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Front cover: Mosaic of Saint Demetrios and an angel (before the 7th century AD). Basilica of Saint Demetrios, Thessaloniki (photo: 9th Ephoreia of Byzantine Antiquities).

Marble tombstone of the Athenian physician Jason (2nd century AD), Athens (photo: British Museum)

Back cover: Rodon (rose), illumination from mid-14th century manuscript (Padua, Biblioteca del Seminario, 194, f.134 r)

Roman limestone ex-voto of pair of eyes, of unknown origin, in the Cyprus Museum, Nicosia (photo: A. Koutas)

Wearing the plantago as a necklace to cure the headache (Codex Vindobonensis 93, f. 10 v).

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27. Health Care and Survival of a Child with Cranial Trauma at *Augusta Emerita* (Mérida, Spain)

*Filipa Cortesão Silva, Juana Márquez Pérez, João Rosa
and Ana Luísa Santos*

Among the individuals recovered in a funerary area south of Augusta Emerita (Mérida, Spain) was a child who was about 3 years old. According to the grave goods, this burial is dated to the second half of the 1st to the 2nd century AD. The observation of the skull revealed a severe traumatic lesion affecting the frontal and right zygomatic areas, with signs of bone remodelling, also visible on images produced by the Three-Dimensional Computed Tomography. The consequences of the lesion on the child's health and the health assistance that allowed his/her survival for some time are discussed. According to literature, the Romans had the medical knowledge, namely surgery, to deal with this type of problem.

Introduction

Our knowledge of the history of medicine can benefit from the study of prehistoric and historic human skeletons. This type of material can reveal medical practices in addition to information about the history of diseases. Trauma is among the pathologies that can be analysed and is the key issue of this work. According to Cook and Powell (2006) the interdisciplinary study of trauma began in the last decades, with aspects such as frequency of fractures, their causes and possible treatments among the obtained data.

In paleopathological literature the diagnosis on non-adults is rare due to the difficulties of identifying these lesions in children and the lack of success in examining children for such pathology (Lewis 2007). However, in the past, as today, fractures in childhood may have been common (Roberts 2000).

Most fractures observed in children from multiple periods in the past are located on the skull, limbs, clavicles, or the ribs (e.g. Lewis 2007). Among the cranial fractures reported, Lewis (1999, in Lewis 2007) documented three cases of head injury (blunt force) in rural Wharram Percy (late medieval England). In one of these cases, the child, who was 5 years old, had no evidence of healing suggesting a subdural haematoma and subsequent death. Furthermore, there are also several bibliographic references to skull lesions observed in infants and children caught up in warfare and

massacres at different places and dates (Lewis 2007). Regarding healed skull fractures, only a few cases were noticed. Rühli *et al.* (2002) studied a child cranial vault fragment found at Vilmar-Weyer, Germany, from the early medieval period, which presents a semicircular lesion with signs of bone remodelling on its edges. A Multislice Computed Tomography confirmed the diagnosis. Another example concerning healed fractures on a right parietal bone was found on a 2 year old girl from the 4th century AD in Lisieux, Normandy (Blondiaux *et al.* 2002). These authors interpreted the skull lesions as a result of child abuse.

Our research concerns a case which comes from a funerary area of the colony of *Augusta Emerita*, the capital of Lusitania. This Roman province extended over a region that today corresponds to the southern territories of Portugal and Spain. *Augusta Emerita*, now called Mérida, is a city located in the Extremadura province, in Spain. This paper aims to describe a cranial case of trauma on a Roman child, its effects on the child's health and the possible health assistance that allowed his or her survival.

Material and methods

In 2005, Grave A 33 (archaeological intervention number 5036) situated in a funerary area located in the south of



Fig. 27.1. Child burial in situ in Grave A 33 at *Augusta Emerita*, with the head facing north and the face lying on its left side. Note that the arms are raised up, one on each side of the head

Augusta Emerita was excavated by Juana Márquez Pérez. According to the grave goods – two ceramic vessels – this grave dates to the second half of the 1st to the 2nd century AD. Among the individuals recovered (Silva *et al.* 2008) there is a child (stratigraphic unit number 325) inhumed in supine position, with the head facing north and the face lying on the left side (Fig. 27.1). Only the skull, thorax and upper limbs were present. The arms were raised up, one on each side of the head, corresponding to an atypical burial body posture. The pelvis and the lower limbs of this individual were not preserved, probably due to the violation of the nearby burial A 34.

