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STABLE ISOTOPE DIETARY ANALYSIS ON HUMAN REMAINS: A CASE STUDY AT KHIRBET AQABET AL QADI BURIAL CHAMBER, NABLUS, PALESTINE

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ABSTRACT. In 2016, a burial chamber hewn into limestone was discovered at Khirbet Aqabet Al Qadi on the northwestern slope of Mount Ebal, 2km north of the city center of Nablus. The floor of the chamber is 3.15 × 2.9 m and the height averages 1.8 m. A movable closure at the entrance consists of a limestone slab. The burial chamber houses four sarcophagi. The aim of this case study is to give information not only on the burial chamber but also, for the first time in the region, on human remains. Stable isotope analysis of a human bone sample enabled us to obtain dietary information on one individual. Due to low collagen content, the sample did not allow precise dating but it can be placed between 50 BC and 50 AD. Systematic illegal excavation and looting at funerary sites in the Nablus area has caused material for potential information to be missing at the site. Nonetheless, the dietary information obtained supports other material finds indicating Mediterranean agricultural use of the land. Our evidence demonstrates that the site dates to between the 1st and 3rd centuries AD.

KEYWORDS: burial cave, funerary site, human bones, Nablus, Palestine, sarcophagi, skeletal remains.

INTRODUCTION

A burial chamber was discovered at Khirbet Aqabet Al Qadi in 2016. It is located 2 km north of the city center of Nablus on the northwestern slope of Mount Ebal. At 600 m above sea level, the site overlooks the city and is 1 km north of the Western Mausoleum and 3–4 km northwest of the Eastern Mausoleum (Figures 1 and 2). The fact that there were significant archaeological remains on the site was first discovered when the owner of the land was clearing the site to build a house. At the time, a small-scale salvage operation was undertaken. The Palestinian Ministry of Tourism and Antiquities requested that the archaeological team from the Department of Tourism and Archaeology at An-Najah National University examine the site. The aims of the salvage excavation were firstly to ensure that the burial chamber and its content remained intact by preventing construction work on the site and secondly to record descriptions of the archaeological structures and remains. Destruction of the landscape and building expansion on archaeological sites in the Nablus area and issues of frequent looting at burial sites made this an important undertaking.

During our exploration of the site, we found a large courtyard leading to the underground burial chamber mentioned, in which four sarcophagi covered most of the floor space. The chamber was in the form of a cave hewn into the limestone rock from which five loculi or niche graves were hewn, extending outward from the central chamber. Another cave was found that was also entered from the courtyard. It contained a large number of artifacts, demonstrating evidence of inhabitation.

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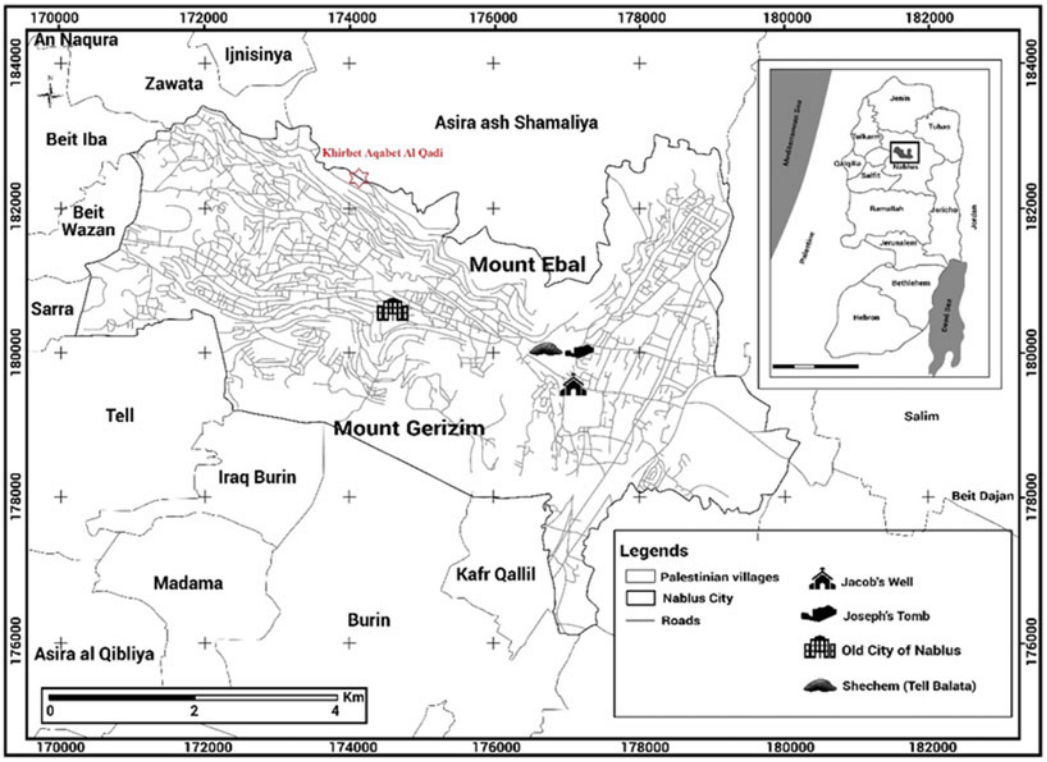

