Recent Prehistoric Enclosures and Funerary Practices in Europe

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Cover image: Magnetogram from Perdigões enclosure, by Helmut Becker (p. 52, this volume)

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HUMAN BONES FROM CHALCOLITHIC WALLED ENCLOSURES OF PORTUGUESE ESTREMADURA: THE EXAMPLES OF ZAMBUJAL AND LECEIA.

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1. INTRODUCTION

The traditional view of burial practices during the Chalcolithic period of the Iberian Peninsula was that settlements and burial locations were geographically distinct with burials taking place in natural and artificial caves, tholoi, and rock cut tombs some distance from hilltop and valley settlements (for example Almagro & Arribas, 1963: 19,fig. 3; Arteaga & Cruz Auñón, 1995: 590, fig. 2; Lillios et al. 2010; 2014; Morán & Parreira, 2004:31, Map; Soares, 2003: 180-181; Spindler , 1981: 4, fig. 2;). However, excavations during the last 20 years show that large amounts of human skeletal remains are recovered from settlement sites suggesting some diversity in burial practices. While in Sangmeister & Schubart (1981:116) finds of human bones from excavations at Zambujal are mentioned, at the time of publication this did not lead to an open discussion of the topic. In fact, only when a burial tholoi was found in the ditched settlement of Perdigões (Reguengos de Monsaraz, Portugal) (Lago et al. 1998: 60-70. 75-79), and S. Oliveira Jorge published the finds of human bones at Castelo Velho de Freixo do Numão (Vila Nova de Foz Côa, Portugal) and used them as the starting point for a ritual interpretation of the site (Jorge 1999) were human bones and burials inside of Chalcolithic settlements observed with more interest. However, the real breakthrough came some years later when salvage excavations completed in the region around Madrid found evidence of a diverse array of human burials within Chalcolithic settlements. Particularly interesting examples of this are found at the ditched settlement site of Camino de las Yeseras where archaeologists found evidence of several complex burial-structures with collective and single graves (Blasco et al. 2009). These new findings of diverse settlement burial practices in late prehistoric Spain have led to the reassessment of settlement burials at Chalcolithic sites in Portugal as well. To this aim, in this paper human skeletal remains from two prominent settlement sites in the Estremadura region of Portugal (Leceia and Zambujal) are examined (Fig. 1) in order to investigate how settlement burials may relate to individual identity, and/or temporal and spatial aspects of community life.

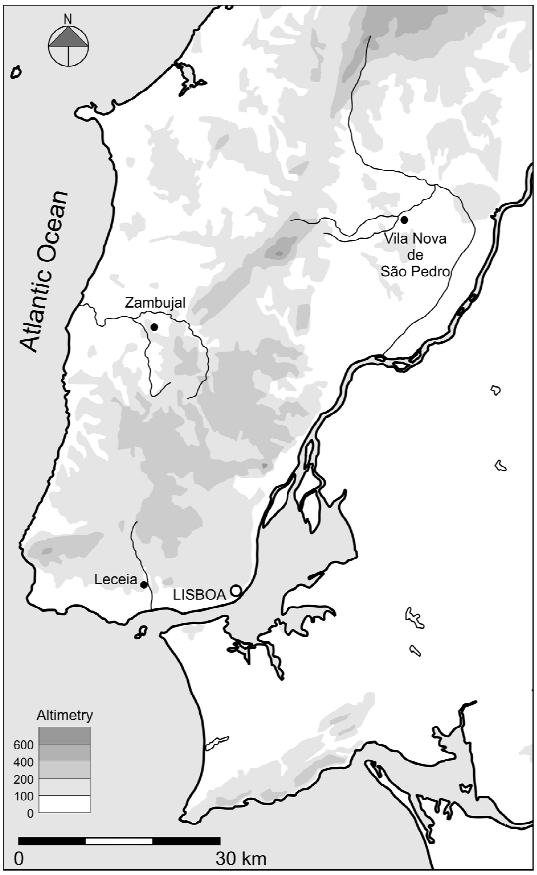


Fig. 1 – Location of Leceia, Zambujal and Vila Nova de São Pedro in the Iberian Peninsula.

2. ZAMBUJAL

2.1Introduction.

M. Kunst – A. Waterman

The earliest evidence of human bones at Zambujal was published by E. Sangmeister and H. Schubart in 1981(Sangmeister & Schubart, 1981:116). Sangmeister and Schubart discuss their finding of 82 human bones in the entrance of small corridor. This corridor corresponds with the structures built during period 5 and lie on top of the destruction horizon of phase 4d and the older entrance of tower L. In 1987 Franz Parsche of the University of Munich (Germany), with the help of his assistant, Veronika Zaya, began a preliminary examination of all of the human remains recovered from Zambujal between 1964 and 1973 and found that there were even more recovered human bones from scattered areas around the site. Unfortunately, this study was never completed or published because of Parsche's untimely death some

years later. Additionally, in subsequent excavations between 1994 and 2007 small deposits of human remains continued to be recovered.

Recently, a reexamination of the human skeletal remains from Zambujal was undertaken for several reasons. First, to date, a significant amount of human bones have been recovered at Zambujal. Secondly, two recent research projects analyzing human remains from Chalcolithic archaeological sites in Portugal have reported findings that may help to answer questions about the context and importance of the human remains recovered from Zambujal. At the suggestion of M. Kunst, Dr. Katina Lillios of the University of Iowa began excavations at the rock shelter of Bolores, located 2 km from Zambujal. Artifacts found during agricultural work at the site suggested that Bolores was a Chalcolithic burial (Kunst & Trindade, 1990:38-41. Taf. 4-5), and in 1986, the museum of Torres Vedras made a first test excavation at the site. Lillios subsequently carried out four excavation campaigns at Bolores between 2007 and 2012, in which the remains of at least 37 individuals were recovered (Lillios et al. 2010, 2014). In conjunction with the Bolores project, A. Waterman conducted a preliminary comparative bioanthropological study on a portion of the Zambujal human remains (Waterman et al. 2014, Waterman 2012), as there may be a relationship between the settlement site of Zambujal and the burial site of Bolores. The other project which piqued our interest in undertaking a new examination of the Zambujal human remains was an article published by Susana Oliveira Jorge (translated by M. Kunst into German) on her excavations at the settlement of Castelo Velho de Freixo de Numão, where she found some intriguing contexts related to the human bones recovered (Jorge, 1999:88-94). Since Waterman's initial review of the human remains from Zambujal in 2012 more human remains have been identified from faunal assemblages. Thus, in this paper we will review the total number of bones found to date.

2.2 Archaeological background.

The Chalcolithic settlement of Zambujal belongs to the township of Torres Vedras (in the district of Lisbon) and is situated south of the Torres Vedras on a promontory of the Cabeço da Calvina, a hill with its highest point at 164 m above the sea level (Fig 2). Currently the Chalcolithic fortifications at Zambujal lie between 75 and 104 m above the sea level and from this height the settlement must have dominated the valley of the Ribeira de Pedrulhos, a smaller tributary of the river Sizandro. On clear days from Zambujal it is also possible to overlook parts of the Sizandro valley, and at the horizon to see the Atlantic Ocean which lies approximately 10 km to the west.

Zambujal was discovered by Leonel Trindade Sr during his excavations of the cave site of Cova da Moura (Kunst, 1993: 47-50). The best preserved parts of the fortification walls were at that time still covered by earth, and therefore at first glance appeared to be a huge burial mound. On top of this mound L. Trindade dug a small test pit and showed the recovered artifacts to Eugénio Jalhay, a Jesuit priest who was at the time excavating at the Chalcolithic fortified settlement of Vila Nova de São Pedro. Jalhay later published L. Trindade early finds at Zambujal (Jalhay 1946).

Fig. 2 – Location of Zambujal on a promontory above the small valley of the Ribeira de Pedrulhos; areophotograph (august 2007), view from northeast (Photo: D-DAI-MAD-MK-DG-25-07-777, photographer M. Kunst).

