

## **Abstract**

Infectious diseases have remained a widespread concern for as long as humans have existed. With the recent increases in medical research and capabilities through advanced technology, it is essential to return to its origins, which can be seldom attached to ancient civilizations. In particular, this paper reviews Ancient Egyptian and Ancient Greek ideologies and practices; namely, the four humors encompassing the Hippocratic approach, as well as extensive records of papyri. These records detail various infectious diseases and their corresponding treatments, which were at the forefront of medicine during their respective periods. The aim of this study is to elucidate ancient cultural beliefs on the origins of disease, methodologies, and approaches to infectious health conditions, and conclusively health, diet and lifestyle. Their potential and current implications in modern medical practices are also explored.

**Keywords:** Ancient healthcare, Western medicine, Hippocrates, Hippocratic Ideal, Ancient Egypt

## **Introduction**

### **1. Healthcare and medicine**

#### **1.1 Ancient healthcare and medical practices**

The pre- and post-mortem medical practices commonly used by ancient Greeks and Egyptians can be observed through the examination of archaeological remains and papyri. Ancient pre- and post-mortem medical practices are critical to our understanding, as they allow us to observe how ancient societies approached the management and prevention of disease. In addition to this, studying past diseases can help us understand long-term sociological and demographic changes in society, and tell us how diseases work over the span of centuries. However, further research of the history of diseases is needed, particularly by looking at medical records and archaeological remains left behind by ancient cultures. This will allow us to develop a better understanding on whether practices, as well as sociological beliefs in ancient cultures, religiously influenced or not, played an important role with regards to individuals with infectious diseases. Understanding these aspects of ancient cultures can tell us how they managed the spread of infectious diseases in their communities. The aim of this paper, then, is to understand how ancient cultures practiced healthcare to manage infectious diseases. Specifically, this paper will be highlighting the kinds of rituals and practices ancient Greek and ancient Egyptian societies used on diseased individuals and further examining how these practices are relevant and applicable to modern healthcare and medicine.

#### **1.2 Modern healthcare and medical practices**

Infectious diseases have spread among humans for almost as long as human societies have existed. While medical, research, and healthcare practices today have evolved into complex systems of technologies and policies, we see that diseases still exist. Although the global

eradication of all infectious diseases may be impossible to achieve, prevention and reduction are within our reach. Given that past societies dealt with, and survived, disease outbreaks, it is necessary to explore the healthcare practices that were implemented during their respective periods to determine which methods were effective and continue to be observed today.

Modern day medical practices, like Western biomedicine, differ vastly from those of ancient cultures, in terms of approach and effectiveness. This is in part due to the development of biotechnology. Sakai and Morimoto (2022) describe the four characteristics of twentieth and twenty-first century medicine, one of which is *in vivo* visualization. *In vivo* studies are those which take place within a living organism. Before the development of *in vivo* techniques, the most effective way to study diseases was through post-mortem autopsies. However, this meant that individuals could only be studied after their disease had caused death. With advancements in biotechnology, such as the development of *in vivo* technologies, we are able to study infectious diseases in individuals while they are still alive. This allows modern practices to save more lives while also receiving a more in-depth understanding of the mechanism of a disease within the body.

### **1.3 Applying past practices to modern healthcare**

It is important to acknowledge that there is not just a single effective method to studying disease and treating diseased patients. Not all medical and healthcare practices performed on diseased persons are the same, and these differences are in part due to cultural beliefs. Another reason for the differences seen between modern and ancient studies and treatment of infectious disease can be attributed to the approaches that ancient societies took toward healthcare. The beliefs of past cultures resulted in unique approaches to healthcare, which were often exercised before a more globally accepted form of healthcare was set in place. This review explores and

compares two past civilizations; ancient Greece and ancient Egypt, both of which had unique healthcare practices. Their approaches to healthcare contrast with modern practices, as well as between each other to a high degree. Ancient Greeks and Egyptians believed in spiritual entities and magic, and thus blamed illness and health status on an individual's relationship with the universe. While modern science has debunked claims of magic, it is important to note that these civilizations' spiritual beliefs were the underlying mechanisms of their naturalistic approaches to infectious disease research and treatment. Given this unique blend of spiritualism and naturalism uncommon in Western medicine and medical practices, it is worthwhile to explore the different aspects of ancient approaches to medicine and healthcare in hopes of finding some relevance to modern medical practices.

