

## Research article

## Three cases of feet and hand amputation from Medieval Estremoz, Portugal

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## ABSTRACT

Peri-mortem limb amputations are rarely reported in the paleopathological literature. The cases reported here concern severing of both hands and feet observed in three adult male skeletons, exhumed from the medieval Portuguese necropolis of *Rossio do Marquês de Pombal*, Estremoz, Portugal. The fact that they were found in the same site, in graves placed side by side, that all are young males, and that the three skeletons show similar perimortem injuries, make this a unique case meriting detailed analysis. Considering the lesions' location and pattern, as well as historical data, we hypothesize that this is a case of amputation as a consequence of judicial punishment. Estremoz was an important city in sustaining the Royal power at a regional scale during the medieval period.

## 1. Introduction

Evidence of amputation, revealed through the analysis of archaeological human skeletal remains, is relatively uncommon. Still, the paleopathological literature provides sporadic evidences of such practice, from diverse chronological, sociocultural, and geographic contexts (Mays, 1996; Stuckert and Kricun, 2011). The great majority of paleopathological cases of limb amputations previously reported, are diagnosed through the evidence of healing of the stump, whereas cases of perimortem amputations are considerably scarcer. The latter are likely underreported, due to the troublesome distinction between perimortem and postmortem trauma in dry bones, which still represents a great challenge to paleopathology (Mays, 1996; Buckberry, 2014; De Boer et al., 2015).

Three male individuals exhumed from the medieval necropolis of *Rossio Marquês de Pombal* (13th–15th centuries), Estremoz, Portugal, show lesions compatible with perimortem amputations observed in the forearms and lower limb bones. Preliminary observation *in situ* revealed the presence of severed hands and feet with stumps, placed under or near the body, yet the bones of these extremities were all in anatomical articulation.

The aim of the present paper is to provide a holistic approach to the interpretation of such finding, by establishing interconnections between the biological, sociocultural, and historical dimensions of these human practices (Ingold, 2005). A holistic framework is drawn by analyzing the skeletal remains in conjunction with cultural and historical framing

of punitive acts. Therapeutic actions, judicial punishment, ritual practices, accidental injury or interpersonal violence might all be hypothesized as underlying causes of limb amputations in past human societies (Mays 1996; Buckberry, 2014). As such, it is our goal to describe the lesions observed and to discuss the possible causes of the amputations documented in these three medieval individuals.

## 2. Materials and methods

The necropolis of *Rossio Marquês de Pombal* (RMPE) is located in Estremoz, a city in southern Portugal, close to the Spanish border. Estremoz was an important geostrategic medieval village, as witnessed by the construction of its famous medieval Castle and the associated Royal Court. The RMPE necropolis was uncovered in 2001 during the construction of a parking lot. A total of 126 graves were identified, 84 (66.6%) of which were excavated, as well as eight ossuaries. A total of 97 skeletons were retrieved, with 67 (69.1%) corresponding to adult skeletons. Radiocarbon dating of two skeletons established a chronological boundary between the 13th and 15th centuries (BP 680–530 and BP 670–530, for 2 Sigma calibration, 95% probability, Beta Analytic Laboratories). Three of the adult skeletons exhumed (RMPE 116, RMPE 117 and RMPE 118) are the focus of the present work.

Most of the graves were dug in the stone or directly in the ground, having an anthropomorphic shape and well delimited. It is noteworthy that the graves of the three individuals under study were located side by side in the south corner of the cemetery, which corresponds to the limits

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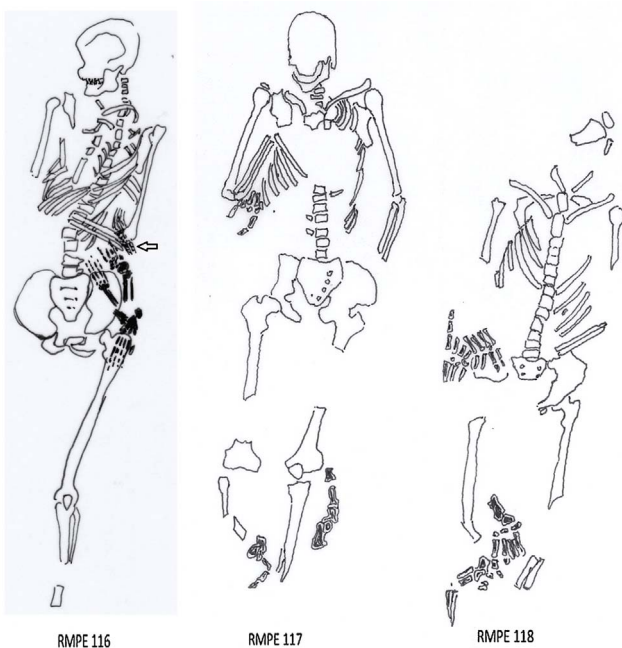