Years later in 1959-1961 L. Trindade, and Aurélio Ricardo Belo who was at the time the director of the Torres Vedras museum, undertook three excavation seasons focusing on the walls around the mound. Belo died in 1961 and the excavations ceased for a short time. In 1963 Vera Leisner acquainted L. Trindade with Hermanfrid Schubart of the German Archaeological Institute. L. Trindade invited H. Schubart to continue with the excavations of Zambujal. Thus, in 1964 a new series of six excavation campaigns were started, directed by H. Schubart of the German Archaeological Institute in collaboration with Edward Sangmeister, then director of the Institute of Prehistory of the University of Freiburg (Germany) and L. Trindade. They excavated until 1973 and the results are published in numerous articles and a series of monographs (Sangmeister & Schubart, 1981; Kunst 1987; Sangmeister & Jiménez 1995; Uerpmann & Uerpmann 2003). Almost twenty years later, the town of Torres Vedras decided to install an archaeological museum in Zambujal and to facilitate this work two new excavation campaigns, under the direction of M. Kunst and H.-P. Uerpmann, were undertaken in 1994 and 1995 (Kunst & Uerpmann, 2002). Additionally, in collaboration with M. Höck from the University of Covilhã, topographic campaigns were started (Höck, 2007) and campaigns continued under the direction of M. Kunst in 2001, 2002, 2004, 2007 and 2012. The 2002 campaign was done in collaboration with E. Morán and R. Parreira (Kunst, Morán & Parreira, 2013).

Chronologically the occupation of Zambujal spans from the 3rd to the beginning of the 2nd millennia BC (Kunst & Lutz, 2011: 454-461). E. Sangmeister and H. Schubart established a system for a relative chronology by phases of construction including phases of demolition (Versturz) and settlement activities like layers of fire places (hearths). Based upon observations of the formations of the fortification walls, according to this system, there were 5 periods of defense construction (Fig. 3) which can be subdivided into16 "construction phases"(Sangmeister & Schubart, 1981: 226-255). New excavations in the area of the farm house and the fourth line of fortification walls, which were discovered in 1995, continue to expand our understandings of the boundaries of the site. Thus, the most recent outline of the Chalcolithic fortifications differs a little bit from the ones published in 1981, and now include the recently excavated fourth line of fortification structures within the sequence of construction phases (Kunst & Lutz, 2011: 447-454) (Fig. 2 and 3).

The absolute chronology of these 5 periods of defense construction and 16 subdivisions of construction phases is not very precise because of the plateau in the calibration curve of the late 3rd millennium BC. However, even with the calibration curve, according to the radiocarbon dates (Kunst & Lutz, 2011: 454-461; Sangmeister & Schubart, 1981: 263-275) the beginning of settlement at Zambujal dates back to the beginning of the 3rd millennium:

before phase 1a: KIA-27565 (4445±31 BP) cal BC (2 σ) 3333-2936; 3133-3009 (47,9%)

before phase 1a: KIA-27559 (4238±29 BP) cal BC (2 σ) 2910-2705; 2910-2861 (66,3%)

before phase 1a: KIA-7260 (4134±43 BP) cal BC (2 σ) 2875-2581; 2875-2617 (89%)

The ^{14}C-dates for the periods 1, 2 and 3 come mainly from the first half of the 3rd millennium and date around 2500 BC, excluding a series of date from animal bones without three-dimensional locations (Kunst & Lutz, 2011: 460, Fig. 35).

phase 1c: GrN-7009 (4200±40 BP) cal BC (2 σ) 2899-2638; 2818-2665 (67,1%)

phase Este 1: KIA-27558 (4129±31 BP) cal BC (2 σ) 2872-2581; 2781-2617 (62,6%)

phase 2: GrN-6671 (4170±55 BP) cal BC (2 σ) 2891-2586; 2891-2619 (93,4%)

phase Este 2: KIA-27561 (4155±32 BP) cal BC (2 σ) 2878-2630; 2822-2630 (76,5%)

phase 2: GrN-7002 (4050±40 BP) cal BC (2 σ) 2851-2472; 2680-2472 (85,4%)

bef. ph. Este 3: KIA-27563 (4065±37 BP) cal BC (2 σ) 2855-2486; 2697-2486 (80,9%)

phase Este 3: KIA-27564 (3992±24 BP) cal BC (2 σ) 2572-2468; 2572-2512 (60,1%)

phase 3b: GrN-7003 (4055±40 BP) cal BC (2 σ) 2852-2474; 2696-2474 (84,3%)

phase 3b: GrN-7004 (3995±35 BP) cal BC (2 σ) 2620-2459; 2586-2459 (93,5%)

phase 3c: GrN-7005 (4055±40 BP) cal BC (2 σ) 2852-2474; 2696-2474 (84,3%)

bef. ph. Este 4: KIA-28668 (3999±29 BP) cal BC (2 σ) 2575-2469; 2575-2469 (95,4%)

bef. ph. Este 4: KIA-28669 (4001±28 BP) cal BC (2 σ) 2575-2470; 2575-2470 (95,4%)

bef. ph. Este 4: KIA-27557 (3996±23 BP) cal BC (2 σ) 2572-2470; 2572-2512 (62%)

after p. Es. 3b: KIA-27555 (3941±32 BP) cal BC (2 σ) 2566-2309; 2497-2338 (81,8%)

after p. Es. 3b: KIA-27556 (3965±32 BP) cal BC (2 σ) 2574-2348; 2574-2432 (84,8%)

The dates of period 4 reach the second millennium. They are all charcoal dates, which mean they may be too old in some cases, which is obvious in the case of sample GrN-7006.

phase 4a-c: GrN-7006 (4090±40 BP) cal BC (2 σ) 2866-2493; 2763-2563 (68,6%)

phase 4b: GrN-6669 (4025±95 BP) cal BC (2 σ) 2875-2300; 2875-2334 (93,6%)

phase 4b: GrN-7007C (3950±65 BP) cal BC (2 σ) 2623-2209; 2623-2276 (92,7%)

phase 4c/d: GrN-6668 (3625±65 BP) cal BC (2 σ) 2198-1776; 2150-1871 (87,7%)

Lastly, there are two dates, which likely come from period 5, but for which the exact phase in not clear. Either way the dates do coincide:

phase 5: KN-4507 (3466±53 BP) cal BC (2 σ) 1921-1641; 1921-1663 (94,4%)

phase Este 5?: KIA-27566 (3467±36 BP) cal BC (2 σ) 1886-1691; 1886-1691 (95,4%)

Thus, the sequence of radiocarbon dates show continued use and construction at the site from circa 3300-2000 cal BC. However, between periods 4 and 5 a hiatus in site activity may have occurred (Sangmeister & Schubart 1981, 247, 272).

2.3 Materials and Methods

In this study human remains from all regions of the site of Zambujal (Fig. 4) to date were examined and the results integrated with the published findings in Waterman (2012). Skeletal and dental materials were identified by criteria outlined in standard osteological

texts (Baker et al. 2005; Scheuer and Black 2000; White 2000). Duplicate skeletal elements, age-at-death estimations, and skeletal morphology were used to identify distinct individuals. Instances of pathology were evaluated on the skeletal and dental remains based on Ortner and Putschar (1981), Hillson (1996; 2005) and Buikstra and Ubelaker (1994). Results of previously completed isotopic analyses are discussed (Waterman 2012; Waterman et al. 2014).