## **Discussion**

### **2. Ancient Ideologies in Ancient Greece and Egypt**

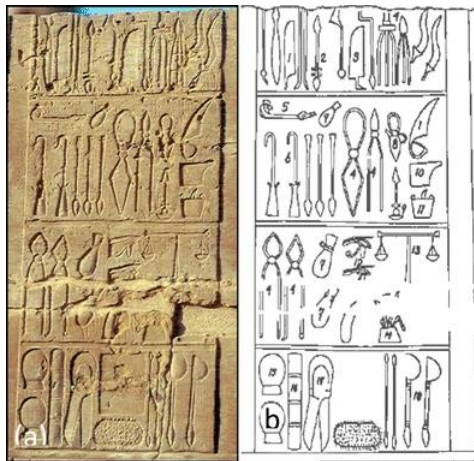
Ancient Egyptian and Greek cultures centered their medical practices of the diseased and injured based on certain ideologies of the body. In Ancient Egypt, it was widely agreed upon that the concept of health and illness were the result of a person's relationship with the universe; encompassing people, animals, and good and malevolent spirits (Metwaly et al., 2021). Incorporation of a multitude of treatment types was considered necessary to restore balance and health, thus magic practices became increasingly used, blurring the lines between scientific medical practices and mystical methods of treatment. Similarly, medical practices in Ancient Greece approached the idea of balance, stressing the importance of "the need for harmony between the individual, social and natural environment" (Kleisiaris et al., 2014). This holistic perspective in health provision was also believed to be strongly related to the closely knit

relationship between both mental and physical health. As a result, many of their practices focused on a naturalistic approach to diseases, revolving around the ideology of a “healthy mind in a healthy body” (Kleisiaris et al., 2014). These general doctrines can further be applied when considering how both ancient cultures treated the afflicted over the course of their life.

### 3. Knowledge in Medicine and the Origins of Disease

#### 3.1 Knowledge in Medicine and the Origins of Disease in Ancient Egypt

According to Ancient Egyptian beliefs, it was believed that illness or infectious diseases were the product of both an invisible pathogenic material caused by a demon or evil spirit, and otherworldly punishment from a god or goddess (Györy, 2008). For such ancient cultures, medical practitioners in Ancient Egypt had highly advanced surgical procedures and techniques. Common procedures consisted of amputations, fracture repairs, and infrequently, the removal of sinuses transnasally (Györy, 2008). These were performed using surgical tools that closely resembled modern day scalpels, drills, forceps, and scissors (**Figure 1.**) (Metwaly et al., 2021). It



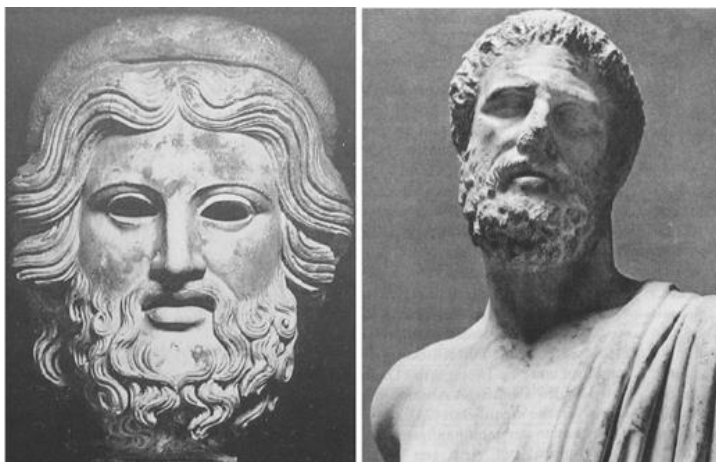
**Figure 1.** Surgical instruments used in orthopaedic practices in ancient Egypt, of which include knives, drills, saws, forceps or pincers, hooks, etc. (Said, 2013)

