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Health and Disease in Greece: Past, Present and Future

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HEALTH IN ANTIQUITY
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Edited by Helen King
IN MEMORY OF DOMINIC MONTSERRAT, SCHOLAR AND FRIEND
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HEALTH AND DISEASE IN GREECE
Past, present and future

Charlotte Roberts, Chryssi Bourbou, Anna Lagia, Sevi Triantaphyllou and Anastasia Tsaliki

INTRODUCTION

Health is crucial to the well-being of society today, its efficient function and survival; as Angel and Bisel state: ‘...health is more than mere survival – it is living usefully despite the various diseases and stresses which challenge all of us’ (1986a: 12). Disease affects everybody at some point in their lives and many factors predispose populations to acquiring deviations from normal health. The occurrence of disease, its transmission and maintenance in a population, its geographic, prehistoric and historic variation captures the fascination of all. Disease can curtail, or even cease forever, a person’s ‘normal’ function, contribution to and enjoyment of life; it is the one factor in our lives that is more often than not unpredictable. P.J. Brown et al. (1996: 183) succinctly state that ‘...particular diseases...vary by culture...(and)...the nature of interactions between disease and culture can be a productive way of understanding humanity’. Whilst the authors support this viewpoint wholeheartedly, they recognise that not all scholars in archaeology, anthropology, the classics and history study health and disease, but the message forwarded is that looking at health may help other disciplines studying the history and archaeology of Greece to answer questions and test the hypotheses that they may have.

This chapter aims, first, to demonstrate the importance of considering past disease patterns and how they affected populations, how they are studied and what limitations there might be. Second, the study of health in past Greek societies is discussed with reference to the late J. Lawrence Angel, the most prominent person to have made detailed studies of human skeletal
material in Greece. Finally, current research on health in Greece in the past is considered, with suggestions as to how its study may progress in the future.

**Background**

Greece has an incredible history and is a region which has attracted a great deal of attention from both archaeologists and historians. The wealth of material of all types, ranging from magnificent buildings to a range of delicately manufactured artefacts, has survived for study by many people from a range of academic disciplines. In addition to this wealth of material culture, there is also a significant body of literary sources. Together these provide a wide range of data sources for the reconstruction of past human behaviour, change and adaptation. However, whilst pottery and other artefacts, buildings and written records have been studied time and again to answer specific questions about people living hundreds or even thousands of years ago, the remains of the people who provided all these data are often ignored, for a number of reasons. Studies of cemeteries have been focused mostly on aspects of material culture such as pottery and luxury items accompanying the deceased as grave goods, rather than on the remains of the people themselves. The study of funerary archaeology in Greece, where burial practices are being approached in terms of socio-political, economic or other cultural variables, has only recently been developed and has been mostly applied to the southern Greek mainland and Crete (Pullen 1985, 1990; Laffineur 1987; Morris 1987, 1992; Hagg and Nordquist 1990; Tzedakis and Martlew 2002). In this context the physical (or biological) anthropological data of the cemetery usually forms a separate appendix at the end of each cemetery report (e.g. Duckworth 1902–03, 1904, 1913; Hawes 1911; Furst 1932; Breitinger 1939; Musgrave 1976a, 1980a; Bisel 1980a; Coldstream *et al.* 1981; Xirotiris 1982, 1992; Wade 1985; Herrmann 1992) or in monographs or papers written in a rather technical style, often dealing with issues far away from the original questions posed (Boyd 1900–01; Hawes 1909–10; Hasluck and Morant 1929; Furst 1930, 1932; Koumaris 1930; Charles 1958, 1963, 1965; Carr 1960; Poulianos 1967; Gejvall and Henschen 1968; Krukof 1971; Paidoussis and Sbarounis 1975, 1979; Musgrave 1976b, 1985, 1990; Prag *et al.* 1984; Wall *et al.* 1986; Preka-Alexandri 1988; Musgrave and Popham 1991; Triantaphyllou and Chamberlain 1996; Triantaphyllou 1997). These analytical approaches are often closely determined by the biological, medical and anatomical backgrounds of the authors and do not necessarily suggest a lack of interest in archaeological questions. On the contrary, many of them are excellent methodological and systematic works but, although they refer to archaeological
material, with the exception of a few cases (Patrick 1967; Halstead 1977; Bisel 1980b; Musgrave 1980b; Xirotiris 1980, 1981, 1986; Bisel and Angel 1985; McGeorge 1988; J.E. Powell 1989; Pappa et al. 1998; Triantaphyllou 1998a) they do not contribute significantly to reconstructing the lives of past populations in Greece. There is, thus, a need in Greek biological anthropology for systematic study and co-operation between biological anthropologists, field archaeologists and historians. This is not to say that Greece is the only country in the world where this problem occurs, but it does highlight the point that, without humans, we could say little about the past. Today our world is shaped by us and we are also shaped by it; we adapt to, and change, our environment when conditions demand. This has the potential to be reflected in our bodies, and more precisely in our skeletal remains; to be blunt, we need to see what is happening with humans themselves before we can interpret other evidence in the past. This chapter therefore aims to convey why and how we can study and use the evidence for health and disease to understand the past.

