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ANA MARIA SILVA

PORTUGUESE POPULATIONS OF LATE NEOLITHIC AND CHALCOLITHIC PERIODS EXHUMED FROM COLLECTIVE BURIALS: AN OVERVIEW

ABSTRACT: In Portugal, the human remains dated to the Late Neolithic/Chalcolithic periods are relatively common. They are mainly exhumed from collective burial places, frequently containing a high number of fragmentary and mixed bones. Although these funerary monuments have been excavated since the second half of the 19th century, only in the 1990's the anthropological studies of these samples had become systematic.
The aim of this paper is to present a synthesis of the actual anthropological knowledge of these communities, focusing on funerary anthropology and demographic data as well as the more relevant morphological and pathological aspects.

KEY WORDS: Collective burials – Late Neolithic/Chalcolithic – Paleobiology – Portugal

INTRODUCTION

In the past 130 years, more than 1,000 graves from the Late Neolithic and Chalcolithic periods were discovered and/or explored in Portugal (Leisner, Leisner, 1951, 1959, 1965, Leisner 1998, Silva 2002). These include various types of funerary monuments as dolmens, *tholoi* (vaulted chamber graves), natural and artificial caves, besides some of uncertain typology *(Figure 1)*.

In these graves, used as collective burial places, the bones are commonly found very fragmentary and disturbed, with total or almost total absence of any anatomical connection. This probably explains the little interest that they roused in the past and discouraged their study. Re-analysis of these collections housed in several museums, began in the 1990's and continues today (Silva 2003b). Moreover, the majority of sites discovered in the past decade include the anthropological approach of the human remains (e.g. Anta do Rego da Murta) and sometimes, the participation of an expert in osteology during the field work (e.g. Hipogeu of Monte Canelas I).

The radiocarbon dating performed on human bones recovered from these collective burial graves, place these osteological samples around 4,750 BP to 3,850 BP.

PRIMARY OR SECONDARY BURIAL PLACES?

In these collective burials places one of the first questions that arise concern whether these graves are primary or secondary burials. To answer this question researchers normally resort to differential bone representation and several tooth proportions, like anterior *versus* posterior teeth, for both maxillas (Crubézy *et al.* 1998, 2000, Silva 1996, 2002, Ubelaker 1974).

Nevertheless, in some samples the bones are mostly reduced to tiny bone pieces, being impossible to identify the laterality or even the bone category and so the results of the analysis of the representativity can be distorted leaving to erroneous interpretations. To surpass this problem, a new approach as been used by some French and Portuguese investigators: the bone (including teeth)

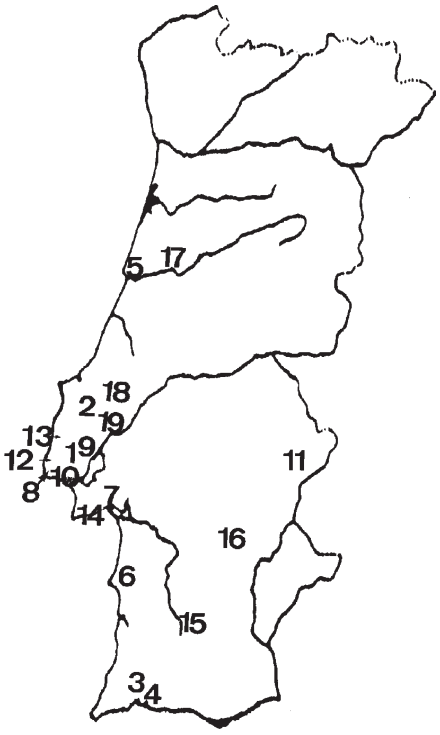

FIGURE 1. Map with the indications of some Portuguese Neolithic and Chalcolithic osteological samples (adapted of Silva 2002: 36). Legend: 1 – Dolmens region of Belas (Sintra); 2 – Natural caves of Cesareda (as Casa da Moura); 3 – Monument of Aljezur; 4 – Necropolis of Alcalar; 5 – Dolmens of region of Figueira da Foz; 6 – Caves of Melides; 7 – Hipogeus of Casal do Pardo (Palmela); 8 – Hipogeus of Alapraia (Cascais); 9 – Hipogeus of Tojal de Vila Chã (Carenque); 10 – Hipogeus of São Pedro do Estoril; 11 – Monuments of region of Elvas; 12 – Praia das Maçãs; 13 – Praia da Samarra; 14 – Natural caves of region of Sesimbra (Lapa do Fumo; Lapa da Furada, Lapa do Bugio); 15 – Monument of Herdade da Malha Ferro; 16 – Escoural (cave); 17 – Natural caves of Eira Pedrinha; 18 – Natural cave of Lugar do Canto (Valverde, Alcanede); 19 – Algar do Bom Santo.

