

ANALYSIS OF ANTE-MORTEM INJURIES IN MEDIEVAL SKELETONS FROM THE NECROPOLIS OF CARAVATE (VARESE) ITALY

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ABSTRACT

Aim: the purpose of this study is to investigate the ante-mortem cranial traumas in the skeletal remains of the medieval necropolis of Caravate (Varese). The skull injuries were classified according to their location, type, frequency, age, and sex distributions to clarify the specific causes of the traumas.

Materials and methods: the human skeletal remains of twenty individuals were discovered during an archaeological excavation near the church of St. Agostine (8-9th century). We used classical physical anthropological methods for the identification (race, sex, age at death, stature). For the trauma investigations we used radiological analyses (X-ray: 16-layer Hitachi Etlos).

Results: six skeletons present cranial traumas. The types of skull lesions diagnosed are principally blunt trauma and perforation trauma. Traumas are present in all age groups and in both sexes.

Conclusions: the significant number of traumas found in the osteological remains of Caravate reveal the possible presence of interpersonal violence in the little community of St. Agostine. In the paleopathological studies the prevalence of traumatic skull lesions among the ancient population suggests a relatively high rate of inter and intra-group violence.

Key words: paleopathology, skull trauma, archaeological human remains.

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Introduction

Traumatic lesions in human remains are a direct source for studying the lifestyle of ancient human populations without being subject to the interpretative difficulties of historical documents and archaeological records⁽¹⁾. Traumatic injuries are familiar to paleopathologists because the signs of injuries suffered during life are often preserved in human skeletal remains after death. These traumatic injuries include perimortem and antemortem fractures⁽²⁾. Trauma, which is defined as an injury to body tissues and organs that is caused by external factors, is considered by anthropologists an important indicator revealing the lifestyle of ancient populations⁽³⁾. The correct interpretation of types of fracture provides informations on many aspects of the lifestyle of human groups, principally associated with interpersonal violence, intergroup conflict or warfare, and daily activities⁽⁴⁾; especially when the paleoepidemiological perspective analyzes the differential exposures to risk in different age groups and between the sexes⁽⁵⁾. Moreover, the frequencies and types of trauma can offer important information about the quantity and quality of therapeutic care available to them⁽⁶⁾.

Several paleopathological studies have revealed the high frequency of cranial traumas in ancient human remains from archaeological excavations. The skull is the most vulnerable part of the skeleton and the analysis of traumatic injuries in the cranium offers important information about the degree of interpersonal conflicts in ancient populations.

Skull lesions can be classified by two factors: location or position, and shape of the mark on the bone. The position of the lesions can establish the dynamics of the struggle and the weapon used. Anthropological studies show that most lesions are on the frontal and parietal parts of the skull, in particular on the left side. These types of traumatic injuries are the result of “face to face” combat in which the aggressor inflicted the blow with the right hand. A few marks can indicate the type of weapon used. The paleopathological and forensic anthropological studies have registered, based on the shape of marks on the bone, three major kinds of weapons: sharp, blunt and pointed⁽⁷⁾. In the analysis of the skulls it is important to distinguish antemortem, perimortem and postmortem fractures. The trauma is examined for the remodeling around it, the color of the fracture, the fracture line, the affected area and the shape of the wound.

The purpose of this study is to describe the occurrence and types of cranial trauma in the skeletal remains of the little necropolis of Caravate⁽⁸⁾. The skull traumas were analyzed for their location, frequency, type, age, and sex distributions in an attempt to illuminate the specific causes of the injuries.

Materials and methods

In 2002, the Lombardy Archaeological Heritage Department initiated the archaeological excavation project with the aim of studying the human remains in the necropolis of Caravate (Varese), Italy. Archaeological investigations based on material culture and the stratigraphic architecture of the necropolis, dated the site to the 8-9th century. 14 burials from necropolis area were excavated.