Later, in 2008, this individual was cleaned and studied in the laboratory. Since the skull was fragmented it was necessary to perform its reconstruction. The age at death was estimated based on Ubelaker (1989) and Scheuer and Black (2000). Measurements of the long bones were taken with a Mitutoyo digital caliper (precision 0.01 mm). The skull was radiographed (GE Healthcare, Senographe DC, reference 5131764-7-1PT) and submitted to Three-



Fig. 27.2. Maxilla and mandible of the child illustrating the tooth erupted. A radiograph of the mandible where the dental development can be seen

Dimensional Computed Tomography (3D-CT), using a Siemens Somatom Volume Zoom 4 VA47C.

Description of the child

According to the sequence of teeth formation and eruption (Ubelaker 1989), this individual was 3 years \pm 12 months old (Fig. 27.2). However, long bone lengths indicated an age at death between 1½ and 3 years (Table 27.1).

The sex of this individual was not determined because, macroscopically, it is impossible to perform a reliable estimation at such a young age, or more precisely before adolescence, when the development of sexual dimorphism in the skeleton occurs (Scheuer and Black 2000).

Table 27.1. Age at death estimation based on the measurements of the long bones

Bone	Measurement	Author	Size (mm)	Age at death (years)
Right clavicle	Maximum length	Black and Scheuer 1996b*	66.5	2–3
Left humerus	Diaphyseal length	Maresh, 1970*	119.2	1.5
Right radius	Diaphyseal length	Gindhart, 1973*	91.6	1.5

* These works were cited in Scheuer and Black (2000)

The identification of a severe traumatic lesion on the frontal bone, with a length of about 4 cm, occurred during the gluing of the cranial bone pieces. The area shows irregular surfaces and signs of bone remodelling which indicate an ante mortem lesion (Fig. 27.3). Besides, an increasing thickness near the orbit and on the orbital surface of the right zygomatic bone was also noticed (Fig. 27.4). These facts were confirmed by the images obtained by 3D-CT, where different bone densities between the area affected by the lesion and the other parts of the bone can be identified (Fig. 27.5).

Discussion

Studying trauma in bones from ancient populations gives us information about occupation, personal relationships, mortuary behaviour, accidents, subsistence and trauma treatment (Roberts 2000; Lewis 2007). Brasili *et al.* (2004) pointed out that from the type and degree of repair of the lesion it is possible to identify its etiology and possible applied treatments. Furthermore, since

‘children were involved in many aspects of life within a community, and performed many subsistence and occupational activities, evidence for trauma in their remains helps to unravel questions such as the age of apprenticeship, child abuse, parental care, the home environment and, in case of peri-mortem cuts during autopsy, the development of paediatrics’ (Lewis 2007, 169).

In *Augusta Emerita*, among the human remains recovered from Grave A 33, was an inhumed child that shows a cranial trauma. This individual dates from the 1st to the 2nd century AD, and was around 3 years old at the moment of death. The injury is located in the frontal and right zygomatic bones, and may have resulted in a primary brain lesion. Most certainly there was also a cutaneous wound. The edges of the bone lesion show signs of remodelling which, according to the medical experience of one of the authors [J. R.], suggested a survival period of between 3 weeks and 2 months. The location of the fracture, just above the orbit, and the involvement of the zygomatic area indicate that there was probably some degree of eye involvement and vision loss on the right eye. It is unlikely that vision loss occurred as a consequence of neurological damage. Despite the fact that immediate death did not occur, the trauma



Fig. 27.3. Frontal bone in right antero-lateral view showing the fracture with bone remodelling on the edge of the lesion

certainly caused some degree of unconsciousness or coma. It is also very likely that small pieces of bone, resulting from the impact, provoked the tearing of the *dura mater*, putting the brain in direct communication with the skin and opening an entrance to micro-organisms. In open or compound fractures, the exposure to microorganisms was obviously a danger in antiquity due to the risk of infection (Roberts 2000), as in this case. Thus, an infection of the wound with progression to the meninges and adjacent brain was most certainly a complication and probably another factor contributing to the child's death.

