THE GLOBAL HISTORY OF PALEOPATHOLOGY

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Pioneers and Prospects

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JANE E. BUIKSTRA AND CHARLOTTE A. ROBERTS

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55

Portuguese Developments in Paleopathology: an Outline History

ANA LUÍSA SANTOS AND EUGÉNIA CUNHA

There are many definitions for paleopathology, all referring to the origin, evolution, and progress of diseases in humans and other animals through time (e.g., Ubelaker 1982; Manchester 1983; Armelagos 1997; Cockburn 1997; Aufderheide and Rodríguez-Martín 1998; Lovell 2000; Ortner 2003). However, a cutoff date for distinguishing "paleopathology" from "pathology" is ill defined. How many years should separate the date of death of the individual or population from the date of observation in order to be considered paleopathology? For this contribution, publications were excluded that concerned pathological evidence in autopsy cadavers or in surgical patients, even though these are described and included in pathological collections in faculties of medicine and/or museums in Portugal. Nevertheless, papers written by physicians at the beginning of the 20th century analyzing contemporaneous skeletal collections were taken into account. Thus, the criteria for data selection are not completely uniform. Keeping these facts in mind, the aim of this paper is to present the history of paleopathology in Portugal and the state of the art today.

TRACKING THE PAST: 1884–1988

The end of the 19th century and the early 20th century were both particularly rich for the sciences, including paleopathology. During this period several landmark studies in human paleopathology appeared (Ortner 1991; Armelagos 1997; Cockburn 1997; Aufderheide and Rodríguez-Martín 1998). In Europe, the Americas, and Africa, researchers wanted to know about the antiquity of their ancestors as well as their anatomical and cultural differences. By that time in Portugal, publications in paleopathology consisted primarily of a corpus of descriptions wherein abnormalities were described against what was considered normal anatomical variation in different human populations. As Ortner (2003:8) stated: "Much of this early research was no more than an anatomical account of these abnormal conditions with little if any attempt to explore the biological or pathological significance of what was being described." Other workers dealt with single case studies of skeletons with corresponding diagnoses. This situation is also referred to by Grauer (2008:58) in her discussion of international pioneers in paleopathology: they "focused much of their skill and attention on the recognition of specific pathological lesions in human bone and the presence of anatomical variation between human groups."

As in other countries, in Portugal the first paleopathological and archaeological studies were conducted as an avocational activity by physicians (Santos 1999, 2000; Grauer 2008), natural philosophers, and geologists, among others (Umbelino and Santos 2001). The first published work referring to human paleopathology dates back to the end of the 19th century. Néry Delgado (1884), an engineer and director of the geological institute (Direcção-Geral de Trabalhos Geodésicos), described a trepanation in a skull from Casa da Moura (Cesareda) and another from Furninha Cave (Peniche), both Neolithic sites (Table 55.1). He presented these cases to participants of the "Congrès International d'Anthropologie et d'Archeéologie Préhistoriques" that took place in Lisbon in 1880, and he considered possible evidence of anthropophagy (cannibalism) at Furninha Cave. The opinion of most of the participants was that it was practiced among the ancient inhabitants of Portuguese caves.

The history of paleopathology in Portugal cannot be separated from the existence of documented collections that had been established by the end of the 19th century and continue today. In Lisbon, the physician Francisco Ferraz de Macedo, a disciple of Broca, was the first to make a collection of human

skulls in 1875 and 1877. He included skeletal material from two Lisbon cemeteries (Rocha 1995). However, the studies published by Ferraz de Macedo were essentially on morphometrics and human evolution. In Coimbra, Bernardino Machado began building a medical school collection ("Colecção Escolas Médicas") of human skulls. Following the scientific movement in other European countries, he also established in 1885 the discipline of "Anthropology, Human Palaeontology and Pre-Historic Archaeology" at the faculty of Natural Philosophy at the University of Coimbra (Areia and Rocha 1985). Besides being a professor in anthropology, Machado was a natural philosopher and politician who became president of Portugal twice. Afterward, Machado's successor, Eusébio Tamagnini, built the International Exchange ("Colecção de Trocas Internacionais") and the Identified Skeletal ("Colecção de Esqueletos Identificados") collections (Areia and Rocha 1985).