Figure 1 Map of Nablus showing distribution of mausoleums.

Figure 2 Aerial photo of the site: 1) courtyard, 2) cave, 3) burial chamber. (Photo by M. Barghothi.)

Funerary studies have the potential to reconstruct past cultures, in particular, in terms of social organization and ritual. Based on this assumption, our study includes analysis of human bones —the first time this has been undertaken in the Nablus area—as well as information sourced from published archaeological reports and manuscripts on Palestinian archaeological sites during the period between the early Roman period (approximately 63 BC) and the late Byzantine period (AD 638/16Hijra) in Palestine.

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Our tasks included comparing the four sarcophagi we found with other examples in the Nablus area and the rest of Palestine in order to ascertain their historical and archaeological context. With regard to the analysis of human skeletal remains found in the sarcophagi, we organized radiocarbon (^{14}C) dating with the intention, if possible, of proceeding to stable isotope analysis. We were seeking more precise information on chronology, dietary habits, and the social-economic status of the individuals concerned.

BACKGROUND

Necropolises and burial chambers can be found dispersed across outlying areas of Nablus. The most significant include our burial chamber at Khirbet Aqabet Al Qadi and the Eastern and Western mausoleums found at the entrances to the city (Magen 1987). Mausoleums were built along the most important trade routes in the area, eastward toward the Jordan Valley, westward toward the Mediterranean, and northward toward Sebastia in ancient Samaria (Magen 1987). In recent years, several articles have been published on the Askar Mausoleum (the Eastern Mausoleum of Nablus). The most notable among these is that by Damati (1985–1986). Roman sarcophagi were made of several materials, including wood, lead and stone—the most valuable were of marble and the least valuable of limestone. Stone sarcophagi were highly valued due to their more elaborate decoration. Plain stone sarcophagi survived in lesser numbers as they were not valued in later periods and were reused as building material (Nadal 2001: 19). The Askar Mausoleum and funerary complex, considered the most important in Nablus, is found on Mount Ebal. Roman tombs evolved in Neapolis[1] in two phases. The first phase, from the 1st century BC to the 1st century AD, related to the use of loculi, and the second, sarcophagi. The sarcophagi would be placed in the burial chamber along with the existing tombs. This practice occurred until the beginning of the 2nd century AD (Magen 1993a: 1354).

Clermont-Ganneau (1896) was the first to publish a reference to sarcophagi in the region when he mentioned a small lid at Shechem (modern Balatah). Later, Vincent (1920: 135) was the first to describe fragments from sarcophagi on the slopes of Mount Ebal in 1919. He thought they were similar to sarcophagi in Jerusalem. He described the walls as fine, the frame as distinctive and the decoration as in the form of friezes; he suggested the sarcophagi belonged to the Jewish community or perhaps the Samaritans, dating them to the early 1st century AD. Abel (1923) attributes the Askar Mausoleum to the Jewish-Samaritan population, at the time of Hadrian and Marcus Aurelius (134–50 AD). However, Avi-Yohah (1946) suggests the sarcophagi belonged to the Samaritan community. According to Smith (1973: 76), either the sarcophagi date to between the late 1st century BC and the early 2nd century AD or the Crusader period. Damati (1972: 174, 1973: 118–119, 1985–1986), suggests the Mausoleum belonged to a Samaritan family living in Askar in the late 2nd to early 3rd centuries AD; support for this lies in the fact that two sarcophagi are inscribed with names. Barkay (1991b) dates the sarcophagi to the late 2nd to 3rd centuries AD when the Samaritan community prospered and spread after the Bar Khoba revolt.

