

UPPER PALAEOLITHIC BONE RETOUCHERS FROM MANOT CAVE (ISRAEL): A PRELIMINARY ANALYSIS OF AN (AS YET) RARE PHENOMENON IN THE LEVANT

Abstract

The use of bone fragments to retouch stone tools is presently recognised as a widespread phenomenon in the Palaeolithic of Europe, since Middle Pleistocene times. However, in the Palaeolithic record outside Europe, evidence for the use of retouchers is scarce. With the sole exception of the late Lower Palaeolithic site of Qesem Cave (Israel), virtually no retouchers have been recognised in the Levant region. Here, we present the first evidence of this type of tool documented for the early Upper Palaeolithic of Manot Cave, western Galilee, Israel. Subsequently, we discuss the absence of retouchers in other Middle and Upper Palaeolithic sites in the Levant, and suggest that either Levantine hominins did not habitually use bone retouchers, or researchers working in the Levant have not yet identified them as such.

Keywords

Early Upper Palaeolithic; Levant; Bone retouchers; Manot Cave

Introduction

The use of bone fragments to retouch stone tools is presently recognised as a widespread phenomenon in Europe that began in Middle Pleistocene times, with the bulk of the evidence coming from the Middle and Upper Palaeolithic (Vincent, 1993; Malerba and Giacobini, 1998; Armand and Delagnes, 1998; Patou-Mathis, 2002; Schwab, 2002, 2005; Castel et al., 2003; Mozota, 2009, 2015; Tartar, 2009; Tejero, 2010, 2013; Jequier et al., 2012; Mallye et al., 2012; Abrams et al., 2014; Schwab, 2014; Mozota, 2015; Tejero et al., 2016a). According to detailed studies performed mostly in the course of the last couple of decades, retouchers

formed an integral part of some lithic production sequences during these periods. Many bone blanks used as retouchers were not chosen randomly, but rather carefully selected based on certain characteristics (e.g., Tartar, 2009; Mallye et al., 2012; Tejero et al., 2016a). This demonstrates the importance of the phenomenon of retouchers for studying Palaeolithic lifeways.

In the Palaeolithic record outside Europe, evidence for the use of retouchers is scarce. Specifically in the Levant region, with its long history of hominin occupation and richness of sites, no bone retouchers have been recognised, with the sole ex-

ception of the late Lower Palaeolithic (ca. 420-200 ka) site of Qesem Cave (Blasco et al., 2013; Rosell et al., 2015). No other cases of bone retouchers have been published for the entire Palaeolithic record of the Levant. Some formal bone tools were identified from the succeeding Epipaleolithic (Natufian) Period (Stordeur, 1988). Here we present three bone specimens that we have identified as retouchers, excavated from the early Upper Palaeolithic sequence of Manot Cave in the western Galilee region of Israel. This first evidence of retouchers in the Levant, other than those from Qesem Cave, contributes new data on the adaptation of early Upper Palaeolithic modern humans in the Levant. We present these specimens in light of the associated archaeological remains of Manot Cave, and discuss whether these retouchers constitute an extra-regional technology that appears periodically in Levantine prehistory. Alternatively, these bone retouchers from Manot Cave may be just the “tip of the iceberg” of an under-recognised phenomenon.

Manot Cave

Manot Cave is an active karstic cavern situated within the Mediterranean vegetation belt of western Galilee, Israel (Figure 1). The cave is located at roughly 220 m asl, ca. 10 km northwest of the Upper Palaeolithic occupation site of Hayonim Cave and about 50 km northeast of the Mount Carmel Caves.

The cave consists of an elongated main hall (ca. 80 m long, 10-25 m wide) with two lower chambers (Figure 2). Rock falls and colluvium apparently blocked the original entrance to the cave ca. 30,000 years ago. During six field seasons between 2010 and 2015, 12 areas were excavated (labelled A to L in Figure 2; Hershkovitz et al., 2015; Barzilai et al., 2016; Marder et al., in press). Two intensively investigated areas, designated Areas C and E, contain well-preserved early Upper Palaeolithic assemblages. Both areas display thick (ca. 3 m) stratigraphic profiles and are extremely rich in finds, including flint artefacts, animal bones, bone and antler tools, shells, ochre and charcoal.