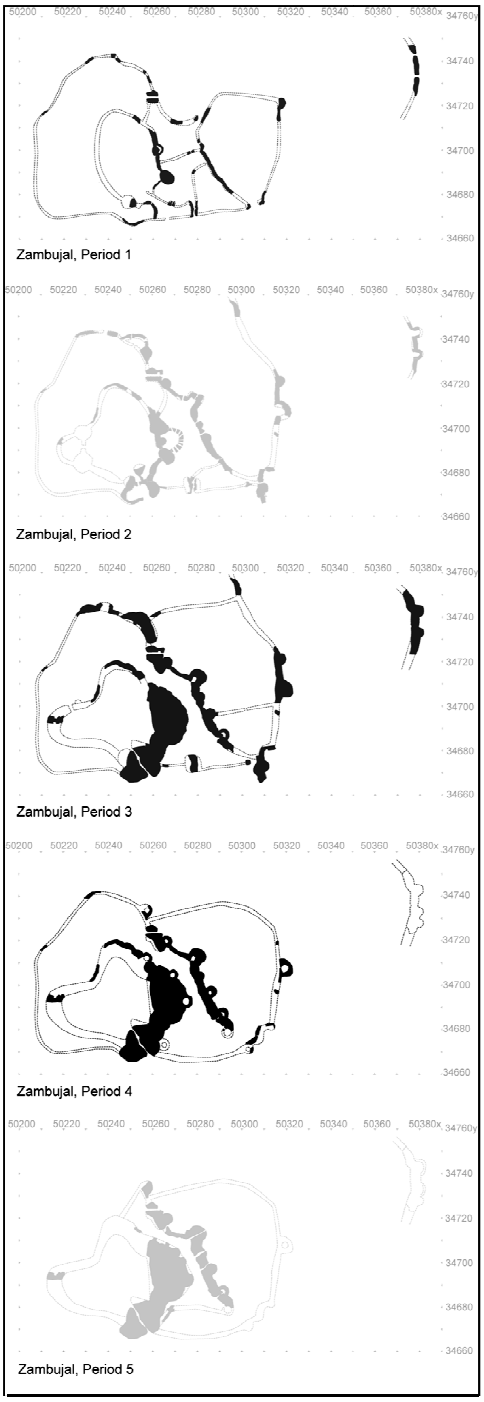


Fig. 3 – The five phases of defense constructions of Zambujal (after Sangmeister & Schubart, 1981, 226-251, modified by M. Kunst and G. Casella).

2.4 Results and Discussion

Currently there are 349 human bone fragments recovered from Zambujal. Over two-thirds of these remains were recovered in a highly fragmented condition. In general the only complete bones found were small, taphonomically resistant bones such as teeth, carpals and phalanges. Nonetheless, basic skeletal element identifications were possible for over 90% of the remains. Skeletal elements from all body regions have been identified suggesting that there may have been some primary interments and the remains of both adults and subadults have been recovered (Fig. 5). However, most bone fragments are found in isolated conditions often with >10 human bone fragments recovered together in a location. This suggests some dispersal of the human remains either through anthropogenic or taphonomic means. The exceptions are remains recovered from region S, region KM Tower L, region KM cut 40a and region AP where larger caches of human bones were recovered. It is possible that the remains recovered in these areas may represent primary burial spaces. In the next sections, the amounts and types of human remains are discussed according to region.

2.4.1 Region S

At the eastern edge of the site, in region S, 95 fragments of human remains were recovered. These fragments represent elements from all regions of the human body, and include 2 vertebral fragments, 13 rib fragments, 2 scapula fragments, 5 ulnar fragments (4 of which refit to form mostly complete right ulna), 4 radial fragments (which refit to form an almost complete right radius), 3 humerus fragments (one example Fig. 5 f), 3 carpals (a lunate, capitate and scaphoid), 16 right and left metacarpal fragments (8 of which are complete or nearly complete), 13 hand phalanges (9 of which are complete or nearly complete), 1 fibular fragment, 2 tarsal fragments (talus and calcaneus), 1 complete metatarsal and 5 metatarsal fragments, 2 foot phalanges, a right mandibular fragment with the right third and fourth premolars, and right first and second molars, a second right mandibular fragment with the right fourth premolar, and the right first and second molars, a maxillary fragment with the upper left canine, third and fourth premolar and first molar, plus five addition isolated teeth and two unidentified bone fragments. The fact that a right ulna and radius were recovered with a large cache of other hand bones suggests that primary burials could have occurred here. However, the bones were recovered in a highly fragmented and disarticulated state and the general lack of pelvises, vertebrae, and femora suggest the possibility that this, alternatively, may be the site of a secondary burial deposit. Based upon the occurrence of two right mandible fragments with *in situ* duplicate tooth types, we know that at least two individuals are represented by these remains. From the low levels of occlusal wear on the molars on both mandibular fragments these appear to have both been young to middle-aged adults at the time of death. Because of the

fragmentary nature of the recovered remains no determination of biological sex was possible.

Only one radiocarbon date exists from region S (GrN-7009: 4200±40 BP; 2899 and 2665 cal BC, see Sangmeister & Schubart, 1981, 264; Kunst & Lutz 2011, 456). The sample of this date belongs to complex Z-971, from which the majority of the region S human remains were found. It belonged to a layer from phase 1c (Tower S, interior, southern half, layer 5 directly above the rock) which was active during the first use-phase of the site. However, later wall constructions also occurred in the area very possibly dating to the end of phase 4 or even possibly into phase 5 (Sangmeister & Schubart, 1981 217-223). The apparent mixing of materials from different archaeological layers also makes clear dating of the human remains difficult.

2.4.2. Region RW

In the RW region in the far southeastern reaches of Zambujal another cache of human remains was recovered. This group of 11 adult bone fragments includes 4 cranial fragments, 1 metatarsal shaft fragment, 1 cervical vertebra fragment, 3 radius and 2 ulna fragments. The lack of other body elements makes the origination of this deposit unclear. As region RW is situated at the southern slope of the site, it is possible that these bones may have accumulated here through sedimentary processes.

All of the human remains in this area appear to be from adult individuals and no duplicate skeletal elements were recovered suggesting these could all be from one adult individual. However, some questions remain concerning the relationship between these bones. For example, the ulna fragments originate from a complex that relates to the destruction of wall **ht** in period 1 (Sagmeister & Schubart, 1981, 205; Abb. 37; Beilage 1). The metatarsal was found in the first stone layer located 2 meters east of wall **ht** and 3 or 4 meters south of tower **W** and may also relate to wall destruction, however, the three radius fragments were found in the filling around entrance "R," and should relate to period 3, Thus, the relationship between this assemblage of bones is unclear and it is possible that they represent more than one individual.

The four cranial fragments come from the western side of tower R and are from a yellow clay destruction layer related to period 2, 3 or 4, and the cervical vertebrae fragment was recovered to the west of the others from a layer likely related to phases 3c and 4b. Again these skeletal elements could be from a separate individual than the arm bones, but it is not possible to be certain. If all bones in RW were from one individual, it seems likely that these bones should have been deposited in a higher level of the wall between **lh** and **h** in order to end up in this configuration. Consequently, we can conclude that we find the remains of at least one, but more likely two, individuals in this region of the site.

2.4.3. Region U

In the western edges of Zambujal, in region U, two isolated human bones were recovered. The first is an isolated adult human phalanx and the second is the distal end of the humerus of an older child. There is no clear relationship between these bones nor is the chronology clear for these finds, one comes from the surface and one could belong to all five periods. Therefore, in region U we have skeletal elements that represent at least one adult and one subadult.

2.4.4. Region GH

In the GH region in the southwest of the site three more isolated human bones were recovered. This first is an adult carpal bone, a capitate, and the second is a fragment of an adult long bone, likely a tibia. The third bone is a fragment of the distal end of a fibula. Again, as with the two bones recovered from region U, the relationship between these bones is not clear. However, both long bone fragments (the tibia shaft and the distal end of fibula) come from the same phase, 1a, and were found in close proximity to one another. Thus, chronologically and by their local proximity they could belong to the same individual. The carpal bone was found in cut 44, in front of entrance G and has a less certain chronology being considered either younger than period 1 or older than phase 5b. Hence, in this region we have partial remains of at least one and possibly two individuals.