A careful observation did not identify any signs of surgery in the frontal bone. However, the Romans had the medical knowledge to treat cranial fractures as can be seen on documents from antiquity (see Jackson 2005; Kshetry *et al.* 2007). These documents contain descriptions of head surgery, including by trepanation, to treat ‘direct or indirect trauma, caused by accidental injuries or battle wounds’ (Jackson, 2005). There is an interesting case of a trepanation made on a hydrocephalic child who was 5–6 years old, dated from the end of the 1st century or the start of the 2nd century AD, on the site of the ancient town of *Fideneae*, near Rome

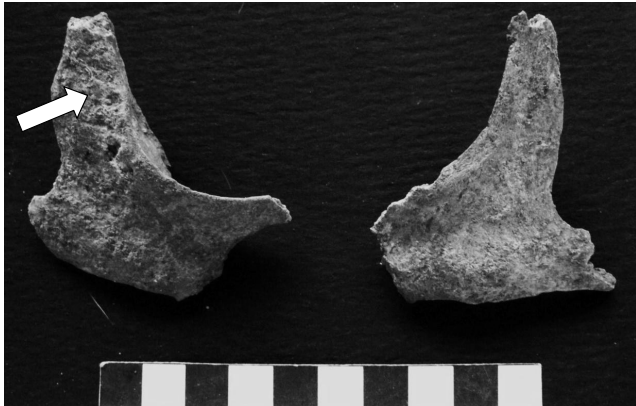


Fig. 27.4. The right zygomatic depicts an increase in the thickness near the orbit in comparison to the left one

(Mariani-Constantini *et al.* 2000). Several burials with medical instruments (e.g. Bejarano Osorio 2002; Márquez Pérez 2006) and epigraphic sources were found in *Augusta Emerita*, with the name and occupation of the person (e.g. Sanabria Escudero 1964). These finds indicate the presence of medical practitioners in the city.

Regarding the treatment of skull fractures with skin wounds, trepanation was an option but was not considered inevitable: Celsus (VIII, 4, 10–12 in Jackson 2005) proposed an initial treatment with plasters and medicated dressing. He also recognized that ‘[a] fractured bone unless it is treated causes severe inflammations, and is treated afterwards with greater difficulty’ (*De med.* VIII, 4,7 in Jackson 2005, 112). *On Wounds in the Head*, of Hippocrates, is ‘the first manuscript of antiquity dealing with cranial trauma in such detail and clarity’ (Panourias *et al.* 2005, 187). In this book, he said that if the major sub-cranial blood vessels were avoided, skull operations presented less risk than surgery on many other parts of the body, but infection was a constant danger (in Jackson 2005).

The survival of the child found in *Augusta Emerita* probably depended not only on medical assistance but also on nutritional aid, since the comatose state which emerged after the accident created feeding difficulties that could lead to malnutrition and/or dehydration and cause an earlier death. These problems represented a challenge to the carer, in particular the feeding of the child, who was probably fed artificially at some point with a tube or a bottle. Unfortunately, hitherto in Mérida no such devices have been identified. However, these bottles were found in Roman child burials from Pauvadou and Saint-Lambert, exhibited in the Musée Archéologique Municipal de Fréjus (France), and recently mentioned by Trigalet (2009) in a paper about maternity and childhood. According to literary sources, children were breastfed until they were 3 years old and weaning was gradual (Fildes 1986 in Dupras *et al.* 2001). Meanwhile, food supplements such as boiled honey or a mixture of