comes to no surprise that these foundations provided a strong basis for an enhanced understanding of how the body functioned from an anatomical perspective. Strong evidence of medical documentation on medical papyri, temple walls, stone and clay of detailed mechanisms and treatment methods were recorded (Metwaly et al., 2021). These records documented diseases revolving around osseous, respiratory, circulatory, genital, muscular, nervous, ocular, amongst many other bodily systems (Metwaly et al., 2021). The Ebers Papyrus describes the extent of ancient practitioners' knowledge on the circulatory system. It states that the body possesses 22 *mtw* (vessels), connecting various substances such as blood, air, semen, mucus, and tears, which are all controlled by the heart and are exposed at several openings (Metwaly et al., 2021). Egyptian healers believed that constant movement of these fluids ensured ideal health conditions for all patients and could measure this through monitoring the pulse. If this balance was offset, it was assumed that it was the result of infectious disease infiltrating the body through open wounds or natural openings and blocking the vessels (Metwaly et al., 2021). Though the idea of the heart being the center for all body fluids was far from being correct, it illustrated strong foundations for contrasting with modern day medicine.

### **3.2 Knowledge in Medicine and the Origins of Disease in Ancient Greece**

Akin to medical beliefs in Ancient Egypt, practitioners in Ancient Greece mostly relied on the idea of corrupt souls or angry gods inflicting illness, and that gods like Asclepius, son of Apollo (**Figure 2.**), could restore health and cure all diseases through sacrifices and prayers (Pearce, 2016). During this period, it was common practice to assume the role of a physician without any formal training, as long as the individual was born into a family of doctors (Tsiompanou & Marketos, 2013). These elements undoubtedly led to a rise in medical practices

being heavily intertwined with magical, supernatural as well as superstitious elements (Tsiompanou & Marketos, 2013). Fortunately, these practices began to shift from an otherworldly viewpoint towards a more naturalistic approach. This was primarily set in motion by Hippocrates (**Figure 2.**), a Greek physician considered to be the father of modern medicine,



**Figure 2.** Sculpture of Asclepius and Hippocrates, two prominent figures in the revolutionization of medical practices in Ancient Greece (Pappas et al., 2007)

and whose influences on medical practices, observational diagnosis, as well as in medically-related ethics remain to this day. Hippocrates did not believe that illnesses were God-sent (Tsiompanou & Marketos, 2013). Thus, an increasingly favored clinical method of practicing medicine was established based on the Asclepius paradigm which dominated the medical field. This pertained to how medical practitioners across different medical schools carried out their respective practices (Kleisiaris et al., 2014), and how its philosophy was primarily concerned in understanding the importance of the patients' condition as a whole in order to restore health.

Hippocrates derived his treatment using a "naturalistic" approach, first relying on observing a patients' symptoms in order to determine an accurate diagnosis. This consisted of recording changes in aspects like mood, sleep patterns, appetite, nausea, chills, pain, convulsions, flatulence, whilst directing attention to more severe symptoms of fevers,

discoloration, respiration, stool, urine, sputum, and vomit (Kleisariis et al., 2014). In addition to this, Hippocrates stressed the importance of physicians being well-versed in anatomy, particularly with regards to the spine and its relationship to the nervous system. This was because the nervous system was acknowledged as a crucial component in controlling all bodily functions and in recognizing symptoms of disease (Kleisariis et al., 2014). Therefore, alongside anatomical observation, diagnosis was done through the analysis of the four liquids derived from Hippocrates' theory of diagnosis; of blood, phlegm, yellow, and black bile (Kleisariis et al., 2014) as well as evidence-based detailed medical reports, which can be commonly observed in modern medical protocol.

#### **4. Cultural practices during life and death**

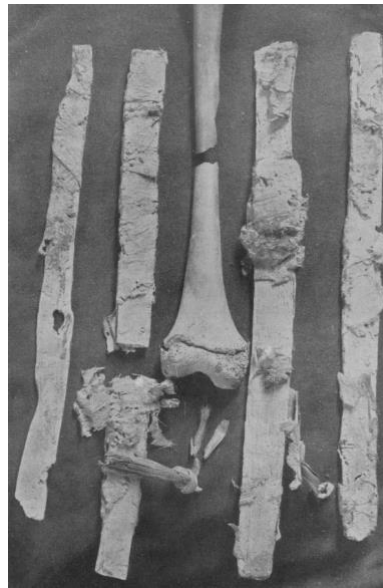
##### **4.1 Cultural practices during life and death in Ancient Egypt**