2.4.5. Region EG

In the EG region, located in the central east portion of Zambujal, three isolated human bones were recovered. These remains include a fragment of a rib head, a maxilla fragment with two teeth, and a complete first metacarpal. The rib, maxilla and teeth were all identified as adult skeletal elements and the degree of wear on the teeth suggests that these are from a middle-aged or older adult. The metacarpal originated from a subadult. Concerning the relationships between these fragments, the rib fragment was recovered from the filling (middle layer 6) of the barbican, and therefore, dates to phase 3b. However, the earth and stones that form this gravel fill may have been brought in from another area of the site. The subadult metacarpal was found in layer C of Tower B, which was the occupation layer of the tower, and belonged to phase 4a, but we cannot exclude any mixture with younger sediments during the tower's destruction. The maxilla fragment belongs to the yellow layer in cut 14 at the inside of the first fortification line, which can be dated to phases between 1c and 3b. As these bones all belong to different phases and different locations it is likely that these bones originated from three different individuals. Furthermore, it is possible that they came into this region of the site in earth brought in for construction. In the case of the metacarpal, it is possible that it was the result of a violent altercation, as Zambujal had extensive fortifications and a large number of arrow heads were found around the barbican suggesting that this

was the site of some armed conflicts (Uerpmann & Uerpmann, 2003, 100).

2.4.6. Region VX

In the VX region, located in the west central portion of Zambujal, 23 human bone fragments were found representing upper limb bones, including 2 humeral fragments, two ulnar fragments, 1 metacarpal and 4 hand phalanges, lower limb bones, including 4 femoral fragments, 1 tarsal and two metatarsals, and parts of the axial skeleton, including 3 rib fragments and 1 vertebral fragment. Two isolated teeth were recovered, but no other skull or tooth fragments were found. All of these remains are from adults and no duplicate skeletal elements were recovered so at first glance it seems possible that all of these bones may belong to the same individual. However, when the positions and chronologies of the recovered remains are examined, it appears more likely that in this region we find the partial remains of several different people. For example, the fragments of femur and humerus belong to a different phase (phase 1b) than the vertebral fragment, phase (1c/ 2). A distance away, in the southern portion of the region in cut 71, another portion of the VX bones were found. These bones generally appear to relate to phase 3 a/b, although one rib fragment was recovered from sediments linked to phase 4b. The remaining bone fragments come from the northern region of VX, from cuts 46 and 39. These were recovered from both the surface and from destruction levels 1, 2 and 3, which relate to phases 4b, 4c, 4d and 5. Hence, because of the disparate spacing and chronologies, it is likely that the bones recovered in the VX region represent 3-4 different individuals.

2.4.7. Region KM, Tower L

Tower L in the KM region of the site is another place where a large amount of human remains were found at Zambujal. These remains were the same ones first recorded and discussed by E. Sangmeister and H. Schubart in 1981 (Sangmeister & Schubart, 1981:116). In this area 91 fragments of human remains were recovered representing all body regions. Over half of the recovered elements (45 bones or bone fragments) were identified as infant remains. These infant remains include 14 rib fragments, 9 cranial fragments, 2 clavicle fragments (see Fig. 6 b for an example), 1 femoral fragment, right and left fibulas (nearly complete), 1 metatarsal fragment, 2 metacarpal fragments, 1 radial fragment, a compete right ulna (Fig. 6 e), a left ulnar fragment and 11 vertebral fragments (see Fig. 6 c for an example). The remaining 46 bone fragments were fully developed and appear to be from an adult individual. These include, 1 humeral fragment, 1 metacarpal fragment, 3 complete hand phalanges, 3 rib fragments, 1 vertebral fragment, 2 metatarsal fragments, 2 tarsal fragments, 1 complete foot phalanx, 5 pelvic fragments, 1 patella, 4 teeth, 4 cranial fragments and 17 unidentifiable bone fragments. One of the pelvic fragments included the pubic symphysis and some of the iliopubic ramus. Based upon morphology of these features the individual appears to have been a female who was middle-aged or older at the time of death. The dental wear on the four recovered teeth also suggests a middle-aged adult.

Temporally, most of the remains including the female pelvic and infant remains are from the filling of the lower entrance from phases 2 and 3, although there may have been some mixing with phase 4. A metatarsal fragment and tarsal were recovered from sediments related to phase 1 and a metacarpal fragment, a calcaneus fragment and an unidentified bone fragment were recovered from phase 5 or surface sediments. Thus, in this area it appears we have the partial remains of an infant and a middle-aged women dating to phase 2 and/or 3 from the site. It is possible that the older remains relate to additional individuals but the relationships are unclear.

2.4.8. Region KM, cut 40a

From cut 40a in the KM region of Zambujal, located in the northeast region of the site, 47 fragments of human remains were recovered. All but one of these come from an adult individual and include 16 vertebral fragments (see Fig. 5 d for an example), 1 clavicle fragment, 13 cranial fragments, 1 femoral fragment, 1 humeral fragment, 1 fibular fragment, 1 patella, 2 pelvic fragments, 2 rib fragments, 4 sacral fragments, 2 tibial fragments, 1 mandibular fragment with lower left and right second incisors, and 1 isolated upper left second incisor (Fig. 6 a). For this collection of remains it was possible to refit many of the fragments of vertebrae, two of the pieces of cranium and the two pieces of tibia (which form an almost complete right tibia). Based on the morphology of the remains and the fact that there are no duplicate skeletal elements it is likely that these remains only represent one adult individual. The humerus and the other long bone remains were quite robust suggesting these came from a large individual, likely a male. In addition to these 45 adult bone fragments one subadult thoracic vertebra centrum was recovered. Thus, the remains of at least two individuals were recovered from this region, an adult (likely male) and a child. The bones recovered from Region KM cut 40a do not have a clear chronology as they were recovered in early excavations at the site and cannot be securely connected with radiocarbon dates based on wall construction and destruction.

2.4.9. Region KM

In the rest of the KM region, excluding cut 40a, an additional 13 fragments of human remains were recovered. These recovered fragments include both adult and subadult elements. The subadult remains consist of 5 fragments including 2 rib fragments, 1 long bone fragment likely from a femur or tibia, 1 complete hand phalange, and 1 complete unfused ilium (pelvic bone). These bones all appear to have originated from a young infant.