Of seven coins found alongside the Samaritan sarcophagi, three date to the Severan dynasty. Another three belong to the second half of the 4th century. Sarcophagi used in the western Nablus region during the Roman period were found at Škem in Sebastia and other places, in

[1]Nablus lies in an enclosed, fertile valley and is the market center of a natural oasis, watered by numerous springs. Founded under the auspices of the Roman emperor Vespasian in 72 AD and originally named Flavia Neapolis, the city prospered in particular because of its strategic site and the abundance of nearby springs. Later called Julia Neapolis, or simply Neapolis (Greek: "New City"), it is portrayed on the 6th-century Maba map. It was conquered by the Muslims in 636 CE; the modern name is an Arabic corruption of the Greek form (Abu Sood 2007).

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chambers carved into rock—the lengthwise front panels were decorated with an ornamental frieze in relief with column motifs. Magen (1993a) suggested the sarcophagi thought to be Samaritan would have imitated the Jewish sarcophagi from the second Jerusalem period. He also suggested this imitation was a common practice in Nablus among the Samaritan and pagan populations (Magen 1993b: 165). However, we do not believe this to be the case. The sarcophagi from Nablus are either undecorated or the panels are decorated with discs, friezes, rectangular shapes and wreaths or partial circles over ivy leaves. Also, in Jerusalem, the Samaritans did not accept the usual Jewish style of burial during Roman rule (the ossuaries of Jerusalem are an example) (Magen 1987: 11).

The Samaritans usually buried their dead in a type of hut (according to a Greek style) and this was witnessed in the Hellenistic burials on Mount Ebal (Magen 1987: 12). While the dating and whether Jewish or Samaritan is unclear, Magen (1993b: 163) believes the Samaritans did not develop a distinctive model and the sarcophagi date to the early 2nd century AD. The finding of materials from later periods in some tombs reinforces the fact that caves continued to be used for burial until the early Arab period (Magen 1993b: 163). Al-Fanni (1998, 1999) also suggests the Askar Mausoleum dates to the 2nd century AD. He refers to the finding of a large quantity of bones and black Greek painted pottery at the site, suggesting reuse of the sarcophagi. This may be the case when considering the intensive building activity in Nablus at that time. The sarcophagi cannot be dated to the time of Hadrian and his successors as Able (1923) believes. Those buried may have been Samaritan, Jewish, or even pagan, but, without evidence for exact dating, we cannot make any conclusive assertion. The debate about whether the sarcophagi are Jewish or Samaritan may be affected by the history of Palestine, due to political, religious, geostrategic, and economic reasons.

More accurate dating, bearing in mind the scarcity of archaeological information, would need to come from future regional studies of the different workshops and import systems in place in ancient Palestine. In regard to similarities in design and decoration between sarcophagi, a local workshop is indicated, operational during a relatively short period of time.

Burial Chamber and Sarcophagi

The burial chamber, hewn into limestone rock, has a nearly square floor measuring 3.15 × 2.9 m and has an average height of 1.8 m (Figure 8). The circular limestone entrance block could be rolled back and forth. There are two stone pillars 0.15 m × 0.15 m framing either side of the entrance. The rolling stone is 1.2 m in diameter and 0.25 m deep and when found still rolled in its trough. The entrance is formed by a gap between two walls of hewn stone. The width is 0.7 m, and the depth, 1.1 m, while the width of each sarcophagus is approximately 0.6 m, indicating they were built elsewhere and later taken into the chamber. There are two steps (0.6 m wide × 0.2 m deep) leading downward from the entrance where five niche tombs carved in rock extend approximately 0.2 m outward from the central chamber. Four of them are 0.53–0.7 m in width and one has a width of 1.8 m (Figure 3). There four sarcophagi standing on the floor of the chamber (Figure 5). They were made of soft limestone, identified as from Mount Ebal (Figures 4 and 5). We have numbered them from one to four for identification purposes and describe them as follows.

Sarcophagus 1, located on the western side of the burial chamber, has a north–south orientation. On the front panel, four vine leaf motifs are carved on either side of a central carved vessel, signifying plenty. The sarcophagus is 2.07 m long, 0.56 m wide, and 0.67 m