After the creation of Machado's course, students started analyzing skeletal samples (Table 55.1). Studying the collection termed today the "Medical School Collection," along with unidentified skulls recovered from Coimbra Cathedral, Menezes (1898) classified the anomalies of the skull into two types: fusion and division. As an example of division anomalies, the persistence of the metopic suture was discussed and interpreted by the author as the result of a larger brain, more common in "superior races." Nevertheless, some anthropologists noticed a high percentage of skulls with metopic sutures in mentally ill patients ("alienados"). Menezes (1898:104) questioned whether this could be a proof that madness can result in "excessive brain development." Another student at the University of Coimbra, Ferreira (1898), related premature synostosis to abnormal cranial shape, e.g., plagiocephaly. This etiology was among the hypotheses proposed by Teixeira (1946) for metopism. Additional authors that published on human paleopathology of archeological and identified materials are shown in Table 55.1, which illustrates that trepanation was the condition most commonly identified in the first half of the 20th century. Interest continued, however, as illustrated by the fact that in 1969, Veiga Ferreira discussed this practice in a paper about surgery and medicine in antiquity.

These earliest Portuguese publications were classic anthropological works, mainly based on craniometry and following the lead of other countries such as France and Spain. However, the physician and anatomist Manuel Bernardo Barbosa Sueiro (1894–1974) may be considered an exception. In 1918 he started research on the Ferraz Macedo Collection and in 1924 became a second teaching assistant of anthropology (segundo assistente de antropologia) in the Faculty of Sciences at the University of Lisbon (Moura 1986). According to Moura, besides teaching anthropology, Barbosa Sueiro taught anatomy and the history of medicine, among other courses at the Faculty of Medicine, also being editor of the journal *Archives of Anatomy and Anthropology* (*Arquivos de Anatomia e de Antropologia*). The studies of Barbosa Sueiro and coauthors reflected their background in comparative anatomy and congenital conditions. In 1924 he analyzed in detail the septal aperture and discussed its etiology, saying it occurs in adulthood, due to bone reabsorption, in both sexes and with no relation to occupation of the individuals. It is also worth mentioning that his dissertation, in the same year, was also about the septal aperture. He published on the frequency of atlas occipitalization, congenital variation in vertebral number, sacralisation and lumbarisation (Sueiro 1926), and morphological variation and spina bifida in the atlas, both from the Ferraz Macedo identified collection and Neolithic collections (Sueiro 1930, 1933, 1934). He also presented a very detailed description of lumbarization and sacralization of lumbar and coccygeal vertebrae in the sacrum of a Mesolithic individual (1932) and irregular sacralization of two coccygeal vertebrae (Sueiro and Macieira 1938) in both identified and archaeological collections. Based upon materials from a Neolithic site called Fontaínhas Cave, Sueiro (1934) described five (of nineteen) skulls with incomplete trepanations, two previously described by Néry Delgado (1884) along with three new examples. Sueiro wrote about the possible techniques and instruments used to perform these trepanations as well as synthesizing work that tried to explain this practice across Neolithic populations. In a posthumous publication, Sueiro (and Moura 1988) considered the classification of cranial deformation, discriminating between artificial and pathological etiologies (Table 55.1).

In studies of ancient skeletal remains, Sueiro and Frazão (1956, 1957, 1959) also reported caries, ante- and postmortem tooth loss, and dental wear in Mesolithic populations. So far, this is the first paper, published in two journals, that employed the definition of paleopathology according to Ruffer (1914; Chapter 13) and also referenced Palès' book (1930; Chapter 43) on paleopathology. The authors also reviewed, beginning with Esper (1774), paleopathological studies in both humans and animals. The word "paleopathologist"

TABLE 55.1 SUMMARY OF WORK IN PALEOPATHOLOGY IN PORTUGAL FOR 1884–1987 (ORGANIZED CHRONOLOGICALLY).

