Early Natufian remains: evidence for physical conflict from Mt. Carmel, Israel

Fanny Bocquentin, Ofer Bar-Yosef

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Fanny Bocquentin[a,*], Ofer Bar-Yosef[b]

[a]*UMR 5199 – PACEA, Laboratoire d'Anthropologie des Populations du Passé, Université Bordeaux 1, Avenue des Facultés, F-33405 Talence Cedex, France*
[b]*Harvard University, Department of Anthropology, Peabody Museum, 11 Divinity Avenue, Cambridge, MA 02138, USA*

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Abstract

Prior to the establishment of farming communities direct physical evidence for human conflict was rarely reported from archaeological contexts. Here we present a case of an Early Natufian (14.500–13.000 cal B.P.) projectile, classified as Helwan lunate, embedded inside the seventh or eighth thoracic vertebra sequence of a mature middle age adult male. Due to calcareous concretion four vertebras were still in anatomical connection when uncovered by F. Turville-Petre, during his excavations at Kebara cave (Mt. Carmel) in 1931.

Keywords: Early Natufian; Kebara Cave; Lunate projectile; Fatal wounding

The Natufian in Kebara Cave

The Natufians are considered the first sedentary population in the Levant and as such they have been consistently portrayed in scientific literature as a peaceful people. Until the present, evidence of a violent past was rarely documented among the rich skeletal remains (Arensburg, 1985; Belfer-Cohen et al., 1991; Keeley, 1996; Rosenberg, 1998), although contemporary Epi-Paleolithic populations in both Nubia and the Maghreb produced clear indications for raiding (Wendorf, 1968; Chamla, 1970). A recent discovery during detailed examination of the skeletal collections from Kebara Cave, attributed to the Early Natufian, indicates that, in this context as well, physical conflict happened.

Kebara Cave, located in the western escarpment of Mt. Carmel, was first excavated in 1931 by F. Turville-Petre who, over the course of three months, removed the entire uppermost sequence of deposits including the Natufian layer (Turville-Petre, 1932; Bar-Yosef et al., 1992). During the excavations, F. Turville-Petre uncovered a burial ground near the entrance of the cave that was described as, "a collective burial pit closely resembling the burial pits at the Mugharet el-Wad. Here as there, the bodies seem to have been thrown

* Corresponding author. Tel.: +33-5-40-00-25-51; fax: +33-5-40-00-25-45.
E-mail addresses: f.bocquentin@anthropologie.u-bordeaux1.fr (F. Bocquentin), obaryos@fas.harvard.edu (O. Bar-Yosef).

in without any attempt at orientation, and packed in with stones" (Turville-Petre, 1932, p. 271).

Anthropological study of the remains, which unfortunately was left incomplete, provided a radiocarbon date on a human bone of 11,150 ± 400 B.P. (uncalibrated; UCLA, no laboratory number is available). At the back of the cave, where the Natufian deposits were overlying a Kebaran layer, a series of charred human skeletal remains was found. One radiocarbon date (OxA-2798) 12,470 ± 180 B.P. (uncalibrated) may suggest that these relics, originally attributed to the Kebaran, belong to the Natufian (Hedges et al., 1992; Bar-Yosef and Sillen, 1993).

The Natufian context of layer B contained a rich lithic industry including a large number of sickle blades, lunates and other tool types, numerous bone objects, as well as a few mortars and pestles. Following the rule of the day, the deposits were not sieved and after documentation the collection was distributed among various museums. Hence, each of the later studies or revisions treated only a part of the original ensemble (Bar-Yosef and Tchernov, 1970; Valla, 1984; Campana, 1989).

The Natufian skeletal collection from Kebara is stored in the Peabody Museum (Harvard University, Cambridge, MA, USA) and was analyzed recently by one of the authors as a part of an exhaustive study (Bocquentin, 2003). This collection was partially described in the past (e.g., Keith, 1932; Bar-Yosef et al., 1971; Smith, 1972; Belfer-Cohen et al., 1991; Peterson, 1998). However, it was during the most recent investigation that we noticed a vertebra with an embedded lunate (Peabody Museum reference H4-KEB3: 61-23-601N/035 1.0).