Area E is located at the western end of the cave (see Figure 2), on top of the talus, where the original entrance is thought to have been situated. Two distinct sedimentological units were identified: Unit 1 is a colluvial accumulation, ca. 1 m thick, with scant archaeological finds in secondary deposition; Unit 2 consists of compact, reworked sediments with cemented crusts in various degrees of brecciation. This unit contains nine distinct archaeological horizons (Unit 2 Layers I-IX). The upper archaeological horizons of Unit 2 (Layers I-III) are composed of a series of well-preserved combustion features. Based

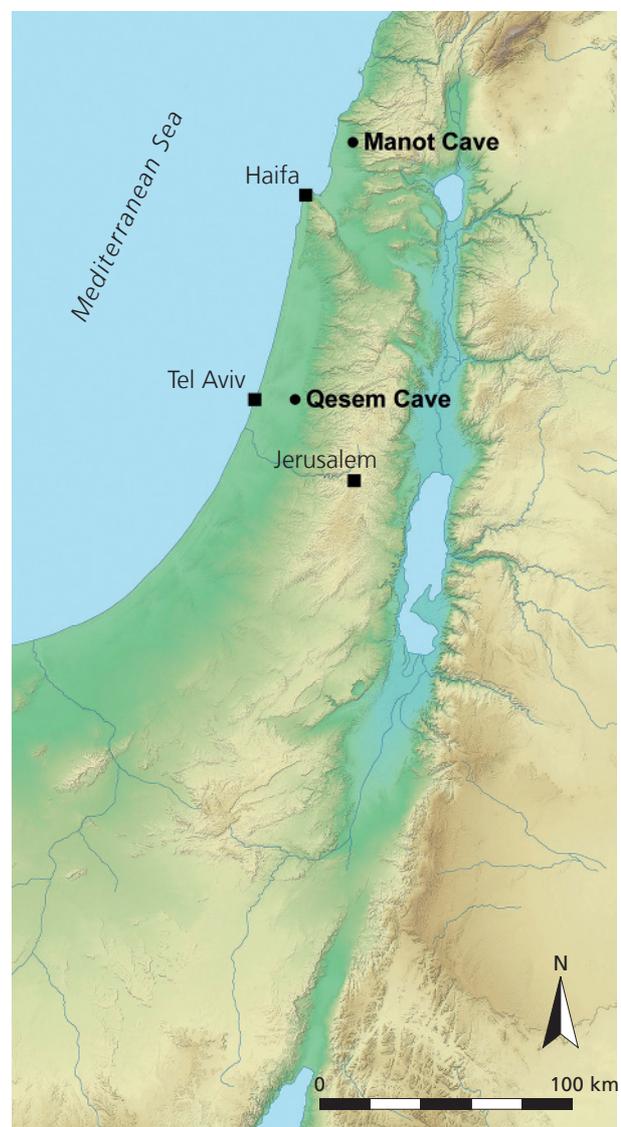


Figure 1 Map showing the location of Manot Cave and other sites mentioned in the text.

