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CRANIAL TRAUMA AT THE SOUTHERN BORDER OF UPPER EGYPT

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Abstract. Signs of trauma were studied in skulls from the hypogeous necropolis of Qubbet el-Hawa (Aswan, Egypt). This was the burial site chosen by the governors living in nearby Elephantine Island, capital city of the southernmost nomes of Upper Egypt that had been on the border with southern Nubian peoples for millennia. These tombs were reutilized over a long time period to bury members of their families and of the inner circle of the ruling class.

Out of the 223 skulls examined, 49 showed evidence of traumas classified as subperiosteal contusions, healed fractures, and injuries indicating violent death. Only two cases show traumas that clearly correspond to episodes of war or other types of interpersonal violence.

Keywords: Injuries. Qubbet el-Hawa. Skull. Ancient Egypt.

1. INTRODUCTION

Qubbet el- Hawa was the burial place of the nobles of Elephantine Island, capital of the first nome of Upper Egypt. The necropolis is close to Elephantine Island across the Nile from the city of Aswan, and the tombs are cut into the sandstone strata and more compact limes of the headland. They are hypogea of variable dimensions that began to be constructed at the end of the Old Kingdom (Vischak, 2015). Subsequent reoccupations of the funeral spaces led to their continuous utilization until the Late Period. They even became used as monastic cells by Coptic Christian monks.

Elephantine Island, near the first cataract of the Nile river, shared a natural border with southern Nubian people (Jiménez Serrano, 2012). Egypt had a largely economic relationship with the country of Kush, which it supplied with raw materials and slaves. However, the relationship was not always peaceful, and there is documentary evidence of multiple conflicts, especially during the Middle Kingdom (Padró, 2014; Pérez Largacha, 2006; Shaw, 2000).

The interest of Egyptologists in the necropolis began in the 19th century, but its systematic archeological study was started by Edel in the middle of the 20th century and continued until 1981 (Vischak, 2015). In this case, the anthropological study was made by Rösing (1990). But there are more recent anthropological studies, such as Nerlich *et al*. (2003) about cases of perforating cranial trauma in individuals from Elephantine Island and Qubbet el-Hawa.

Collaboration between the University of Jaen (Southern Spain) and the Egyptian Supreme Council of Antiquities led to the launch of the Qubbet el-Hawa project in 2007. It initially focused on the excavation, documentation, and analysis of tomb QH33 and then examined other tombs and areas at the site in subsequent campaigns (Jiménez-Serrano and Sánchez-León, 2019). The project is currently run by a multidisciplinary team that includes physical anthropologists from the University of Granada.

Although some intact spaces have been found in the necropolis, frequent episodes of pillage and reoccupation have led to the scrambling of materials, hampering the dating of skeletal remains. Nevertheless, its position on the frontier between countries makes the necropolis of Qubbet el- Hawa especially useful for gathering data on violence between peoples through injury analysis.

The objective of this preliminary study was to examine and characterize injuries detected on skulls excavated between 2008 and 2018.

2. MATERIAL AND METHODS

The study included 226 skulls from tombs QH31, QH33 QH34aa, QH34bb, QH34cc, QH35O, QH35P, QH36, QH35N, and QH122. The sample has been pooled and therefore covers a wide chronology from the end of the Old Kingdom to the Late Period. Although the study of shorter periods would have been desirable, pooling proved necessary because of the inadequate number of skulls with a precise chronology.

Subadult individuals were excluded from this study. The sex and age were recorded using the methods gathered by Buikstra and Ubelaker (1994). Sex was estimated according to the commonly accepted sexual dimorphism parameters for the skull and, when available, the pelvis and long bones. In complete skeletons, the age was based on changes in the pubic symphysis and the auricular surface of the os coxae. Age was estimated in isolated skulls according to the degree of obliteration of ectocranial sutures (Olivier, 1960), which yields a relatively imprecise result but was the only possible approach, given that the major wear of remaining teeth prevented their utilization for this purpose.