Skeletal series/sites	Main contribution	Chronology	Reference
Casa da Moura (Cesareda) Furninha Cave (Peniche)	Trepanation	Neolithic	Delgado, 1884
Lapa da Galinha	Trepanation	Neolithic	Vasconcelos, 1897/1913
IC-UC	Congenital	19th–20th centuries	Menezes, 1898
Coimbra Cathedral, Anatomical collections, IC-UC	Congenital, plagiocephaly	16th–20th centuries	Ferreira, 1898
Alqueves Cave	Skull with trauma or trepanation. Ante- and postmortem tooth loss and caries	Neolithic	Carrisso, 1909
IC-UL, IC-UC, Anatomical and Archeological samples (Convento Cristo de Tomar, Conv. de Jesus de Lisboa, among others) and radiographs. Mammals	Septal aperture of the humerus		Sueiro, 1924
IC-UL	Congenital conditions in the column		Sueiro, 1926
IC-UC	Occipitalization of the atlas	19th–20th centuries	Correia, 1927
Museum of the Institute of Anthropology, University of Porto	Occipitalization of the atlas	19th–20th centuries	Monteiro and Tavares, 1928
IC-UL	Spina bifida	Neolithic 19th–20th centuries	Sueiro, 1930; 1933/1934
Alcácer do Sal	Discriminated between ante and postmortem trauma in a skull	Iron Age	Correa, 1931
Cabeço da Arruda	Lumbarisation or sacralisation of lumbar and coccygeal vertebrae	Mesolithic	Sueiro, 1932
Fontainhas cave	Five skulls with incomplete trepanation	Neolithic	Sueiro, 1934
IC-UL	Irregular sacralization of two coccygeal vertebrae	19th–20th centuries	Sueiro and Macieira, 1938
Castelo de Pragança	Trepanation	Bronze/Iron Age	White, 1946
IC-UC, Faculty of Medicine-UC	Metopism	19th–20th centuries	Teixeira, 1946
Eira Pedrinha	Neoplastic disease and trauma on skulls	Neolithic	Júnior, 1947
Silveirona	Compared the thickness of the skull with Piltdown and Cohuna (Australia) but rejected the conjecture that this characteristic was typical of early fossil forms.	Visigothic	Barros e Cunha, 1947
Dolmen da Capela	Trepanation	Neolithic	Rocha, 1949

(*Continued*)

TABLE 55.1 (CONTINUED)

Skeletal series/sites	Main contribution	Chronology	Reference
Silveirona	"[T]he femora have an exaggerated curvature, and the cranium presented a pathological character"	Visigothic	Serra et al., 1952:204; Cunha and Neto, 1953; 1955
Cabeço da Arruda, Moita do Sebastião, Cova da Onça	Caries, ante- and postmortem tooth loss and dental wear	Mesolithic	Sueiro and Frazão, 1956; 1957/1959
Bugio cave (Sesimbra)	Dental pathologies, a bony excrescence on a humerus, exostoses in several vertebrae, and sacralization of the 5th lumbar vertebra.	Neolithic	Isidoro, 1964
IC-UL	Men who had died from tuberculosis had longer heads and faces than the surviving populace.	19th–20th centuries	Olivier and Almeida, 1972
Gruta da Lapa do Suão (Bombarral)	Although dental wear is not a pathological condition, it started to be seen as an occupational marker.	Upper Paleolithic	Rocha, 1978
Necropolis in Marvão	Bone fractures and "spondyloarthrosis"		Fernandes and Mendes, 1985:229.*
Lugar do Canto (Alcanede)	Trauma, infectious and joint diseases, trepanation	Neolithic	Leitão et al., 1987

Legend:
IC-UC: Identified Collection, University of Coimbra; IC-UL: Identified Collection, University of Lisboa
* Since images of these bones were not presented, it was impossible to confirm these diagnoses.

was used in this paper and the authors said that (p. 198): "within certain limits, on the basis of the knowledge of osseous lesions, both in humans and animals, we can obtain interpretations on paleopathology according for example the environmental influence, diet, and other life conditions."

According to Armelagos (1997), a new era of paleopathology started in the 1960s. By then interpretation became the key feature, the English physician Calvin Wells being one of the best known proponents (Waldron 1994; Chapter 18). His 1964 book *Bones, bodies and disease,* was translated into Portuguese in 1971 and remains, thus far, the only book in paleopathology ever translated in this country.

In the early stages of paleopathology's development in Portugal, several isolated examples of pathological conditions in individual skeletons were described and diagnosed. The majority of the authors limited their contributions to either mentioning the detection of pathological lesions or excluding them from their morphological analysis, which was the main objective of physical anthropological studies at that time. Among the authors mentioned, the most relevant figure was Barbosa Sueiro, both because of the variety of pathological conditions he reported and the number of publications.

THE LAST TWO DECADES

In the last twenty years, paleopathology has had an important impact on other sciences (Armelagos 1997). The study of patterns of mortality and morbidity in past populations is essential to our evaluation of the susceptibility of specific populations to certain diseases and disorders (Pfeiffer 1991), and it also contributes to modern medical knowledge and diagnosis (Møller-Christensen 1953), including the forensic sciences.

