

1-2000

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# ΕΥΛΙΜΕΝΗ

ΜΕΛΕΤΕΣ ΣΤΗΝ ΚΛΑΣΙΚΗ ΑΡΧΑΙΟΛΟΓΙΑ,  
ΤΗΝ ΕΠΙΓΡΑΦΙΚΗ, ΤΗ ΝΟΜΙΣΜΑΤΙΚΗ ΚΑΙ ΤΗΝ ΠΑΠΥΡΟΛΟΓΙΑ

Τόμος 1  
Μεσογειακή Αρχαιολογική Εταιρεία  
Ρέθυμνο 2000

## ASPECTS OF DEMOGRAPHY AND PALAEOPATHOLOGY AMONG THE HELLENISTIC *ABDERETES* IN THRACE, GREECE\*

### Introduction

Systematic excavations at the multicomponent and often superstratified archaeological sites of ancient Abdera<sup>1</sup>, located in coastal Thrace, Greece (Fig. 1), unearthed since the early 50s, a considerable number of architectural remains, such as roads and fortification walls strategically enhanced with many towers, the commercial and war-time harbors, the theater, the agora, temples, some public and many private buildings and activity areas, such as burial grounds and cemeteries, dating from the 7<sup>th</sup> c. B.C. to the 15<sup>th</sup> c. A.D.<sup>2</sup>.

In addition, a plethora of cultural materials and artifacts were discovered, ranging from statues and statuettes<sup>3</sup>, epigraphic stelae<sup>4</sup>, luxury and utilitarian utensils in ceramic<sup>5</sup>

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\* I wish to thank Dr. Chaido Koukouli-Chrysanthaki, Ephor of Antiquities of Eastern Macedonia and Director of the Archaeological Museum in Kavala, excavator of the site, for her continued scholarly support, but especially for being a source of inspiration and a mentor during my pursuit in Archaeo-Anthropology. Further, I wish to recognize the Adelphi team of students, who worked with me in the field, for their commitment and efforts.

<sup>1</sup> Herodotus from Halicarnassus (c. 484 - 420 B.C.), History; Thucydides, (c. 460 - 455 B.C.), History of the War between Athens and Sparta, 431 - 404 B.C.; Diodorus Siculus (c. 60 - 30 B.C.), World History; Strabo of Amaseia (64/3 B.C. - A.D. 21 at least), Geography. Book 7: North and east Europe, North Balkans; Gaius Plinius Secundus (A.D. 23/24 - 79), Naturalis Historia, V: Geography. Books 3-6.

<sup>2</sup> Λαζαρίδης Δ., «Ανασκαφή εν Αβδήροις», *ΠΑΕ* 1950:293-302, 1952:260-278, 1954:160-172, 1955:160-164, 1956:139-140, 1966:59-66, 1971:63-71; Μπακιριτζής Χ., «Ανασκαφή Πολυστύλου Αβδήρων», *ΠΑΕ* 1892:18-26, 1983Α:13-19; Κουκούλη-Χρυσανθάκη Χ., «Ανασκαφικές Έρευνες στα Αρχαία Άβδηρα», *ΠΑΕ* 1982:1-17, 1983Α:1-12, 1984Α:1-11, 1987:177-185; Σκαρλατίδου Ε., «Επισκόπηση της ιστορίας των Αβδήρων με βάση τις φιλολογικές πηγές και τα αρχαιολογικά δεδομένα», *Θρακική Επετηρίδα*, 1984, 5:147-161; Σκαρλατίδου Ε., «The Archaic Cemetery of Abdera», *Thracia Pontica* III, 1985, 99-108; Κρανωίτη Λ., «Γύμβος από τη ΒΔ νεκρόπολη των Αβδήρων», *ΑΕΜΘ* I, 1987, 431-435; Κουκούλη-Χρυσανθάκη Χ., «Abdera and the Thracians», *Thracia Pontica* III, 1987, 82-98; Σαμίου Χ., «Το ελληνικό νεκροταφείο των Αβδήρων», *ΑΕΜΘ*, 1988, 2:471-480; Καλλιγιάννη Κ., «Ανασκαφή Ταφικού Τύμβου στα Άβδηρα», *ΑΕΜΘ* 4, 1990:561-568; Ψιλοβίκος Α. και Συρίδης Γ., «Η αρχαϊκή πόλη των Αβδήρων. Α. Γεωμορφολογικές Έρευνες», *Πρακτικά 2<sup>ου</sup> Διεθνούς Συμποσίου Θρακικών Σπουδών, Αρχαία Θράκη*, 1997, 2: 707-714; Σκαρλατίδου Ε., «Οικισμοί και εγκαταστάσεις ιστορικών χρόνων μέσα στα όρια της «χώρας» των Αβδήρων», *Μνήμη Δ. Λαζαρίδη, Θεσσαλονίκη*, 1990, 611-618.

<sup>3</sup> Μπόνιαν Ζ., «Ανδρικός κορμός από τα Άβδηρα». Ανακοίνωση, 2<sup>ο</sup> Διεθνές Συμπόσιο Θρακικών Σπουδών, *Αρχαία Θράκη*, 1992, Κομοτηνή.

<sup>4</sup> Σκαρλατίδου Ε., «Επιτύμβιο ανάγλυφο από τα Άβδηρα», *Πρακτικά 2<sup>ου</sup> Διεθνούς Συμποσίου Θρακικών Σπουδών, Αρχαία Θράκη*, 1997, 2:775-788; Παπανικολάου Γ., «Νέα επιγραφή από τα Άβδηρα», *Πρακτικά 2<sup>ου</sup> Διεθνούς Συμποσίου Θρακικών Σπουδών, Αρχαία Θράκη*, 1997, 2:841-847.

<sup>5</sup> Κρανωίτη Λ., «Άβδηρα: Τόπος παραγωγής ελληνιστικής ανάγλυφης κεραμικής», *Πρακτικά 2<sup>ου</sup> Διεθνούς Συμποσίου Θρακικών Σπουδών, Αρχαία Θράκη*, 1997, 2:789-806.

silver and gold, jewelry, coins<sup>6</sup>, tools and weapons, assemblages of toys, and votive offerings, to mention a few, justifying the citations of the historical records which designated Abdera as one of the richest cities in Greece, in both material resources (with major contributions of funds to the Delean League), and intellectual vigor as with the geniuses of *Protagoras*, and *Demokritos* to mention a few<sup>7</sup>.