**The study of past health and disease: palaeopathology**

Health can be defined as ‘the state of being bodily and mentally vigorous and free from disease’, and disease as ‘any impairment of normal physiological function affecting all or part of an organism especially a specific pathological change caused by infection, stress, etc., producing characteristic symptoms; illness or sickness in general’ (Hanks 1979). As Bhasin et al. (1994: 65) state, ‘Health is not a component but is an expression of development; so that the health of a community at a given moment is the very situation of the whole social system seen from a health point of view.’ Palaeopathology was described earlier last century by Sir Marc Armand Ruffer, an Anglo-French doctor, as the science of diseases whose existence can be demonstrated on the basis of human and animal remains from ancient times. It is a multidisciplinary and holistic sub-discipline of physical or biological anthropology (the study of the biological evidence for humans from prehistory to the present) which considers many types of evidence ranging from written records to skeletal and mummified remains (e.g. Íçcan and Kennedy 1989; Roberts and Manchester 1995; Bourbou 1999a). Not only does it look at the evidence for ill health *per se*, but it also attempts, by considering the cultural context from which the material comes, to understand why certain diseases appear and affect populations at specific time periods (the ‘biocultural approach’, or also termed ‘bioarchaeology’); Roberts and Cox (2003) provide a recent study of British health from prehistory to the present. For example, if we were to imagine a population that starts to settle and practise agriculture rather than hunting and
gathering, what changes in their lives would affect the diseases from which they would suffer (Cohen and Armelagos 1984)? They would be living in permanent housing, relying on a more limited range of food sources which may be deficient in important nutrients, domesticating animals and accumulating refuse. Consequently, they may be at risk from developing respiratory and other infections from living in close contact with other members of the community (rather than living in temporary structures in smaller groups). In addition, nutritional deficiency diseases may increase, and diseases such as tuberculosis, affecting animals, may be transmitted to humans. As a modern comparison, today we see a rise in cases of tuberculosis, an infectious disease (Raviglione et al. 1995). Why? There are many factors responsible, including more people living in poverty and in crowded and poor housing, deficient diets due to poverty, resistance to the drugs used to treat the disease and deficient immune systems, as in people with HIV (human immunodeficiency virus infection); in the developing world, we could add transmission of the disease from cattle suffering from bovine tuberculosis. Many of these factors are also relevant to the appearance of the infection in the past.

The evidence used to reconstruct health and disease in the past consists of skeletal and mummified remains (considered as primary evidence), contemporary artistic depictions and written records, with reference to disease patterns and their predisposing factors in traditional living societies (e.g. leprosy in India today). All this evidence is interpreted using a clinical base; that is to say, one has to consider how a disease affects the body in a living individual before this can be recognised and interpreted for the past. For example, what is the bony damage in rheumatoid arthritis and what signs and symptoms does the person experience; how common is it today and what causes it? From the information on diseases today one can begin to consider disease in the past. That is not to say that there are no limitations to the study of palaeopathology. It has to be assumed that disease affected the skeleton in the same way in the past as it does today, and that people illustrated and wrote accurately about disease; we have to pay close attention to these particular problems. The appearance of a disease in a skeleton may have altered, for many reasons, over long periods of time. The virulence of the organism could have changed and, hence, its effect on bone, and it is highly probable that many writers and artists recorded the most dramatic and unusual diseases in the past, whilst ignoring those conditions which may not produce visually disturbing features.

Reconstructing the diseases that were present in a population, and their frequency, is not an easy task and is undertaken by a variety of people from a range of backgrounds; these include biological anthropologists specialising in palaeopathology, interested doctors and dentists, anatomists, historians
and archaeologists. In the United States the discipline has grown rapidly, whilst in Europe and the rest of the world it has lagged behind in making training in palaeopathology available. In the United Kingdom, for example, postgraduate courses in the study of human remains in archaeology did not begin until the late 1980s and the majority of archaeology departments do not teach undergraduates in this area. Whilst Europe is still catching up, the United States has made significant advances in the biocultural interpretation of disease patterning in past societies and has paved the way for how future studies should be undertaken. For example, standards for data collection in human skeletal remains have been developed (precipitated by the repatriation and reburial issue in North America), and provide a baseline for recording of data, making it potentially possible to compare populations from different geographic regions and time periods (Buikstra and Ubelaker 1994). This is the only way in which information can be generated on how and why, worldwide, diseases have appeared at different points in time, and how different that information is to today’s health and disease problems.