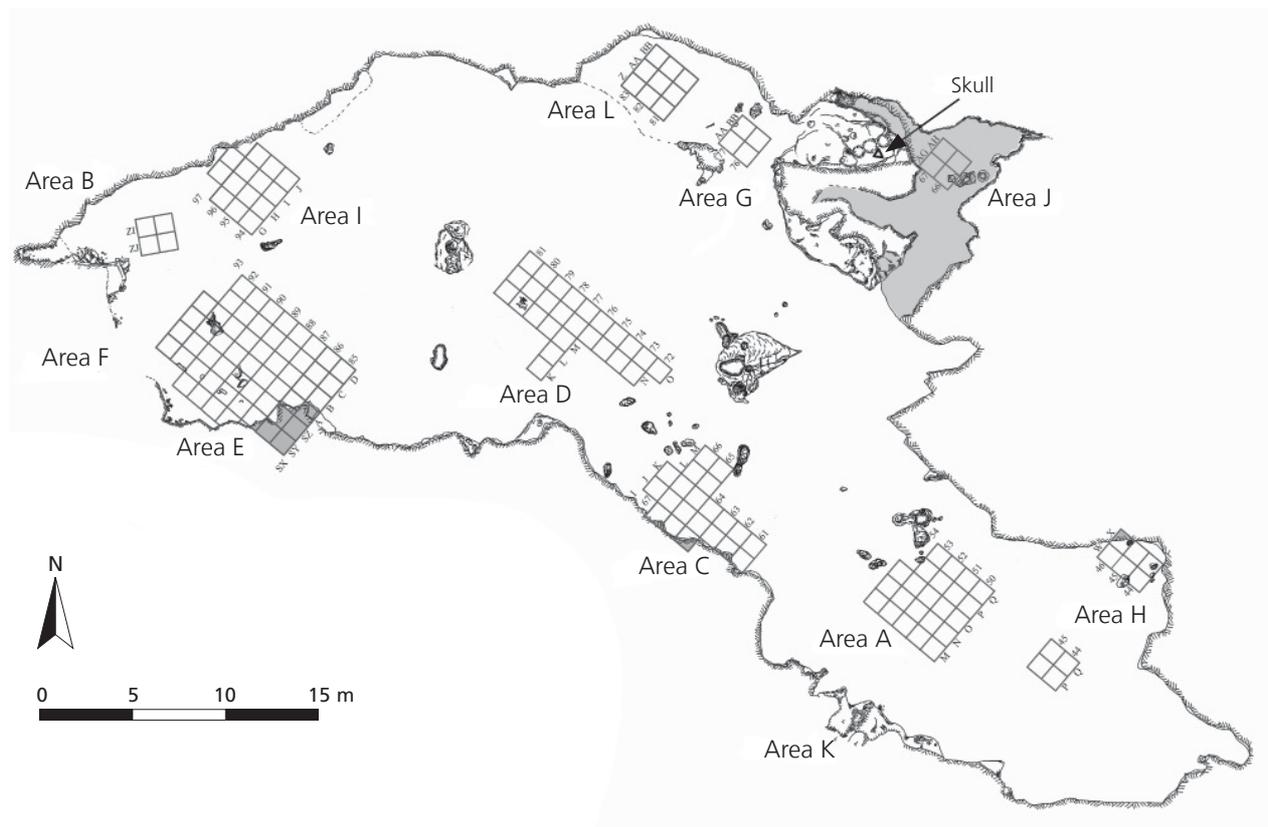


Figure 2 Plan view of the excavations at Manot Cave. Retouchers were recovered from Area C.

on the small lithic assemblages, these horizons are understood as corresponding to post-Aurignacian entities (Barzilai et al., 2016; Marder et al., in press). The lower archaeological horizons of Unit 2 (Layers IV-IX) display dense archaeological assemblages rich in flint artefacts, bone tools, animal bones and shells. The lithic assemblages are comprised of typical Levantine Aurignacian tools, such as nosed and carinated scrapers, as well as blades displaying Aurignacian retouch and a few atypical el-Wad points (Barzilai et al., 2016; Marder et al., in press). The shell assemblages include mostly *Patella* sp., while various species of the scaphopod genus *Antalis* were also found (Barzilai et al., 2016).

The stratigraphy of Area C was defined according to sedimentological criteria and subsequently divided into eight units (Figure 3). The archaeological assemblages are rich in finds, including large quantities of flint artefacts and animal bones. Also found were bone and antler tools, charcoal pieces, ochre and basalt ground stones. Due to the nature