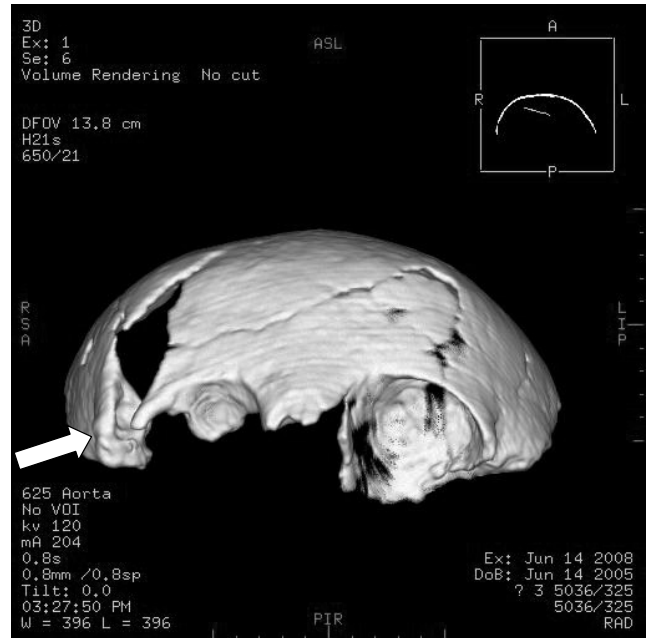


Fig. 27.5. Frontal bone observed by 3D-CT confirmed different bone densities around the area affected by the lesion

honey and goat’s, cow’s or sheep’s milk were introduced using bottle feeding (Dupras *et al.* 2001).

Even nowadays cranial fractures are common in children in this age group (Lyons *et al.* 1999). Clinical data show that the bone affected by the lesion varies according to the age of the individual (Glencross and Stuart-Macadam 2000). Infants and young children, who are not yet able to walk, are more prone to have skull fractures (Kowal-Vern *et al.* 1992) as well as clavicular fractures (Glencross and Stuart-Macadam 2000). On the other hand, there is a prevalence of limb fractures when children become ambulatory (Cheng and Shen 1993). Today this kind of accident is more common in boys in the proportion of 1.2 to 1.5–1 (Towner and Scott 2008).

In Roman society, child mortality was high. Rawson (2003, 341) points out that in the age group of birth to 5 years old the mortality rate was probably nearly 50%. Nowadays, according to UNICEF (2009), this rate is 68% worldwide and 6% in industrialised countries. After diseases, trauma was the second cause of death (Coulon 2004). Based on Roman sources, Laes (2004) gives a picture of the kind of accidents affecting children, e.g. falls, accidents with chariots on crowded streets, sporting activities at the gymnasium or drowning in a river or swimming pool.

Conclusions

The observation of the skull of the child from *Augusta Emerita*, revealed a severe cranial trauma with signs of bone

remodelling. Given the characteristics of the bone lesion and the possible consequences of the accident on the child's health, we estimate his or her survival for a period of between 3 weeks and 2 months. Survival for such a long time after such a violent head trauma could only have been possible with a relatively high level of care and assistance.

From a medical point of view the cause of death may have been multifactorial: trauma with direct brain injury was the initial mechanism followed by coma, or at least some mental status disturbance. It is impossible to know if the child was assisted by a Roman healer. However, it is known that the Romans had the medical knowledge, namely surgery, to deal with cranial trauma such as the case described here. This study also illustrates the importance of a multidisciplinary dialogue to understand the history of disease and medicine during the study of skeletons from past populations.