The skeletons were morphologically analyzed in the Laboratory of Physical and Molecular Anthropology of Varese⁽¹⁰⁾. The sex of the skeletons was estimated from pelvis and skull morphology, using the standard described by Buikstra and Ubelaker⁽¹¹⁾. The criteria of dental development were used for age-at-death estimation of non-adult skeletons⁽¹²⁾. Methods based on the changes of the auricular surface of the ilium⁽¹³⁾, pubic symphysis⁽¹⁴⁾, sterna, and ribs^(15,16) were used for age-at-death determination of adult skeletons. Long bone lengths were also measured following Martin and Saller (maximum length in all cases)⁽¹⁷⁾ in order to provide a determination of stature according to Trotter and Gleser⁽¹⁸⁾ and Manouvrier methods⁽¹⁹⁾.

All skeletons were analyzed macroscopically for signs of healed traumas using forensic anthropological methods and radiological analyses⁽²⁰⁾. For CT examinations the skeleton remains were transported to the Institute of Radiological Diagnostics of the Fondazione Borghi in Brebbia⁽²¹⁾, where a 16-layer Hitachi Eclon X-ray was available.

Results

The skeletal remains from necropolis consist of four adult males, two adult females, two non-adult subjects, one infant, and other skeletal remains too fragmentary for anthropological identification (Table 1, 2). The analysis of these skeletons revealed several traumatic injuries affecting six individuals (Table 3). These injuries occurred months or years before the time of death. All of these ante-mortem traumatic injuries are located in the cranium, frontal and parietal bones.

Age	Subadult age group	n. individuals
12-30 months	infant	1
12-15 years	adolescent	2
tot. subadults		3

Table 1: Age estimation of subadult subjects.

Sex			
Age	F	M	Tot.
20-25	1	1	2
30-40	-	-	
40-50	1	3	4
Tot. adults			6

Table 2: Estimated age and sex according to pelvis and skull analysis of adult subjects.

Skeletons with lesions

Tomb 1

The skeleton was a 40 to 50-year-old female measuring 150-155cm in height⁽⁸⁾. The skeleton presents a small quadrangular perforation in the right front of the skull⁽⁷⁾ (Figure 1, 2).

Age	Sex			
	F		M	
15-Dec		2		2
20-25	1			1
30-40				
40-50	1		2	3
Tot. skeleton with lesions				6

Table 3: Individuals with traumatic lesions on the skull.

Tomb 2

The human remains belonged to a 40 to 50-year-old male 160-163cm in height⁽⁸⁾. The skull exhibits a circular depression on the left parietal, the nasal septum deviation and peculiar scratches on the left and right frontal region⁽⁷⁾(Figure 3, 4).

Tomb 6

The skeleton remains belonged to an adult male aged 45-60 years, 159-160cm tall⁽⁸⁾. The facial bones present the nasal septum deviation.



Figure 1: Healed perforating fracture probably caused by a pointed weapon in skeleton from Tomb 1.

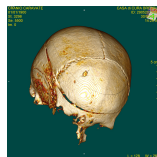


Figure 2: CT image of the skull from Tomb 1.



Figure 3: Healed depressed fracture caused by a pointed instrument in skeleton from Tomb 2.

Tomb 7 us 118b

The skeleton was 13-15 years old (no sex determination), and presents a depressed fracture on the right parietal.

Tomb 7 us 118b1

The human remains belonged to a 12-14-year-old female. The cranium exhibits a frontal depressed lesion (Figure 5).

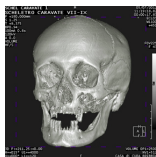


Figure 4: CT image of the skull from Tomb 2.



Figure 5: Depressed fracture in skeleton from Tomb 7 (us 118b1).

Tomb 12

The skeleton was around 25-year-old female measuring 144-145cm in height⁽⁸⁾, which presents a small perforation of the right parietal.

