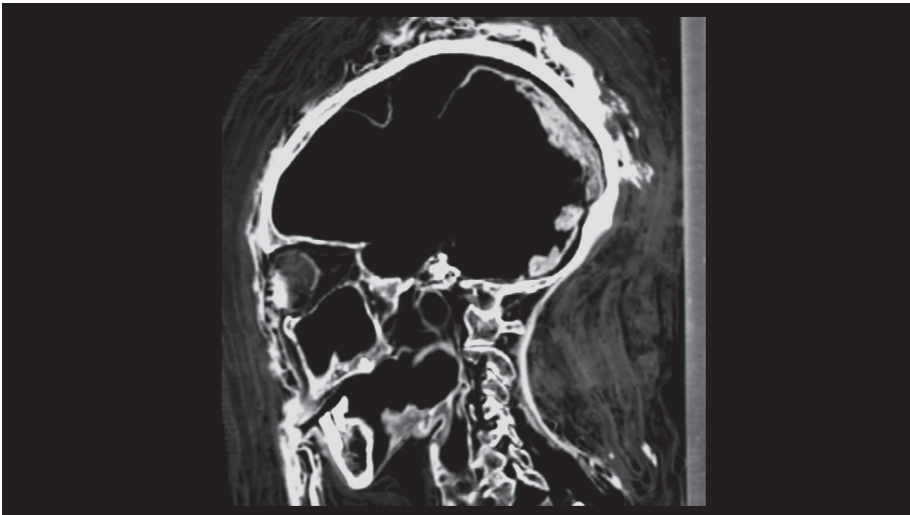


Figure 1.1. Pawiamen (IMP00105) is a male aged 22-44 dating to the Late Period. He has been mummified with resin applied to the back of the head, but the skull is intact with no attempt at excerebration. His desiccated brain, and meninges are visible posteriorly in the cranial vault.

1.1 Research aims and purpose

The purpose of this study is to re-evaluate some commonly held assumptions regarding medical concepts of the human brain and its treatment during anthropogenic mummification. In doing so the following questions will be addressed:

- How was the brain conceptualised in ancient Egypt and to what degree was its functions understood?
- Was ancient Egyptian medical theory largely cardio centric?
- How did treatment of the brain during the mummification process differ from organs in the thorax and abdominal cavity?
- Was mummification of the brain linked to medical concepts of the brain?

To answer these questions, I will re-evaluate the treatment of the brain during the mummification process by studying radiological data sets using ORS Visual software, a functional processing tool available within IMPACT (Picture Archiving and Communication System). Next, I will examine the medical papyri to assess what was understood of the anatomy and physiology of the brain; and finally, I will examine the palaeopathological records in the literature for evidence of cranial injuries and ensuing treatments.

1.2 Ethical considerations

With any study that involves the examination of human remains it is important to consider and follow ethical guidelines. Human remains preserve a record of the past life of individuals. This record contributes enormously to our understanding of ancient diseases, medical treatments, and mummification procedures. It is of the utmost importance to treat those deceased with respect and dignity and make every effort to retain their identity (Kaufmann and Rühli, 2010). In Appendix A, I have provided a list of all the individuals in my research with their name, age, sex, and where possible, the site where they were discovered. This study is based on non-invasive methods to preserve the integrity of the deceased.

1.3 Chapter outline

The chapters of this study are arranged as follows:

Chapter 2 is divided into sections. Part one, section 2.1 provides a comprehensive literature review of mummification in relation to the human brain. Part two, section 2.2 provides a review of the medical literature regarding the concept and function of the brain in ancient Egypt.

Chapter 3 is a re-evaluation of ancient Egyptian mummification procedures to assess how and why the brain was treated differently from the viscera. Section 3.3 traces the history of the identification of the four sons of Horus with the protection of specific

visceral organs. This is followed by a discussion of heart retention in section 3.4 to evaluate if it was part of ancient Egyptian religious ideology or a modern construct. Section 3.5 is devoted to the treatment of the brain beginning with an investigation into alterations in the biochemical environment of the brain after death followed by a discussion of excerebration, packing materials and protective amulets. Section 3.6 is a study of 33 subjects inhabiting the IMPACT radiological mummy database, to assess treatment of the brain during anthropogenic mummification. The chapter concludes with a discussion of the findings in section 3.7.

Chapter 4 looks at trauma care and neurosurgery in ancient Egypt. The main sources of evidence are discussed in sections 4.1 and 4.2 followed by a detailed look at Papyrus Edwin Smith in section 4.3. For transliterations, translations and commentaries, Sanchez and Meltzer's 2012 edition of Papyrus Edwin Smith has been selected for ease of reading and discussion of a complex manuscript. Breasted's 1930 publication has been cross referenced.

Chapter 5 sifts through the palaeopathological records for evidence of cranial surgery beginning with trepanning. This is followed by a look at skull injuries and ensuing treatment.

Chapter 6, the conclusion, provides a summary of the findings of the study followed by suggestions for future research.

The overall aim of this study is to provide a medical and historical re-evaluation of the function and importance of the human brain in ancient Egypt. This is an area of research that has not been examined in any detail. Many commonly held assumptions stem from ancient classical sources such as Herodotus (See Chapter 2, Section 2.1). This study is one of the first to utilize a multi-faceted approach in examining what was understood of the human brain in ancient Egypt.