Healthcare practices in Ancient Egypt, akin to modern day medicine, sought out symptom treatment using all available resources rather than attempting to only prevent the illness itself. It was important for physician teachings to be accurately reproduced by practitioners, as they would be punished with death if they deviated through experimentation (Győry, 2008). Granted the maintenance of health in Ancient Egypt involved avoidance in angering the gods, curing the diseased not only meant managing physical symptoms but also encompassed appeasing the spiritual world. Complementary therapies consisting of physiotherapy, hydrotherapy or heliotherapy were strongly encouraged alongside other practices including drugs, surgery, and the use of magical incantations, which was used in conjunction with treatment (Győry, 2008). Despite these surgeries being minor in scale as they did not possess complete knowledge of the body and its functions, they were still considered to be revolutionary;



building the foundations of modern medical care. An example of this would be in dental care, where ancient Egyptians performed surgeries for dental caries, mouth ulcers, teeth extraction, pyorrhea and abscesses (Metwaly et al., 2021). Evidence of this was found in a mandible of a mummy from the 4th dynasty (2625-2510 BCE), where drilling of the mandible underneath the molars allowed for the drainage of the abscesses (Metwaly et al., 2021). Another instance of surgical practices noted in the Ebers Papyrus was cancers; depicted as enlarged thyroids, polyps, and tumors of the pharynx, skin, stomach, rectum, and uterus (Hajdu, 2004), which practiced techniques such as cauterization or incision using a knife despite being deemed untreatable (Hajdu, 2011), contrary to the extensive research and accessible cancer treatment provided in modern times. Interestingly, the properties of anti-inflammatory substances and techniques were often studied in Ancient Egypt for treating various conditions ranging from physical to systemic ailments. Natural remedies consisting of honey and onions were identified to possess antibiotic properties useful in treating infections (Elsayad, 2023), particularly in chemical debridement of open wounds; a treatment still practiced in modern times (Eardley et al., 2011). Alongside this, plant-based remedies derived from the Ebers Papyrus depicted the use of incense (derived from an olibanum tree), boswellic acid acetate, and salicin obtained through willow tree extracts in reductions in inflammation, tumorous growths, and pain (Elsayad, 2023). Techniques like cauterization (burning) were employed by Ancient Egyptian practitioners to treat inflammatory symptoms and promote rapid healing post-surgery in addition to antiseptic wound dressage with oils and lipids (Elsayad, 2023). Ancient Egyptian practices strongly align with the dawn of allopathic medicine, of which include fracture repairs, minor surgeries, dental care and medicinal pharmacopeias akin to modern day pharmacies (Metwaly et al., 2021).

Conversely, a more large-scale medical predicament such as an epidemic would result in reliance on all available drugs known to treat the disease. If these methods were exhausted, healers would turn to a more one-sided approach, relying solely on magical incantations (Györy, 2008). The Egyptians considered death as part of a cyclical process in which the deceased retained their individuality and personality formed during their lifetime, as they attained spirituality or the afterlife (Meskell, 2001). It was believed that the binding of both spiritual and physical aspects allowed for a proper send-off, thus full preservation of the body was needed, and was completed through mummification. Cataloguing of bodily fluids when confronting decaying corpses detailed fear and disgust from practitioners, though was also contrasted with claims of perfection and god-like preservation (Meskell, 2001). Ancient orthopedic practices are



**Figure 3.** An image of skeletal remains dressed with wood and stiffened linen, dipped in a mixture of powdered beans, honey, barley and resin (Smith, 1908)

reflected in mummification, skeletal remains and in papyri, such as fracture splinting using wood and stiffened linen dipped in mixtures of powdered beans or honey, barley, and resin (**Figure 3**) (Said, 2014). Many medical records of diagnoses of preserved mummies point to the presence of

infectious diseases, including malaria, tuberculosis, leprosy, and the plague (*Yersinia pestis*) (Habicht et al., 2020). This may explain why archaeological discoveries of ‘rushed burials’ did not reflect mummification practices (Habicht et al., 2020), perhaps due to large death toll numbers and fear of contagion.