Classification of injuries

Blunt trauma

Three individuals exhibit blunt fractures with complete bone remodeling in the skulls. An adult male (Tomb 2) and a subadult subject (Tomb 7 us 118b) present a depression in the parietal bone while the other female subadult (Tomb 7 us 118b1) presents a depressed fracture on the frontal bone. Blunt trauma in the skull is determined whenever the fractures manifested a clear external border with radiating and concentric reticulations. The entire area afflicted appears depressed. The impact bodies are usually classified as “large contact area”⁽²¹⁾.

Perforation trauma

Two adult female skeletons present a perforation fracture (Tomb 1 and 12), one on the right frontal and the other on the right parietal bone. In both fractures bone remodeling confirmed that the wound was not fatal. In the past arrows may have been the cause of this type of trauma. The damage caused to the skull by pointed objects depends largely on the velocity of the arrow. Frequently, two holes, rounded or quadrangular, are present: the entry hole, which is smaller in shape ectocranially and less regular endocranially, and an exit hole, which is larger and has irregular borders on its ectocranial surface⁽²¹⁾.

Nasal septum deviation

Two adult males (Tomb 2 and 6) present the nasal septum deviation. The deviated nasal septum is probably the result of a traumatic event by a blow to the face, but a congenital origin cannot be excluded. The deviated septum is an abnormal condition in which the top of the cartilaginous ridge leans to the left or the right, causing obstruction of the affected nasal passage.

Trauma by age class

The trauma is present on all age groups: adult (Tomb 1, Tomb 2 and Tomb 12) and subadults (Tomb 7 us 118b and Tomb 7 us 118b1).

Trauma by sex

In the necropolis of Caravate male individuals especially present blunt force trauma and nasal septum deviation, while the only two adult females excavated in the necropolis present perforation trauma.

Discussion and conclusions

The Caravate remains have yielded a considerable amount of data concerning cranial traumas. The prevalence of trauma is high for the little necropolis of St. Agostine Church. All the cranial injuries have characteristics consistent with blunt force trauma or perforation force trauma, and weren't fatal for every individual. Ante-mortem injuries are characterized by evidence of bone remodeling, whereas in perimortem lesions no healing processes can be observed in the skull. The most frequent non-fatal trauma consisted mainly of depressed fractures found primarily on the frontal and parietal bones.

Identifying trauma in archaeological material is problematic, since very frequently it is very difficult to distinguish antemortem, perimortem and postmortem fractures. Above all several post-depositional processes may mimic trauma. For example, the effects of post-depositional processes (taphonomic changes) such as earth pressure, water flow and animal activity may also resemble trauma-related features⁽²²⁾. In our initial interpretation of the scratches of the individual of Tomb 2 we supposed that the skull marks may have been caused by plant roots, which, by trapping water and secreting acid substances, could produce imprints that can be confused with the pathological alterations. But following CT analyses the skull marks were deemed to be vascular imprints^(7,8).

Evidence for skeletal trauma is common in the remains of ancient people. The causes of trauma may be accidents or violence⁽²³⁾. The existence of violence can also be identified in more complex analyses that focus on the frequency, form, and distribution of traumas in bones and their associations with distinct sex and age groups. Traumatic lesions are therefore among the most investigated matters in paleopathology, particularly among researchers who aim to define the relationship between trauma and ancient life style⁽²⁴⁾.

The considerable number of lesions in the human remains of Caravate could demonstrate that interpersonal violence was part of the little community of St. Agostine^(7,8). The most common patterns of trauma found in our necropolis were minor circular depressed injuries and perforation trauma. This implies that most traumatic lesions were caused by blunt or pointed instruments. Future archaeological research (extension of the necropolis excavation), and anthropological research (analyses of the new skeletal remains), should offer more information to distinguish between various types of trauma and their possible causes, and so attempt appropriate interpretations of the high prevalence of skull lesions in the human skeletal remains of Caravate.

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