Excavation

The increasing number of skeletons recovered from archaeological contexts has also played an important role in the expansion of paleopathology.

Paleopathological analysis should ideally begin during fieldwork since pathological lesions may frequently only be observable when the bones are first uncovered because of their fragility and subsequent deterioration when they are removed from the earth (Santos 2000). In other words, since excavation is always an invasive process, some observations cannot be repeated later due to the often fragile nature of bones affected by disease. Caria Mendes (1989) published one of the very first bioanthropological guides in Portugal for the study of human remains from a necropolis that included "paleopathological aspects." By the late 1980s, in the extinct Serviço Regional de Arqueologia do Sul (Évora), archeologist Rui Parreira coordinated a research team that included Teresa Matos Fernandes as a specialist in physical anthropology. Among the sites excavated by these researchers were S. Manços Chapel (Évora) and Santiago Church (Monsaraz). The human remains from these two sites were later studied respectively by Abelho (1990) and Santos (1990), and both of these works provided brief descriptions of skeletal disease. Later, in July 1999, the Portuguese Assembly passed a national law (Diário da República) that required the participation of a physical anthropologist in any excavation that reveals human remains. Later, more intense research on past human populations started and, subsequently, published studies of archaeological samples, including paleopathological analyses, increased significantly. More than seventy unpublished, primarily descriptive technical reports on skeletal remains have been produced by staff members, students, and collaborators of the former Department of Anthropology (currently Department of Life Sciences) at the University of Coimbra (Cruz 2012) and at the University of Évora.

A few international excavations and specific laboratory teams should also be mentioned. For example, in Baixo Alentejo, the Archaeological Campus of Mértola (http://www.camertola.pt/) integrates Portuguese, Spanish, and French researchers from different disciplines, including physical anthropology, to focus on paleopathological analysis of skeletal remains. In Alto Alentejo, Torre de Palma, where Roman to medieval occupations have been identified, a team of researchers from the United States and Portugal includes American Mary Lucas Powell, who heads the paleopathological analysis. More recently, the most important paleoanthropological find in Portugal, the Gravettian human skeleton from the Abrigo do Lagar Velho, was also subjected to paleopathological analysis by an international group of researchers (Trinkaus et al. 2002).

Teaching

Paleopathology is today considered a subdiscipline of biological/physical anthropology (Buikstra and Ubelaker 1994; Roberts and Manchester 2005; Buikstra and Beck 2006) and, in Portugal, paleopathology has developed mainly in relationship to the teaching of anthropology. A significant event in the professional development of paleopathology was the creation of a discipline of paleodemography, which included paleopathology (1995, 1996) within the anthropology degree (1992, 1993+) in the Faculty of Sciences and Technology at the University of Coimbra. Later, paleopathology was taught in the master's course in human evolution (started in 1998) and in its successor, the master's in evolution and human biology (2007/2008-), under the name "Paleopathology of human populations." The subject is also taught in short courses such as biological anthropology (2006-) and in paleoparasitology, by Adauto Araújo from the Oswaldo Cruz Foundation, Brazil (2007), in seminars at the Department of Anthropology at the University of Coimbra, and in summer courses at the New University of Lisbon (2008-). At the University of Évora it is taught in the discipline "Human Paleoecology and Paleopathology" in the degree programs of Biology and Enviromental Sciences.

Research

Partially in relationship to the increased teaching discussed above, several academic works directly and indirectly related to paleopathology have appeared. Approximately fifty undergraduate theses, thirty master's theses, six of them studying specific pathological conditions (Table 55.2), and nine PhD theses have dealt with paleopathology to date, and another six will be finished in the next year (Table 55.3). For example, in 1993, Cidália Duarte studied oral pathology in individuals from the Neolithic/Chalcolithic site of Tojal de Vila Chã Artificial Caves for her master's degree at the University of Alberta (Canada). The first PhD thesis that focused on paleobiology and paleopathology was completed in 1994 wherein Eugénia Cunha finished a systematic paleodemographic and paleopathological analysis of two Portuguese medieval populations. Similar studies considered the Neolithic/Chalcolithic (Silva 2002) and Medieval periods (Garcia 2007; Fernandes 2008). Thus, the trend identified by Roberts and Manchester (2005:264), which suggests that since 1995, an increasing number of "population-based studies of heath" have been apparent and that "there is more consideration for placing health data in cultural context" also applies to Portugal. However,

TABLE 55.2 MASTER'S THESES ON SPECIFIC PALEOPATHOLOGICAL CONDITIONS (ORGANIZED CHRONOLOGICALLY).