Despite the vast wealth of material remains, artifacts, and ecofacts, however, our knowledge concerning the human condition through empirical first hand archaeo-anthropological investigations was limited. The systematic proper excavation, recovery, documentation, and preservation of human skeletal remains was an exercise conducted by a select number of colleagues who interested in funerary customs and practices, as well as the nature of burial artifacts were enlightened by the then emerging theoretical and methodological challenges in the area of Archaeology, during the early seventies. These colleagues, in a process of pioneering efforts, extended collaborative invitations to archaeo-anthropologists for participating in excavations and subsequently for the undertaking of systematic analyses of the anthropological record, recovered during mitigations from the necropoleis of the ancients<sup>8</sup>. The universe of important data that kept pouring in from such integrated projects helped launch a new era in the sphere of Greek Archaeology paving and ensuring among other things a better cross disciplinary environment of post-processual meta-archaeological goals for the younger generation of our colleagues.

Holding such a special place for the personal and professional becoming of some of us, the archaeological sites of Abdera have offered, since the seventies, a unique milieu for the excavations and subsequent studies of burial grounds and cemeteries dating from the Archaic period, 7<sup>th</sup> c. B.C., to the terminal Late Byzantine period, 15<sup>th</sup> c. A.D. The human skeletal collections recovered and analyzed so far from Abdera cover a well documented stratigraphic and diachronic continuum of more than 2000 years. Since the beginning of this ongoing process we have been privileged in studying aspects of the human condition during antiquity in Abdera through physical anthropology and palaeopathology, coupled by endeavors in the field of ethnography.

This paper presents aspects of the demographic and palaeopathological profiles<sup>9</sup> of the population at Abdera during the Hellenistic period.

<sup>6</sup> May J.M.F., *The Coinage of Abdera*, London, 1966; Picard O., «Χάλκινα Νομίσματα Αβδήρων», *Πρακτικά 2<sup>ης</sup> Διεθνούς Συμποσίου Θρακικών Σπουδών, Αρχαία Θράκη*, 1997, 2: 685-690.

<sup>7</sup> H. Diels, *Die Fragmente der Vorsokratiker*, 2<sup>nd</sup> Edition, Weidman, 1906, Berlin.

<sup>8</sup> Μπακιριτζής Χ. και Ζήκος Ν., «Ανασκαφή πολυστύλου Αβδήρων», *ΠΑΕ*, 1984:11-17; Σκαρλατίδου Ε., «Ανασκαφή στο αρχαίο νεκροταφείο των Αβδήρων», *ΑΕΜΘ* 1, 1987, 421-425; Κουκούλη-Χρυσανθάκη Χ., «Ανασκαφές στα αρχαία Αβδηρα», *ΑΕΜΘ*, 1987, 407-410; Καλλιτζή Κ., «Αρχαιολογικές εργασίες στα Αβδηρα», *ΑΕΜΘ* 5, 1991, 456-469; Καλλιτζή Κ., «Έθιμα ταφής στα Αβδηρα», *Πρακτικά 2<sup>ης</sup> Διεθνούς Συμποσίου Θρακικών Σπουδών, Αρχαία Θράκη*, 1997, 2: 807-839; Κουκούλη-Χρυσανθάκη Χ., «Η Αρχαϊκή Πόλη Αβδήρων. Β. Αρχαιολογικές Έρευνες», *Πρακτικά 2<sup>ης</sup> Διεθνούς Συμποσίου Θρακικών Σπουδών, Αρχαία Θράκη*, 1997, 2:715-734; Τριαντάφυλλος Δ., «Σαρκοφάγος Κλαζομενικού Τύπου από τα Αβδηρα», *Πρακτικά 2<sup>ης</sup> Διεθνούς Συμποσίου Θρακικών Σπουδών, Αρχαία Θράκη*, 1997, 2:741-774.

<sup>9</sup> Stewart T.D., *Essentials of Forensic Anthropology*, C.C. Thomas, 1979, Springfield, Ill; Ortner D.J. - Putschar W.G.J., *Identification of Pathological Conditions in Human Skeletal Remains*, Smithsonian Contributions to Anthropology, 1981, No. 28. Smithsonian Inst. Press, City of Washington; Hassan F.A., *Demographic Archaeology*, 1981 Academic Press; Huss-Ashmore R., *Nutritional inference from paleopathology*, *Advances in Archaeological Method and Theory*, 1982, 5:395-474; Krogman W.M. - Iscan M.Y., *The Human Skeleton in Forensic Medicine*, 1986 C.C. Thomas. Springfield, Ill; Iscan M.Y. - Kennedy K.A.R. (Eds.), «Reconstruction of

### Sample size and preservation of skeletal remains

Recovered from the internal peripheries of a northerly gate of the city, amidst large fortification walls and overlooking towers this segment of the Hellenistic population, a random sample of 48 individuals<sup>10</sup>, had been interred as primary single, and/or multiple, interments in rather plain ceramic or stone sarcophagi, pithos burials, and boxed graves constructed with marble slabs. These, had been placed at the vicinity of a Classical period temple. Whereas the majority of skeletal bodies were preserved in an excellent condition for both inspectional, mensurational and archaeometric analyses<sup>11</sup>, some of the skeletal remains had undergone a variety of complex taphonomic impacts<sup>12</sup> (Fig. 2) relative to seasonal elevations of the water table, requiring lengthy consolidation and conservation efforts.

### Mortality prevalence, and sexual morphometric dimorphism

The skeletal collection comprised both sex subcategories<sup>13</sup> (Fig. 3) and most age subgroups<sup>14</sup>, with the exception of prenatal, perinatal and early Infancy I individuals as these according to burial customs should have been interred in infant cemeteries. Interestingly enough and in accord with chronological periods which both ante- and post-date the Hellenistic period —based on intra site skeletal studies<sup>15</sup>, females scored a

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Life from the Skeleton», Alan R. Liss, Inc., 1989, New York; Ortner D.J. - Aufderheide A.C., *Human Paleopathology: Current Synthesis and Future Options*, Smithsonian Institution Press, 1991, Washington.