weight. In this methodology, the bones are weighted according to their category and the obtained values converted to percentages. These are compared with the reference values, generally the ones cited by Krogman and Iscan (1986), based on 105 Asiatic skeletons. This comparison is carried out to detect any abnormality in bone representation. This approach, mostly used in forensic contexts, has several advantages over bone representation, starting with the possibility of inclusion of all bones fragments in the study, and so to be more precise.

In 2002, Silva calculated new reference values using 100 individuals (both sexes and several age groups) from a Portuguese Identified Skeletal Collection, hereafter named CEI, housed at the Museu Antropológico of the University of Coimbra. These reference values were used in the study of several Portuguese prehistoric collective burials for the interpretation of the mortuary practices of these prehistoric individuals.

The Hipogeu of São Paulo (Almada) is one example. From this artificial cave, 93,921 kg of bones were recovered, which were converted in percentages *(Figure 2)* and then compared with the reference values of Silva (2002). As it can be seen in *Figure 2*, the results are not quite different from the expected ones. The observed differences can easily be explained by differential preservation due to less density and more fragile bone elements, as the low percentage of weight obtained for the bones from the thorax and trunk (named "others" *in Figure 2*). Therefore, the hypothesis of a primary burial place can not be rejected.

This approach revealed to be very useful in the interpretation of the mortuary practices of these prehistoric individuals, allowing that many Portuguese collective burials cannot now be interpreted as primary burial sites instead as secondary ones.

MINIMAL NUMBER OF INDIVIDUALS

The minimum number of individuals exhumed from these graves is very variable, ranging from less than 10, until more than 400 (413 for the *tholos* of Paimogo I, Silva 2002, 2003b) *(see Table 1)*.

The available studies suggest a larger number of individuals recovered from later chronological graves and, if we consider the typology of the monument, generally from artificial caves and *tholoi* (vaulted chamber graves).

DEMOGRAPHIC PROFILE

Paleoanthropological data from cemeteries are capable of providing simple and fairly reliable demographic information (Bocquet – Appel 2002, Cunha 2003), as the

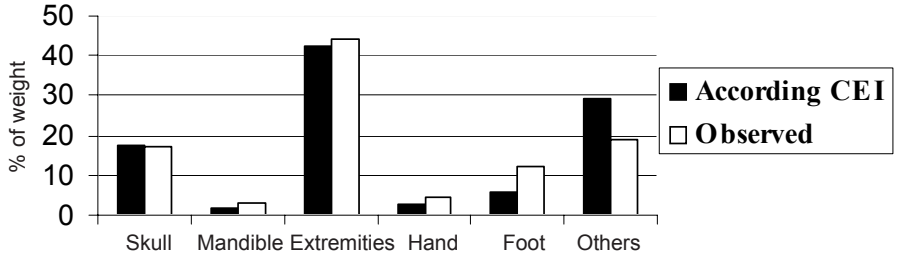

FIGURE 2. Comparisons of the weight (in percentage) of the bones exhumed from the Hypogeum of São Paulo (Almada) and the selected reference values (CEI, according to Silva 2002).

TABLE 1. Minimal number of individuals recovered from some Portuguese collective burials.