of the talus, some mixing occurred between the stratigraphic units, although preliminary analysis of the lithic assemblages and radiocarbon chronology suggest that chrono-cultural distinctions can be defined (Barzilai et al., 2016; Marder et al., in press). Considering the freshness of the lithic material, the discovery of complete lithic production sequences (cores, tool debitage and numerous small artefacts < 2 cm) and the preservation of charcoal pieces, the assemblages do not indicate high levels of movement down the slope. The archaeological assemblages from Units 2-4 (ca. 1.5 m thick) are dominated by an Aurignacian lithic component, similar to that described for Area E, as well as antler projectile points (Barzilai et al., 2016). The archaeological assemblages from Units 5-6 (ca. 1 m thick) include both Ahmarian and Aurignacian elements, while Units 7-8 (ca. 1 m thick) are composed almost exclusively of the Ahmarian component, with numerous blades/bladelets produced from single and opposed platform cores, retouched bladelets and el-

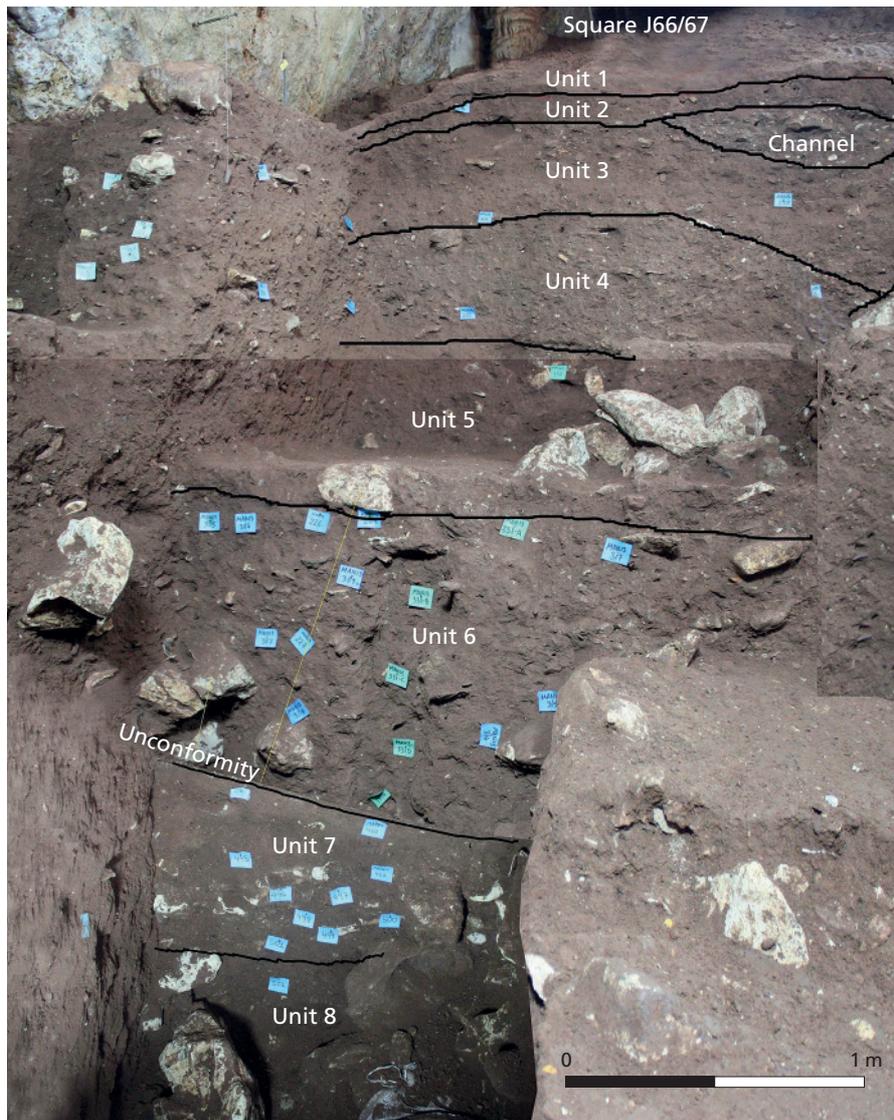


Figure 3 Stratigraphic sequence of Area C, Units 1-8, in Squares J66-67, facing west.