Fig. 1. Field draw (scale 1:10) of the skeletons RMPE 116, 117, and 118. The arrow points the right hand lying below the left elbow.

of the necropolis, in an area with lesser burial density. Moreover, these graves were poorly delimited and without anthropomorphic shape. No other features of the mortuary practices were atypical for these three cases. The three bodies were laid in *decubitus dorsalis*, with head towards West and feet to East. Observation *in situ* revealed that the hands and feet were separated from the forearms and forelegs, and located under or on the side of the skeletons, yet the hands and feet had all bones in anatomical articulation (Fig. 1), indicating a primary deposition. During fieldwork, it was also possible to observe cut marks on forearms and lower leg bones. Some post-depositional disturbances, due to a previous intervention to place electric cables, were detected in grave RMPE 116 causing disarticulation of the right lower limb, which was kept inside the grave.

Age at death estimation was obtained following the recommendations of Işcan et al. (1984), Mincer et al. (1993), Scheuer and Black (2000), and Coqueugniot and Weaver (2007). The protocol for morphological sex estimation followed standard osteological techniques recommended by Buikstra and Ubelaker (1994). Stature was evaluated using the regression equations of Santos (2002) applicable on the metatarsal bones. Macroscopic identification of perimortem trauma followed the standard guidelines of forensic anthropology literature (Symes et al., 2002; Kimmerlee and Baraybar, 2008; Symes et al., 2012; Berryman et al., 2013; Quatrehomme, 2015); in addition to the recommendations of the Scientific Working Group for Forensic Anthropology (2011).

### 3. Results

#### 3.1. Case I: RMPE 116

Cranial bones were mostly destroyed postmortem, however the mandible was well preserved. The postcranial skeleton had most of its bones present, as can be seen in Fig. 1, with an overall high degree of preservation.

Skeleton RMPE 116 exhibited morphological features compatible with a male individual based on cranial and pelvic morphology, and it is the youngest of the three individuals. Third molar root apices were still open (Mincer et al., 1993), the distal epiphyses of the ulna and radius were not completely fused, and the distal epiphyseal line of the



Fig. 2. Oblique cuts in the distal third of the diaphysis of the fibulae and tibiae noticed in the skeleton RMPE 116.

fibulae was also visible. Ossification stage of the sternal end of the clavicle suggests an age below 25 years old (Scheuer and Black, 2000; Coqueugniot and Weaver, 2007). Considering all of the age at death indicators, it can be inferred that the age bracket of this individual was probably between the ages of 18–20 years old at the time of death. Regression equations (Santos, 2002) for stature indicated a height of approximately  $170 \pm 5.4$  cm.

Both forearms show an oblique and complete fracture of the distal third of the diaphyses, leading to the complete separation of the hands and a small portion of stump (stump length is approximately five centimeters for the radii and seven centimeters for the ulnae). Cut marks are oblique and located slightly higher in the ulnae in relation to the radii. Both fibulae and tibiae show cut marks affecting the distal third of the diaphyses (Fig. 2). The lesion's outline is regular and with the same color as the surrounding cortical bone, and the cuts are oblique with sharp edges. Macroscopically, it is also possible to observe striations parallel to the kerf floor (Fig. 3). The feet and the stumps of the forelegs (stump length is 10 cm for the tibiae and 11 cm for the fibulae) were completely separated. Interestingly, the feet and left hand were placed under the left femur and pelvis, while the right hand was placed under the left elbow, as it can be seen in Fig. 1. Hands and feet were complete with all bones in anatomical articulation, suggesting that the severing of the extremities was intentional and happening while the joint soft tissue was still preserved, precluding postdepositional disturbances, decay, or other taphonomic agents.

#### 3.2. Case II: RMPE 117

Skeleton RMPE 117 had most of the bones present (Fig. 1), however



Fig. 3. Striations parallel to the kerf floor in the right distal extremity of the fibula, observed in the skeleton RMPE 116.

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