<sup>10</sup> Bernard H. R., *Research Methods in Anthropology: Qualitative and Quantitative Approaches*, 2<sup>nd</sup> Edition, 1994, Sage Publications, Inc., California; Bordens K.S. - Abott B.B., *Research Design and Methods*, 2<sup>nd</sup> Edition, Mayfield Publishing Company, 1991, Toronto; DiBennardo R., in Kathleen J. Reichs, «Forensic Osteology: The Use and Interpretation of Common Computer Implementations of Discriminant Function Analysis» 1986:171, C.C. Thomas, Springfield, Ill.

<sup>11</sup> Agelarakis A., «Εγχειρίδιο φυσικής ανθρωπολογίας για αρχαιολόγους», *Αριάδνη*, 1996, 8:189-247; van Vark G.N. - W. Schaafsma, in S.R. Saunders and M.A. Katzenberg (eds.) «Skeletal Biology of Past Peoples: Advances in the Quantitative Analysis of Skeletal Morphology», Willey-Liss, 1991: 225-257, New York.

<sup>12</sup> Shipman Pat, *Life History of a Fossil: An Introduction to Taphonomy and Paleoecology*, Harvard University Press, 1981, Cambridge, Massachusetts.

<sup>13</sup> Sutherland D. L. - Suchey J.M., «Use of the Ventral Arch in Pubic Sex Determination», *Journal of Forensic Sciences*, 1991, V:36, N,2, pp. 501-511; Rogan, K. P. - J.J. Salvo «Study of Nucleic Acids Isolated From Ancient Remains», *Year Book of Physical Anthropology*, 1990, V: 33, pp.195-214; Berry C. - Berry J., «Epigenetic variation in the human cranium», *Journal of Anatomy*, 1967, 101(2):370-390; Finnegan, M., «Non-metric variation of the Infracranial skeleton», *J.Anat.*, 1978, 125:23-37; Saunders S.R., in M.Y. Iscan - Kennedy, K.A.R. «Reconstruction of Life from the Skeleton: Nonmetric Skeletal Variation», 1989, 95-108, A.R.Liss, New York.

<sup>14</sup> El-Nofely A. - Iscan M.Y., in M.Y. Iscan (ed.) «Age Markers in the Skeleton: Assessment of Age from the Dentition in Children», 1989, 237-254, C.C. Thomas, Springfield, Ill; Brooks S. and Suchey J.M., «Skeletal Age Determination based on the Os Pubis: A Comparison of the Ascadi-Nemeskeri and Suchey-Brooks Methods» *Human Evolution*, 1990, V:5, N,3, 227-238.

<sup>15</sup> Agelarakis A. - Agelarakis Ar., «The Palaeopathological Evidence, Indicators of Stress and Dietary Evaluations from two Skeletal Populations, a Middle and a Late Byzantine, from Polystylon Abdera, Greece», *Byzantinische Forschungen*, 1989, V.(XIV), 9-26; Agelarakis A., «Social Hierarchy in a Classical Society at Abdera as Revealed by New Archaeological Perspectives of the Human Skeletal Record», *Πρακτικά 2<sup>ου</sup> Διεθνούς Συμποσίου Θρακικών Σπουδών, Αρχαία Θράκη*, 1997, 2: 849-866; Bakirtzis Ch. - Agelarakis A., «Cemeteries of Polystylon—Abdera». Paper presentation, *First Symposium on Burial Customs and Practices in the Rhodopes*, 1996, Smolyan, Bulgaria; Agelarakis A., «Report on Anthropological Investigations in Classical Abdera: Cremated

higher mortality prevalence compared to males during: a) their terminal, Subadult and early Young Adulthood years, suggested to be relevant to the difficulties of the initial fertility years; and b) during the years of the Maturus and Senilis age subgroups, since they usually out-competed their male counterparts in longevity. Males, following a comparable diachronic pattern for Abdera, registered a higher prevalence of mortality during their Middle to Late Adulthood years. Analogous results, conforming to these of other time periods in Abdera were also retrieved from morphological studies of osseous structures, robustness, and evaluations of skeletal measurements revealing a discernible sexual dimorphism between males and females, with higher values among males (*ibid*).

### Dental pathologies, and aspects of dietary patterns

Dental surfaces and their hard supporting tissues indicated clusters of pathologies<sup>16</sup> (Fig. 4) comparable to these of the periods which both preceded and followed the Hellenistic era, these of the Classical, and Roman periods respectively<sup>17</sup>. Again, as usual for Abdera, males showed a nearly greater prevalence on all palaeopathological conditions compared to females. The majority of dental palaeopathological conditions were assessed to be of infectious and degenerative nature. Dental linear enamel hypoplastic defects (LEH), permanent markers of early life stress, were attributed to palaeopathological, and physical environment related causative agents<sup>18</sup>. Further, male jaws and teeth revealed under all circumstances (observation ratio 100%) a greater severity on all pathological manifestations compared to females of the same age subgroups with the exception of ante mortem tooth loss. It should be mentioned that no individuals younger than 18 years revealed cervical cariogenic lesions<sup>19</sup>, while the first osseous manifestations associated with periodontal disease were discerned among individuals as young as 25 years. With the exception of the two Infancy II individuals, both of whom manifested cribra orbitalia and porotic hyperostosis —symptoms relative to

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and Dry Human Osseous Materials», *Archival Report*, Archaeological Museum of Abdera, 1996; Agelarakis A., «Excavations at Polystylon (Abdera) Greece: Aspects of Mortuary Practices and Skeletal Biology», *Αρχαιολογικό Δελτίο*, 1997, 47:293-308; Agelarakis A., «The Archaic Burial Grounds: Physical Anthropological Investigations», *Archival Reports*, Museum of Komotini, 1982, 45; 1984, 52; Agelarakis A., «The Roman Skeletal Collection from Abdera», Report in preparation.

