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Cuidar, curar, morir: la enfermedad leída en los huesos

*Care, heal, die:
the disease read in the bones*

María Paz de Miguel Ibáñez
Alejandro Romero Rameta
Palmira Torregrosa Giménez
Francisco Javier Jover Maestre
(Eds.)



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XIV CONGRESO NACIONAL E INTERNACIONAL DE PALEOPATOLOGÍA

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FRANCISCO JAVIER JOVER MAESTRE
(Eds.)**

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PETRACOS es una publicación de difusión y divulgación científica en el ámbito de la Arqueología y el Patrimonio Histórico, cuyo objetivo central es la promoción de los estudios efectuados desde el Instituto Universitario de Investigación en Arqueología y Patrimonio Histórico de la Universidad de Alicante –INAPH–. *Petracos* también pretende ser una herramienta para favorecer la transparencia y eficacia de la investigación arqueológica desarrollada, transfiriendo a la sociedad el conocimiento generado con la mayor rigurosidad posible. Esta serie asegura la calidad de los estudios publicados mediante un riguroso proceso de revisión de los manuscritos remitidos y el aval de informes externos de especialistas relacionados con la materia, aunque no se identifica necesariamente con el contenido de los trabajos publicados.

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Exploring the ossuary: a possible case of mandibular trauma in the Modern Era (17th-18th centuries), Lisbon

Explorando el osario: un posible caso de trauma mandibular en época Moderna (siglos XVII-XVIII), Lisboa

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Resumo:

No edifício situado na Rua do Recolhimento 7/9, localizado na área intramuros do Castelo de São Jorge (Lisboa, Portugal), junto ao antigo Hospital dos Soldados, identificou-se uma necrópole de época moderna, da qual foram recuperados 841 enterramentos e 23 ossários.

A peça óssea aqui apresentada e discutida foi recuperada do ossário 11 (950 ossos, NMI = 116). Trata-se de um fragmento mandibular (porção anterior do lado direito), que apresenta sinais exuberantes de patologia. Após ter sido limpo, o fragmento foi observado macroscopicamente e submetido a exame imagiológico. O diagnóstico diferencial das alterações observadas teve em consideração a sua forma, estrutura, tamanho e localização. As alterações consistem num crescimento ósseo protuberante na face lingual, com 12mm de comprimento. Na face labial são visíveis dois locais com crescimentos ósseos. A mandíbula apresenta um espessamento ósseo bastante expressivo e pouco uniforme. Registou-se perda ante mortem total da dentição na porção observável. O diagnóstico diferencial das alterações observadas teve em consideração diversas possibilidades, nomeadamente traumatismo, neoplasia, osteomielite ou um carácter discreto mais exuberante (torus mandibular), sendo as características da lesão compatíveis com um eventual traumatismo

facial. Pretende-se valorizar os contextos do tipo ossário que, embora frequentemente negligenciados, podem constituir uma importante fonte de informação nos estudos paleopatológicos.

Palavras-chave: *modern age, oral pathology, neoplasia, torus mandibular, Hospital of the Soldiers.*

Abstract:

A modern necropolis from which 841 burials and 23 ossuaries were recovered was identified in the building located at Rua do Recolhimento 7/9, at the intramural area of Castelo de São Jorge (Lisbon, Portugal), near the former Soldiers' Hospital. The osteological element here presented belonged to ossuary No. 11 (950 bones, NMI = 116). It is a mandibular fragment (anterior portion of the right side) which presents exuberant pathology signs. After being cleaned, the fragment was observed macroscopically and submitted to imaging. The differential diagnosis took into account the shape, structure, size and location of changes. The pathological alterations consist in an outstanding 12mm-long bony growth on the lingual surface of the mandible. Two bony growths also appear on the labial surface. The mandible exhibits a rather visible non-uniform bone thickness. Complete ante mortem tooth loss was observed in the recovered mandible portion. The differential diagnosis of the pathological alterations led us to consider several possibilities, namely: trauma, neoplasia, osteomyelitis and a more exuberant discreet character (mandibular torus). The aim of this paper is to highlight the ossuary-type contexts which, albeit often neglected, can be an important source of information in palaeopathological studies.