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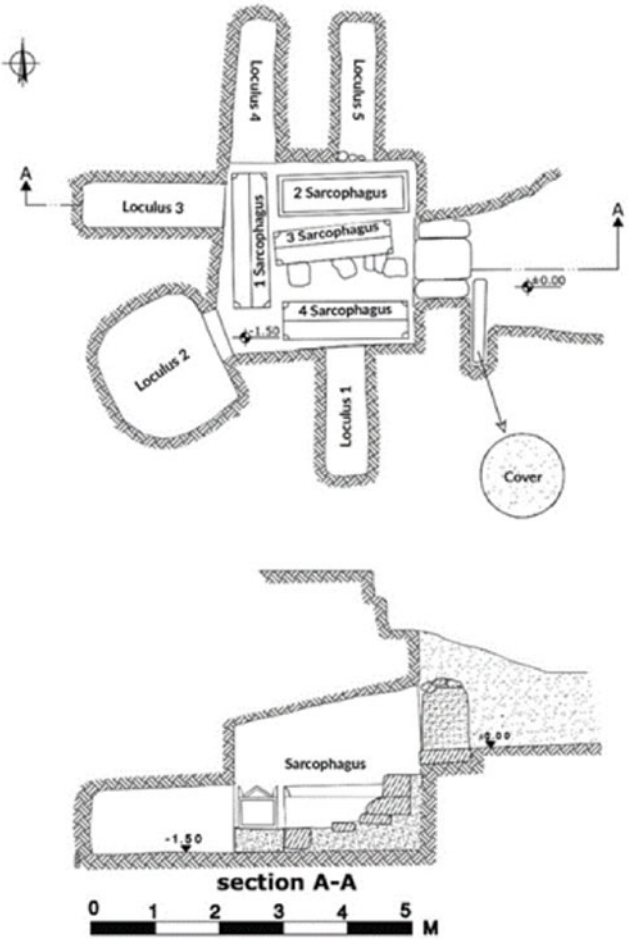

Figure 3 Overhead and cross-section views of the burial chamber.

deep. (Figures 4:1 and 5). Sarcophagus 2 was found on the northern side of the burial chamber and lies east-west. The decoration consists of three geometric squares on the front panel and a geometric square on each of the end panels. It is 2.07 m long, 0.58 m wide, and 0.71 m deep (Figures 4:2 and 5). Sarcophagus 3 was in a central position in the chamber lying parallel to Sarcophagus 2. It is decorated with a carved geometric square on either side of the front panel and is 1.82 m long, 0.51 m wide, and 0.48 m deep (Figures 4:3 and 5). Sarcophagus 4, also parallel to the previous two, is found on the southern side of the chamber and has three carved geometric squares on both longitudinal side panels. It is 2.01 m long, 0.58 m wide, and 0.7 m deep (Figures 4:4 and 5).

Other Structures and Material Finds

Artifacts were found in the burial chamber and the cave. The courtyard leading to both of them measures 18 × 10 m and the floor is of hewn rock in some parts and paved with flagstones in others and has not been excavated. The burial chamber entrance is on the western boundary and the entrance to the cave on the northwestern one (Figure 3). In the cave measuring 6 × 5 m,

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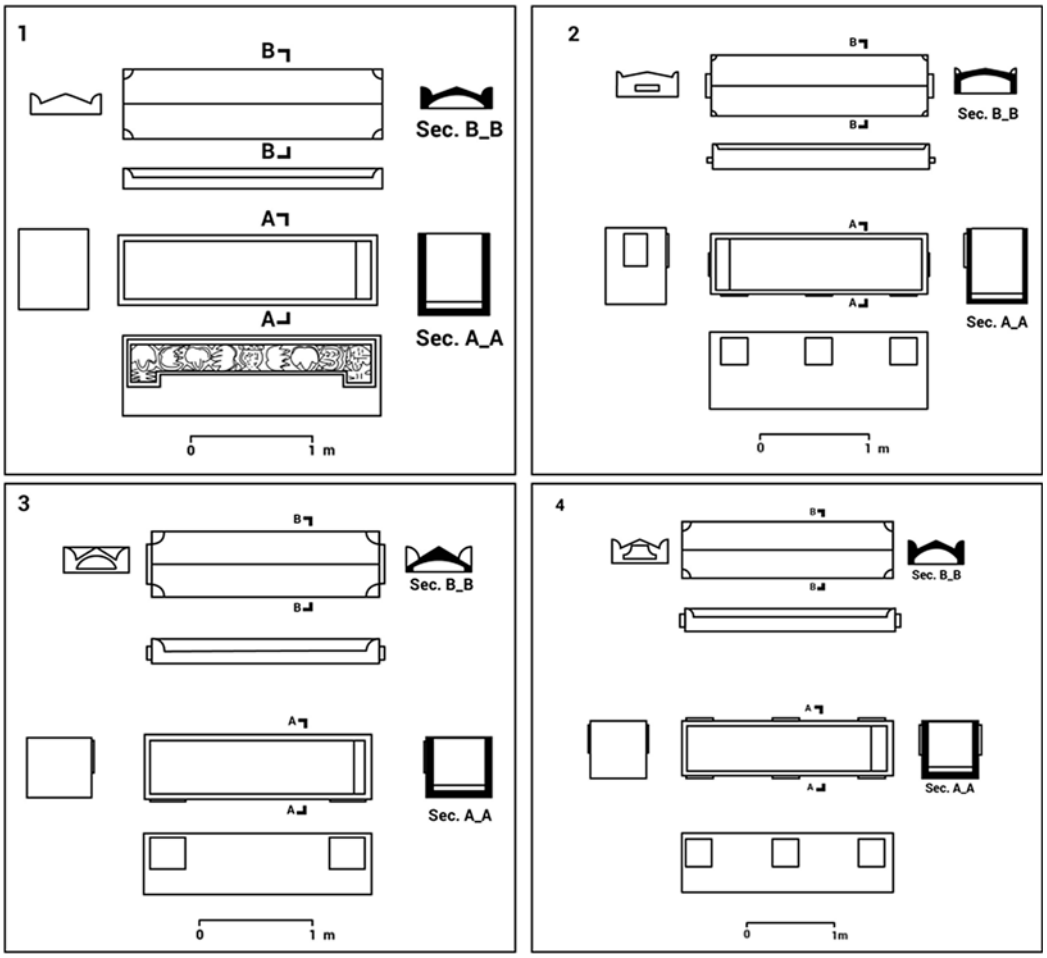