<sup>16</sup> Darling A.I., «Dental Caries», in R.J.Gorlin - Goldman H.M. (eds), *Thoma's Oral Pathology*, The C.V.Mosby Co., St. Louis, 1970, 239-307; Pindborg J.J., *Pathology of the Dental Hard Tissues*, W.B.Saunders Co., 1970, Philadelphia; Molnar S., «Human tooth wear, tooth function, and cultural variability», *AJPA*, 1971, 34:27-42; Rose J.C. K.W. Condon - Goodman A.H., «Diet and Dentition: Developmental Disturbances», in *The analysis of Prehistoric Diets*, J.Mielke and R.Gilbert (eds.), 1984, Academic Press, New York; Cate R.A. Ten, *Oral Histology, Development, Structure, and Function*, 4<sup>th</sup> Edition, 1994, Mosby, New York.

<sup>17</sup> See n. 15 above.

<sup>18</sup> Park E.A. «The imprinting of nutritional disturbances on the growing bone», *Pediatrics*, 1964, 38:815-862; Scrimshaw N. «Ecological Factors in Nutritional Diseases», *American Journal of Clinical Nutrition*, 1964, 14:112-122; Swärdstedt T., *Odontological aspects of a Medieval population in the province of Jamtland/ Mid-Sweden*, Tiden-Barnängen AB, 1966, Stockholm; Grahnén H., «Maternal diabetes and changes in the hard tissues of primary teeth, I. A clinical study», *Odont. Rev.*, 1967 18:257-162; Grahnén H., «Neonatal asphyxia and mineralization defects of the primary teeth», *Caries Res.*, 1969, 3:301-307; Rose J.C., G.J. Armelagos, and J. Lallo, «Histological Enamel Indicators of Childhood Stress in Prehistoric Skeletal Samples», *AJPA*, 1978, 49:511-516.

<sup>19</sup> Darling A.I., «Dental Caries», in R.J.Gorlin - Goldman H.M. (eds), *Thoma's Oral Pathology*, The C.V.Mosby Co., St. Louis, 1970, 239-307.

anemias and/or metabolic disorders, all other individuals with LEH had survived till terminal Late Adulthood and the Maturus age subgroups. This kind of pattern appeared to have been typical in Abdera— as revealed through the dental record from the Classical to the later stages of the Middle Byzantine periods. During subsequent Byzantine periods, a significantly increased morbidity is reflected among individual with LEH none of which survived past the terminal stages of Middle Adulthood for a number of strongly suspected causative agents<sup>20</sup> which acted in a synergistic way with plausible pathogenetic causative agents.

Masticatory wear of dental surfaces<sup>21</sup> indicated a rather well prepared dietary intake for the majority of individuals which showed a progressively heavier and less homogeneous loss of dental surfaces relative to processes of aging. Bone isotopic fractionation<sup>22</sup> identified a bulk of a diet based on agricultural C3 plants (such as wheat and barley), supplemented by adequate inclusions of both terrestrial and marine protein intake measuring a volume of about 12%. Such dietary compositions were very similar to these of the ante-dating Classical and post-dating Roman periods but relatively higher, by about 3-4% on the protein component, when compared with the later periods of the Middle, and subsequent Late Byzantine periods<sup>23</sup>.

#### **Traumatic events, and implications of bodily activities allocated to markers of habitual and occupational stress**

Periosteal osteoblastic reactions, and trauma<sup>24</sup> usually involved a range of well healed and anatomically aligned fractures, and in the process of healing traumatic events which hadn't caused fractures (Fig. 5). The proximal and distal ends of the tibio-fibular structures showed the greatest observation ratio of trauma and subsequent osteoblastic reactions. Nevertheless, there were also upper extremity traumatic manifestations which were usually associated with the sternoclavicular and scapulo-clavicular structures. From the few traumatic impacts which implicated crania one case must have involved surgical intervention, for the removal of a sharp penetrating object and at least of bone splinters,

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<sup>20</sup> Decrease in quality of nutritious dietary intake as reflected through the skeletal record; Socio-economic changes aspects of which are detectable in the skeletal record; Suspected fragmentation of medical «networks» and reduced applications of medical practice, as Polystylon (Byzantine Abdera, see n. 2 above) loses gradually its provincial influentialness —as seen through the archaeological and anthropological record.

<sup>21</sup> Molnar S., «Human tooth wear, tooth function, and cultural variability», *AJPA*, 1971, 34:27-42; Pindborg J.J., «Aetiology of Developmental Enamel Effects not related to fluorosis», *Int. Dent. J.* 1982 32 (2): 123-134; Agelarakis A., «The Chalcolithic Burial Cave in Ma'avarot, Israel, and its Paleoanthropological Implications», *International Journal of OsteoArchaeology*, 1998, 8: 431-443.

<sup>22</sup> Krueger H.W. and C.H. Sullivan, «Models for Isotope Fractionation Between Diet and Bone», ACS Symposium Series, 1984, No. 258, *Stable Isotopes in Nutrition*, R. Turnland and P.E. Johnson (eds.). Am.Chem.Soc.; Krueger H. W., «Models for Carbon and Nitrogen Isotopes in Bone», Krueger Enterprises, Inc. 1985, Cambridge, Mass.

<sup>23</sup> See n. 15 above.

<sup>24</sup> Sognaes R.F. (ed.), «Mechanisms of Hard Tissue Destruction», *AAAS*, 1963, Publ. 75, Wash., D.C.; Zarek J. M., «Dynamic Considerations in Load Bearing Bones with Special Reference to Osteosynthesis and Articular Cartilage», in F.G. Evans (ed.), *Studies on the Anatomy and Function of Bones and Joints*, 1966, pp: 40-51. Springer Verlag, N.Y.; Agelarakis A., «The Shanidar Cave Proto-Neolithic Human Population: Aspects of Demography and Palaeopathology», *Human Evolution*, 1993, 8, 4:235-253.

as revealed by the faint yet detectable linear and J-curve mechanical traces on the external periphery of the margins with sclerotic characteristics, of a nearly circular infectious free depression showing an incomplete, hiatus-like, inner surface of the endocranial table under active remodeling.