Wad points (Barzilai et al., 2016). The shell assemblages from Area C included *Columbella rustica* and *Nassarius gibbosulus*, which were used for personal ornamentation, and *Patella* sp., which was probably consumed as food (Marder et al., 2013).

The Aurignacian entity at Manot Cave (Areas C and E) is dated to 38-34,000 cal. BP, while the Ahmarian entity (Area C) is dated to 46-42,000 cal. BP (Barzilai et al., 2016). Several Uranium-Thorium dates retrieved from flowstone layers that seal the archaeological horizons in Area C range between ca. 41,000 and 33,000 BP, roughly corresponding with the radiocarbon dates (Hershkovitz et al., 2015).

The Manot Cave retouchers

As part of our on-going analysis of the faunal remains from Manot Cave, which includes the study of bone and antler technology (Tejero et al., 2016b), three retouchers have been identified in Units 5 (n=2) and 6 (n=1), the mixed Ahmarian / Aurignacian levels of Area C (Table 1; Figure 4). Retouching modifications were found on a medium-sized ungulate (probably fallow deer, *Dama mesopotamica*) femur fragment (Manot.28.C.B3699). A second tool (Manot.29.C.B3803) was identified as a metapodial shaft from a medium-sized ungulate (probably fallow deer, *Dama mesopotamica*). A third retoucher

Table 1 Description of the retouchers found in Manot Cave.

N°	Taxon	Anatomical part	LxWxT (mm)	Use area (mm)	Scraping area (mm)	Use trace orientation
M28	Medium ungulate (cf. <i>Dama mesopotamica</i>)	femur	74x29x6	21x18	34x20	perpendicular
M29	Medium ungulate (cf. <i>Dama mesopotamica</i>)	metapodial	48x15x6	26x17	—	oblique
M30	Large ungulate (cf. <i>Bos primigenius</i>)	femur/humerus	80x29x8	15x14	42x22	perpendicular

(Manot.30.C.B3773) was made from an upper limb bone shaft (femur/humerus) of a large ungulate (probably *Bos primigenius*). Concerning morphology, the three retouchers are roughly similar in size, with thick cortical bone being an important parameter for selection. The cross sections of the three blanks are plano-convex.

The breakage planes of two of the retouchers (M28 and M30) display curved v-shaped outlines, oblique angles, and smooth edges along their apical edges (relative to the position of the use traces), indicating that the bones were fresh when fractured (Villa and Mahieu, 1991). In contrast, the basal portions of both pieces display straight breakage planes

without patina, as found on the rest of the bone, and are of a different colour. This indicates that these fractures likely occurred during the excavation. The third retoucher (M29) has straight breakage planes in both the apical and basal portions. In this case, the breakage planes show the same patina and colour as the rest of the bone, suggesting that these dry fractures were produced by post-discard taphonomic processes, likely sediment compaction or trampling.

The preservation of the bone surface of the three pieces is good (see **Figure 4**). Although some sediment concretions and a loss of cortical bone fraction are displayed in retouchers M28 and M30, these



Figure 4 The Manot Cave retouchers: M29, M28, M30 (left to right).



Figure 5 Scraping marks and superimposed retouching marks on retoucher M28.

modifications do not affect the use areas. A single use area is documented for each retoucher. Following the terminology of Mallye et al. (2012), the use areas are centred on the tool. The concentrated and superimposed traces we observed in retouchers M28 and M30 consist of numerous triangular pits and rectilinear scores oriented perpendicular to the long axis of the bone. The third retoucher (M29) is marked by dispersed, rectilinear scores with oblique orientations. The extensions of the respective use areas (length×width) measure 21×18 mm, 26×17 mm and 15×14 mm. Differences in the traces found on the three retouchers are likely related to the more intensive use of pieces M28 and M30, resulting in the formation of scaled use areas on both retouchers. Overall, the traces on retoucher M29 are scarcer, and none of the individual traces are superposed.