#### **4.2 Cultural practices during life and death in Ancient Greece**

With beliefs of mystical miasma no longer presiding over Ancient Greece and the surge of Hippocratic medicine settling the debate on origins of contagion, a formal separation between superstition and medicine was established. Alongside the theory of the four humors (blood, phlegm, yellow bile, and black bile) brought forward the concept of balance between human health and the natural environment. It was proposed that the formation of disease arose from a unique set of circumstances, influenced by combinations of the atmosphere, soil, and water (Pappas et al., 2007). This in turn allowed for great emphasis to be placed on hygiene and community sanitation in Ancient Greece, recognized as playing an important role in prevention of disease causation (Tulchinsky & Varavikova, 2014). These concepts were commonly observed in treatment practices on infectious wounds during the Trojan War, as wars were a recurrent occurrence in ancient Greece (Kleisiaris et al., 2014). Wound care practiced in ancient Greece reflected similar methodologies used by ancient Egyptian physicians, such as suppuration, the process of discharging pus from an infected battle wound or sore (Eardley et al., 2011). As a result of infectious wounds being a commonality observed during wars, clinicians began characterizing varying forms of pus (Eardley et al., 2011). Benign pus was ideal, facilitated in the rapid reduction of wound complications (Eardley et al., 2011). In addition to suppuration, these wounds were treated with frequent administration of natural medicine in the form of seawater, honey, vinegar, rainwater, and powdered medicinal plants (Kleisiaris et al.,

2014). The Trojan War also brought to light the first record of debridement and soft tissue management (Manring et al., 2009). Combat using edged weapons like swords and bow and arrows frequently resulted in trauma as well as heavy casualties. Literary accounts from *The Iliad* detailed wound care from poison-tipped arrows (Manring et al., 2009). These were first extracted, followed by removal of the poison through sucking up of the blood from the wound (or washing the black blood with water) and the subsequent application of a salve (Manring et al., 2009).

Increased application of these medical practices was depicted in psychological and mental illness treatment, as they were regarded as the influence of nature on the afflicted, akin to infectious diseases (Kleisiaris et al., 2014). Hippocrates postulated that mental illness and intelligence were acquired through breathing through the mouth (Kleisiaris et al., 2014). Therefore, in addition to practices that restored imbalance in the humors like bloodletting (Papavramidou & Christopoulou-Aletra, 2009), methods such as music and drama were employed in order to improve human behaviour and treat diseases like gout and “passion” (Kleisiaris et al., 2014). In conjunction to this, bloodletting through placement of leeches on the head was often prescribed to treat ‘melancholy’, a condition commonly observed as depression in modern times; as at the time it was considered to have originated from an excess of black bile in the bloodstream (Papavramidou & Christopoulou-Aletra, 2009). Removal of the diseased blood was believed to solve the problem, effectively returning balance to the humors. The concept of death caused by infectious diseases was treated with disgust and avoidance; as a form of contamination which tainted everything it came in contact with, in turn repulsing the gods (Retief, 2010). To rid of such contamination in order to attain the afterlife, appropriate purification through appropriate funeral rites was required, including washing, salving, and

burial or cremation, all while avoiding contact with the deceased as much as possible (Retief, 2010). These instances of surgical practices in ancient Greece highlight the significance of Hippocrates' model of medicine and its translation to modern medicine. This was not only through diagnosis using symptomatology for adequate treatment, but also by radicalizing healthcare during this period through the elimination of ties to superstition, magic and religious beliefs, and relying more on scientific reasoning and experience (Kleisiaris et al., 2014).

## **5. Health, diet, and lifestyle**

### **5.1 Health, diet, and lifestyle in Ancient Egypt**

Ancient Egyptians had an understanding of the importance of good hygiene and eating habits for maintaining good health (Elsayad, 2023). They were seen to promote eating healthy food, participating in sports, body cleansing, mouthwash, and more, all of which are behaviours relevant today. In a review, Walker (1990) discussed an unintentional benefit of the ancient Egyptian diet on dental disease. A large portion of the Egyptians diet consisted of bread. Through examinations of archaeological remains, ancient loaves of bread from Egypt were found to contain tiny grains of quartz crystals, or simply sand. Although this requires more research, it is thought that the ancient Egyptians purposely added sand to their bread. Grinding wheat with mortar and pestle is time consuming, adding sand to the wheat speeds up this process by a great degree, hence why it was used by the Egyptians (Walker, 1990). Sand in bread caused it to be gritty, thus wearing down the teeth. While the early breakdown of teeth leads to an increase in the likelihood of being infected, Walker also highlighted some benefits. The wearing down of the teeth reduced the number of sites where cavities could occur, thus reducing the number of individuals with dental disease in the population (Walker, 1990). It might also have been the case

that the act of chewing on gritty bread itself may have contributed to the removal of bacteria that causes cavities. A more recent article by Forshaw (2009) highlights these same details.