Figure 4 The four sarcophagi found in burial chamber. (Drawing: I Iqtiat.)

Figure 5 Sarcophagi in burial chamber showing distinctive decoration on Sarcophagus 1.

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Figure 6 Amphorae found in burial chamber. (Drawing: I Iqtait.)

numerous pottery shards were found among a large quantity of debris and earth. The shards were from jars, cookware, and tableware, as well as from a large number of oil lamps dating from the Roman and Byzantine periods to the early and middle Islamic periods (Figures 2, 3, and 8: 1–18).

Three amphorae were found in the burial chamber. They were in the western corner and two of them were intact and the other one was broken. They all have long, conical bodies, horizontally ribbed, curving inward to long, narrow cylindrical necks and have long handles on either side. A very small hole is found in the center of each neck that would have been inserted after manufacture, suggesting they were probably originally produced for wine, but later used for vinegar with the air holes aiding fermentation. Five olive stones and a grape seed were found in the base of the broken amphora. Their stoppers would have been of stone or mud. A carved hard white limestone stopper was found near them. Some scholars suggest

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Figure 7 Glass bottles found in burial chamber (1–3) and cave (4–5); bracelets (6–7), funerary marker (8).

this type of stopper was used from the mid-5th to mid-6th centuries AD (Wicenciak 2016: 658; Figure 6: 1–3). This type of wine amphora was manufactured from the 4th to 5th centuries AD and small quantities are found to the north and west of the Black Sea and in the eastern Mediterranean, in Athens and Palestine (Opaiţ 2010: 371). Two bracelets were also found in the burial chamber: one was metal with an ornamental snake design and the other of plain blue glass (Figure 7: 1–5). Five glass bottles of different shapes and colors were found, of which, three were found in the burial chamber and two in the cave (Figure 7: 6–7). The characteristics of the bracelets and the bottles indicate they date from the early Roman period (63 BC–135 AD).

In addition to these artifacts, a funerary marker carved from hard limestone was found near the burial chamber. It is in the form of a pyramid on a cylindrical base—the pyramid symbolizing the soul of the deceased. Pyramids were also an emblem on funerary markers found in Jericho (Toynbee 1971:245; Hachlili and Killebrew 1999: 162–163; Figure 7: 8). Furthermore, divided between the burial chamber and the cave, 18 oil lamps of Samaritan typological characteristics were found, all but one made from moulds, with the exception carved from white limestone. Three were found in the burial chamber and 15 in the cave. Samaritans, Christians, and pagans in Palestine and Jordan used Samaritan oil lamps from the late Roman to the early Islamic periods (Adler 2004: 96). Examples were found in Nablus and Apollonia-Arsuf (Sussman 1983; Magen 2009). We identified four types: A–D (Figure 8: 1–18).