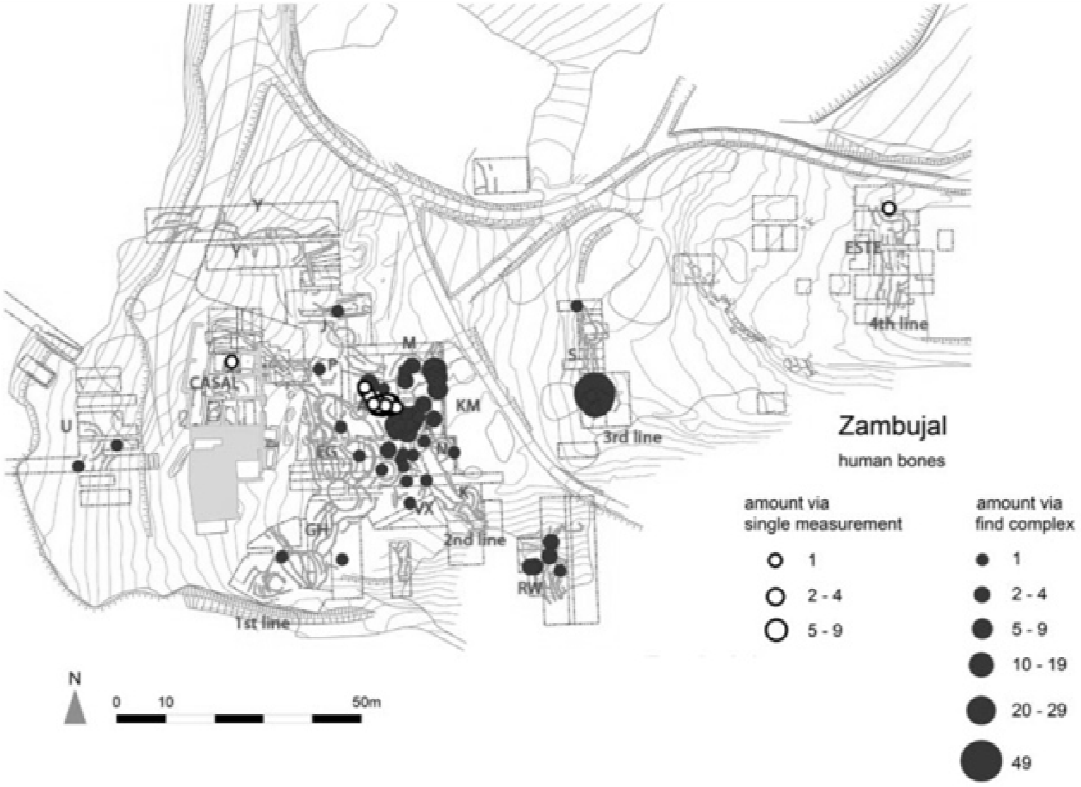


Fig. 4 – Distribution of the human bones over all regions of the Chalcolithic settlement of Zambujal. Circles indicate larger and smaller caches of bones (GIS-map created by D. Schäffler).

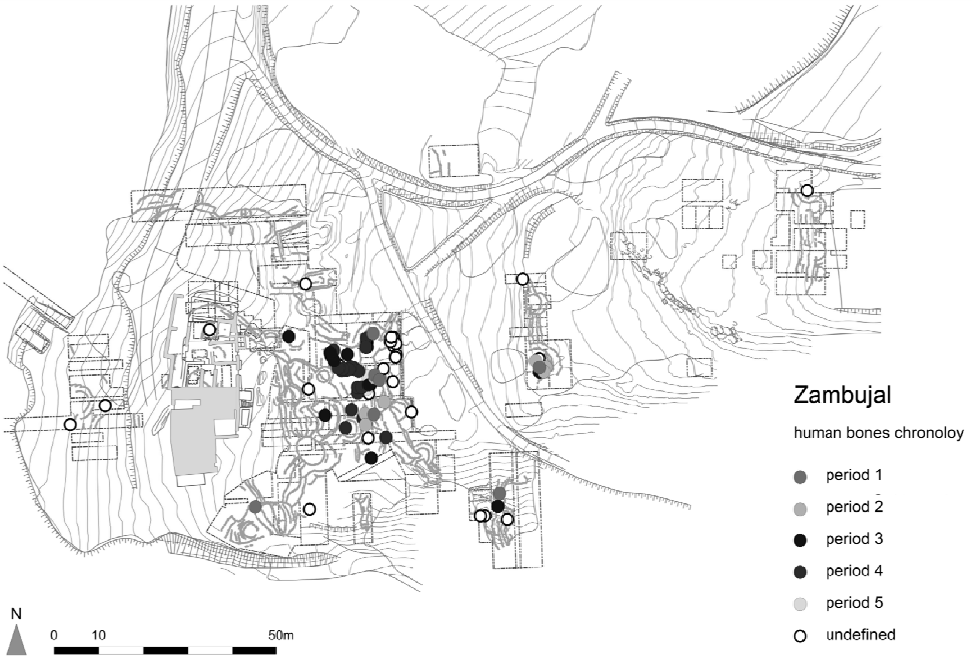


Fig. 5 – Distribution of the human bones over all regions of Zambujal; colors indicate the different phases to which they belong (GIS-map created by D. Schäffler).

The remaining 8 bone fragments appear to be from an adult and originate from all regions of the body. These include 2 rib fragments, 1 vertebral fragment, a tibia shaft fragment and a humeral shaft fragment, a metacarpal fragment, an isolated lower left 3rd molar and an unidentifiable bone fragment. Ten of these bones come from Tower M. The oldest of these date to phase 1 b/c and are exclusively adult remains. The bones from complex Z-521 relate to the phase 2 and/or 3 in the occupation history of the tower and are again exclusively adult remains. The remaining bones relate to phase 4 from the filling of the tower and are exclusively subadult remains. One remaining bone is recovered from tower N and relates to phase 2a. Therefore, in the rest of the KM region partial remains from an adult and an infant were recovered. It is possible that these remains are related to those recovered from KM cut 40a, however without better chronological control this relationship is unclear.

2.4.10: Region AP

In the AP region in the north central area of Zambujal 50 human bone fragments have been recovered. These remains include adult and subadult elements. The 11 recovered subadult bone fragments include 2 cranial fragments, rib fragments, 2 femoral shaft fragment, a distal humerus fragment and 5 teeth. The teeth include both deciduous and permanent dentition. With the exception of one (an upper right third molar) all of the other teeth belong to a child who was between 5-10 years old at the time of death. The development of the humerus also fits this same time frame, thus, it appears that in this area there are the partial remains of an older child. The upper right third molar does not have fully developed roots which suggest this tooth came from an older adolescent or young adult. Of the recovered human remains 34 adult fragments have been identified. These include 21 cranial fragments many of which were found in close proximity and likely belong to the same individual, 2 humerus shaft fragments that refit, 3 ulna shaft fragments, 1 femur shaft fragment, a distal foot phalanx, an upper canine tooth with a broken crown and 4 unidentifiable bone fragments. Thus, in the AP region of Zambujal we have the partial remains of at least one older child and one adult. It is possible that the upper right third molar may belong to the same individual as the adult skeletal remains, suggesting that this individual may have been an older adolescent or young adult at the time of death. When we consider the chronology and find location of the bones, we find that one fragment of subadult vertebrae was recovered on its own from house P in the westernmost area of AP. This area relates to phase 3c, while the adolescent tooth, a cranial fragment, two ulnar fragments and a femoral fragment appear to all relate to the beginning or middle of phase 3 (3a/b). A foot phalanx was found near these bones but from higher destruction layer and may or may not relate to the same individuals. All of the rest of the recovered remains relate to the destruction levels of phase 4d and 5b and come from the northern part of cut 46. These include both subadult and adult skeletal elements which are mainly composed of cranial fragments, teeth, and arm bones. Slightly north of cut 46 in cut 40/45 more mixed subadult and adult bones are found, this time including fragments of subadult and adult humeri and subadult femora. It is not clear if these relate directly to the bones recovered from cut 46 but as they are from the same chronology and the subadult age-at-death appears similar it suggests that the bones may be from the same individuals. Consequently, when we consider the location and chronology of the bones it appears that we have human bones representing 2 children, 1 adolescent/young adult and 1 adult in this region.

2.4.11. Other locations.

For 6 bone fragments, the provenience is unknown. These include two teeth, ulnar fragments, a rib fragment and a proximal hand phalanx. Additionally, several human bone fragments were recovered from the surface of the site including 2 cranial fragments and a radius fragment. An ulnar and a humeral shaft fragment were also recovered from the fourth line during more recent excavations. For these no clear chronology or relationship is currently discernable.

2.4.12. Conclusion, Zambujal

Past assessments of the minimum number of individuals (MNI) represented by the Zambujal human remains, calculated the MNI based on the total aggregate of bones recovered at the site (at the time of analysis) (Waterman 2012). These assessments provided an MNI of only 5 for Zambujal. However, when the geographic location and the chronological relationships of the finds are considered, we suggest that the MNI is much higher – in the range of 20 individuals. Nonetheless, this is not to say that we find 20 inhumations at Zambujal –quite to the contrary we find little evidence of intact burials or otherwise curated whole human bodies. Instead we find scattered adult and subadult human skeletal elements which, only occasionally, seem to be from related areas of the body or even from the same individuals. The only circumstances where it appears we may have evidence of primary burials are in region S where a large cache of bones belonging to two adults were recovered, in tower L where a large amount of remains from a middle-aged women and an infant were found, and in KM, cut 40a where bones of an adult male were unearthed. An additional primary interment is possible in region AP, but the complexity of the chronology and recovery locations make it harder to discern (Fig. 4 and 5).