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Bibliography

- Bejarano Osorio, A. M. 2002: 'Nuevas aportaciones al conocimiento de la medicina y farmacéutica en la ciudad de *Augusta Emerita*', *Mérida excavaciones arqueológicas* 2000 6, Mérida, 397–421.
- Blondiaux, G., Blondiaux, J., Secousse, F., Cotten, A., Danze, P.-M. and Flipo, R.-M. 2002: 'Rickets and child abuse: the case of a two year old girl from the 4th century in Lisieux (Normandy)', *International Journal of Osteoarchaeology* 12, 209–15.
- Brasili, P., Bianchi, E. and Ventrella, A. R. 2004: 'Traumatic events and life-style in Ancient Italian populations', *Collegium Anthropologicum* 28(1), 179–91.
- Cheng, J. C. Y. and Shen, W. Y. 1993: 'Limb fracture pattern in different pediatric age groups: a study of 3,350 children', *Journal of Orthopaedic Trauma* 7, 15–22.
- Cook, D. C. and Powell, M. C. 2006: 'The evolution of American paleopathology', 281–322 in J. E. Buikstra and L. A. Beck (eds), *Bioarchaeology: the Contextual Analysis of Human Remains*, Amsterdam.
- Coulon, G. 2004: *L'enfant en Gaule Romaine*, Paris.
- Dupras, T., Schwarcz, H. P. and Fairgrieve, S. I. 2001: 'Infant feeding and weaning practices in Roman Egypt', *American Journal of Physical Anthropology* 115, 204–12.
- Glencross, B. and Stuart-Macadam, P. 2000: 'Childhood trauma in the archaeological record', *International Journal of Osteoarchaeology* 10, 198–209.
- Jackson, R. 2005: 'Holding on to the health? Bone surgery and instrumentation in the Roman Empire', 97–119 in H. King (ed.), *Health in Antiquity*, London.
- Kowal-Vern, A., Paxton, T. P., Ros, S. P., Lietz, H., Fitzgerald, M. and Gamelli, R. L. 1992: 'Fractures in the under-3-year-old age cohort', *Clinical Pediatrics* 31, 653–9.
- Kshetry, V. R., Mindea, S. A. and Hunt Batjer, H. 2007: 'The management of cranial injuries in antiquity and beyond', *Neurosurgical Focus* 23(1), 1–8.
- Laes, C. 2004: 'Children and accidents in Roman Antiquity', *Ancient Society* 34, 153–70.
- Lewis, M. 2007: *The Bioarchaeology of Children: Perspectives from Biological and Forensic Anthropology*, Cambridge.
- Lyons, R. A., Delahunty, A. M., Kraus, D., Heaven, M., McCabe, M., Allen, H. and Nash, P. 1999: 'Children's fractures: a population based study', *Injury Prevention* 5, 129–32.
- Mariani-Constantini, R., Catalano, P., Gennaro, F., Tota, G. and Angeletti, L. 2000: 'New light on cranial surgery in ancient Rome', *The Lancet* 355, 305–7.
- Márquez Pérez, J. 2006: *Los Columbarios: arquitectura y paisaje funerario en Augusta Emerita* (Ataecina: colección de estudios históricos de la Lusitania, 2) Mérida.
- Panourias, I. G., Skiadas, P. K., Sakas, D. E. and Marketos, S. G. 2005: 'Hippocrates, a pioneer in the treatment of head injuries', *Neurosurgery* 57, 181–9.
- Rawson, B. 2003: *Children and Childhood in Roman Italy*, Oxford.
- Roberts, C. 2000: 'Trauma in biocultural perspective: past, present and future work in Britain', 337–56 in M. Cox and S. Mays (eds), *Human Osteology in Archaeology and Forensic Science*, London.
- Rühli, F. J., Lanz, C., Ulrich-Bochsler, S. and Alt, K. W. 2002: 'State-of-the-art imaging in palaeopathology: the value of Multislice Computed Tomography in visualizing doubtful cranial lesions', *International Journal of Osteoarchaeology* 12, 372–9.
- Sanabria Escudero, M. 1964: 'La medicina emeritense en las épocas romana y visigoda', *Revista de Estudios Extremeños* 20 (1), 53–84.
- Scheuer, L. and Black, S. 2000: *Developmental Juvenile Osteology*, London.
- Silva, F. C., Pérez, J. M., Rosa, J. and Santos, A. L. 2008: 'Cranial trauma on a child from a double Roman burial at *Augusta Emerita*, Spain', *Paleopathology Association: scientific program & abstracts. 17th European Meeting of the Paleopathology Association, 25–7 August 2008, Copenhagen, Denmark. Supplement to the Paleopathology Newsletter*, 62.
- Towner, E. and Scott, I. 2008: 'Chapter 1. Child injuries in context', 1–28 in M. Peden, K. Oyegbite et al. (eds), *World Report on Child Injury Prevention*, Geneva.
- Trigalet, V. 2009: 'Maternité et petite enfance', *Histoire antique* 41, 64–73.
- Ubelaker, D. 1989: *Human Skeletal Remains: Excavation, Analysis, Interpretation*, Washington.
- UNICEF 2009: <http://www.unicef.org/index.php>.