Chronological and Dietary Analysis of Human Remains

The number of studies on health and diet related to newly discovered necropolises has increased significantly in recent years, where researchers have attempted to analyze the social structure of settlements (Sánchez Romero 2008: 25). The distribution of wealth is related to the variables of health and diet (Sánchez Romero 2008: 26). Despite our sample size limiting our options for

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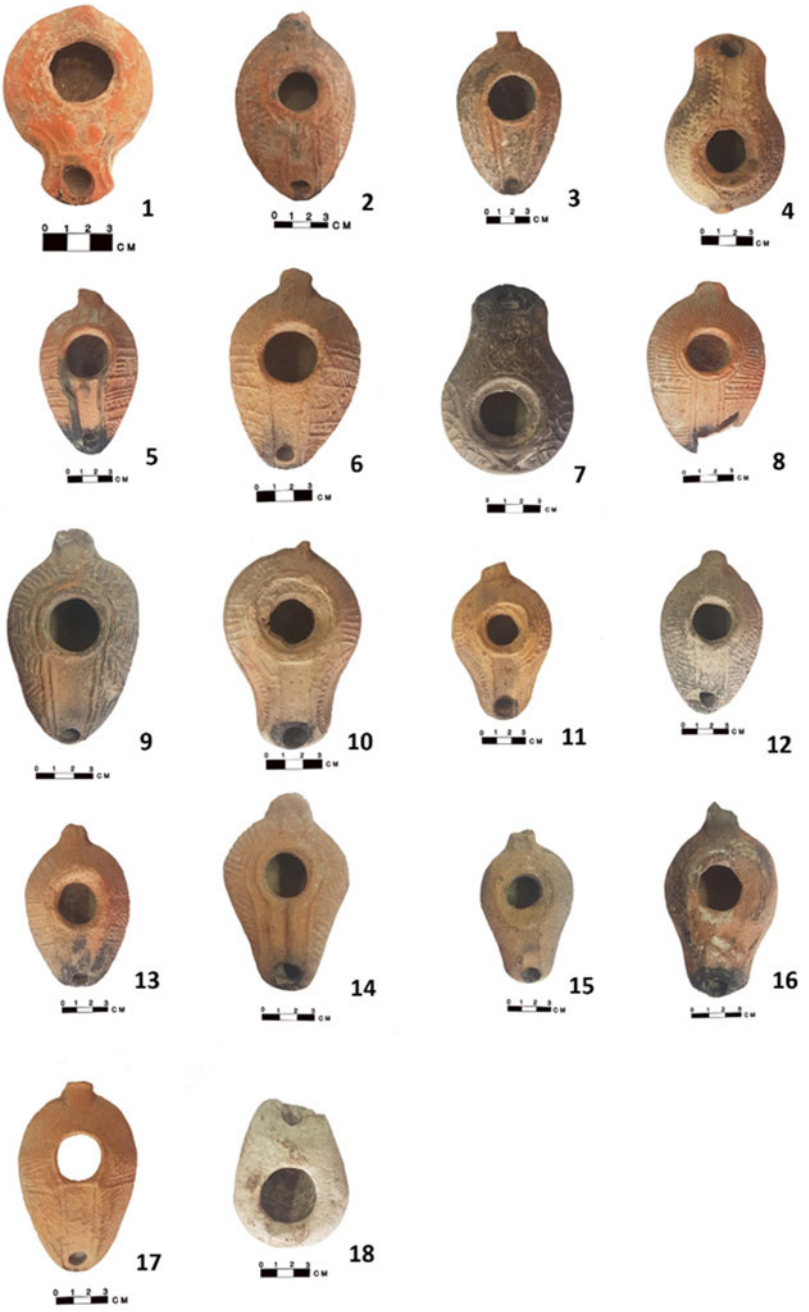

Figure 8 Oil lamps found in burial chamber (1–3) and cave (4–18).

analysis, we present it as pioneer research for this study area. Two of the sarcophagi contained human skeletal remains, but the poor state of preservation of the bones and the high fracture rate prevented the undertaking of a pathological study relating health condition to diet and social status. Nevertheless, our analysis of carbon and nitrogen stable isotopes in the