Anatomical description

The vertebra belongs to a mature middle age adult (medial epiphysis of the clavicle is closed and the skeleton does not show any signs of senescence). The morphological and metrical sex determination was based on the pelvis (Murail et al., 1999; Bruzek, 2002) and certainly indicates male features. Although the skeleton is not complete, all the bone categories are represented except for the sternum. There are no additional signs of trauma among the bone categories, even on the (few) preserved ribs.

The projectile, a Helwan lunate, was discovered in a group of four thoracic vertebrae which, due to calcareous concretion, were adhered to each other in an anatomical position (Fig. 1). The vertebra penetrated by the projectile is the third vertebra in the group and corresponds to the seventh or eighth in the thoracic sequence (the thoracic column is incomplete). Two thirds of the armature is still in place, sunk into the left antero-lateral face of the vertebral body; the missing part of the lunate was lost in antiquity before the formation of the calcareous concretion that covers the fracture. The lesion, 21 mm long preserved, is oblique in an antero-inferior to a postero-superior direction. Its anterior edge is unknown because the bone was broken (probably during the excavations) and its posterior edge extends to the end of the superior costocapitular demifacet. The cut is not deeper than a few millimeters. There is no sign of bone remodeling anywhere around the point of penetration (Fig. 2) and nothing is shown on the

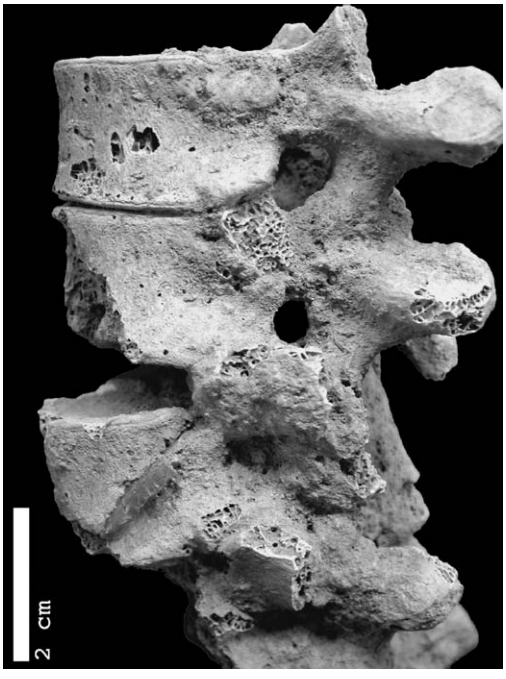

Fig. 1. Kebara H4/Keb3 a block of vertebrae with a lunate embedded in the 7th or 8th thoracic vertebra.

Fig. 2. Detail of Fig. 1. A view from the left antero-lateral.

radiograph. These observations indicate that the individual did not survive very long after being shot with the projectile.

The penetration trajectory of the projectile (before entering the vertebral body) was determined by the shooting device and the hafting method of the flint point. There are various ways of hafting lunates, as suggested based on ethnographic analogies (e.g., Desmond-Clark, 1977; Bar-Yosef, 1987). There are two basic methods of hafting, each resulting in a different ballistic scenario:

a. hafting the lunate as a transverse arrowhead (Fig. 3a), which means that the longer axis of the piece is perpendicular to the axis of the wooden shaft,
b. lateral insertion (Fig. 3b) where the lunate length is more or less parallel to the wooden shaft.