Keywords: *Modern Age, oral pathology, neoplasia, mandibular torus, Soldiers' Hospital.*

1. Introduction

Paleopathological studies should be performed taking into account the macro-population scenarios but without neglecting the information given by smaller contexts, including case studies represented by a single osteological piece.

The present research aims to: 1) present the necropolis and osteological collection of Rua do Recolhimento/Soldiers' Hospital; 2) describe the creation and use of ossuary 11; 3) present a pathological mandible from this secondary funerary context and make its differential diagnosis; 4) demonstrate how a mandible coming from a secondary context can be useful for the study of both paleopathology and Modern hospital treatments.

2. Historical and archaeological context

The Royal Military Hospital of the Knights Hospitaller São João de Deus was founded in 1673. However, the first reference to a military hospital in the Castle of São Jorge goes back to 1587 and a 1660's royal decree licensed improvements and extensions (Borges, 2007). At that time, Portugal was involved in the Restoration war against Spain that lasted from 1640 to 1668. Under this political situation

military hospitals were needed (Borges, 2007).

Archaeological diggings identified the Military Hospital on the South side of Rua do Recolhimento (fig. 1), presenting architectural elements, like the tiles and the floors, consistent with the 17th century. Stone and wood steps that would lead to the first floor were also identified, as well as structures from the 16th century (e.g., a cistern). One of the rooms dug was interpreted as a prison, due to the amount of clay pipes recovered and the architectural elements present (Gaspar and Gomes, 2005).

These findings are consistent with a well-established structure in the community, with a great level of organization, showing the importance of this hospital to the military stationed in the castle area, but also to all branches of the military corps. The hospital was destroyed by the 1st of November of 1755's earthquake. The signs of this tragedy were identified during the archaeological diggings with burnt floors, cracked and collapsed walls (Gaspar and Gomes, 2005). The surviving militaries that were at the hospital were then transferred to the Hospital of the Convent of São João de Deus in the Pampulha area (Caldas, 2012). The hospital was never rebuilt.

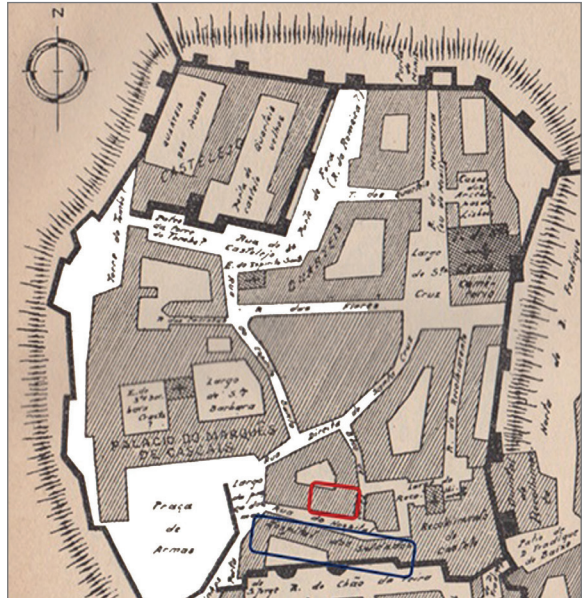


Figure 1. Localization of the necropolis (red) and the military hospital (blue) From: Vieira da Silva (1937). O castelo de São Jorge em Lisboa, Lisboa, 2nd edition. Page 2.