While it was revealed, palaeopathologically, that the availability of medical assistance must have been readily available at Abdera, also supported by the Hippocratic writings —especially the books on *Epidemics* I, and III, it was assessed that some of the traumatic events were not caused by random physiological, and/or pathological factors but rather because of habitual— culturally speaking, and occupational circumstances — relevant to the techno-economic capacities and organization<sup>25</sup> of the Hellenistic population. It is suggested for example that the knee joint tibiofibular traumatic events, mainly located at the lateral loci of these structures, and documented nearly exclusively among males, in addition to other plausible causative agents, might also represent the difficulties of horse riding while for example when pushing through the low-lying native oak thickets in such an ecotone as that of the region of Abdera. Similar complaints were gathered ethnographically by the author from the so-called “older cohort of males” at the contemporary historic village of Abdera, who eagerly talk around coffee tables and sometimes even show these old wounds at their knees, and ankle joints, from their years of youth, when as they say “riding a fast horse was both pride and freedom”. And yet during the Hellenistic period, in rare instances, it was also possible to document, exclusively among males, osseous traumatic impacts caused by frictional contact —due to malicious intent, and/or warfare. Both historical and archaeological data verify that Abdera has been the theater of skirmishes and of more serious battle engagements during several periods of polemic activities in antiquity<sup>26</sup>. Under any circumstances, males, in a comparable fashion with all other ancient time periods in Abdera, scored a higher prevalence of traumatism compared to any pertinent female age-subgroups (Fig. 6)<sup>27</sup>. This however, wasn't the case with osteoarthritis and spondyloarthropathies. Here females revealed a slightly greater observation ratio, if not equivalent to these of comparable male age subgroups (Fig. 7). These kinds of indications present an «anomaly» which reaches its apex, in the diachronic palaeopathological record of ancient Abdera, during the Hellenistic period. This data, combined with the otherwise high prevalence of hip-joint and distal tibio-fibular traumatic events might support an argument placing females at least in an equal productive mode with males at the gamut of food production activities, for example including but not limited to agriculture.

Further indications for an active participatory role of females in specialized daily activities is derived from the so-called «markers of habitual & occupational stress» or (MHOS)<sup>28</sup>, which although sexually dimorphic compared to males, but usually only to the

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<sup>25</sup> Agelarakis A., «Paleopathology and its Contributions to the Decipherment of the Human Condition in Antiquity: A Preliminary Report for the Case of two Skeletal Populations from Malloura in Cyprus», *Report of the Department of Antiquities*, Cyprus, 1997, 239-250; Κουκούλη-Χρυσανθάκη, Χ. - Σγούρου Μ. - Α. Αγγελράκης, «Αρχαιολογικές έρευνες στη νεκρόπολη της Αρχαίας Θάσου 1979-1996», *AEMΘ* 10B, 1996, 770-794.

<sup>26</sup> See n. 1 above.

<sup>27</sup> See n. 15 above.

<sup>28</sup> Agelarakis A., «The Archaeology of Human Bones: Prehistoric Copper Producing Peoples in the Khao Wong Prachan Valley, Central Thailand», *The Indo-Pacific Prehistory: The Chang Mai Papers*, IPAA Bulletin, P. Bellwood (ed.), 1996, 14, V:1, 133-139; Agelarakis A., «The Thasos/Kastri, Archaeo-



level of severity of the manifestations, weren't exclusive to males. Such determinations helped entail new roles to some traditionally held notions on the activities of females. The prevalence of a select set of MHOS (Fig. 8) might possibly readily exemplify this argument. Both females and males were involved in a number of such bodily activities which involved the phalanges of the hands, the femora, and the ulnae, only excluding females from kinetics associated with an MHOS designated here as «MHOS-humerus #3».

In a more detailed fashion, both females and males were involved in serious grasping activities. Such were also documented ethnographically in Abdera by the author to relate to: a) weaving, exclusively conducted by females; and b) a non-sexually discriminatory seasonal but very copious manual milking processes of a large number of ovicapric domesticates —a condition which produces a quite painful swelling to the thumb and the first row of phalanges of the hands. Further, manifestations relative to the flexion of the knee joint and the extension of the hip joint (Fig. 9) indicated a non-exclusivity of this trait to males, revealing a participation of females in prolonged activities of walking and standing, coupled by a habitual squatting position as also documented among contemporary working women, in agricultural settings, at Abdera. Ulnar manifestations also indicated a sharing in the activities which involved the supination and hypertension of arms as also observed, however, sporadically in Thrace, during the 60-s and 70-s, during the seasonal reaping activities of cereals with the basic tool: the broad, unserrated and of small curvature sickle on a long shaft, the subsequent thrust-pounding of the harvested plants with long handle-sticks with attached batons for detaching the seeds, and then the now outdated daily routine of the manual dextrorotatory movement on the family's stone rotary quern for the production of flour. The indications for a lesser participation of the females compared to males in carrying heavy loads with their arms, (loads cradled between both arms) isn't as clear cut when we compare data between ulnar and clavicular MHOS (Fig. 10). The clavicular manifestations show strong indications of robustness in their lateral ends thus signifying strong lateral downward dragging forces as when carrying loads on extended arms for any number of activities, or as also characteristically observed by the author in the region, before the 70-s, when women profusely worked on a daily basis, on their large horizontally standing looms. Hence the fact remains, that females were also involved in activities which exerted skeletally recognizable load-bearing stressors on their upper arms and forearms.

The only MHOS which wasn't observed among the Hellenistic females of Abdera, when compared with their male counterparts, were the exostoses at the medial humeral epicondyles —manifestations designated as «MHOS-humerus #3». When present, the exostoses signify a hyperactivity of the pronator teres, flexor capri radii, palmaris longus, flexor digitorum superficialis, and flexor capri ulnaris, deciphered forensically to relate to a thrusting movement of the arms, suggested to be associated here with spear throwing; an activity which even through historical records is preferably attributed to males.

