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Epipaleolithic human appendicular remains from Ein Gev I, Israel

Restes de membres du squelette humain de l'Épipaléolithique d'Ein Gev I, Israël

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ABSTRACT

The Upper Paleolithic (Early Epipaleolithic/Kebaran; ~ 19,000 cal BP) human skeleton, from Layer 3 of Ein Gev I on the western flanks of the Golan Heights adjacent to the Sea of Galilee, retains sufficient limb remains to permit assessment of its body size and proportions, as well as diaphyseal reflections of skeletal hypertrophy. The individual was of modest stature but average mass for a later Upper Paleolithic individual, providing it with the body mass-to-stature body proportions characteristic of later Upper Paleolithic and more recent circum-Mediterranean humans. The humeri exhibit unexceptional diaphyseal asymmetry and robustness for an Upper Paleolithic human, and the femur exhibits similar relative diaphyseal hypertrophy. The humeral midshafts are relatively round, but the femoral and tibial midshafts are pronounced anteroposteriorly. As such, Ein Gev 1 provides additional paleobiological data on the appendicular remains of these Southwest Asian humans prior to the increasing sedentism of the terminal Pleistocene.

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R É S U M É

Le squelette humain du Paléolithique supérieur (Épipaléolithique ancien/Kébarien ; ~ 19 000 cal BP) du niveau 3 d'Ein Gev I, sur les bords du Massif de Golan, à côté de la mer de Galilée, comprend suffisamment de vestiges du système appendiculaire pour permettre une analyse de sa taille, de ses proportions corporelles, et pour mener une réflexion concernant son hypertrophie squelettique. L'individu était de petite taille, mais d'une masse moyenne pour le Paléolithique supérieur récent, lui donnant des proportions de la masse à la taille caractéristiques des populations circum-méditerranéennes du Paléolithique supérieur final et des périodes plus récentes. Les humérus ont une asymétrie et une robustesse normales pour le Paléolithique supérieur, tout comme la robustesse du fémur. A mi-diaphyse, les humérus sont relativement ronds, alors que les mi-diaphyses du fémur et du tibia sont allongées antéro-postérieurement. Cette étude d'Ein Gev 1 enrichit le corpus des données paléobiologiques pour les restes appendiculaires des hommes d'Asie du Sud-Ouest avant l'apparition de la sédentarité à la fin du Pléistocène.

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1. Introduction

The human fossil record for the southwestern Asian Epipaleolithic prior to the Natufian has been relatively poor, lacking the plethora of associated skeletons and isolated elements that are well known from the neighboring regions of northern Africa and Europe. However, ongoing field research and reassessment of some long-known elements are increasingly documenting the nature and variation of those human populations, especially those dating to the time of the Last Glacial Maximum (LGM) and the subsequent Epipaleolithic (Kebaran and Geometric Kebaran) period.

The currently known human remains are from the sites of Ein Gev I, Kharaneh IV, Mataha, Neve David, Ohalo II, and 'Uyun Al-Hammam, plus the earlier remains from El-Wad, Eshkaft-e Gavi, Hayonim, Kebara, Nahal Ein Gev I, and Qafzeh (Arensburg, 1977; Arensburg and Bar-Yosef, 1973; Arensburg et al., 1990; Hershkovitz et al., 1995; Mahler, 2007; McCown and Keith, 1939; Rolston, 1982; Scott and Marean, 2009; Stock et al., 2006; Trinkaus, 2018; Vandermeersch et al., 2013).

The focus has been primarily on assessments of morphological relationships using craniofacial features, and primarily with respect to the subsequent Natufian samples. With a few exceptions (e.g., Hershkovitz et al., 1993; Stock et al., 2006; Trinkaus, 2018), there has been little attention to the postcranial paleobiology of these human remains, with other postcranial assessments mostly restricted to general comments and limited sets of standard osteometrics (e.g., Arensburg, 1977; Hershkovitz et al., 1995; Rolston, 1982). Appropriate assessment of the available Epipaleolithic human postcranial remains, and their potential implications for the paleobiology and behavior of these Upper Paleolithic *sensu lato* foragers, would be aided by the detailed descriptions of these relatively rare, and often fragmentary, human remains.