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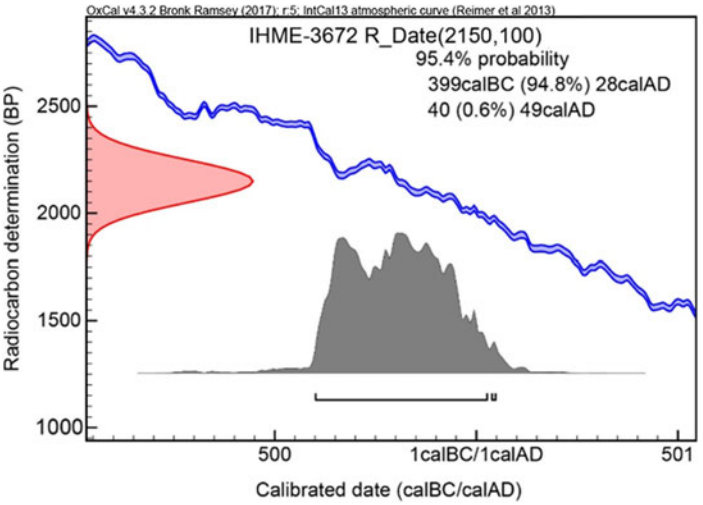

Figure 9 Radiocarbon calibration for Khirbet bone sample (K1).

collagen from our bones permitted reconstruction of the paleo diet of one of the individuals in the sarcophagi.

We used rib samples from the individuals in Sarcophagus 1 (2150 ± 100 BP; see Figure 9) and in Sarcophagus 2 (^{14}C dated to approximately 400–300 BC but this age is not considered reliable due to low collagen content)[2]. The extraction of collagen and stable-istope mass spectrometry were performed at the laboratories of the Isidro Parga Pondal Geological Institute, at A Coruña University, Spain, while the ^{14}C samples were analyzed by Mykhailo Buzinny at a laboratory in Ukraine.

Before extracting collagen from the bones following the Longin method (1971), the bones were decontaminated by alternately cleaning them in H_2O and acetone baths. Subsequently, the two samples were pulverized, obtaining 250–300 mg of bone powder. A small amount (20 mg) was subjected to carbon and nitrogen elemental analysis. In Sample 2, the amount of nitrogen was very low at 0.17%. This indicated poor collagen preservation and limited possibilities for stable isotope analysis. However, the amount of nitrogen in Sample 1 was sufficient for analysis at 0.55%.

Sample 1 was subjected to digestion and filtration procedures. The sample was demineralized in HCI 1 M and then in NaOH 0.125 M to eliminate organic contaminants. Subsequently, microfiltration was carried out in which insoluble residues were dissolved in mild HCI 0.01 M in a 100ºC oven for 17 hr. After lyophilization, the bone collagen was combusted and the CO_2 and N_2 measured in a mass spectrometer for the stable-isotope composition (Longin 1971; Bocherens et al. 1997).

For validity, we needed results within the collagen performance parameters of carbon and nitrogen content percentages of the C: N atomic ratio. According to Van Klinken (1999), the content needs to be above 1.5%, and our sample met this target: carbon and nitrogen

[2]Two samples were ^{14}C-tested. However, due to the poor state of preservation of Sample 2 and a high fracture rate, we were unable to carry out chronological analysis. Thus, our research is based on analysis of Sample 1 only.

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Table 1 Results of elementary analysis of C and N values per sample.

Sample	EA ref. no.	Weight (mg)	% N	% C
PAL 1	2018/23585	5.167	0.55	4.14

Table 2 Results of stable isotope analyses.

Sample	SIA ref. no.	Yield (% col in bone)	Weight (mg)	% C col	% N col	C:N atomic ratio	$\delta^{13}C_{VPDV}$ (‰)	$\delta^{15}N_{AIR}$ (‰)
PAL 1	2018/25577	2.09	0.105	18.7	6.74	3.2	–21.4	1.6

percentages were low, but acceptable with the C: N atomic ratio within established limits (De Niro 1985; Ambrose 1990).

The information from the stable isotopes ($\delta^{13}C$) demonstrates that the individual's (Sample 1) diet was derived mainly from C3 plants, which could include wheat, olive and grape, characteristic of the fertile Nablus valley, and the low $\delta^{15}N$ values could indicate a legume-based diet. The $\delta^{13}C$ values indicate the diet was not meat-based, nor was it marine or C4 plant. This diet suggests the individual was from a middle socio-economic group, as the burial style indicates (Table 1).

However, analysis of a greater number of bone samples from individuals with age and gender determined would be needed for a wider view. Diet, age, and gender variables might determine social status. However, archaeological stable isotope research goes beyond human diet and mobility; crop and livestock analysis could give valuable archaeological knowledge (Tables 1 and 2).