In Europe, in recent years, there has been an increase in the population approach to past health and disease (e.g. Lewis et al. 1995) rather than a concentration on isolated cases of certain diseases (e.g. Wells 1965). Whilst interesting in itself, and contributing to the evidence for disease in the past, study of one individual suffering from, for example, osteoarthritis in Anglo-Saxon England is hardly very illuminating with respect to osteoarthritis in Anglo-Saxon populations generally. Despite this, however, the discipline has developed from the nineteenth century, where non-human cases of disease were initially recorded, into the twentieth century where more population-based approaches answering specific questions began to emerge, mainly from North American scholars. For example, when did syphilis first appear? Did tuberculosis first occur in the New or Old World? What precipitated the plague to appear and devastate so many populations around the world? We see this trend continuing with the emphasis on the biocultural approach in answering questions, and testing hypotheses about disease in the past, by studying skeletons from large cemetery sites.

**Problems in the study of skeletal evidence**

First, the skeletal material that palaeopathologists study is highly dependent on what survives in the ground to be excavated, and how carefully it is recovered. Many factors affect survival of bones and teeth (the latter tend to survive better) and these range from how the dead person is disposed of (e.g. cremation versus inhumation), what happens to the body whilst it is in the ground (e.g. grave water content, soil acidity, temperature and humidity, the presence of plants and animals in the grave, a coffin and/or
clothing, depth of burial and later disturbance, for example by another
grave; Boddington et al. 1987), and what methods are used to excavate the
skeleton (McKinley and Roberts 1993). For example, the small bones of the
hands and feet may not survive or could be missed during excavation, and
these preserve vital evidence for some of the joint diseases and conditions
like leprosy. Once the skeletons are recovered, the question of how repre-
sentative of the original population they are needs to be asked. A rural
cemetery, for example, may have been totally recovered and could provide a
better picture of the community at a single point in time, and yet an urban
cemetery is more likely to be incompletely excavated because of constraints
on the excavated area caused by standing modern buildings in the vicinity.
In effect, a cemetery population is only a sample of the original contributing
population and it may be that it is biased in some way (Waldron 1994).

The methods used to examine the evidence for disease are many, but
mainly rely on macroscopic and radiographic techniques – most researchers
use the former. Microscopic study may be used for confirming diagnosis in
problematic cases, and stable isotope and trace element analysis may be used
to reconstruct past diet and migration, both relevant to disease (Katzenberg
2000). Of late, ancient DNA (aDNA) and other biomolecules specific to
micro-organisms causing disease have been used for diagnosis (see T. Brown
and K. Brown 1992 for problems and potential, and Salo et al. 1994 for an
eample). Disease can affect bone in a limited number of ways; namely, by
forming bone, destroying bone, or both. These changes on the bone are
recorded in detail, noting which bones are affected (their distribution pat-
tern), where on the bone they occur and whether or not the lesions are
healed. This latter information is important in determining whether a per-
son was actively suffering from a disease when they died (perhaps a con-
tributory cause of death) or whether they had survived the problem which
had then led to resolution and healing of the lesion. Once abnormal changes
have been recorded, a number of potential diseases may be forwarded for
consideration (differential diagnosis) because many diseases leave similar
‘marks’ on the skeleton. It is usually their distribution pattern and the char-
acteristics of the lesions that indicate what specific disease was present. The
characteristics and patterning of lesions are interpreted with reference to
descriptions in the clinical literature of diseases affecting bones and joints
(e.g. Resnick 1995). More often than not, it is only possible to categorise
disease into broad groups, such as infectious or metabolic disease, but in
some circumstances a specific condition may be identified. What is impor-
tant is that a detailed description of the abnormalities is given (preferably
including photographs) so that future workers have access to as much data
as possible for potential re-interpretation. Another complication is that not
all diseases affect the skeleton so that, for example, the plague, smallpox,
cholera, diphtheria, measles, malaria and many tumours will not be seen in
the skeleton; this invisible data may only be recognised in visual or written
historical records. This makes documentary and iconographic evidence par-
ticularly useful in these cases, although the development of aDNA as a tool
for diagnosis of disease may help to identify some of these diseases; as in the
case of Drancourt et al. (1998) on the diagnosis of plague in post-medieval
France. Two other major points need to be made. First, just because a skele-
ton has no abnormal lesions – that is, the bones look normal – does not nec-
essarily mean they did not suffer disease; after all, something killed them!
They could have died in the acute stages of the disease before the bones were
affected. Second, skeletons with chronic healed lesions may be regarded as
the healthy part of a population because they have survived the acute stages
of a disease (due to their strong immune system, perhaps), and developed
skeletal lesions which have healed; many of these limitations are discussed
in the excellent paper by Wood et al. (1992).