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Anthropological Project», *Proceedings of the International Conference on Thasos: Matières premières et Technologie de la Préhistoire à nos jours*, (in press). Publications of the French Archaeological Institute in Greece; Levi L., *Stress and distress in response to physiological stimuli*, Pergamon Press, 1972, Oxford; Currey J., *The Mechanical Adaptations of Bones*, Princeton Univ. Press, 1984, Princeton N.J.

Finally, in the process of trying to elucidate some of the more esoteric facets of the palaeodemographic dynamics and palaeopathological profiles during Hellenistic times at Abdera, (Fig. 11) it was determined that a number of calcaneal markers of habitual & occupational stress —such as emphasized exostoses, and enthesophytes, (indicative of bursitis) usually associated with typical male roles and activities, i.e. extensive walking and running on hard pavements, coupled by repeated stress impact on the plantar surfaces with build up of enthesophytes and sclerotic bone, caused for example by frequent dismounting from horses, albeit with a higher prevalence among males, were also shared with the Hellenistic females.

### **Epilogue**

Based on data derived from the skeletal collections, in addition to deriving basic physical anthropological assessments, it was possible to document and elucidate unknown aspects of the archaeo-anthropological and historical records in Abdera, hence claiming the Hellenistic period to have been one of liberal attitudes, one that saw the deconstruction of social conditions and pretexts of the more conservative ante-dating periods; conditions which bestowed new roles and expectations allowing for fresh opportunities between men and women, and possibly even new conferred understandings and anticipations between humans, gods and goddesses.

It is envisioned that within the next five years a comprehensive report would describe diachronic aspects of the palaeodemographic, palaeopathologic and palaeoenvironmental record, also reflecting on pivotal facets of the socio-economic organization and capacities, and ideational systems in ancient Abdera.

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Fig. 1 - Coastal Area of Eastern Macedonia and Thrace