With these considerations in mind, the appendicular remains of the adult female skeleton from the site of Ein Gev (Ein Guev, 'En Gev I, Ein Gev 1, are described and assessed paleobiologically in the context of available data from penecontemporaneous western Eurasian and North African humans remains. The Ein Gev 1 cephalic remains have been described by Arensburg (Arensburg and Bar-Yosef, 1973), but only a few diaphyseal and articular measurements of the limb bones have been provided previously (Arensburg, 1977; Shackelford, 2005; Sparacello et al., 2017; Trinkaus and Patel, 2016), in the contexts of other fossil descriptions or comparative analyses.

2. Materials and methods

2.1. The Ein Gev 1 Limb Remains

The Ein Gev 1 remains were discovered *in situ* during excavations at the site of Ein Gev I in 1964, within a burial pit immediately below Layer 3 (Arensburg and Bar-Yosef, 1973; Bar-Yosef, 1970). The site is on the eastern shore of the Sea of Galilee, ~150 m bsl, on the talus slope of the flanks of the Golan Heights (32° 46' N, 35° 39' E). The body had been laid on its right side with the legs strongly flexed

at the knees and partially flexed at the hip, such that the left hand and femur were in contact. The grave was within a hut structure dug into the hillside and adjacent to a concentration of lithic and faunal remains (Arensburg and Bar-Yosef, 1973; Bar-Yosef, 1970; Stekelis and Bar-Yosef, 1965). Layer 3 yielded a rich Kebaran lithic assemblage (Bar-Yosef, 1970; Stekelis and Bar-Yosef, 1965) and a diverse faunal assemblage dominated by *Gazella*, *Dama mesopotamica* and *Capra aegagrus* (Davis, 1974; Marom and Bar-Oz, 2008). Charcoal adjacent to the burial in Layer 3 provided a radiocarbon date of $15,700 \pm 415$ ^{14}C BP (GrN-5576) or $18,910 \pm 465$ cal BP (calibrated using www.calpal.de v.1.5). This date places the remains about four millennia younger than the Ohalo 2 burial (Hershkovitz et al., 1995) and probably 7–8 millennia after the 'Atlitian' Nahal Ein Gev 1 individual (Arensburg, 1977; Belfer-Cohen and Goring-Morris, 2014; Belfer-Cohen et al., 2004).

The burial was removed *in situ* as a block, and subsequently excavated in 1968 by B. Arensburg. The human remains were originally described as “almost complete but seriously damaged and covered by a thick sandy calcareous incrustation” and that “the only complete bones of the postcranial skeleton were a left femur, a left ulna and some segments of the hand and the foot. All the other long bones were present, but lacked epiphyses” (Arensburg and Bar-Yosef, 1973: 202). The original publication provided little further postcranial information, but a limited set of osteometrics (mostly diaphyseal diameters) were provided subsequently (Arensburg, 1977). My analysis of the remains in 1995, as part of a comparative analysis of Southwest Asian late Pleistocene appendicular remains, revealed the potential to obtain substantial additional paleobiological data from the Ein Gev 1 limb bones, which are provided here.

The humeri consist of an essentially complete right diaphysis and distal epiphysis; it retains the distal lesser tubercle, thereby permitting accurate length estimation (Supplementary data, Table S1; Fig. 1). The left humerus is less complete but retains much of the shaft and a partial cubital area. The left ulna provides direct measurement lengths, and both ulnae and radii provide diaphyseal diameters (Fig. 2; Supplementary data, Table S1). The left os coxae preserves a damaged antero-inferior ilium with the femoral head and neck crushed into the acetabulum; the acetabular rim is nonetheless sufficiently complete to provide a height measurement of ~54.5 mm. The left femur retains the intact diaphysis from the lesser trochanter to the distal condyles with minor damage to the distal epiphysis (Fig. 3); it is sufficiently complete to estimate its original lengths (Supplementary data, Table S4). The right femur is eroded anteriorly, twisted proximally and compressed anteroposteriorly distally, and provides little additional data. The tibiae retain a largely complete, but heavily encrusted, left diaphysis and the proximal two-thirds of the right diaphysis (Fig. 4), with the tibial tuberosities preserved for orientation and alignment. The distal right tibia is cemented to its talus and distal fibula. These long bones are joined by scattered and variably complete manual and pedal remains, some of which are cemented to adjacent bones at their articulations (Supplementary data, Tables S3 and S6 to S10).

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