HEALTH AND DISEASE IN PAST
GREEK POPULATIONS

Early studies of biological anthropology in Greece

The study of health and disease in past Greek skeletal remains has a long
history and is documented in Agelerakis’s (1995, 1997) description of the
development of biological anthropology in Greece. The first studies of skele-
tal remains in Greece were conducted in the first quarter of the nineteenth
century by Rudolf Virchow, the German physical anthropologist (Virchow
1872, 1873, 1891, 1893), but the creation of the Museum of Anthropology
in 1886 inaugurates the history of the study of biological anthropology in
Greece, it being one of the oldest museums of humankind in Europe (Pitsios
1994: 7). Initially it was housed at the Academy of Athens but, in 1930, it
was transferred to the newly built School of Medicine at the University of
Athens, of which it has been an integral part ever since. Two researchers were
seminal in the creation of the Museum and in the establishment of biological
anthropology as a separate discipline in the Greek Academia. Klon Stephanos
was the founder and director of the Museum from 1886 to 1915 and was also
responsible for the establishment of Anthropology in 1915 as a separate Chair
at the University of Athens. Yiannis Koumaris took over the direction of the
Museum for another 35 years (1915–50), also being the first Professor of
Anthropology at the University of Athens and the founder of the Greek

The educational background of both directors of the Museum, as of most
of their successors and colleagues, originated from the fields of medicine
and biology, and impacted upon the kind of research they pursued. Skeletal analyses concentrated on the analyses of extensive series of human crania (Furst 1930; Koumaris 1930, 1931) within a framework that emphasised morphological similarities explained by genetic diffusion, and aimed to assess ‘racial’ histories. During the 1960s and 1970s the discovery of significant palaeoanthropological findings in Petralona (Bostanci 1964; Breitinger 1964; Charles 1965; Poulianos 1971a, 1976, 1983) and in Mani (Pitsios 1979, 1985) directed Greek anthropological research interests toward the study of phylogenetic relationships and the exploration of the role that the Greek peninsula played in human evolution.

The same period witnessed an increased interest in studies of living populations that aimed to assess population affiliations through the acquisition of a number of anthropometric and anthropomorphic data (Poulianos 1968, 1971b; Pitsios 1978). Whereas most of these studies offer unique datasets that can prove useful for further analyses, they seldom contain information concerning the biological significance of the observed variations and are, sometimes, driven by an ideological rather than a scientific impetus (e.g. Poulianos 1976, 1977). A dominant trend in skeletal studies in Greece was, and is, highly detailed osteological descriptions, typically appendices to many site reports with long lists of measurements and other observations which, whilst not very useful in isolation, provide raw data for further inferences about ancient lives (Buikstra 1998).

Apart from Angel’s work, and until the last few years, most skeletal study in Greece appears to have been focused on anthropometry (looking at variation between and within populations using measurements). Greece, being the crossroads of various cultures throughout its history, offers a flourishing area for the study of movement and intermixing of people. The latter can be seen in the tendency throughout the twentieth century to explore and prove that modern Greeks come originally from their ancient ancestors, mostly ignoring issues of health and adaptation. Biological anthropology, along with other branches of the social and applied sciences such as ethnography, cultural anthropology and the medical sciences, was targeted to support certain political decisions and ideologies, but this is not to say that all of the anthropometric work done had that aim. Even despite this apparent activity in Greece in biological anthropology, in the early 1980s Grmek (1983: 52) claimed that the ‘results obtained (in palaeopathology) up to now are incomplete, especially for the classical period’, and even as early as the late 1800s there were comments about the incorrect ways archaeologists were excavating skeletons (Grmek 1983: 53), obviously to the detriment of further analysis. Grmek’s (1983) work, in fact, is an incredibly useful text on disease in ancient Greece, collating documentary and skeletal evidence for health and disease, a publication which Angel would have found useful for his work.
The contribution of J.L. Angel

J. Lawrence Angel (Figure 2.1) had also always been very interested in human skeletal variation, especially with respect to migration and immigration in the Mediterranean area, but later in his work he tended to focus much more on health and disease. As Buikstra and Hershover (1990) point out (and other authors reiterate), Angel was significantly ahead of his time in the study of skeletal remains, and more specifically health problems.

Figure 2.1 J.L. Angel (courtesy of Don Ortner and Agnes Stix of the Smithsonian Institution, Washington, DC, USA).
He advocated interdisciplinary studies, a regional approach to answering questions, and the application of the study of skeletons to prehistory and history. In addition to the study of Eastern Mediterranean skeletal material (which included modern Greece, Anatolia and Cyprus), he also worked on New World populations (Angel et al. 1987) and modern problems (Angel 1949), including forensic anthropological investigations (Angel and Caldwell 1984; Ubelaker 1990), and all this work covered a wide range of subject areas (e.g. microevolution, occupation, obesity, ecology, dental anthropology, palaeodemography, social biology and palaeopathology).

Angel was born in London in 1915 and died in 1986. His father was a sculptor, and mother, a classics scholar (Orrtner and Kelley 1988). He studied classics but moved rapidly into physical anthropology, visiting Greece for the first time in 1937 and completing his PhD in 1942. He excavated archaeological sites in Greece, knew much about Greek history and had an interest in contemporary Greece (Jacobsen and Cullen 1990). He also pioneered the study of skeletal material in Greece painstakingly searching for excavated skeletons, fighting bureaucracy, educating archaeologists on the best excavation methods for skeletal material and analysing skeletal material for his research. Angel combined a unique background in classics with studies in human anatomy and biological anthropology (St Hoyme 1988) and was able to bring together diverse disciplines in his analyses, his research being ahead of his time perhaps by as much as two decades (Buikstra 1998). The extent of the impact of Angel’s research upon the study of biological anthropology worldwide has been assessed by several authors (Ubelaker 1982; St Hoyme 1988; Buikstra 1990, 1998; Buikstra and Hershover 1990; Jacobsen and Cullen 1990; Kennedy 1990).