Skeletal series/sites	Main contribution	Chronology	Reference
Tojal de Vila Chã (Carenque)	Oral pathologies	Neolithic/Calcolithic	Duarte, 1993
Cabeço da Arruda, Cabeço da Amoreira, Moita do Sebastião, Cova da Onça	Stress indicators: Harris lines, Porotic hyperostosis, cribra orbitalia, dental enamel hypoplasias	Mesolithic	Cardoso, 2001
IC-UL	Tuberculosis	19th–20th centuries	Matos, 2003
IC-UC	Bone loss, trauma	19th–20th centuries	Curate, 2005
São Julião Church necropolis (Constância)	Markers of occupational stress, Biocultural approach	14th–19th centuries	Assis, 2007
IC-UL	Spondyloarthropathies	19th–20th centuries	Marques, 2007

TABLE 55.3 PHD THESES DEALING WITH PALEOPATHOLOGY, COMPLETED BY PORTUGUESE RESEARCHERS (ORGANIZED CHRONOLOGICALLY).

Skeletal series/sites	Main contribution	Chronology	Reference
S. João de Almedina Church (Coimbra) and Fão (Esposende)	Trauma, oral, joint, congenital and infectious diseases, among others	12th–15th centuries	Cunha, 1994
Hospital archives and IC-UC	Tuberculosis	19th–20th centuries	Santos, 2000
Ansião, Serro da Roupa, Paimogo I, Abrigo da Carrasca, Cabeço da Arruda, Cova da Moura, São Paulo	Trepanations, fractures, oral, congenital, infectious and joint diseases, among others	Neolithic/Calcolithic	Silva, 2002
Muge and Sado shell middens and Abrigo da Carrasca, Hipogeu de S. Paulo, Pai Mogo I, Eira Pedrinha, Gruta dos Alqueves, Tholos Cabeço da Arruda	Paleodiets and indicators of nutritional stress	Mesolithic and Neolithic	Umbelino, 2006
IC-UC	Oral disease	19th–20th centuries	Wasterlain, 2006
Praça de S. Martinho (Leiria)	Various diseases	13th–16th centuries	Garcia, 2007
S. Miguel de Odrinhas (Sintra)	Trauma, and oral, congenital, infectious and joint diseases, among others	12th–15th centuries	Fernandes, 2008
IC-UC and IC-UL	Degenerative joint disease, musculoskeletal makers (MSM) and markers of occupational stress (MOS)	19th–20th centuries	Cardoso, 2008*
St. Jørgen's (Odense, Denmark) and Archives from the Hospital-Colónia Rovisco Pais (Portugal)	Leprosy	Medieval and 19th–20th centuries	Matos, 2009
IC-UC and IC-UL	Osteoporosis and trauma	19th–20th centuries	Curate, 2010
IC-UC and IC-UL	Neoplasias	19th–20th centuries	Marques, [2012]
Merida (Spain), Álcacer do Sal	Oral and joint disease, trauma, among others	Roman	Silva, [2012]

(*Continued*)

TABLE 55.3 (CONTINUED).

Skeletal series/sites	Main contribution	Chronology	Reference
São Julião Church necropolis (Constância) and IC-UC and IC-UL	Paleohistology: specific and nonspecific bone infections	14th–20th centuries	Assis, [2012]
Hospital archives and IC-UC	Syphilis	19th–20th centuries	Lopes, [2012]
Ca. 70 sites	Infectious, oral, and joint diseases, trauma, among others.	11th–20th centuries	Cruz, [2012]
Hospital archives and IC-UC	Trauma	19th–20th centuries	Peneda, [2012]

Legend:
IC-UC: Identified Collection, University of Coimbra; IC-UL: Identified Collection, University of Lisboa
* Thesis from Durham University, U.K.

theses have also focused on specific conditions, such as oral health (Duarte 1993; Wasterlain 2006), tuberculosis (Santos 2000; Matos 2003), indicators of "stress" (Cardoso 2001), bone loss and osteoporosis (Curate 2005; 2010), spondyloarthropathies (Marques 2007), markers of "occupational stress" (Assis 2007; Cardoso 2008), leprosy (Matos 2009), neoplastic disease (Marques 2012), syphilis (Lopes 2012), and trauma (Peneda 2012).