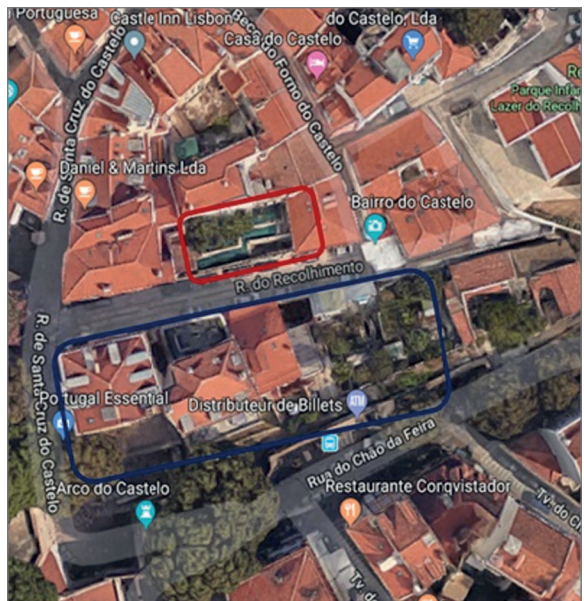


Figure 2. Localization of the necropolis (red) and of the military hospital (blue) (<https://www.google.com/maps/@38.7125085,-9.1326655,187a,35y,6.04h/data=!3m1!1e3>).

During the archaeological diggings, the necropolis associated with the Military Hospital was identified in the North side of Rua do Recolhimento (fig. 2). According to the historical sources, this necropolis would be in usage at the same time as the parish cemetery (Borges, 2007). The set of structures belonging to the necropolis occupied most of the interior and exterior area of a building built after the earthquake of 1755. Obituary records indicate the continuous usage of this area as a necropolis after the collapse of the hospital in 1755, maybe as a secondary resource burial ground since the churchyard could be full with the tragedy's victims. These records give important information about the hospital-cemetery relation and the origin of the buried individuals (military, prisoners of the castle's prison, hospital personnel, etc.).

In the structure of a military hospital, cemeteries are implemented later, meaning that the area allocated to the necropolis is not assigned at the same time as the hospital is established, although they are supposed to be nearby (Borges, 2007). In the case of the necropolis of the Royal Military Hospital of the Knights Hospitaller São João de Deus in the Castle of São Jorge, there is no indication of the date of beginning of usage. Nevertheless, it is reasonable to assume that it started in the period comprised from the second half of the 17th century to the second half of the 18th century.

3. The necropolis

The necropolis of the Royal Military Hospital of the Knights Hospitaller São João de Deus in the Castle of São Jorge was probably used between 1673 and 1773. Although the abandonment date is uncertain, after the 1755 earthquake there was a reorganization of the city and it is still possible to envision it in this location (França, 2008; Caldas, 2012; Carvalho, 2012). A civil building, dated from 1773, was constructed upon the area, affecting several burials.

The burial ground presents an area of 107 square meters identified so far, with at least 841 burials. Most burials were of men (91.8%, n=549) aged between 12 and 50 years (93.3%, n=395). This pattern is observed both in burials and ossuaries. No peri-mortem traumatic injuries were detected, excluding a direct relation to a war conflict. On the other hand, many infectious pathological conditions were identified, suggesting a back-up hospital that would serve the entire military community (Ortner, 2003).

In all, 23 ossuaries were recovered, amongst which three types were identified. The charnel (ossuary #11) was 4 meters length and probably had a removable cover due to its constant use (simple planks of wood would suffice), being essential to the space management. Throughout the ossuary, there was a layer of lime at the bottom, probably used to accelerate the decomposition. Within this ossuary there were at least 116 individuals.

The ossuaries #2 and #13 were of medium size, the first with a minimum number of individuals (MNI) of 32 and the second with a MNI of 10-14. They appear to be related to the building of the new structure.

Finally, the other twenty ossuaries were of very small size (MNI=1-5).

4. Material

The case presented here was retrieved from the ossuary 11, a large charnel (MNI=116). A charnel designates a big open pit at the farthest end of the necropolis where all disposable bones were placed within the consecrated land. The ossuary is composed mostly by adult men, several bones presenting pathological lesions. This ossuary was constituted, used and closed when the necropolis was still active. Lime and anthropic manipulation caused various taphonomic changes (Schotsmans *et al.*, 2014a; 2014b).

The osteological element under study is a mandibular fragment (anterior portion of the side, including the mental eminence), which presents exuberant signs of pathological origin (figs. 3 and 4).