Angel’s initial interest was in ‘racial’ history and its relation to culture (1942, 1944a) but he shifted later to a focus on palaeoecology, health and human adaptation (Jacobsen and Cullen 1990) and, although he rejected racism, he admitted that human biological variation existed (Kennedy 1990: 204). From his very early studies Angel was concerned with the issue of ‘race’ but the notion of ‘race’ that he used differed drastically from that of his contemporaries. Angel ‘interpreted his racial categories not as rigid, genetically determined entities, but as abstract concepts which were useful in defining genetic change and physical characteristics appearing in different frequencies in human populations. In short, his biological types were tools, not biological realities . . . However, a rejection of racism was never confused with the necessity to admit the existence of human biological diversity’ (Kennedy 1990: 205). From the beginning, Angel conceded that ‘types’ only loosely represent genetic realities; in effect ‘they are inflexible and artificial’ (Angel 1945: 282). This is a point that Jacobsen and Cullen (1990: 40) note: ‘types make vivid the biodynamics of population change,
but are too inflexible and artificial in representing genetic reality'. Attitudes to the study of ‘race’ (now more properly termed as ancestry or ethnicity) in the past have changed since Angel’s work and there is much controversy in biological anthropology about whether ‘race’ can and should be identified, or even discussed, in skeletal remains. This has stemmed from the religious, political and social dimension attached to racial issues today, and the heterogeneity of populations all over the world. People have moved around, migrated and immigrated, and there have been intermarriages between people of different ancestral groups, so that identifying the origin of people based on their skeletons becomes problematic, with traits from many different groups present in the same skeleton. The main point to emphasise is that people may be different, and this ‘difference’ may be identified in the skeleton, although not always that easily, while that these ‘differences’ do not reflect any hierarchy among people.

In the 1940s Angel was studying something that became a controversial area in the later part of last century. He used data on cranial measurements he collected to answer questions about population movement. Today we still see the study of ‘race’ in forensic situations when identification of a skeleton utilises ancestral characteristics visible in the bony structure. This is particularly important because on a missing person list the ancestral origin of each person is stated, so recording this feature is essential in identification. It is important to stress the theoretical framework of Angel’s work, which was not shared by many of his contemporaries. Although his classificatory system was based on the type system employed by his mentor (Hooton 1930: 185–6, as noted by Angel 1944a: 336), Angel moved beyond a static typological approach to one that employed a biocultural perspective and focused on the exploration of the nature of human biological variation through the consideration of ecological, social and cultural variables (Angel 1944a, 1946a, 1965, 1966, 1969a). This emphasis of Angel on the process, rather than on the history, of diverse biological conditions also had a great impact on the shaping of the modern palaeopathological approach. Angel belongs to the group of people who were responsible for shifting the research interests of palaeopathology from a static concern with the history of disease to questions concerning the epidemiology of diseases and their relation to other biocultural factors (Ubelaker 1982: 345).

Angel’s publications (from 1939 to 1991) number 145 (see Appendix) and include, on the basis of the title, around 60 papers (40 per cent) on aspects of past Mediterranean populations. The total number, however, also includes 17 conference abstracts (some of which eventually became publications); 6 related to forensic anthropology, 8 on New World skeletal material/issues (publications seen later in his life), and 3 book reviews.
Buikstra and Hershover (1990) critique 107 of his publications and show that, throughout his life, his major interest remained in Greece. He published in many areas of physical anthropology, but it was his cemetery reports of skeletal material that figure prominently; it is probably in this area that many physical anthropologists worldwide today produce most publications. In effect, the basic skeletal report is the first piece of work produced for a site, which may then be followed by more specific research as questions and hypotheses develop about the skeletal material as it is being analysed. Apart from his many reports on skeletal material from a variety of archaeological sites in Greece, he had a keen interest in a number of areas of physical anthropology still attracting attention today. These include the biocultural approach to studying past populations (or ‘social biology’ – this is the approach advocated currently), palaeodemography (many of his papers are still cited today), palaeopathology (notable work was his study of thalassaemia and its relationship to malaria in the Mediterranean which is still a hot topic of debate by historians and biological anthropologists alike, now being tackled using ancient DNA analysis, e.g. Taylor et al. 1997), and occupationally related pathology (which is seeing a major increase in interest today, despite the problems of studying it; Jurmain 1999). He was also keen to state why studying the past was important, almost justifying it as he documented his analyses: he advocated cross-discipline fertilisation at all times for the interpretation of archaeological materials.