The use areas of the retouchers M28 and M30 were prepared by scraping before the objects were used (Figure 5). The respective extensions of the scraping (length×width) are 34×20 mm and 42×22 mm. The scraping marks are oriented parallel or slightly oblique to the longitudinal axis of the bone, and its timing is revealed by the overlap of the different bone surface modifications – the functional use traces (pits and scores) are always above the scrape marks. The correlation between the scraped

surfaces and the extension of the use areas signifies that the scraping of the bones was not related exclusively to the processing of meat. The effect of the scraping on the cross-section of the bone is negligible. Therefore, the purpose of scraping was not to regularise the surface or prepare a working plane, but probably was to eliminate remains of the periosteum, fat, meat or other animal tissues, which might otherwise impair the functionality of the retoucher.

Discussion and conclusions

Our identification of bone retouchers at Manot Cave contributes a new cultural element to the study of early Upper Palaeolithic entities in the Levant. By itself, the osseous industry of this period is a significant marker of new cultural habits and ideas (Tejero, 2014; Goutas and Tejero, 2016; Tejero et al., 2016b). The identification of retoucher use at Manot Cave raises the question of why this was apparently such an isolated occurrence in the Middle and Upper Palaeolithic of the Levant. This region includes many deeply stratified Middle-to-Upper Palaeolithic cave sites that contain large and well-preserved faunal assemblages, collected and analysed by modern

working procedures (e.g., Rabinovich, 2003; Stiner, 2005; Speth and Tchernov, 2007; Yeshurun, 2013). Therefore, the near absence of retouchers in this region cannot generally be attributed to a meagre archaeological record, partial recovery, degraded preservation of bone surfaces or a lack of taphonomic studies. We suggest two possible explanations: either Levantine hominins did not habitually use bone retouchers or researchers working in the Levant have not yet identified them as such.

The first explanation, that bone retouchers were not routinely used in these periods of the Levant, should be evaluated. The Manot Cave retouchers are confidently dated to the early Upper Paleolithic, but due to their intermediate stratigraphic position (Area C, Units 5-6), it is unclear whether they were used during the Ahmarian, the Aurignacian or both. If these items belong to the Aurignacian, we may hypothesize that the two cases of retoucher use discovered so far in Israel may be associated with lithic industries that share little in common with the other Levantine industries: the Acheulo-Yabrudian at Qesem Cave and the Aurignacian of Manot Cave. It has been suggested that the former be detached from both the preceding Acheulian and the succeeding Mousterian (e.g., Barkai and Gopher, 2013; Zaidner and Weinstein-Evron, 2016). Similarly, the Aurignacian has been interpreted as a European intrusion into the Levant, in contrast to the "local" Ahmarian industry (e.g., Bar-Yosef and Belfer-Cohen, 2010). It may be that the use of bone retouchers in the Palaeolithic of the Levant was a relatively short-lived, imported cultural habit and was not, for some reason, practiced by the local population. This suggestion obviously requires scrutiny of the cultural context of retoucher use in the early Upper Paleolithic sequence at Manot Cave in our subsequent research.

Before such an explanation is further investigated, our second hypothesis, the non-identification of retouchers by researchers in the Levant, must be disproved. As it stands now, the non-identification hypothesis may better explain the absence of retouchers. The detailed taphonomic studies of bone surface modifications published from the Levant

have evaluated numerous types of bone damage, including butchery and intentional breakage by humans, carnivore and rodent gnawing, damage from weathering, abrasion, trampling and burning (e.g., Bar-Oz, 2004; Stiner, 2005; Speth and Tchernov, 2007; Yeshurun et al., 2007, 2011; Rabinovich et al., 2012; Yeshurun and Yaroshevich, 2014). However, these and other research projects have not included retouchers as part of the specific research design, something apparently attributable to a lack of interest or awareness. Therefore, it is entirely possible that the retoucher phenomenon, if encountered, was either misinterpreted or entirely unrecognised by researchers conducting their analyses. Following the initial identification of this phenomenon in the Levant (Blasco et al., 2013), the ongoing taphonomic analysis of the rich faunal assemblages of Manot Cave and other current research projects in the region are now explicitly incorporating the search for retouching traces on bones, something which will certainly assist in clarifying this matter.

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