The Egyptians also practiced good hygiene to deter infections and illnesses, ranging from food to body. They believed that excretory products produced by food taken into the body was unnecessary and caused illness, therefore they practiced elimination methods such as laxatives, fasting, and enemas (Walker, 1990). The food they ate was often fresh and pure. This was because the food was offered to the gods before being eaten by humans, therefore the Egyptians made sure to handle their food with clean hands and utensils. This, in return, ensured lower chances of ingesting infected food. In terms of keeping their bodies clean, Egyptians were said to have bathed daily and used mouth fresheners such as natrons and spices (Walker, 1990).

When a child suffers from a period of malnutrition or illness, the growth of the long bones in their arms and legs will be inhibited until they receive proper nutrition again (Walker, 1990). These periods of malnutrition can be seen in the bones as transverse lines across the shaft, called Harris lines. Harris lines have been found in approximately thirty percent of uncovered Egyptian mummies. Walker compares this data to the Saxon populations in England and finds that Harris lines are present in forty to ninety percent of different Saxon populations. This data suggests that Egyptians likely did not suffer from malnutrition or illness as much compared to other societies of the time, thus indicating the success of their dietary healthcare (Walker, 1990).

## **5.2 Health, diet, and lifestyle in Ancient Greece**

The Ancient Greeks deeply embraced the concept of “a healthy mind in a healthy body” and believed that the key to maintaining health was physical exercise (Kleisiaris, 2014). This natural approach to disease was developed by Hippocrates around the fourth century BC, and as

a result is referred to as the Hippocratic Ideal (Indla & Radhika, 2019). Hippocrates emphasized environmental causes of diseases and the importance of psychological and lifestyle factors as therapy (Kleisiaris, 2014). According to the Hippocratic Ideal, if the mind and the body were in harmony, then mental and physical health were interconnected. To achieve this harmony between the mind and the body, the development of the human body needed to be optimized. To achieve this optimization, the ancient Greeks did sports and gymnastics. Physical exercise was such a prominent aspect of their healthcare system that the Greeks went as far as making it a necessary part of training in schools (Kleisiaris, 2014).

When it came to healthy diets, the Greeks often believed in the importance of moderation. Plato was a prominent Greek philosopher from around the fifth to fourth century BC. According to Plato, excess of food caused ailments, and diseases were believed to be caused by unhealthy diets (Skiadas & Lascaratos, 2001). As a result, the Greeks often employed nutritional interventions as a way to treat these diseases. Plato's diet consisted of cereals, vegetables, fruits, milk, honey, fish, and meat.

While both ancient Egyptians and Greeks maintained healthy lifestyles through diet, exercise, and hygiene, Western biomedicine fails to include these environmental factors in its treatments.

## **Conclusion**

By examining the beliefs, cultural practices, diets and lifestyles of the ancient Egyptians and ancient Greeks, it can be further understood as to how these two societies managed their healthcare and the spread of disease. Although based on superstitious beliefs, the ancient Egyptians and Greeks were able to use naturalistic methods to treat diseases, and thus can

potentially be applied to modern healthcare practices. The Greek concept of the Hippocratic Ideal was a major contributor to the health of the Greeks, and through their belief of a harmonious mind and body, they focused on physical exercise to target physical and mental health. Complementary therapies of the ancient Egyptians were used alongside traditional therapies like drugs or surgery, which is often seen today. The notion of “a healthy mind in a healthy body” can further be applied towards Western medical practices, where most treatments are strictly pharmaceutical. The pharmaceutical approach to treatment that Western biomedicine implements does not take into consideration environmental factors of disease the same way the Hippocratic Ideal does. Perhaps the Western medical system can further research the effects of interventive therapies, such as music therapy, sport therapy, or nutritional interventions, or even modify them in accordance with the Hippocratic Ideal. Using these examinations of ancient healthcare practices, we can attempt to influence modern healthcare to focus more on the harmony between the individual, the individual’s mind, and the surrounding environment. These practices can also demonstrate the extent to which culture was involved in medical care, the consequences of which we can explore further and attempt to apply to modern medicine.



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