Other recent trends include the use of new methodological approaches for understanding certain pathological conditions. These studies have developed in collaboration with foreign colleagues and laboratories. Thus, aDNA (Santos 2000) and mycolic acids of Mycobacterium tuberculosis (Redman et al. 2009) were sought in skeletons from the Coimbra Identified Skeletal Collection. Umbelino (2006) used trace element and stable isotope analyses to reveal the diet of Mesolithic and Neolithic/Chalcolithic populations. Roman cremated materials have been studied by Silva (2012) using three-dimensional computed tomography, and paleohistology has been applied to periostitis in trying to distinguish among specific and non- specific infectious diseases as its etiology (Assis 2012).

Since 2001, from its very beginning, Portugal has been involved with the Global History of Health Project: European Module (http://global.sbs.ohio-state.edu/). This is an important international research program on health in the past that emphasizes the use of a uniform methodology for data collection and the creation of international databases, which through a comparative approach allows the study of the evolution of health and disease through time in many different countries. Research and teaching based on the well-documented large identified skeletal collections at the University of Coimbra (Rocha 1995; Santos 1999, 2000; Cunha and Wasterlain 2007), and more recently at the Museum Bocage within the National Museum of Natural History at the University of Lisbon (Cardoso 2006), have been contributing significantly to paleopathology. The more relevant papers based on identified and archaeological skeletal samples are summarized in Table 55.4.

Moreover, intense fieldwork on sites from periods from the Mesolithic to recent times provides skeletal samples from the whole of Portugal. These facilitate population-based studies, including paleopathological analyses, allowing an evolutionary perspective to be explored. The modern study of the history of disease follows a bioarchaeological approach—biological data are interpreted within appropriate cultural contexts, which include relevant details of historical development, local geography, and material culture of the people whose remains are under examination (Manchester 1983; Roberts and Manchester 2005). This represents a recent development of a multidisciplinary approach to paleopathology (Santos 1999, 2000). Furthermore, differential diagnosis has become a mandatory step whenever a specific cause for pathological lesions is considered. However, this approach is not followed by all the researchers. Examples include publications by the dentist Santinho Cunha, and colleagues, including the historian Rodrigues Ferreira (1998) and the geologist Telles Antunes. An example of a paper with questionable assumptions and conclusions considered the Muge Mesolithic populations wherein Antunes and Cunha (1992, 1993) described, among other practices, ablation of the tongue, slaughter of the individuals by an "execution platoon," and human sacrifice, namely of sterile women and young males, among other

TABLE 55.4 MAIN CONTRIBUTIONS ON PALEOPATHOLOGY PUBLISHED FROM 1993 TO 2011 (ORGANIZED CHRONOLOGICALLY).