SITE	**MNI – adults**	**MNI: non-adults**	**TOTAL – NMI**
Algar do Barrão (Antunes-Ferreira s/d)	16	4	20
Algar do Bom Santo (NC) (Duarte 1998)	–	–	121*
Algar do Covão do Poço (Silva e Cunha 2002)	4	2	6
Anta da Arquinha da Moura (Silva 1995)	7	1	8
Anta da Várzea (Cunha *et al.* 2000)	11	5	16
Anta do Rego da Murta (D) (Ferreira 2002)	8	10	18
Anta I da Herdade da Alcarapinha (Viana 1947/50)	–	–	7
Cabeço da Arruda I (U) (Silva 2002)	14	5	19
Cabeço da Arruda II (T) (Silva 2002)	54	20	74
Cova da Moura (NC) (Silva 2002)	75	15	90
Dólmen de Ansião (D) (Silva 2003b)	23	14	37
Dólmen do Monte Abraão (Ribeiro 1880)	–	–	> 80
Dólmen Folha das Barradas (Ribeiro 1880)	8	4	12
Gruta da Cêrca do Zambujal (Mello Nogueira 1924)	–	–	± 46
Gruta de Aljezur (Estácio da Veiga 1886)	–	–	± 30
Gruta do Lagar (Mello Nogueira 1924)	> 10	Some	–
Gruta dos Alqueves (NC) (Umbelino 1998)	21	10	31
Grutas de Eira Pedrinha (NC) (Gama 2003)	113	31	144
Grutas de Poço Velho (NC) (Antunes-Ferreira 2003)	93	22	115
Hipogeu Casal do Pardo (Cave IV) (Bubner 1979)	–	–	51
Hipogeu de Monte Canelas I (AC) (Silva 1996)	97	50	147
Hipogeu de São Paulo I (AC) (Silva 2002)	131	123	254
Hipogeu de São Pedro do Estoril II (AC) (Silva 1999)	41	12	53
Lapa da Furada (Cardoso e Cunha 1995)	66	64	130
Lapa da Galinha (Sá 1959)	–	–	> 70
Lugar do Canto (Leitão *et al.* 1987)	–	–	48
Necrópole de Pragais (Silva 2003d)	6	1	7
Mon. da Herdade da Malha Ferro (Viana *et al.* 1960)	–	–	11
Pedra Escorregadia (Santos e Umbelino 1996)	4	0	4***
Praia da Samarra (Camarate França and Veiga Ferreira 1958)**	–	–	130
Praia das Maças (Leisner and Leisner 1965)**			
Gruta artificial	–	–	10–15
Tholos	–	–	> 150
Serra da Roupa (S) (Silva 2002)	28	12	40
Tholos de Paimogo I (T) (Silva 2002, 2003b)	290	123	413
Tojal do Casal de Vila Chã (4 artificial caves) (Duarte 1998)	–	–	167 (teeth)
Túmulo de Jeremigo (Viana e Dias de Deus, 1954/58)	–	–	12

Legend: AC – Artificial cave; D – Dolmen; NC – Natural cave; T – Tholoi (vaulted chamber grave); S – Shelter; U – Uncertain typology; * – Preliminary results; ** – Part of this collection is presently re-analyzed by investigators of the Department of Anthropology of the University of Coimbra; *** – Includes part of the material.

TABLE 2. Age groups distribution of the immature individuals exhumed from Portuguese Late Neolithic/Chalcolithic collective burials.

Sample	0–4 years	5–9 years	10–14 years	15–19 years	Author
Algar do Barrão***	1	1	0	1	Antunes-Ferreira (s/d)
Anta Arquinha da Moura	1	0	0	0	Silva (1995b)
Anta da Várzea	1	3	0	1	Cunha *et al.* (2000)
Anta do Rego da Murta**	4	3	2	1	Ferreira (2002)
Cabeço da Arruda I	1	2	2	0	Silva (1999b,2002)
Cabeço da Arruda II	8	8	3	1	Silva (1999b,2002)
Cova da Moura	5	7	1	2	Silva (2002)
Covão do Poço	1	0	0	0	Silva and Cunha (2002)
Dólmen Ansião	6	5	2	1	Silva (2002)
Monte Canelas I	25	15	7	3	Silva (1996)
Necrópole de Pragais	0	0	1	0	(Silva 2003d)
Paimogo I	48	42	33	*	Silva (2002)
São Paulo	68	36	19	*	Silva (2002)
Serra da Roupa	6	3	1	2	Silva (2002)

Legend:
* – Due to methodology, individuals with > 15 years were considered adults;
** – Preliminary results;
*** – For one non-adult no age at death is indicated.

TABLE 3. Platymeric and platycnemic indexes of Portuguese Late Neolithic and Chalcolithic samples.