One of the main goals of this analysis was to attempt to understand how these human remains came to be buried at the settlement rather than in the standard burial locations in the surrounding landscape. Based upon the diverse array of contexts in which the human remains were recovered at Zambujal, it seems prudent to consider that many factors and events contributed to these distributions. As Zambujal was a heavily fortified site, and must have been the site of numerous armed conflicts, it seems likely that at least a portion of these remains

were the results of violent deaths and/or dismemberments. Some settlement interments could have occurred based upon funerary practices which may have excluded particular classes of individuals from other burial locations. For example, young infants are rarely recovered from burial sites in the region (Waterman and Thomas 2011), but one is found at Zambujal in the KM region. This may suggest that infants were more commonly interred in settlement or household contexts. It is not clear if the partial remains of the middle-aged female found near the infant are related, but it is possible that this represents a peripartum or postpartum mortality event.

In order to ascertain if any of the potential primary settlement interments represent individuals that are somehow socially differentiated from the rest of the population in the area, Waterman (2012) and Waterman et al. (2014) gathered stable isotope data from bone and tooth samples from some of the Zambujal individuals. Based upon comparisons of these data with stable isotope data from non-settlements burials in the regions, the sampled adults ate diets that are comparable with other adults of this time and region, consisting of terrestrial protein sources and C_3 plants. For the older child from the AP region, the $\delta^{13}C$ apatite value was strongly divergent when compared to the rest of the population and could provide evidence of C_4 or CAM plant intake. As C_4 plants such as millet did not become prominent in human diets and animal feed in the region until the later Bronze Age it is possible that this child represents a later intrusive burial. Alternatively, this apatite enrichment could be due to diagenesis. The very young infant from tower L exhibited enriched $\delta^{15}N$ and $\delta^{13}C_{co}$ values which are probably due to in-utero patterns of isotope fractionation and, thus, not necessarily a product of dietary differentiation with regard to the infant or its mother. Also, in general, the low standard deviations in $\delta^{18}O$ values suggest similar water sources for all of the Zambujal individuals. Based upon the analysis of $^{87}Sr/^{86}Sr$ isotope ratios none of the tested individuals from Zambujal were migrants into this region. Thus, only in regard to the older child do we see dietary patterns that may provide evidence of some differential identity in relationship to burial practice.

While some of the Zambujal remains were found in cluster with many other bones, in other cases only a handful were found spread across a region. We must consider other processes to explain these recoveries. One strong possibility is that an occasional bone was brought into Zambujal with stones and earth moved in for construction. The stone wall fortifications at Zambujal required the moving in of large amounts of earth and stone and it is highly likely that some of these materials could have been recycled from older burial structures. In many cultures throughout time individual human bones, or larger portions of skeletons, have been used as religious relics. It is possible at Zambujal that some of the human remains were curated for religious or other cultural reasons. Animal activity, weather, and erosion patterns may have also contributed to these assemblages, and lastly some of these finds may represent intrusive burials from later time periods. In order to tease out these different possibilities a more fine-grained analysis of the human remains should be undertaken.

Fig. 6 – Six examples of human remains recovered from Zambujal, a. Adult left mandible fragment with *in situ* teeth (Z-831-45-01). b. Subadult right clavicle fragment (Z-571-45-01). c. Subadult thoracic vertebra fragment (Z-572-45-23) d. Adult cervical vertebra fragment (Z-831-45-02). e. Subadult right ulna (Z-485-45-02). f. Adult right distal end of humerus and shaft (Z-971-45-08) (photos by M. Kunst).

3. LECEIA

J. L. Cardoso – A. J. Waterman

3.1. Introduction

This paper presents a synthesis of new and old analyses on the recovered human remains from the prehistoric settlement of Leceia. As no large scale cemetery features are associated with Leceia and burial places during this time are normally geographically distinct from settlements, the aim of this study is to identity the special contexts in which human remains have been recovered from three distinct *loci* of the site. In particular because the construction of, and successive reinforcements to, the fortifications at Leceia suggest a climate of instability and social competition in the region across the third millennium BC, we are interested in assessing the

possibility that incidents of violent conflict could explain the occasional finding of human remains inside the settlement enclosure.

3.2. Archaeological background

Leceia is located on the right slope of a steep hillside overlooking the valley of the Ribeira de Barcarena (Oeiras), about 4 km from the Tejo estuary (Fig.1). Continuous excavations of the settlement were carried out between 1983 and 2002, under the direction of J. L. Cardoso (Cardoso, 1999; Cardoso, 2008; Cardoso, 2012). Stratigraphic records correlated with over 40 radiocarbon dates provide a detailed account of the cultural sequence and the construction phases at Leceia which span over a millennium (Fig. 7).The earliest human occupation at Leceia dates back to the late Neolithic (second half of the 3rd Millennium BC). This occupation was followed by a short period of abandonment, lasting as long as one hundred and fifty years. Then, in the beginning of the Early Chalcolithic (2900/2800 to 2600/2500 years BC), human occupation resumed and imposing defensive structures were erected, in the form of three semi-circular lines of ramparts and bastions. These fortifications supplemented the existing natural defenses at Leceia, which consisted of two Cretaceous era limestone cliffs overlooking the valley (Fig. 8). The defensive structures were continually refurbished and reinforced over the next 300 years, until approximately the middle of the millennium, suggesting that social instability and conflict were serious concerns for the community which occupied this landscape. Around the middle of the third millennium BC, during the beginning of the Full Chalcolithic, the building of these defensive structures stopped and the archaeological record suggests that populations were declining in the previously defended occupied area. By the end of the Chalcolithic, which coincides with the last quarter of the third millennium BC, Leceia had been abandoned.

3.3. Materials and Methods

The human remains examined in this study come from three distinct locations, two located within the walled area, *Locus* 1 (a closed circular structure) and *Locus* 2 (exterior wall of a bastion); the other, *Locus* 3, is a small burial cave located on the escarpment that delineates the eastern side of the site (Fig. 8). For loci 1 and 3 the human remains had been previously published (Cardoso, Cunha & Aguiar, 1991). In this study human remains from *Locus* 2 were examined for the first time and the results integrated with the published findings. For *Locus* 2 skeletal and dental materials were identified by criteria outlined in standard osteological texts (Baker et al. 2005; Scheuer and Black 2000; White 2000). Duplicate skeletal elements, age-at-death estimations, and skeletal morphology were used to identify distinct individuals. Instances of pathology were evaluated on the skeletal and dental remains based on Ortner and Putschar (1981), Hillson (1996; 2005) and Buikstra and Ubelaker (1994).

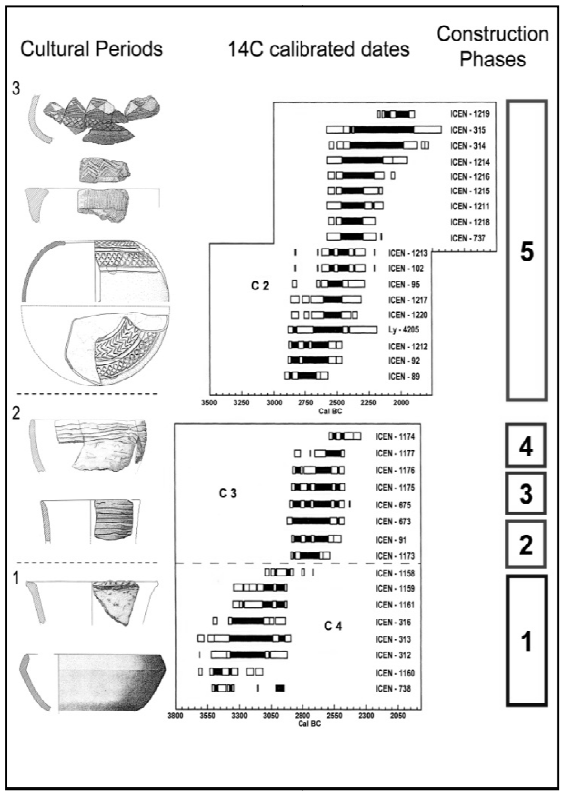
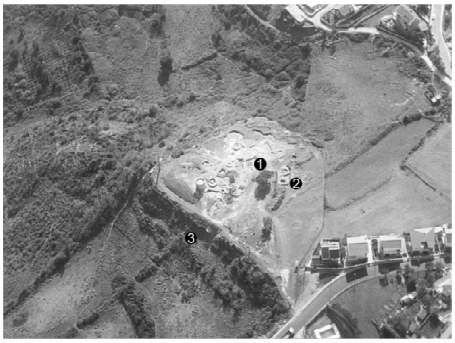