To minimize the dispersion of data, the population under study was classified as adult (20-40 years), mature (40-60 years), or senile (> 60 years).

Lesions were detected by macroscopic examination and classified as subperiosteal contusions, *antemortem* fractures and *perimortem* fractures. In each skull with lesions, their number, localization, and laterality were recorded. *Postmortem* fractures were excluded from this analysis.

Frequencies of sex, age, number, type, location and side of lesions were analyzed by the χ^2 test. Fisher's exact test was used for comparisons with other populations.

3. RESULTS

The 223 skulls belong to 113 men, 107 women, and 3 individuals of undetermined sex; 119 individuals were classified as adults (20-40 years), 61 as mature (> 40 years), and 43 as elderly (> 60 years).

Injuries were detected in 49 (21.97%) of the skulls: 27 (55.10%) from men, 21 (42.86%) from women and 1 from an individual of undetermined sex (2.04%), corresponding to 28 from adults, 14 from mature individuals, and 7 from the elderly. There are no significant differences respect to sex ($p=0.747$) and age ($p=0.631$).

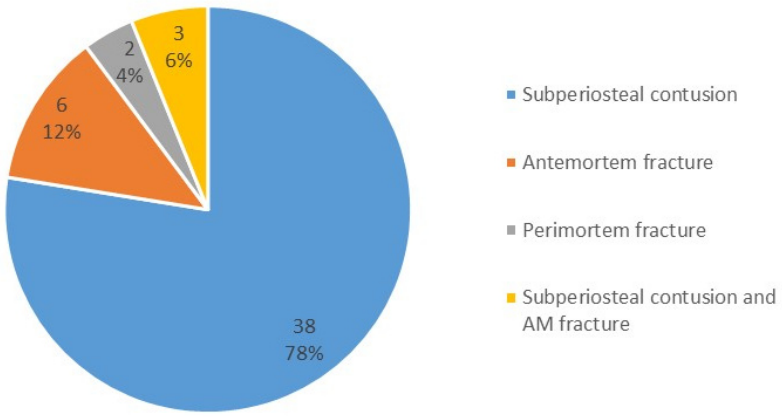

Fig. 1. Type of injury.

Two or more lesions were detected in 33% of injured skulls. Multiple injuries are more frequents in men (75%) than in women. The most frequent injury was subperiosteal contusion, present in 84% of injured skulls, including three cases with both contusion and *antemortem* fracture (Fig. 1).

The majority of contusions are on frontal (38.78%) or parietal bones (32.65%) (Table 1). Facial bones were injured in 8.16% of the skulls, including nasal bone fracture. Significant differences were observed between location and type of injury (p=0.000), but no in the laterality of lesions. Finally, *perimortem* sharp force trauma and blunt force trauma were found in two skulls, affecting multiple skull bones (4.08%).

Table 1. Type of lesion and location

BONE	BONE				Total
	Frontal	Parietal	Facial	Several bones	
Subperiosteal contusion	18	16	0	4	38
Antemortem fracture	1	0	4	1	6
Perimortem fracture	0	0	0	2	2
Subperiosteal contusion and AM fracture	0	0	0	3	3
TOTAL	19	16	4	10	49

4. DISCUSSION

The study of injuries is of interest to assess the degree of violence between and within populations and are especially relevant in Egypt and the Middle East, where episodes of interpersonal violence are well documented.

Three types of injury were detected in this series of skulls from Qubbet el-Hawa:

- Subperiosteal contusions, which do not produce discontinuity of bone and are only visible on the external table as depressions. They are generally small and mainly affect frontal and parietal bones. They would be caused by low-energy impact in which the periosteum is separated from the underlying bone. This produces a localized subperiosteal hematoma that leaves a permanent mark due to the osteolytic action of the blood on the bone (Fig. 1)

- *Antemortem* fractures, observed in the skull and face bones and manifesting signs of bone regeneration, showing that the individual survived the trauma. They have been found in both the skull and face (Fig. 2, Fig. 3).