Sample	Platimeric index	Platicnemic index	Author
Cabeço da Arruda II	76.4 (n=71)	67.4 (n=22)	Silva (1999b, 2002)
Cova da Moura	74.6 (n=54)	67.7 (n=20)	Silva (2002)
Dólmen Ansião	77.9 (n=21)	–	Silva (2002)
Monte Canelas I	82.3 (n=46)	64.2 (n=20)	Silva (1996)
Paimogo I	79.4 (n=241)	69.9 (n=131)	Silva (2002)
Poço Velho	83.35 (n=38)	67.94 (n=38)	Antunes-Ferreira (2003)
São Paulo	76.7 (n=56)	68.7 (n=31)	Silva (2002)
São Pedro Estoril II	75.2 (n=27)	67.5 (n=6)	Silva (1999a)
Serra da Roupa	83.6 (n=19)	66.6 (n=23)	Silva (2002)

ratio of immatures to the total skeletal population (Bocquet – Appel 2002). In these prehistoric Portuguese collective burials, the percentage of non adults varies between 18% to almost 50% of the total minimal number of individuals exhumed *(see Table 1)*.

A more detailed study of the mortality profile of the non adults of these human groups, by comparing the mortality coefficients to the expected ones according to the mortality tables (Ledermann 1969), show a generalized under-representativity of individuals under the age of five, in particular, under one year of age (see *Table 2*). For the remaining age groups, the mortality curve line is more or less in accordance with the expected one for natural populations.

Due to the nature of these samples, age at death estimation for the adult sample is very difficult to assess. Generally, it is only possible to say that all adult age groups seem to be present, including "old people". One interesting point is that, at least for some samples (as Paimogo I, São Paulo I), there is evidence that a great part of the adults died older than 30 years, which is contrary to the common belief (Silva 2002).

Sex diagnosis of these individuals can generally not be performed in the more accurate bones: *pelvis* and *skull*. Both display poor preservation and are, in general, reduced to small bone fragments. Discriminant function analysis of several postcranial elements like femoral head diameter (following Wasterlain 2000), talus and calcaneum length (according to methodology proposed in 1995a by Silva), systematically indicate a sex ratio in favour of females. Several explanations can be proposed for these results.

TABLE 4. Percentages of carious lesions in permanent teeth recovered from Portuguese collective burials dated to the Late Neolithic and Chalcolithic.

Sample	% carious teeth	Author
Cabeço da Arruda I	5.7% (2/35)	Silva (1999b, 2002)
Cova da Moura	8.2% (27/331)	Silva (2000, 2002)
Dólmen Ansião	2.5% (1/40)	Silva (2002)
Paimogo I	6.7% (72/1073)*	Silva (2002)
São Paulo	3.3% (12/361)*	Silva (2002)
Serra da Roupa	4.5% (3/67)	Silva (2002)
Monte Canelas I (lower funerary level)	11.5% (114/988)	Silva (1996)
Tojal de Vila Chã	5.1% (102/1996)	Duarte (1993)
Poço Velho	2.6% (27/1034)	Antunes-Ferreira (2003)
Alqueves	1.7% (3/173)	Umbelino (1998)
São Pedro Estoril I e II (loose teeth)	6.2% (90/1443)	Araújo (1996)
São Pedro Estoril II (*in situ* teeth)	2% (1/49)	Silva (1999a)
Anta da Várzea	3.8% (5/131)	Cunha *et al*. (2000)
Necrópole de Pragais	0/11	Silva (2003d)
Algar do Barrão	6.3% (5/79)	Antunes-Ferreira (s/d)
Algar Covão do Poço	6.7% (1/15)	Silva and Cunha (2002)
Anta da Arquinha da Moura	0	Silva (1995b)
Anta do Rego da Murta*	0	Ferreira (2002)
Eira Pedrinha	4.8% (54/1116)	Gama (2003)
Pedra Escorregadia	0	Santos and Umbelino (1996)
Lapa da Furada	14% (n=?)	Cardoso e Cunha (1995)

Legend:
* – Only in situ teeth; ** – Preliminary results;

Besides representing a real trend, it can reflect methodological problems (discriminant points used are inadequate for these prehistoric populations) or that some individuals of these communities, in the present case various males, had been buried in another place for an unknown reason.