Fig. 2 - Taphonomic Impact & Skeletal Preservation

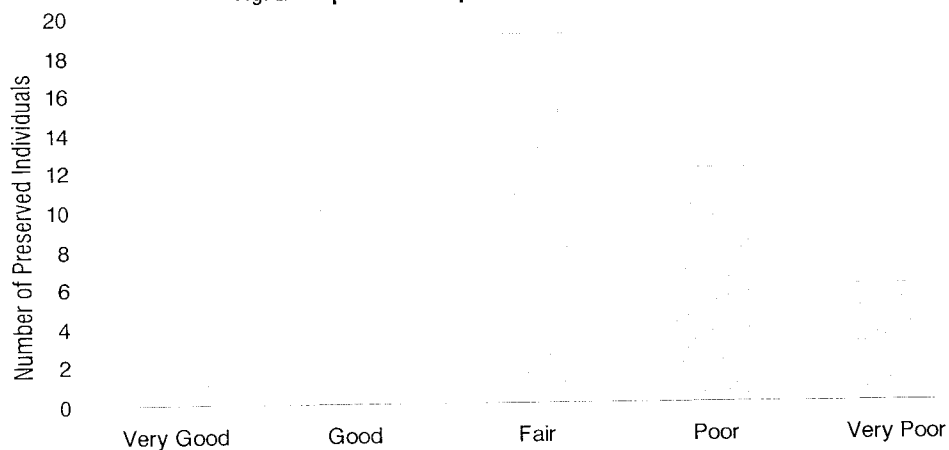


Fig. 3 - Sex & Age Subcategories

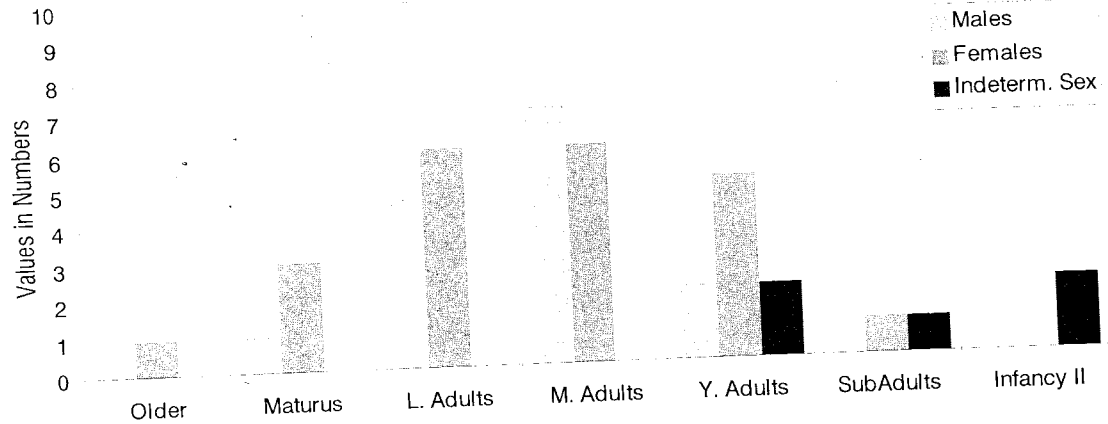


Fig. 4 - Individuals with Dentitions and Dental Pathologies

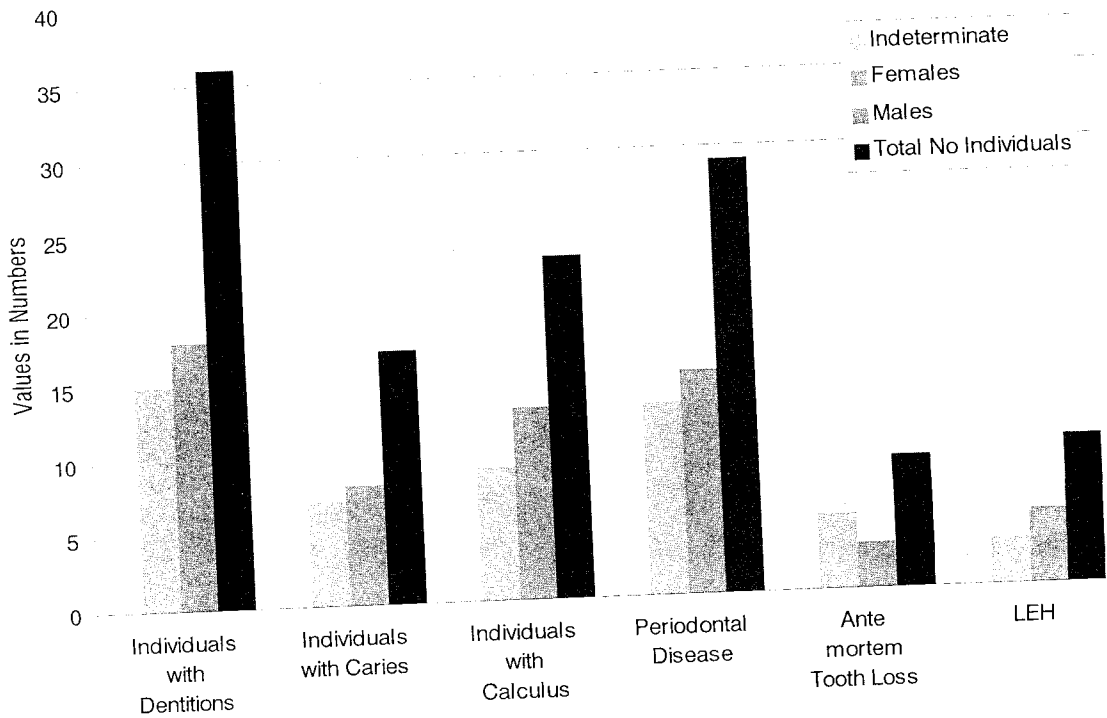


Fig. 5 - Periosteal Reactions by Sex Subcategory

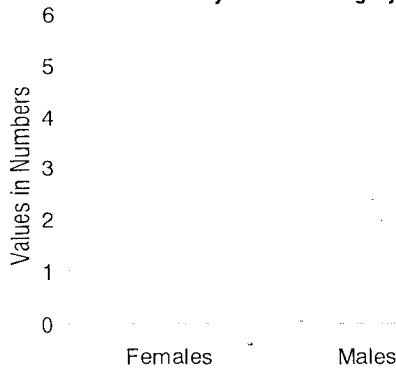


Fig. 6 - Prevalence of Trauma & Periostitis By Sex Subcategories

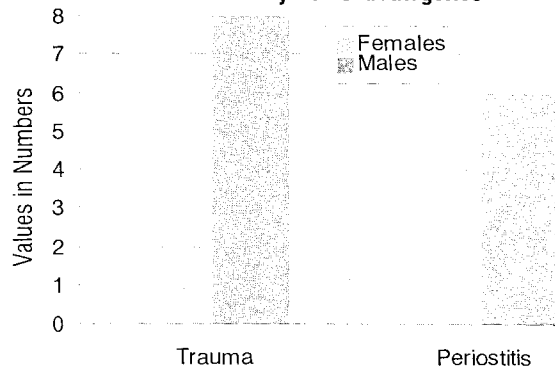


Fig. 7 - Prevalence of Osteoarthritic (OA) Manifestations By Sex Subcategory

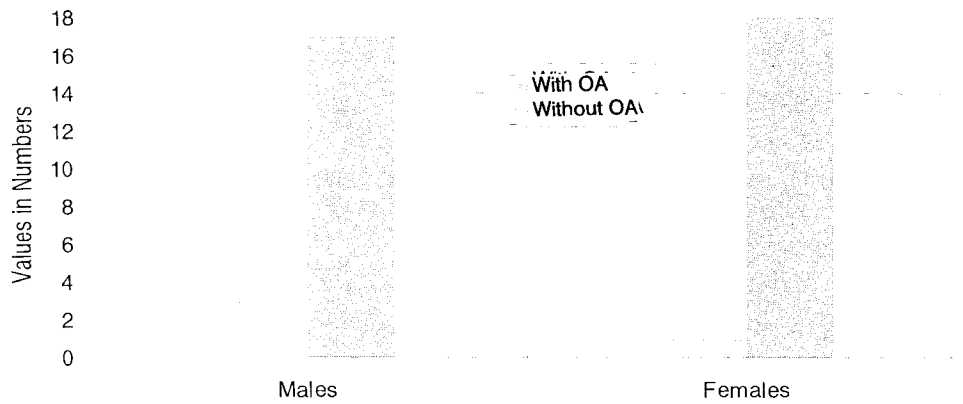
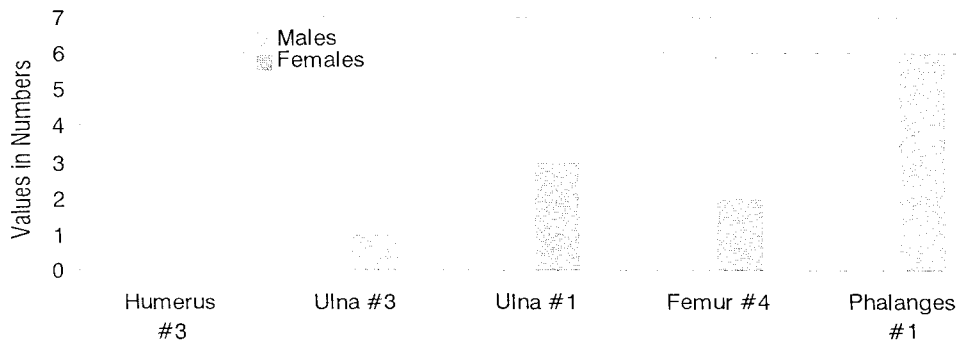
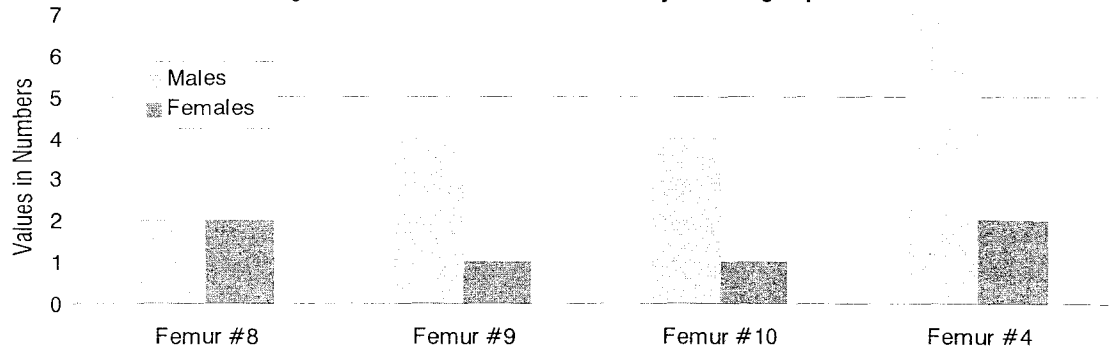