A survey of some of his publications shows that, from the start, Angel was not only interested in the biological remains of Greek populations but also in their cultural context, ranging from the funerary customs associated with them to the diseases from which they suffered. His initial publications did focus on the subject of movement of people in the Mediterranean, concentrating on measurements of skulls to define head shapes (e.g. 1945, 1946b), but his attention to detail in recording is laudable at this very early stage of biological anthropological study. Even in 1944 (1944b), however, he was already studying health and disease, and his paper on teeth took a comparative look at both ancient and modern populations, even delving into differences between urban and rural groups, something which is only seriously being considered of late in palaeobiological anthropology (Roberts et al. 1998). In 1947 Angel published his first paper specifically tackling palaeodemography, something he developed in later years, in publications which are still cited today (1968, 1969a,b). He was particularly keen to show the relationship between ecological factors and the structure of past populations, including their health patterns (1972a, 1975). Perhaps one of his most important works was that on the proto-urban population from Middle Bronze Age Lerna in 1971, a time when this population was experiencing a critical time in its history; in fact, Grmek (1983: 56) considers that the monograph was
a ‘model of the genre’. In this monograph, Angel emphasised that he could only consider these people bioculturally by studying all their physical remains, ‘...plus from archaeologists and other experts, a knowledge of their environment, their diet and the material objects in their culture, as well as a more or less firm structure of knowledge of hundreds of other sites made into a chronological sequence by a host of scholars and scientists’ (1971: 112). This point comes across time and again; namely, that a multidisciplinary approach to reconstruct past human population adaptation and change was the way to proceed. His publications in 1972 and 1975 on the relationship between ecology and population in the Eastern Mediterranean certainly proved that collating all these types of data together made possible a reconstruction of why populations changed, in terms of male/female length of life, and why disease rates altered from 9000 BC to AD 1800. He continued this sort of work well into those publications that appeared in the 1980s.

In the 1960s he began to tackle another question in health and disease, that of the effect of the transition to agriculture on the health of populations, using Neolithic skulls from Sotira. This area of study was given more prominence in 1984 with the publication of a book on palaeopathology at the origins of agriculture, for which Angel produced a paper on Greek populations, leading to many more studies in the same vein (Hill and Armelagos 1990). Later (1964a), he first published on an area of palaeopathology, the thalassaemias, which has prompted much work since then. He showed an association between high sea levels, marshy areas of Greece, malaria and skeletal changes of the genetic anaemia, thalassaemia, well before 2000 BC in Greece. A flurry of papers on this subject were published (1966, 1967, 1977, 1978) and all his skeletal reports noted the presence or absence of this condition. The key to this argument was that the organism causing malaria was a factor for the maintenance of relatively high frequencies of genes for abnormal haemoglobin (Angel 1964a). Since his work, no papers have been published on this subject in Greek populations, although other Greek researchers have considered it (e.g. Lagia 1993). In 1974 he also presented the first real population-based approach to the study of trauma from the seventh millennium BC to the twentieth century in Greece, finding a negative association of fractures with levels of ‘civilisation’. Although this was his only paper specifically on this subject, it was influential in the field of biological anthropology, and still stands as one of the few population-based approaches to trauma in the past, others including Jurmain (1991), Lovejoy and Heiple (1981) and Grauer and Roberts (1996). He also considered the association of occupation and skeletal change (1964b, 1982), which has seen a major interest over the last fifteen years (Merbs 1983; Kennedy 1989; Bridges 1990, 1991; Jurmain 1999).

Angel’s painstaking work on reconstruction of skulls from fragments of mainly cranial vaults and faces is worth mentioning, although he was limited
by the tools available at the time. The extensive use of wire and benzine-based transparent glue often deformed skulls and made the sutures unobservable, and the bones were prone to break at the same or different areas. Without doubting Angel’s genius and passion for his work, it is wise for the modern researcher to take these problems into account.

In short, Angel had a wide range of publications on many aspects of biological anthropology and pioneered studies of skeletal material in Greece. He paved the way for the future and highlighted many questions which still need to be asked of extant material and of that which may be excavated in the future. He worked towards successfully bridging the gap between biological anthropology and archaeology, and helped educate the latter in the importance of the efficient and careful retrieval of skeletal remains from the ground. What then of the present and future?

**Current work in health and disease in Greek skeletal material**

Several developments in a number of institutions in Greece that support the study of human skeletal remains, such as University Departments, the Eforeia/Ephorate of Palaeoanthropology and Speleology, and the Wiener Laboratory of the American School of Classical Studies at Athens (ASCSA) appear very promising for the field of biological anthropology in the region today. The Wiener Laboratory, in particular, honouring the contribution of J.L. Angel to the study of human skeletal remains in the Eastern Mediterranean, offers annually one or two Fellowships for the study of human skeletal remains in Greece. In the Eforeia/Ephorate of Palaeoanthropology and Speleology, a rich environment is offered for interdisciplinary research that functions towards the development of a better understanding of archaeological investigation (Stravopodi 1993a,b; Stravopodi *et al.* 1999).