5. Methodology

The fragment was carefully cleaned in the laboratory and observed macroscopically under good lighting conditions. It was also radiographed (conventional Philips radiography equipment) and a computerized axial tomography (CT) was performed (volumetric acquisition equipment with high resolution algorithm Siemens Emotion Deteton 16). Measurements of the lesion were taken in millimeters (mm), with a sliding caliper. The differential diagnosis took into account the shape, structure, size and location of the observed alterations.



Figure 3. Right portion of the mandible belonging to ossuary #11 (frontal anterior view).



Figure 4. Right portion of the mandible belonging to ossuary #11 (superior anterior - posterior view).

6. The lesion

The mandibular fragment presents protuberant bony growth (exostosis), about 15 mm long, in the lingual surface where the chin spines are located (figs. 3 and 4). At the labial side two bony growths are visible (Figure 4). The jaw presents a very expressive non-uniform bone thickness. Total ante-mortem loss of the dentition was recorded in the observable portion. X-ray analysis revealed an irregular line that may correspond to one or more fractures, around which cancellous bone is noticeable (figs. 5 and 6). This less compact bone is also observed in the region of the exostoses, especially at the mental spines' region, near the mandibular symphysis. The CT showed an irregular line crossing the entire base and mandibular body.

7. Discussion

The lesions observed at the mandibular fragment from ossuary 11 led us to make a differential diagnosis amongst various pathological or morphological conditions, namely mandibular torus, neoplasm, osteomyelitis, and trauma.

7.1. Mandibular torus

The mandibular torus is characterized by bony growths projecting beyond the surface of the mandible. It is usually located in the lingual area under the premolars. Radiographically it is represented by a radiopaque mass (Seah, 1995). Both environmental and genetic factors are responsible for this morphological alteration. Tori don't cause pain but can affect the speech, deglutition and mastication (Seah, 1995). In the living Portuguese population, their prevalence is 3.1% (Silva, 2012;



Figure 5. X-ray in anatomical norm superior view (arrow indicates possible area of the lesion).

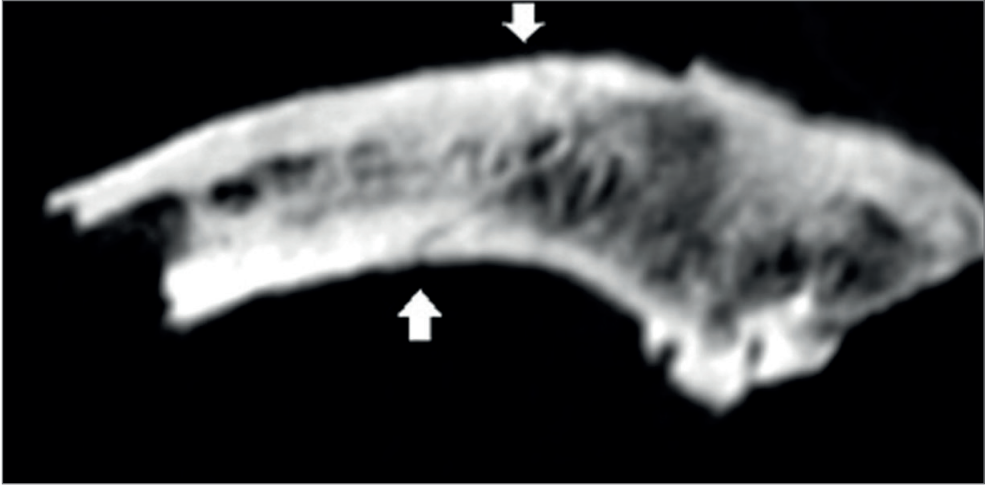


Figure 6. Computed tomography, anatomical norm superior view (arrows indicate areas of fracture of the lesion).

Cortes *et al.*, 2014). Although the type of bony growth resembles a mandibular torus, the presence of line fractures at the radiological images does not support this hypothesis.