MORPHOLOGY

Concerning morphological aspects, despite the poor state of preservation that generally characterized these Portuguese prehistoric samples, some morphological inferences can be drawn.

Bone measurements of long bones diaphyses as well as the platymeric and platicnemic indexes, can provide a general picture of robusticity and flatness and, therefore, reveal some behaviour aspects of past populations (Larsen, 1997). Various researchers reported a temporal decrease in the flatness of the femur and tibia with the transition to sedentary lifeways, like settings involving the adaptation of agriculture. For the Portuguese series, the available studies that include Mesolithic (Cunha, Cardoso 2001), Neolithic (Jackes *et al*. 1997) and Late Neolithic series (Silva 2002) (see *Table 3*), do not reveal a consistent pattern in reduction of the flatness of the proximal femur shaft with the transition and intensification of agriculture. Furthermore, in a recent study, Silva (2002) analyzed 535 proximal areas of femurs and 253 of tibias (8 graves); all femoral proximal indices were means within the limits of platymeria, that is all sites analyzed had platymeric indexes below 85, with a mean value of 78.37 (ranging between 74.6 and 83.6 for the different series).

For the tibia, Silva (2002) in the above mentioned study, found less statistical differences for the cnemic index. The obtained means were in the range of mesocnemic values: 68.5 (64.2–69.9). Moreover, when comparing with Mesolithic and Neolithic series (Cunha, Cardoso 2001, Jackes *et al*. 1997), a trend of decrease in flatness of the proximal area of the tibia is visible: Mesolithic series showed means between 63.0 (Arruda, n=30) and 65.6

TABLE 5. Percentages of enamel hypoplasias in permanent teeth recovered from Portuguese collective burials dated to Late Neolithic and Chalcolithic.

Sample	% hypo. teeth	% hypo. canines	Author
Algar Covão do Poço	13.3% (2/15)	–	Silva and Cunha (2002)
Algar do Barrão	0	0	Antunes-Ferreira (s/d)
Anta da Arquinha da Moura	0	0	Silva (1995b)
Anta da Várzea	0	0	Cunha *et al*. (2000)
Anta do Rego da Murta*	0	0	Ferreira (2002)
Cabeço da Arruda I	5.3% (2/38)	2/4	Silva (1999b,2002)
Cabeço da Arruda II	0/27	0/1	Silva (1999b, 2002)
Cova da Moura	1.4% (5/361)	0/28	Silva (2002)
Dólmen Ansião	1.2% (6/500)	0/71	Silva (2002)
Eira Pedrinha	–	27.9% (38/136)	Gama (2003)
Gruta dos Alqueves	4% (7/173)	10.5% (2/19)	Umbelino (1998)
Lapa da Furada	0% (n=?)	0	Cardoso e Cunha (1995)
Monte Canelas I (lower funerary level)	2.2% (22/988)	9.2% (13/141)	Silva (1996)
Necrópole de Pragais	0	0	Silva (2003d)
Paimogo I	1% (56/5509)	3.3% (26/800)	Silva (2002)
Pedra Escorregadia	0 (n=?)	0	Santos and Umbelino (1996)
Poço Velho	14/1089	9/?	Antunes-Ferreira (2003)
São Paulo	0.7% (29/4046)	2.4% (14/574)	Silva (2002)
São Pedro Estoril I e II (loose teeth)	–	67.2% (45/67)	Araújo (1996)
São Pedro Estoril II (*in situ* teeth)	0/49	0/5	Silva (1999[a])
Serra da Roupa	0/61	0/8	Silva (2002)
Tojal de Vila Chã	–	19.6% (70/357)	Duarte (1993)

(Moita, n=23; Amoreira sample: 63.8, n=4) (Cunha, Cardoso 2001). The Neolithic series studied by Jackes *et al.* (1997) displayed values between 60.9 (Caldeirão) and 68.8 (Fontainhas).

In a recent study of several Portuguese prehistoric coastland populations, two morphological details in the proximal area of the femur became distinguished (Silva 2002). These, which must have had important influence in the mobility of the hip joint of these pre-historic individuals, were the low femoral neck-shaft angle and the position of the femoral head towards the greater trochanter, frequently at an approximate level.