Current projects undertaken within the University of Athens include the development of a modern reference collection, initially founded at the
Wiener Laboratory (Pike 1997), and currently curated at the University of Athens, in the Department of Biology (Figures 2.2 and 2.3). The collection aims to contribute to the development of standards for sex and age estimation for Greek populations (Lagia et al. 2000), as well as to the identification of diseases from the human skeleton (Lagia 1997; Lagia and Kontanis 1997). Moreover, the creation of the field of Forensic Anthropology at the University of Athens, in the Department of Forensic Medicine and Toxicology (Moraitis et al. 2000), is one of the most recent establishments.

A large number of biological anthropological analyses apply current methods of skeletal biology to investigate health and disease patterns in populations from diverse regional and chronological contexts (Agelarakis 1987, 2000; McGeorge 1992; Fox Leonard 1997; Lagia 1999; Triantaphyllou 2001; Bourbon 2003a, 2004a; Bourbon and Rodríguez-Martín 2003; Bourbon in press; Malama and Triantaphyllou 2003; Tsaliki 2003b). There is also an ongoing interest in the identification of specific diseases in the past which is expressed through a series of studies addressing methodological considerations in palaeopathology (Lagia 1993; Eliopoulos 1998; Tsaliki 2002a) and presenting specific pathological conditions (Manolis et al. 1994; Arnott 1996; Barnes and Ortner 1997; Bourbon 1998, 2000, 2001a, 2003b, 2004b, in press; Little and Papadopoulos 1998; Lagia and Ruppenstein 1999; Tsaliki 2003a, 2004a).

Recent years have also witnessed a blossoming of analyses that attempt to combine biological anthropological with contextual and other multi-disciplinary based data in order to reconstruct aspects of life history and the treatment of the deceased as revealed by human skeletal remains (e.g. Tsaliki 1996, 1997, 2000, 2001, 2002b; Karali and Tsaliki 2001b; Vavouranakis et al. 2002). These studies employ current analytical techniques to a theoretical framework and have a population-based approach working at a regional and temporal level with cross-cultural comparisons in some cases (Papathanasiou et al. 1995, 2000; Manginis et al. 2001; Papathanasiou 2001a,b; Triantaphyllou 2001; Bourbon 2003a, 2004a). The contribution of the field of taphonomy to bioarchaeological analyses has enhanced our understanding of the interaction of human and environmental factors (Moraitis 1998; Moraitis and Koutselinis 2000; Lagia 2002). Special emphasis is also given to sub-groups within a population, such as the sub-adults. The study of infant mortality, until recently a neglected subject in the bioarchaeological literature, has brought to centre stage aspects of the preservation of immature remains or neonatal versus post neonatal mortality, the latter highly associated with poor environmental conditions (Triantaphyllou and Chamberlain 1996; Papadopoulos 2000; Bourbon 2001b).
Figure 2.2  Modern example of cancer affecting the pelvic bone in a 65 year old male who died of metastases (‘secondaries’) of cancer of the brain (primary site was the lungs); University of Athens modern reference collection.

Figure 2.3  Radiograph of Figure 2.2 and the opposite side, also showing destructive lesions.
Furthermore, researchers have focused attention on regions and chronological periods that were previously ignored (e.g. Tsaliki in press). For example, in Northern Greece the analysis of a large series of skeletal remains from Greek Macedonia has revealed intriguing data about aspects of health and dietary status, demography and mortuary behaviour from the Neolithic to the Early Iron Age (Triantaphyllou 1997, 1998a,b,c, 2000, 2001). These studies indicate an overall tendency towards declining levels of health and oral status in Late Bronze and Early Iron Age populations, and an overall shift from a high reliance on meat consumption to a diet based on carbohydrate foods from the Neolithic and Early Bronze Ages to the Late Bronze and Early Iron Ages. Changes in the treatment of the dead from the Neolithic to the Early Iron Age also suggest a shift in emphasis from individual to lineage-group identity. Meanwhile, there is an ongoing project that attempts to explore similar questions from the same area in historical cemetery populations (e.g. ancient Pydna and Amphipolis; Bessios and Triantaphyllou 2002; Malama and Triantaphyllou 2003; Grammenos and Triantaphyllou 2004). Integrated analyses have inspired an increasing collaboration between biological anthropologists and archaeologists and have resulted in important research findings (Liston 1993; Lagia 2000; Bessios and Triantaphyllou 2002; Malama and Triantaphyllou 2003).

Within the analytical techniques employed in bioarchaeology, bone chemical analyses (e.g. Magou et al. 1997; Papathanasiou 2001b; Triantaphyllou 2001; Bourbou and Richards forthcoming) have offered valuable knowledge on the reconstruction of past diets and economic strategies. Triantaphyllou (2001) and Papathanasiou (2001b) have conducted isotopic analysis on prehistoric Greek populations from diverse regions and have reached similar conclusions concerning diet (Van Klinken and Triantaphyllou 1997). In both studies the absence of any signal indicating marine consumption even at coastal sites, and the presence of a primarily terrestrial-based diet are striking (also see Karali 1999 for comment about fluctuations in the consumption of shellfish in Greek prehistory). Garvie-Lok (2001) has taken a further step in bone chemical analysis attempting to reconstruct patterns of diet and mobility in Medieval Greece (twelfth to fifteenth centuries AD).

