



ELSEVIER

Contents lists available at ScienceDirect

HOMO - Journal of Comparative Human Biology

journal homepage: www.elsevier.com/locate/jchb

Assessing the effect of manual physical activity on proximal hand phalanges using Hellenistic and modern skeletal samples from Greece

F.A. Karakostis^a, E. Le Quéré^b, V. Vanna^c, K. Moraitis^{d,*}

^a Area of Prehistory, University Rovira I Virgili (URV), Catalan Institute for Human Paleoecology and Social Evolution (IPHES), Campus Sescelades URV (Building W3), 43007 Tarragona, Spain

^b Department of History and Archaeology, University of Rouen, 1 Rue Thomas Becket, 76821 Mont-Saint-Aignan, France

^c Wiener Laboratory, American School of Classical Studies at Athens, 54 Soudias Street, 10676 Athens, Greece

^d Department of Forensic Medicine and Toxicology, School of Medicine, National and Kapodistrian University of Athens, 75 M. Asias Str, 11527 Athens, Greece

ARTICLE INFO

Article history:

Received 14 March 2015

Accepted 28 November 2015

ABSTRACT

In humans, physical activity is an important regulator of bone size. Furthermore, hand bones have been proposed as a potential avenue for assessing patterns of manual activity. However, there are very few studies presenting a metric comparison of proximal hand phalanges among different populations. Moreover, an osteoarchaeological approach to the manual activities performed by an ancient population is yet to be made. In this framework, this study aims at assessing and interpreting the metric variation in these bones between a documented modern Greek sample (20th century) and a Hellenistic sample from Demetrias (3rd–1st century BCE), in terms of size and sexual dimorphism. Ancient males were significantly larger than females for ten phalangeal measurements out of 35. Even though the degree of sexual dimorphism was lower in the Hellenistic material (the maximum sexual dimorphism observed – 12.46%) than in modern sample (the maximum observed – 21.19%), the ranking of rays and bone parts by sexual dimorphism was similar in both populations. No metric difference was observed between modern and ancient males, whereas ancient females were larger than modern females in seven dimensions (the maximum variation observed was 11.58%), which involved the bases and midshafts

* Corresponding author. Tel.: +30 210 7462426; fax: +30 210 7462390.

E-mail address: kmoraitis@med.uoa.gr (K. Moraitis).

of phalanges. Given that these dimensions are affected by the degree of muscular recruitment for the formation of various hand grips, it is suggested that ancient females were involved in manual activities of greater grasping variance than modern females. Indeed, the historical and archaeological sources suggest that sexual distribution of labour in the Hellenistic society seems to explain the differences estimated between the sexes and the two populations under study.

© 2015 Published by Elsevier GmbH.

Introduction

In archaeological science, the study of physical activity in past human populations is essential for reconstructing their socioeconomic profile. With regard to anthropological research, it provides a basis for further understanding skeletal variation among various human groups. In general, this variation can be estimated through the morphometric comparison of human skeletal remains (Frayer, 1980; Smith, 2000).

Particularly, the reconstruction of physical activity patterns can be attempted through the analysis of occupational stress markers on bones. This includes the analysis of bone dimensions, particular pathological lesions as well as musculoskeletal stress markers (Gualdi-Russo and Galletti, 2004; Larsen, 1997). Even though occupational stress markers of the upper limb long bones are widely used in research (Gualdi-Russo and Galletti, 2004; Villotte et al., 2010), smaller hand bones are usually excluded from bioarchaeological studies (Cashmore and Zakrzewski, 2013). This is a result of numerous factors including the lack of essential anatomical knowledge (e.g., in the identification of the ray of phalanges) and the aforementioned focus on major upper limb bones.

A recent study has produced highly accurate morphological methods for the anatomical allocation (positioning and siding) of proximal hand phalanges, in contemporary and ancient human populations (Case and Heilman, 2006; Varas and Thompson, 2011). In another study, it has been suggested that small and compact bones, such as proximal phalanges, are often preserved better (frequently intact) in the field than larger bones, proving themselves potentially useful for reconstructing biological profiles of individuals (Byers et al., 1989).

In addition, it has been suggested that the musculoskeletal stress markers of these bones can provide the basis for assessing patterns of manual physical activity in modern and past populations (Cashmore and Zakrzewski, 2013; Foster et al., 2009). A recently published study has focused on the nature and degree of sexual size dimorphism in the dimensions of proximal phalanges of modern Greek individuals whose sex, age and occupation are known from the public records held by the cemeteries in which they were buried. This study proposed that the observed pattern of sexual dimorphism in the dimensions of these bones resulted from a difference in physical activity between the sexes (Karakostis et al., 2015).

However, the degree of the impact of physical activity on the dimensions of human proximal hand phalanges has been only assessed indirectly in few studies on bilateral asymmetry (Cashmore, 2009; Cashmore and Zakrzewski, 2009), while there are no studies approaching thoroughly the way in which manual activities regulate the size of these bones. These two objectives could be approached through a metric comparison across populations with different occupational habits, followed by the interpretation of the significant differences observed. Furthermore, thus far, a metric comparison between a sample from an ancient population from a historical period and a fully documented modern sample is not available in recent literature. In a modern and fully documented sample, the occupational profile of the population is known, while, in a bioarchaeological sample, the various historical and archaeological sources could provide useful information on everyday manual activities. Subsequently, assessing the occupational differences between these two populations could provide an interpretation of the metric variation observed between their skeletal samples.

In the present study, the two samples analyzed originate from a modern Greek skeletal collection (late 20th c. CE) and a Hellenistic sample (3rd–1st c. BCE) from Demetrias (Thessaly, Greece).

Download English Version:

<https://daneshyari.com/en/article/100034>

Download Persian Version:

<https://daneshyari.com/article/100034>

[Daneshyari.com](https://daneshyari.com)