7.2. Neoplasm

The disorganized bone resembles a tumor-like lesion such as osteoma or osteochondroma. Osteomas are benign tumors, usually exhibiting a smooth/polished appearance and a generally circular or oval delimited shape (Odes *et al.*, 2017). They are more common in the skull, but there are also unusual types affecting the auditory canal and the paranasal sinuses (Ortner, 2001). On the other hand, osteochondromas are formed from the ossification of cartilages. In result they are limited to the growing period of the skeleton (Ortner, 2001). The cranial and facial bones are rarely involved but, when present in the mandible, they usually affect the condyles and coronoid processes (Sanders and Mckelvy, 1977; Ortner, 2001). Finally, the metastases of carcinomas, although sometimes characterized by disorganized growth, are infrequent in mandibles. When present, the molar area is the most involved, resembling more a periapical abscess than a usual bone metastasis (Poulias *et al.*, 2011; Kumar and Manjunatha, 2013; Hirshberg *et al.*, 2014). In sum, none of these conditions seems to fit the presented case.

7.3. Osteomyelitis

Osteomyelitis is often caused by the introduction of pyogenic bacteria into bone (by trauma, infection of adjacent soft tissues, or hematogenous route with a remote focus) (Ortner, 2001). When caused by a traumatic lesion, the loci can virtually be anywhere in the skeleton. The infection leads to abnormal and irregular bone deposition/thickening (Ortner, 2003). In the present case, no cloaca, sequestrum,

or necrotic bone were identified either in the macroscopic observation or in the radiological analysis, turning this diagnosis improbable.

7.4. Trauma

Mandibular trauma is relatively common in the clinical practice, with some studies reporting a frequency of around 24.3% (Gassner *et al.*, 2003). In opposition, the cases reported in the osteoarcheological literature are rare and chronologically/geographically dispersed (Black *et al.*, 2009; la Cova, 2012; Cieslik *et al.*, 2017; Czarnetzki *et al.*, 2003; De Luca, 2011; Jurmain, 2001; Lieverse *et al.*, 2014; Mitchell, 2006; Paine *et al.*, 2007; Redfern and Bonney, 2013; Slaus *et al.*, 2012; Steadman, 2008; Steyn *et al.*, 2010; Viciano *et al.*, 2012; Wilkinson and Neave, 2003). Although mandibular trauma occurs most frequently at the mandibular angle, followed by the condyle, ascending ramus, molar zone, and finally coronoid process, mandibular body and mental foramen, being the symphysis and alveolar process less affected (De Luca *et al.*, 2011), both the X-ray and the CT of the present mandible reveal a bone lesion compatible with a healing fracture. In fact, given the impossibility of immobilizing the mandible, the bone exostoses may have been produced to allow for the bone union. This hypothesis also explains the ante-mortem tooth loss since it is common for teeth to be exfoliated at the time of trauma or even during the period of recovery (Cieslik *et al.*, 2017). A similar case, dated from the 19th century, was presented by Black *et al.*, (2009), and attributed to blunt-force trauma, possibly involving a rounded or oval-based object. Given that the individual here described would be in a military hospital, it is possible that he had also suffered a blade-related blunt trauma. However, caution is required since mandibular trauma is most commonly caused by falls (Jurkin, 2001; Wilkinson and Neave, 2003; Steadman, 2008; Redfern and Bonney, 2013). Although he had survived the mandibular trauma, the bone did not heal appropriately or completely. The stage of healing suggests that the traumatic event took place less than 6 months before death (Lovell, 1997). Given the infectious state of the lesion, the individual would probably feel pain. Considerable ante-mortem tooth loss would have had also an effect on the feeding routine (Furr *et al.*, 2006; Koshy, 2010; Viciano *et al.*, 2012; Christensen y King, 2016). Because it is an often non-fatal injury, mandibular trauma, like the one here described, can provide information about the clinical healing process and consequent limitation in the individuals' quality of life (Lovell, 1997).

8. Conclusions

Although often neglected and considered less informative, skeletal elements coming from ossuary funerary contexts can be an important source of information to the past populations studies.

The macroscopic and radiological alterations observed at the mandibular fragment here described led us to consider a traumatic origin as the most probable. We think this case is important since mandibular trauma is quite uncommon in the

paleopathological literature and those in the mandibular symphysis are even rarer. Besides being rare, remodeling, healing and/or taphonomic changes can make their differential diagnosis amongst other pathological or even morphological conditions quite challenging.

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