Underground Burial Chamber Tradition

The building of burial chambers and artificial caves for different purposes began in Neolithic times in Palestine. During the Iron Age (1200–538 BC) the number of caves used as dwellings decreased (Mati 2001: 12). Semi-habitational forms appeared during the Iron Age, and later, Hellenistic and classical cultures influenced design and rituals. However, Iron Age underground construction became more generalized with large underground storage and water supply systems. An example is the 700 m of tunnelling underneath old Jerusalem (Gill 1991: 1467). Construction of artificial caves for funerary purposes became widespread and their functional use continued until the beginning of Christianity, as demonstrated by the Holy Sepulchre in Jerusalem (Broshi 1991: 83). During this period, artificial burial caves were used by single families. The remains of libations, ritual fires and offerings of food and beverages are found with the human remains (Barkay 1991a: 92; Kloner and Davies 1991: 108).

In general, from the 7th to 6th centuries BC, we see large burial chambers of wealthy families excavated in rock. A staircase led down from an entrance of one square metre to a chamber with carved niches radiating outward (Barkay 1991b: 93). In the 5th century, we see Hellenistic

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influences and in the beginning of the 3rd century, the accumulation of human remains led to the use of ossuaries and there is an increase in finds of household items that would continue throughout most of the Roman era. Numerous cave finds, now believed to have been for funerary rituals rather than inhabitation, resulted from the Roman war in Palestine (Aviam 1997: 8; Stern and Gorin-Rosen 1997: 7). During the 1st century AD with the advent of Christianity, the use of ancient burial chambers as community meeting places for rituals increased. (Sutcliffe 1960: 82; Avi-Yonah 2001: 149). In the Byzantine era (4th–5th centuries AD), major underground projects, as in the case of caves at Tefen, show complex constructions for family use (Lederman and Aviam 1997: 138). The entrance was designed to prevent theft.

Hundreds of rock-cut tombs were constructed south of the Levant in ancient times, sometimes with elaborate facades and multiple burial chambers (Al-Houdalieh 2009: 338). Some were above ground, but most were caves. Each usually belonged to a wealthy family, while poorer inhabitants were buried in the earth. Bodies were placed in the loculi and after a generation the bones were moved to bone chambers or, later, placed in sarcophagi to allow the loculi to be used for new burials.

In ancient Palestine, cemeteries were built outside the city walls because burials were forbidden inside the city (Loffreda 1968: 244). Almost all of the tombs in the area of our chamber have been illegally excavated; this has resulted in the finding of very few skeletal remains in their original burial position and thus the samples are few for reconstruction of demographic, nutritional and palaeopathological information. Advantage was taken of the soft limestone for the construction of burial chambers, loculi and sarcophagi in the area. The entrances to all the burial chambers face east. Some of them have a circular rolling stone entrance and others a moveable square block closing the gap between the hewn stone walls. Descriptions are found in the Four Gospels, describing how the body of Jesus was wrapped in a clean linen cloth and placed it in a new tomb cut from the rock, and then rolled a large stone across the entrance and went away (Matthew 27: 57–66, 28: 1–2; Mark 15: 42–47, 16: 1–8; Luke 24: 1–2, 10–11; and John 20: 1, 11–18). The burial chamber at Nablus is very similar to those found at other sites in Palestine and Jordan, such as Khirbat Medras, Khirbat Umm Tuba near Jerusalem, the cemetery at Yasileh, north of Jordan and other cemeteries in Jenin and Ramallah (Al-Muheisen 2008: 315–337).

CONCLUSION

Khirbet Aqabet Al-Qadi is an important Roman site in the Nablus area. The rock-hewn burial chamber included five loculi and contained four sarcophagi. Information was gathered from the analysis of two samples of human bones from two different sarcophagi. After ^{14}C analysis of the samples, we decided to focus on the results from Sample 1, due the poor state of preservation and high fracture rate of Sample 2. The sample demonstrated the diet of the individual—a diet that reinforces other evidence pointing to agricultural use of the land. We suggest that the burial chamber was first used in the 1st century AD, due to the fact that there is an inconsistency between the dating of the remains found in the burial chamber and the architectural design. In the analysis, the low collagen content prevented accurate dating of our sample but based on the results we were able to suggest a dating between 50 BC and 50 AD. This is chronologically in accordance with the other information gained from material and structural remains. The burial chamber, loculi and sarcophagi and the numerous artifacts found provide evidence to conclude that the hamlet

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was inhabited between the 1st and 3rd centuries AD. The depiction of a vase and grapevine motifs on Sarcophagus 1, and the amphorae found nearby are representative of symbolism of the early Christian and Samaritan eras.

SUPPLEMENTARY MATERIAL

To view supplementary material for this article, please visit https://doi.org/10.1017/RDC.2019.65

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