Fig. 8 - Prevalence of Selected MHOS Showing Sexual Dimorphisms



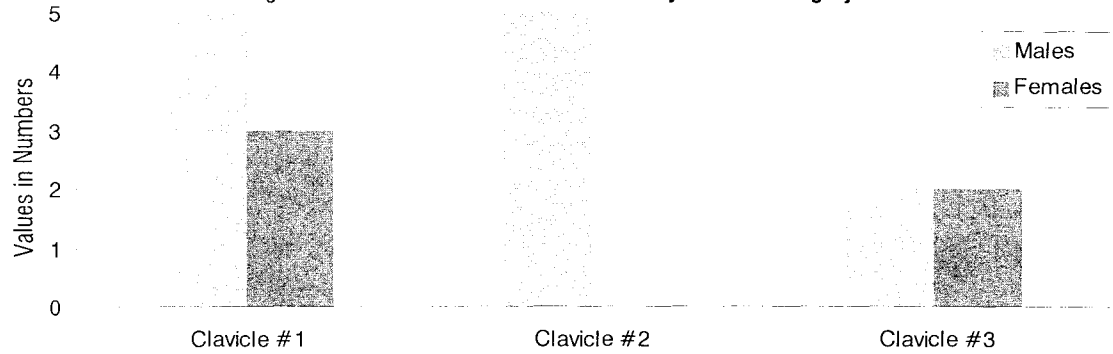
MHOS/Skeletal Manifestation	Associated Kinetics	Bodily Posture/Function
Phal.#1:Marked Flex. Ligam.palmar 1st Phal.	Firm Palmar Flexion	Firm Grasp
Fem.#4: "Poirier's Facet"	Flexion of knee, Extension of Hip Joint	Squatting Posture, Prolonged Standing/Walki
Ulna#1: Hypertrophy of Supi. Crest & Fossa	Supination, Hypertension of Arm	Spear throwing, Use Sling, Pitch Missiles
Ulna#3: Elevation of Anconeus Ridge	Extension of Humeroulnar Joint	Carrying Heavy Objects Cradled in Arms
Hum.#3: Exostosis of Medial Epicondyle	Hyperactivity of: Pron.teres, Flex. Capri Rad.,	Thrust Movement of Arm (Javelin Thr.)

Fig. 9 - Prevalence of Femoral MHOS By Sex Subgroups



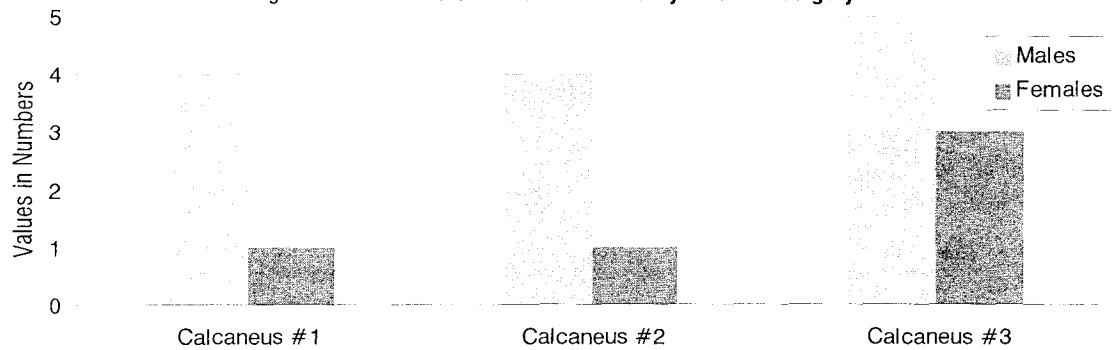
MHOS/Skeletal Manifestation	Associated Kinetics	Bodily Posture/Function
Femur # 4 = "Poirier's Facet"	Flexion of knee, Extension of hip joint	Squatting, Prolonged Standing/Walking
Femur # 10 = "Osteochondritic Imprint"	Flexion of knee, Extension of hip joint	Squatting Posture
Femur # 9 = "Tibial Imprint"	Flexion of knee, Extension of hip joint	Squatting Posture
Femur # 8 = "Charle's Facet"	Flexion of knee, Extension of hip joint	Squatting Posture

Fig. 10 - Prevalence of Clavicular MHOS By Sex Subcategory



MHOS/Skeletal Manifestation	Associated Kinetics	Bodily Posture/Function
Clav. #1: Robusticity of Lateral End	Strong Lateral Downward Direction	Carrying Loads on Extended Arms
Clav. #2: Robusticity Sternoclavicular Joint	DistoDorsal Lateral Stress	Dragging Heavy Loads
Clav. #3: Prominent Origin Pectoral. Major	Circumduction of Arms	Fishing from the Shore with Line

Fig. 11 - Prevalence of Calcaneal MHOS By Sex Subcategory



MHOS/Skeletal Manifestation	Associated Kinetics	Bodily Posture/Function
Calc. #3: Bursitis & Bony Spurs	Pull on Attachment of Plantar Fascia	Walking on Hard Pavement
Calc. #2: "Rider's Bone"	Repeated Impact of Heel on Ground	Dismounting fm. Horse, stress on Heel
Calc. #1: Achilles Tendon Exostosis	Plantar Enthesopathy: Adduct. Hallucis	Long Distance running/Hard Pavement