Fig. 7–Table of cultural and construction phases at Leceia and their correlation with the stratigraphy and absolute chronology (table created by J.L. Cardoso)



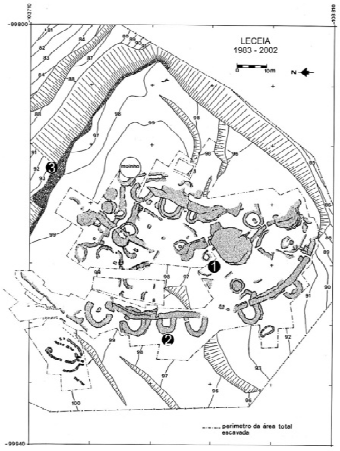


Fig. 8 – Aerial photograph of Leceia, and the corresponding plan of the excavated area, with the locations of the finds mentioned in the text.

3.4 Results and Discussion

3.4.1 – Locus 1. Closed circular structure

Based upon the data published in Cardoso, Cunha & Aguiar (1991), 36 human bones, bone fragments, and dental remains were found inside a closed circular structure excavated in 1988, situated in the area adjacent to one of the passages in the second line of defense. As indicated by the mixed faunal remains and archaeological materials, in the final phase of occupation at Leceia, during the Full Chalcolithic, this structure was used as trash pit (Fig. 9). Mixed in with the debris in this location were the human skeletal remains. All of these remains were portions of the axial skeleton consisting of 18 teeth, 1 mandibular fragment, 1 vertebral fragment and 16 cranial fragments.

The previous published analysis of the teeth indicates that these remains are from at least three individuals, all adult males who likely were in their mid-thirties at the time of death. On the teeth of at least two of these adult males, dental enamel hypoplasias were noted which may indicate a period of childhood illness or stress. A carious lesion was also noted on the tooth of one of the adults.

Individual	Age-at-death	Biological sex
Adult 1	30-40 years old	Male
Adult 2	30-40 years old	Male
Adult 3	30-40 years old	Male

Table 1. Individuals identified in *Locus* 1

Fig. 9 – *Locus* 1 in Leceia, silo later used as trash pit (photo by J.L.Cardoso).

As the individuals from which these bones originated were not given the typical funeral treatments of this time period and region, in the past we have suggested that these individuals were not native inhabitants (Cardoso, Cunha and Aguiar, 1991). One possible explanation for these remains, if they were from the Chalcolithic occupation of the site, was that these three individuals were part of an attacking group and after being captured and killed, they were disposed of in the circular structure, as trash. However, AMS radiocarbon dating completed on four human bone fragments from *Locus* 1, made by initiative of one of us (J.L.C.) reveal that all of these remains came from a slightly later time (Middle Bronze Age). Thus, we suggest that these remains do not represent an episode of conflict, but rather the reuse of this Chalcolithic structure during the Bronze Age, when the site was already completely abandoned. The reuse of this closed circular structure may have been in the form of a collective grave site for primary burials, or more likely, given the state of mixing, fragmentation and disconnection evidenced by the bones and the absence of grave goods, as a secondary burial space used for the disposal of human remains from other locations. Therefore, although archaeological evidence of Bronze Age occupations at Leceia is lacking, it appears likely that these Chalcolithic fortifications continued to be sporadically visited and used over the years by small groups of people. In fact, such reuse has been observed in other large fortified settlements in the Extremadura, such as Vila Nova de São Pedro, Azambuja, where many artifacts from the Bronze Age were collected (Soares, 2008).

The AMS radiocarbon results obtained are as follows:

1 – Fragment of a cranium (calotte)
Wk – 34420 – 3236 +/- 26 BP, 1606-1574 cal BC (7,9%); 1538-1436 cal BC (86,5%)

2 – Fragment of a cranium (distinct individual from 1) (calotte) (Cardoso, Cunha and Aguiar, 1991, Est. 1, n.º 1)
Wk – 36309 – 3201 +/- 25 BP, 1516-1426 cal BC (2 σ)

3 – Mandibular fragment (Cardoso, Cunha and Aguiar, 1991, Est. 1, n.º 2)
Wk – 36307 – 3217 +/- 25 BP, 1527-1431 cal BC (2 σ)

4 – Maxillary fragment (Cardoso, Cunha and Aguiar, 1991, p. 30, n.º 5)
Wk – 36306 – 3207 +/- 25 BP, 1520-1428 cal BC (2 σ).

3.4.2. Locus 2. Exterior wall of a bastion

Human remains were also found at one of the existing bastions of the first defensive line (Fig. 8), the Bastion EQ (Fig. 10). The 41 bone fragments represent all body regions – upper limb, lower limb, and the axial skeleton including the skull – and were recovered from a circumscribed area suggesting a primary interment. No duplicate skeletal elements or skeletal landmarks were identified that would suggest an assemblage from multiple individuals and no pathologies were identified on any of the bones. While in some cases it was possible to refit multiple bone fragments, the only complete skeletal elements consist of a patella and a hand phalanx. Additionally, although all body regions are present, the

recovered skeletal elements represent only a small number of the total bones present in the human body, small bones, such as carpals and tarsals are noticeably absent and only one phalanx is found in the assemblage suggesting a high level of disturbance of the remains. While many of the skeletal elements, in particular a partial tibia, appear adult-size and rather robust in comparison with other skeletons of Chalcolithic populations in this region, proximal and distal ends of the recovered tibia remain unfused, as do the proximal end of the humerus, the femoral condyles and the proximal epiphyses of the recovered hand phalanx. Additionally, the two recovered premolars exhibit no wear. Thus, it is clear that these human remains represent a subadult. The distal epiphyses of the femur and proximal and distal ends of the tibia fuse in late adolescence between the ages of 16 and 20 years-old. Considering the size and robusticity of many of the recovered lower leg bone fragments, it seems likely that these skeletal remains belonged to a male individual who died during late adolescence.

The AMS radiocarbon result obtained is as follows:

Wk – 34421 – 3681+/- 26 BP, 2142-1977 cal BC (2 σ)

As the community living in and around Leceia during the Chalcolithic were normally buried in properly prepared collective burial spaces in the surrounding landscape, the discovery of an isolated individual interred at the base of the outer wall of one of the bastions built to defend the site, could be explained as a deliberate offensive act which resulted in this individual's death and possible abandonment at the location of his demise. In contrast to the remains from *Locus* 1, an AMS date obtained on a human rib from *Locus* 2 show that the individual was contemporaneous with the last Chalcolithic occupation of the site, bolstering the theory that this could represent someone who perished during an episode of conflict. However, according to the site's stratigraphic record, the defensive complex had been abandoned at that time. Therefore, this occurrence may simply represent an accidently death and burial event.

Individual	Age-at-death	Biological sex
Adolescent 1	16-20 years old	Male

Table 2 – Locus 2

3.4.3 – Locus 3. Small cave in the escarpment

The largest cache of human remains recovered at Leceia were found in a small natural cave excavated by Carlos Ribeiro (Ribeiro, 1878), situated in the bottom of the natural escarpment delineating the eastern side of the settlement. These remains also correspond to the end of Leceia's occupation and represent a secondary burial deposit with remains from some of these late prehistoric villagers. In two other important Chalcolithic fortified settlements in the Estremadura (Zambujal and Vila Nova de S. Pedro), it has generally not been possible to identify directly associated primary or secondary burial grounds. Instead, only small collective burials (primary or secondary depositions) in the surrounding regions are known. Thus, the situation at Leceia is an exception.