For this skeleton, if the first scenario is employed, the projectile penetrated the left side of the individual between the fourth and sixth ribs. Due to the size of the armature and the way it was embedded obliquely in the vertebral body, the ribs were not necessarily damaged. In the second

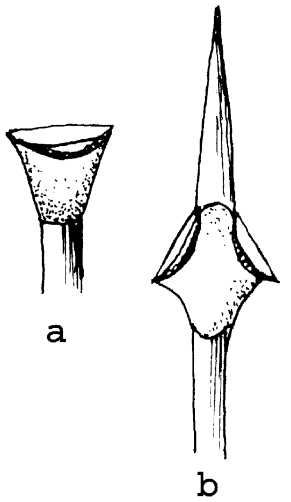

Fig. 3. Suggested ways of hafting lunates as projectile points (after Bar-Yosef, 1987): a. transverse hafting; b. lateral hafting.

scenario, the projectile penetrated the individual frontally or at a slight right angle. The penetration must have occurred from below where the individual was standing and at an angle of about 45 degrees. Again, neither the ribs nor the sternum were pierced, with the possible exception of the costal cartilage. In the first scenario, the left lung was perforated, while in the second trajectory, the heart was perforated and the aorta was split. In both cases, vital organs were affected and a rapid death was inevitable.

Burial context

As mentioned above there are no details available concerning the context of the burials. However, the study of the human relics provided additional information. It seems that all burials were primary as most of the skeletons, in spite of the poor excavation techniques, are generally complete (Bocquentin, 2003). In numerous cases, due to the formation of concretions, the bones are still in their anatomical positions. The individuals were probably buried successively, each as an individual burial, as it was possible to collect the bones from each individual separately. Thus it was not a collective grave where the skeletal elements became co-mingled. This grave resembles a similar

but better documented burial ground excavated at El-Wad (Garrod and Bate, 1937, p. 14).

Seventeen individuals were buried in this manner in Kebara Cave. Eleven were children, aged zero (stillborn) to 12 years old, and six adults. All adults were males (Bocquentin, 2003). Because of the high variability of senescence, accurate estimation of age at death is not possible (e.g., Hoppa, 2000; Jackes, 2000; Schmitt et al., 2002). However, it is interesting to note that all skeletons display the same degree of tooth attrition that likely reflects a comparable biological age at death in the Natufian population (Smith, 1972).

Discussion

The Kebara Cave individual is one of the oldest examples of skeletal remains with an embedded projectile, and similar Epi-Paleolithic occurrences were recovered in North Africa as mentioned above (Wendorf, 1968; Chamla, 1970). Other isolated cases were recorded from the European Epigravettian (Bachechi et al., 1997; Henry-Gambier, 2001). In the later periods the number of instances increases (for a review see Bachechi et al., 1997; Guilaine and Zammit, 2001).

The apparent force that facilitated the penetration of the projectile and its current depth suggests that the individual was in relatively close proximity to the shooter. The type of the projectile, a Helwan lunate common in Early Natufian, suggests interpersonal violence between people sharing the same lithic tradition, hence reflecting either intra- or inter-Natufian group aggression. Worth noting is the fact that out of five other adult males associated in the same general burial complex, two other cases of trauma were noted. H14 shows a partly closed straight scar on the frontal bone, just above the left orbit, caused by a penetrating implement (Fig. 4). H8 presents a depression close to the bregma, likely to be a healed fracture (Lovell, 1997).

Evidence of trauma is present in all of the Natufian groups where a large number of skeletons is available. In reviewing the Natufian skeletal collections additional cases of trauma may surface and support the notion of interpersonal violence (Bocquentin, 2003). In Hayonim cave, children are not spared. Although archaeological indicators for Natufian inter- or intra-group conflicts are yet not documented, markers for social tensions amongst these groups was recently suggested (Bar-Yosef and Belfer-Cohen, 2002). The intensification of artistic activities and material evidence for local group identities, expressed either by technical choices, spatial organization or burial customs, are interpreted as inter-group rivalry and competition. Other evidence, as the simultaneous inhumations of adult corpses at El-Wad (Garrod, 1937), or the special funerary treatment accorded to adolescent and young adult male (15–29 years old) at that time (Bocquentin, 2003) may also support the notion of social tension at the beginning of sedentism. In this context an increasing number of documented cases of physical conflict is an additional marker for enhanced sense of territoriality characteristic of settled group sharing the region of Mount Carmel and the Galilee during the Early Natufian times.

Fig. 4. Kebara H14/Keb6 shows a partly closed straight scar on the frontal bone, just above the left orbit.

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