In modern adults the femoral neck-shaft angle ranges between 110º–150º. This angle is very high in neonatal modern humans, around 150º, and then gradually decreases during development, reaching adult values during adolescence. This normal process of reduction is the result of the normal weight-bearing through the hip region and increasing locomotor's activity levels during development (Anderson, Trinkaus 1998, Trinkaus 1976).

The mean values now obtained for several Late Neolithic/Chalcolithic Portuguese samples, between 124.7º–127.3º (Silva 2002), are within the range of populations with a greater mobility, as foragers. This suggests that these Portuguese prehistoric agriculturalists displayed a greater mobility that the one normally associated with agriculture. The heavy physical effort upon the hip joint during childhood of these individuals can be related to pastoralist's activities and/or daily dislocation in a mountain region (Silva 2002). Other observations that can be linked with this low angle, are the cases of *osteochondritis dissecans* detected in some of these samples (see *infra*), since they can be related to trauma (Aufderheide, Rodríguez-Martín 1998).

For the several cases of atypical morphology of the proximal end of the femur described above (*Figure 3*), a bone growth dysplasia of genetic cause can be suggested – the hypochondroplasia – a milder form of achondroplasia. Hypochondroplasia is a genetic skeletal dysplasia characterized by disproportionate short stature, stocky

appearance, including shortened and stubby long bones, decreased lumbo-sacral interpediculate distances, posterior scalloping of the *lumbar vertebrae*, metaphyseal flaring and moderate macrocephaly. This disease varies within and between families (Aufderheide, Rodríguez-Martín 1998, Iannaccon, Tiberti 2001, Le Merrer *et al*. 1994, Ortner, Putschar 1981). Hence, the frequency noticed in some of these Portuguese prehistoric series, like the ones from the *tholoi* of Paimogo I and Cabeço da Arruda II (Silva 2002), allows us to suggest a certain degree of endogamy.

PATHOLOGY

Regarding evidence of diseases (detectable in the bones), which affected these pre-historic communities, it is noticed the low incidence of the main type's of pathologies: oral, infectious, traumatic and degenerative.

Periostitis and degenerative joint diseases show low prevalence and with few exception are of low severity.

Traumas are not numerous. In the cranium, some cases of depressed fracture of skull vault are reported. All concerned small fractures, more or less circular and well healed at the time of death. The exact causes of these fractures are unknown, but the absence of other injuries suggests that the majority had resulted from accidental events. It is noticed that, for example for Dolmen de Ansião and Serra da Roupa (shelter), two sites with an absolute larger number of cases, are mountain regions where falls would be frequent in their daily activities. In the postcranial, the factures are also rare and when detected, they are mostly in metacarpal and metatarsal bones (Silva 2002).

Only one possible case of perforation made by an arrow-head in a frontal bone is described for a Portuguese site. Even for this case, the hypothesis of interpersonal violence is questionable (Silva 2003c).

In prehistoric periods, trepanations are relative common in Europe. Yet, in Portugal they seem to be very rare. Until now, only 22 trepanations from the Late Neolithic to the Early Bronze Age in Portugal are reported (Silva 2003a). All were performed in adults, the two most used methods being scraping and incision. This low number of cases reported can partially be a consequence of the collective burial practices, especially disarticulated bones and sometimes secondary burials of the remains, which explain the poor preservation and incompleteness of the skulls recovered from these sites and consequently, the difficulty to access a diagnosis.

The dentition of these individuals is characterised by a low-moderate dental attrition. Dental afflictions of low prevalence are antemortem tooth loss, abscesses and pulp chamber exposure (Silva 2000). Caries frequencies show a greater variability (see *Table 4*, affecting normally less than 7% of the teeth (tooth count method). Some geographical differences can be detected: samples coming from the south of Portugal reveal a higher prevalence of caries, like the one of the Hipogeu of Monte Canelas I,

FIGURE 3. Atypical morphology of a left femur recovered from the natural cave of Cova da Moura.

with 11.5% of cariogenic teeth, probably linked with the presence of very high cariogenic fruits, like carobs and figs, abundant in this area (Silva 1996).