Individual	Age-at-death	Biological sex
Adult 4	Adult <35 years old	Female
Adult 5	Adult <35 years old	Male
Adolescent 2	16-20 years old	Unknown
Child	1	4-6 years old
Child	2	5-7 years old

Table 3 – Locus 3

The radiocarbon result obtained based upon a set of human bones is as follows:

ICEN-737 – 3920 +/- 70 BP, 2580-2190 cal BC (2 σ)

In contrast with the human remains found in the other areas of the site, the distribution of age and sex of this set of individuals is more compatible with the characteristics of typical prehistoric burial populations in the area. Recovered remains from all regions of the body – including the upper and lower limbs and the axial skeleton –are present. However there is a distinct absence of vertebral and cranial remains, although 3 mandibles were recovered. This suggests that this cave may contain secondary burial deposits. Based upon the previous analyses (Cardoso, Cunha & Aguiar, 1991), there are a minimum of 5 individuals represented by these skeletal elements including two young adults (1 male and 1 female), 1 adolescent and 2 young children. Five isolated teeth belonging to at least 1 subadult exhibited hypoplasic defects suggesting childhood illness or malnutrition.

3.5. Conclusion

The human remains collected in Leceia probably show three distinct situations:

A. Locus 3, a small natural cave in the limestone escarpment bordering the east side of the settlement, contains the largest interment of human remains representing a minimum of five individuals. The demographic configuration of this burial grouping is compatible with the existing pattern of mortality of the Chalcolithic time period. These remains appear to represent a secondary burial during the later occupation of the site as the human bones were disarticulated, mixed with ash and ceramic vessels, and missing certain skeletal components. This suggests that funerary rituals during this time were likely complex and that there may have been another primary funerary space where the bodies were first deposited.

B. In *Locus* 1, a closed circular structure within the settlement, the next largest deposit of human remains was

recovered. These remains represent a minimum of three individuals, all likely adult males. Given the fact that the skeletal remains are fragmented and incomplete, and that they were recovered from a possible silo which appears to have been later used as a trash pit, an initial theory was that the remains belonged to a group of community outsiders who may have taken part in aggressive activities directed at the community occupying Leceia. Such an event would have explained why these individuals did not receive typical funerary treatments and were instead buried in a trash pit. However AMS radiocarbon dates disproved this theory, revealing that these individuals are not reflective of Chalcolithic conflict and unrest as they date to the Middle Bronze Age – providing evidence of the later reuse of the site.

C. The human remains from *Locus* 2 have been attributed to a minimum of one individual. The remains of this juvenile male of stocky build (16-18 years), were found at the base of the outer wall of one of the bastions of the most advanced defensive line and could represent someone who perished during an episode of conflict. However, AMS dates and the stratigraphic record suggests that these bones may equally be attributable to the last period occupation of the settlement and may represent an accidently death and burial event as the previous defensive structures had been abandoned by this time in the settlement's history.

Fig. 10 – View from outside the Bastion EQ at Leceia (photo by J.L.Cardoso)

In sum, a synthesis of new and old analyses on the human remains recovered from Leceia provides evidence that the limited number of burials at the settlement occurred under a diverse set of conditions. One set appears to originate from standard burial practices, while another provides evidence of the later reuse of the site. The third, a single interment, suggests a death caused by either violent conflict or an accident, either incident resulting in an anomalous burial event. While one goal of this investigation was to assess the possibility that settlement burials were commonly the result of societal conflict, as the threat of continued external aggression is suggested by intensive fortifications constructed at Leceia, with the exception of the young male burial in *Locus* 2, aggressive events cannot explain the majority of the human burials at the settlement.

4. CONCLUSION: ZAMBUJAL AND LECEIA

In this paper, human skeletal remains from two prominent settlement sites in the Estremadura region of Portugal (Leceia and Zambujal) were examined in order to investigate how settlement burials may relate to individual identity, and/or temporal and spatial aspects of community life. Our findings have been that, at both Zambujal and Leceia, the contexts in which the human remains are recovered are diverse and cannot be explained by one process or type of event. The complexity of mortuary and funerary practices of the 4th and 3rd millennia BC, with a particular focus on settlements burials, is, at the moment, one of the main questions of Neolithic/Chalcolithic archaeology in Portugal (Jorge 1999:88-93) and Spain (Barroso et al. in print; Cruz- Auñón & Mejías, 2013: 186-190; García Sanjuán & Díaz-Zorita, 2013; Gómez Pérez et al. 2011). Similar investigations are also occurring in other European countries, for example in Germany, where recent excavations in the eponymous settlement site of the late Neolithic so called "Culture of Salzmünde" (ca. 3400-3050 BC), Salzmünde, 7 km west of Halle (Sachsen-Anhalt, Germany) show very complex funerary practices (Friedrich 2013, Stecher et al. 2013; Meyer et al. 2013; Schlenker & Stecher 2013) which are forcing researchers to reassess standard ideas about Neolithic burial traditions.

These new findings suggest that perhaps the human skeletal remains recovered from Neolithic/Chalcolithic settlements could provide evidence of multistage funerary practices (see Schwarz 2013). Similar occurrences have been noted in Portuguese burials in the cave sites of Ribatejo (Oosterbeek, 1997) and, for example, in the tholos of Praia das Maçãs (Leisner et al., 1969:94). The complexity of multistage funerary practices has been discussed in detail by R. Meyer-Orlac in Hallstatt contexts (Meyer-Orlac 1982:123-143).

In the region of Zambujal we have, on the one hand, the nearby (2km) burial site of Bolores, where it appears that, at times, primary interments of whole bodies occurred – as articulated skeletal elements are recovered. However, disarticulated and commingled remains are also found at this site. Based on the examples of *Locus* 3 of Leceia, the cave sites of the Ribatejo, the tholos of Praia das Maçãs, and the human remains at Castelo Velho de Freixo de Numão (Jorge 1999, 88-93), we cannot exclude the possibility that multistage burials occurred at burials sites like Bolores, wherein the deceased, after ritual ceremonies in settlements like Leceia and Zambujal, and perhaps after the decomposition of some portion of the bodies, were deposited in separate burial places. At times, settlement interments may have occurred based upon cultural practices that excluded particular individuals from secondary burial in other locations. For example,

perhaps some infants, such as the one found at Zambujal, were only buried in settlements. It is possible that other socially differentiation groups, such as foreigners, may have also experienced differential burial practices. However, in order to gather data on the life histories of the people whose remains are recovered from settlements, further bioanthropological analyses are required. Other explanations may be needed to take into account the isolated findings of human remains at settlements like Leceia and Zambujal, such as the keeping of human remains in settlements as relics or for apotropaic reasons, or as possible ritual demonstrations of power wherein skulls or other parts of deceased enemies or criminals are displayed. Some recovered human remains may simply reflect the reuse of settlement structures for later burials, like perhaps in *Locus* 1 and 2 of Leceia, or the transportation of human bones into settlements with rocks and soils brought in for construction projects, such as in the barbican in Region EG at Zambujal. Erosion patterns, and the activities of burrowing or scavenging animals may have also played a role in deposition of human remains at these sites, however, more detailed analyses of the individual caches of recovered human remains are needed to provide clearer insight into these depositional events. In sum, it appears that, in the cases of Leceia and Zambujal, the finds of human remains at these Chalcolithic settlement sites are likely due to multiple anthropogenic processes and that burial practices in these communities were more complicated than previously thought. Further research into these collections of human remains and the contexts in which they were recovered will help to clarify our understanding of funerary practices in late Prehistoric Portugal.

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