Skeletal series/sites	Main contribution	Chronology	Reference
S. João de Almedina (Coimbra) and IC-UC	Diffuse idiopathic skeletal hyperostosis (DISH)	Medieval and 19th–20th centuries	Cunha, 1993
IC-UC	Harris lines	19th–20th centuries	Cunha and Gomes, 1994
IC-UC	Stress indicators	19th–20th centuries	Cunha, 1995
IC-UC	Enthesopathies	19th–20th centuries	Cunha and Umbelino, 1995
Aljubarrota	Trauma	Medieval	Cunha and Silva, 1997
Évora	Trauma	Medieval	Santos et al., 1998
IC-UC	Tuberculosis	19th–20th centuries	Santos and Roberts, 2001
Muge and Sado shell middens	Oral disease, trauma, stress indicators, trepanation, among others	Mesolithic	Cunha et al., 2003
Eira Pedrinha	Trepanation	Neolithic	Gama and Cunha, 2003
Furninha, Casa da Moura, Lapa das Galinhas, Castelo de Pragança, among others	Trepanation	Neolithic to Bronze Age	Silva, 2003
Cacela Velha (Algarve)	Brucellosis	Medieval	Curate, 2003/2004
Atapuerca (SH)	Enamel hypoplasias	Middle Pleistocene	Cunha et al., 2004
Hipogeu São Paulo II (Almada), Serro da Roupa (Columbeira)	Non-osseous calcaneonavicular coalitions	Neolithic/Chalcolithic	Silva, 2005
Quinta da Torrinha (Monte da Caparica)	Trauma	Roman	Assis, 2005/2006
Alcácer do Sal	Brucellosis	Medieval-Modern	Curate, 2006
IC-UL	Tuberculosis	19th–20th centuries	Matos and Santos, 2006
IC-UC	Spondyloarthropathies	19th–20th centuries	Martin-Dupont et al., 2006
IC-UC	Tuberculosis	19th–20th centuries	Santos and Roberts, 2006
Church of Sacramento (Lisboa)	Syphilis	18th century	Souza et al. 2006
Muge and Sado shellmiddens, Cabeço da Arruda, Cova da Moura, Dólmen Ancião, among others	Oral and joint diseases, trepanation, trauma, among others	Mesolithic and Neolithic/ Calcolithic	Cunha et al., 2007
IC-UC	Oral pathologies	19th–20th centuries	Dias et al., 2007
Estremoz	Klippel-Feil Syndrome	Medieval	Fernandes and Costa, 2007
IC-UC	Oral pathologies	19th–20th centuries	Wasterlain and Dias, 2007
Samarra	Trauma	Neolithic Calcolithic	Silva and Ferreira, 2008
Cacela Velha (Algarve)	*Os odontoideum*	Medieval	Curate, 2008
IC-UL	Rib trauma	19th–20th centuries	Matos, 2009
IC-UC	Oral pathology	19th–20th centuries	Wasterlain and Dias, 2009
IC-UC	Oral pathology	19th–20th centuries	Wasterlain et al., 2009
Constância	Neoplastic disease	14th–19th centuries	Assis and Codinha, 2010
Olival (Ourém)	Dystocia	19th century	Cruz and Codinha, 2010
Santa Clara-a-Velha (Coimbra)	Osteoporosis, trauma	14th–17th centuries	Curate et al., 2010
IC-UC	Syphilis	19th–20th centuries	Lopes et al., 2010
Lapa do Bugio (Sesimbra)	Oral and neoplastic diseases	Neolithic	Silva and Wasterlain, 2010

(*Continued*)

TABLE 55.4 MAIN CONTRIBUTIONS ON PALEOPATHOLOGY PUBLISHED FROM 1993 TO 2011 (ORGANIZED CHRONOLOGICALLY).

Skeletal series/sites	Main contribution	Chronology	Reference
Tholos of Paimogo I, Paradela, Santarém, Constância, Juncal, Seixal	Hip fractures	3000–2500 BC to 19th century	Curate et al., 2011
São Miguel (Castelo Branco)	Infectious disease	13th and 19th centuries	Matos et al., 2011
Praça do Comércio (Coimbra)	Neoplasia	15th–20th centuries	Wasterlain et al., 2011
IC-UC	Periodontal disease	19th–20th centuries	Wasterlain et al., 2011

Legend:
IC-UC: Identified Collection, University of Coimbra; IC-UL: Identified Collection, University of Lisboa

statements very difficult to confirm using the skeletal remains. Another example is that of Mendes and Oliveira (1990) who referred to the skeletons from an ancient necropolis as the link between archaeology and history with bioanthropology and paleopathology. Following this interesting observation, the authors used the paleopathological study of sixteen skeletons found in Mértola as an example of this interdisciplinarity, describing fractures and their medical treatment. However, their conclusions must be called into question at the point when the authors said that they could see in the skeleton an "expression or feeling of horror" (Mendes and Oliveira 1990:207).

Apart from the study of disease from the perspectives of the history of medicine and archaeological contexts, it is important to note that, since 1997, paleopathological studies have also been linked to work in forensic contexts. In that year, collaboration between the National Institute of Forensic Medicine (Instituto Nacional de Medicina Legal) and the Department of Anthropology at the University of Coimbra began. Since then more than 100 forensic cases have been analyzed and reported, and pathological analysis is also mandatory as can be seen (Cunha 2006; Cunha and Pinheiro 2009). Analysis of pathological conditions has helped, in many cases, to establish a positive identification. In the meantime, further efforts to bridge the gap between past and present have been achieved (Pinheiro et al. 2004).