In 1998, Umbelino presented some paleodietary inferences from a sample exhumed from the natural cave of Gruta dos Alqueves, near Coimbra. Bone trace element analysis and dental microwear were used to obtain information about the nutritional behaviour of this past population. Mandibular and maxillary definitive first and second premolars and the deciduous first and second molars were chosen for this purpose (n=41, corresponding to, at least, 21 individuals). The obtained data suggest that these individuals had a mixed diet, with medium to low intake of food from animal sources. The high number and long dental striations recorded indicate a high proportion of vegetables ingested and/or abrasive diet (Umbelino 1998). This kind of approach has currently been extended to other Portuguese Late Neolithic and Chalcolithic populations (Umbelino s/d) as an essential source of information about the diet of these Portuguese past populations.

Among the dental disorders documented, the most noteworthy fact is the low prevalence of enamel hypoplasia, including the total absence of this stress indicator in the dentition of some archaeological sites. The majority of the available studies found frequencies around 2–3% of the teeth (with some exceptions, where the frequency is very high, see *Table 5*). These values are especially low when comparing with other archaeological and living populations (Silva 1996, 2000, 2002). Other stress indicators, like *cribra orbitalia* and porotic hyperostosis are even rarer.

In the scope of circulatory disturbance diseases seven cases (including one non adult of about 10–14 years) of

osteochondritis dissecans, a disease associated with trauma and vascular deficiency, were recently described for the *tholos* of Paimogo I. They involved cases in ulna, femurs and tibia. The frequencies range between 0.6% to 1.6% for the several articulations involved. One possible bilateral case in the acetabulum, was also described for the shelter of Serra da Roupa (Silva 2002).

A curious case of tarsal coalition was recovered from the collective burial of Hipogeu of São Paulo I. A left calcaneum and a right navicular display evidence of an incomplete coalition since the tissue formed between them was cartilage (synchondrosis). Despite the bones seem to be symmetrical, the hypothesis that they belong to different individuals cannot be excluded.

Besides these cases, some other pathologies were described, but whose diagnoses were pointed out under high reservations due to the nature of the present series (bones that were exhumed from collective burial contexts and without any anatomic connection):

– Two possible cases of Perthes disease and two of DISH, from the natural caves of Poço Velho (Antunes-Ferreira 2003);
– Possible cases of tuberculosis in the Hipogeus (artificial caves) of São Paulo I (Silva 2002) and in São Pedro do Estoril II (Silva 1999b);
– Spondiloarthropathy, namely a case of ankylosing spondylitis, in the *tholos* of Paimogo I (Silva 2002).

CONCLUSION

This study represents an attempt to compile the current knowledge about the human populations that lived in Portugal during the Late Neolithic and Chalcolithic (around 4,750 BP and 3,850 BP) and who buried their dead in different types of collective graves. This analysis includes more than 1,000 individuals, adults and non-adults of both sexes, almost exclusively recovered without any anatomical connection. The more relevant aspects of funerary anthropology, demography, morphology and pathology have been presented.

In the scope of funerary anthropology, the method of weighting the different kinds of bones allow a more accurate interpretation of the funerary gestures that occurred in the tomb and thus of the kind of inhumation. For many burials, this approach led to a re-interpretation of the type of inhumation, avoiding the rejection of primary burial places. This kind of methodology should be extended in the future to other osteological series.

In the morphological analysis two details can be distinguished, which are observed in the femur proximal area, and which must have had important influence in the mobility of the hip joint of these prehistoric individuals: the low angle of the femoral neck-shaft and the position of the femoral head towards the greater trochanter. The former was interpreted as being a consequence of a heavy physical effort upon the hip joint during childhood. For the atypical position of the femoral head, a bone growth dysplasia from genetic cause was suggested as a possible diagnosis: hypochondroplasia. Futhermore, the frequency noticed in some of the series allows to suggest a certain degree of endogamy of the considered populations.

Pathological conditions (as oral, infectious, traumatic and degenerative pathologies) and stresses (enamel defects) of these populations are low, contrary to many other populations worldwide of prehistoric agriculturalists which suggest that these Portuguese prehistoric communities were relatively healthy.

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Ana Maria Silva
Departamento de Antropologia
Universidade de Coimbra
3000 – 056 Coimbra, Portugal
E-mail: amgsilva@ci.uc.pt