**Future work**

It is accepted that for the application of theoretical and methodological advances to take place in the reconstruction of past lifeways it is necessary to have large representative samples of well-documented skeletons. As Buikstra (1991: 174) said, ‘The major factors limiting advancement in bioarchaeological research centre are on the quantity and quality of skeletal
remains and contextual data. The need for representative samples of sufficiently large size continues to be crucial.' Ubelaker (1982: 346) also notes that 'Ancient disease in a biocultural and epidemiological perspective represents an exciting area of research, but one with many methodological problems. The problems centre on the incomplete evidence for disease and the need for more accurate chronological controls and more exact indicators of subsistence and other cultural variables.' These statements, although intended to describe the situation in a different cultural context, are as urgent as ever in the modern arena of anthropological research in Greece. Despite Angel’s monumental efforts, Jacobsen and Cullen (1990) note that a close collaboration of the archaeologist with the biological anthropologist has not yet been achieved. It is also obvious to the researcher that Greek Eforeias (i.e. local archaeological councils), museums and other institutions can lack well-organised, properly curated, and easily accessible skeletal collections.

Education has played an important role in the perpetuation of this phenomenon. For instance, the University of Athens is the largest and oldest University in Greece, established in 1837. Archaeology is being taught in the Department of History, Archaeology and History of Art but the approach to archaeology is traditional and classicist. Undergraduate students must follow compulsory courses on all three major subjects, with the addition of ancient and modern literature, psychology, philosophy and similar subjects, whereas courses in environmental archaeology, human osteoarchaeology, archaeobotany, archaeozoology and burial archaeology are either optional or non-existent. In addition, the lack of a unified University library is an important drawback. Every discipline has its own small specialised library, housed separately, which prohibits interdisciplinary research. The modules taught in other more recently developed archaeology departments across the country seem more promising and modern in approach.

Within the framework for improving the current status of biological anthropology in Greece, the Department of Biological Sciences, University of Athens has initiated an annual bioarchaeological seminar addressed to the archaeological community. This seminar aims to increase the communication between the disciplines of anthropology and archaeology, providing information about theoretical, technical and methodological advances that take place in the field and about the mutual interest that exists in such collaboration. The seminar emphasises the need for collaboration taking place at all levels of a project, starting from the planning of the research design, moving to sampling strategies, the recovery and conservation of the material and finally to the analysis and interpretation of the results. The Research Team for Environmental
Archaeology of the University of Athens, in collaboration with the Hellenic Society for the Protection of the Environment and the Cultural Heritage, the Department of Chemistry of the University of Athens, the National Research Centre Democritos, and lately the Laboratory of Sea Geology and Oceanography of the Department of Geology, University of Patra, and the Netherlands Institute in Athens (NIA), have organised several seminars which aim to bring together scholars in archaeology, archaeometry, geosciences, environmental studies and biology. It is only within such a collaborative framework that it will be possible to escape from descriptive appendices and integrate analyses and interpretation of cemeteries with problem-oriented research designs.

The accelerated participation of biological anthropology in understanding the past highlights the importance of the participation of a person who understands the analysis of human skeletal remains at cemetery excavations for the most efficient retrieval of skeletal material, together with soil and other samples (Tsaliki 2004b). For example, where an excavator lacks the appropriate training, small foetal bones may be missed and this may result in misinterpretation of the data retrieved from the skeletal material. The limited potential of one single Archaeological Service, namely the Eforias/Ephorates of Palaeoanthropology and Speleology, to accommodate for the needs of numerous cemetery excavations that take place throughout Greece, emphasises the need to establish affiliations of biological anthropologists, as well as of organised Laboratories fostering interdisciplinary analysis. Continuous active participation in cemetery excavations will eventually lead to large skeletal collections being properly recorded, maintained and curated. According to a recent public announcement on the website of the Ministry of Culture in June 2003, the President of the Hellenic Democracy signed a decree on the ‘New Organisation of the Ministry of Culture’. Among the major changes, it has been announced that the Eforias/Ephorates of Antiquities will be increased by 28 units. As a result, every prefecture will house at least one service of the Ministry of Culture. In addition, two Eforias/Ephorates of Palaeoanthropology and Speleology will be organised, one in Athens and one in Thessaloniki. The number of Archaeological Institutes will also be increased to six. The study of human remains from archaeological sites therefore has much greater potential.

Archaeologically-derived Greek skeletal material provides the opportunity of studying the lives of past populations diachronically with the added benefit of integrating the biological evidence with, for example, contemporary literature, epigraphy, artefacts and architectural remains. Furthermore, the availability of easily accessible data on standards for recording for human skeletal remains (Buikstra and Ubelaker 1994), means that the stage seems set for this to be achieved.
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