Scientific Meetings and Associations

Portuguese paleopathologists are now keen to share and discuss their results with their international peers. This can be witnessed by the fact that many researchers are members of different paleopathology associations, for example the Asociación Española de Paleopatología (AEP; Chapter 58), the Paleopathology Association (PPA; Chapter 67) and the Paleopathology Club. Several researchers have also participated in the meetings of the PPA since 1996, in Maastricht, and later in the United States and South America. Due to the proximity of Portugal and Spain, the biennial meeting of the AEP is particularly frequented by Portuguese members and their students. According to Gonzalez and coauthors (2007), 11 percent (38 out of 343) of the papers published in the proceedings of the meetings from 1988 to 2001 were from foreign researchers, and in particular from Portugal (14 papers, or 37 percent).

The first scientific meeting centered on human paleopathology organized in Portugal was the 14th European Meeting of the Paleopathology Association, held between August 28 and 31, 2002, at the University of Coimbra. One hundred and ninety-six participants from more than twenty-two different countries (Cunha and Santos 2003) presented and discussed approximately 160 papers and posters (EMPPA 2002). Twenty-one of the presentations were published in special issues of *Antropologia Portuguesa* (volume 19, 2002) and the *International Journal of Osteoarchaeology* (volume 13(5), 2003). Six years later, on June 6, 2008, the Department of Anthropology, University of Coimbra, hosted the "I Jornadas Portuguesas de Paleopatologia" ("1st Portuguese Meeting of Paleopathology"). Organized by seven PhD students in biological anthropology, thirty-three presentations were made to the eighty-eight participants (Santos 2008). The second meeting was held in 2010 (http://www.uc.pt/en/cia/events/meetings, Santos 2011) and the third is plan for fall 2012.

On July 2–3, 2009, the "Workshop in Musculoskeletal Stress Markers (MSM): limitations and achievements in the reconstruction of past activity patterns" (http://www.uc.pt/en/cia/msm/) took place (Santos et al. 2009; Jurmain 2010; Santos et al. 2011). This was a more focused meeting that aimed to contribute to the development and standardization of protocols in MSM research. Three lectures, sixteen podium presentations, ten posters, and two syntheses on research in this area as well as discussions were presented to the seventy-five researchers from twenty-one countries. The institutional assistance for all these events comes from the University of Coimbra, the former Department of Anthropology, and the Research Centre for Anthropology and Health (Centro de Investigação em Antropologia e Saúde, or CIAS; www.uc.pt/en/cia). The *Populations and Cultures of the Past* research group of the CIAS has more than twenty-five members who focus on the relevance of skeletal remains to the study of human paleopathology.

CONCLUSION

A review of paleopathology in Portugal presents some difficulties since a broad range of publications in archaeology, anthropology, and related sciences existed by the end of the 19th and the beginning of the 20th century. Once those sources had been analyzed, the challenge was to balance the quantity and depth of the available information on paleopathology. With the completion of this task, we believe that this outline of the history of Portuguese paleopathology is just a starting point. Continuing research on this subject will bring new evidence for the antiquity of paleopathological studies in Portugal.

Furthermore, since the very earliest work in paleopathology, Portuguese scientists have published in international outlets. For decades, however, craniometry and "race" determinations dominated contributions from physical anthropology, and pathological bones tended to be analyzed by physicians, natural philosophers, and by other researchers linked to archaeological and anthropological studies. From the 1880s to 1950s, trepanation was the most commonly reported condition. The physician Barbosa Sueiro published many paleopathological studies from the 1920s to the 1950s. By the 1950s the word paleopathology started to be used for the first time in Portugal by Sueiro and Frazão (1956, 1957, 1959).

During the last century both case and population-based approaches to paleopathology were common, with some attempts to contextualize the data. This panorama changed considerably after the 1990s, when formal education in paleopathology began. Since then the dominant trends have included biocultural approaches to the study of disease in the past. Additionally, the potential of identified skeletal collections has been explored, namely to attempt to create new methods for the diagnosis of infectious, metabolic, and neoplastic diseases. Moreover, the classic macroscopic observations have been complemented with new techniques such as the application of stable isotope and aDNA analyses, computed tomography and paleohistology to skeletal remains in national and international partnerships. Above all, paleopathology proceeds as a multidisciplinary endeavor (Roberts and Manchester 2005; Cook and Powell 2006) and "international in its scope as we begin the 21st century" (Cook and Powell 2006:322). Thus, it has an enormous potential. As Roberts and Manchester (2005:274) stated "[p]alaeopathology has an excellent future, backed up by a solid base of research that is increasing by the day."

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