- *Perimortem injuries*, produced at or around the time of death. Given the characteristics of fresh bone, it cannot be established whether they occurred immediately before, during, or immediately after the death; i.e., whether it caused the death or immediately followed it. Solid evidence of interpersonal violence is provided by two individuals with penetrating injuries that contain traces of the weapons that caused them.

Signs of trauma were observed in 21.97% of 223 skulls from Qubbet el- Hawa. These findings are in line with observations in other historical populations (Walker, 1989; Alvrus, 1999; Judd, 2004; Buzon and Richman, 2007; Cohen *et al*., 2014), which describe a high frequency of subperiosteal contusions, especially in the frontal and parietal bone, which were more frequent among men than among women.

Some authors considered that a higher frequency of injuries on one or other side of the head might indicate violence (Walker, 1989; Brink *et al*., 1998; Aufderheide and Rodríguez-Martín, 1998), but no significant difference in laterality was found in the present series.

The frequency of skull injury is higher in the Qubbet el- Hawa collection (Table 2) than reported in Nubians from Kerma in the Middle Kingdom (Judd, 2004), from Tombos in the New Kingdom (Buzon and Richman, 2007), or from Semna South (400 BC to 1400 AD) (Alvrus, 1999). The difference was statistically significant with respect to the population from Tombos ($p=0.0001$) and Kerma ($p=0.0054$) but not Semna South ($p=0.2348$).

Table II. Percentage of skull traumas in different populations from the region

SITES	PERIOD	% SKULL TRAUMAS
Kerma [1]	1750-1550 BC	11.2%
Tombos [2]	1400-1050 BC	1.4%
Semna South [3]	400 BC-1400 AD	17.9%
Qubbet el- Hawa	Old-Middle-New Kingdom and Late Period	21.97%

1 - Judd, 2004; 2 - Buzon and Richman, 2007; 3 - Alvrus, 1999

The larger number of skull injuries observed in Kerma than in Tombos has been attributed to the more aggressive policies of the Egyptian state in the Middle Kingdom, very different from the policies of diplomacy and cooperation followed in the New Kingdom (Buzon and Richman, 2007). The high frequency of skull injuries in the population of Semna South was attributed by the author (Alvrus, 1999) to environment-related causes or episodes of interpersonal violence resulting from social stresses.

Although a natural border region, Lower Nubia, situated between the first and second cataract of the Nile, served as a buffer zone between the Egyptian state and peoples to the south of the first cataract for long time periods (Jiménez-Serrano and Sánchez-León, 2019).

Because the present sample constitutes a chronological continuum, it is not always possible to compare findings to particular historic periods in order to explain possible causes of a greater or lesser incidence of injuries. This sample from Qubbet el-Hawa is too small for chronological analysis; therefore, it cannot be determined whether associated events in Qubbet el-Hawa would have been related to political changes, as in Kerma and Tombos, or to an increase in interpersonal violence through social conflicts, as in Semna South. Likewise, it is tendentious to attribute subperiosteal lesions to interpersonal violence, because these can also be produced by accidents or other environmental factors.

Only two skulls with obvious signs of violence have been detected in this site to date, confirming the violent death of two individuals due to multiple injuries from a sharp weapon.

5. CONCLUSIONS

- The prevalence of trauma in the necropolis of Qubbet el- Hawa is relatively high, being substantially higher than in neighboring Nubian populations.

- They are more frequent in skulls of adult males, with no significant differences between sexes or age groups.

- The most frequent type of skull injury is subperiosteal contusion, present in 81.6 % of skulls with lesions.

- The most frequent localization of contusions is the anterior cranial vault. There are no significant differences in laterality.

- It proved impossible to definitively associate the traces of subperiosteal contusions and antemortem fractures in skulls from Qubbet el Hawa with episodes of interpersonal violence.

- Only two individuals show evidence of violent death, caused by multiple sharp force trauma to the skull.

This study is part of the PhD thesis of the first author.

Fig. 1. Subperiosteal contusion in the parietal bone.

Fig. 2. Antemortem fracture in the frontal bone.

Fig. 3. Antemortem fracture of the nasal bones.

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