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Handling dead bodies: Investigating the formation process of a collective burial from Neolithic Tepecik-Çiftlik, Central Anatolia (Turkey)

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A B S T R A C T

There are only a few collective burials that include a large number of individuals during the PPN (Pre-Pottery Neolithic) and PN (Pottery Neolithic) settlements of the Near East. However, analyses of this type of burial are highly important since they provide enormous information about a variety of cultural and biological aspects of a society. In this study, a large collective burial from Tepecik-Çiftlik is evaluated. The main goal of this study is to examine and understand the formation process of this burial. Following excavation, the human skeletal remains were curated and analyzed. In this analysis, at least 42 individuals were documented in the burial. A calculation of the Most Likely Number of Individuals (MLNI) has indicated there may be as many as 47 individuals present. The burial includes both sexes and all age groups, with the exception of infants below the age of 1.5 years. In summary, we argue that the final stage of the burial was formed through multiple factors and the reasons behind the complexity of this assemblage include successive burials over time, movement of the primary burials by human agents, and the secondary deposition of several individuals.

1. Introduction

The transition from a nomadic hunter-gatherer lifestyle to a settled life with an agricultural economy dependent on plant cultivation and animal breeding developed independently in different parts of the world and at different times (Bellwood, 2004.) By the end of the Pleistocene (approx. 12,000 before the present) the disappearance of severe climatic conditions and hence the enrichment of resources led to radical changes in the lifestyle of the people living in the Near East (especially the Fertile Crescent and Central Anatolia) (Özdoğan, 2002). This period, termed the "Neolithic", is an important process in which social, cultural, and technological changes in the life of human groups can be traced (Kuijt, 2002).

During the Neolithisation process, different patterns of behavior are also recorded by archaeologists. One of the most important of these are ritualistic, especially those related to mortuary behaviours. Indeed, diversity in mortuary practices in various settlements in the Near East throughout the Neolithic has been determined by many researchers. These practices include the ritual secondary treatment of the bodies and are key to understanding the Neolithisation process, as one of the most significant sociocultural transformations in human history (Cauvin et al., 1999; Erdal, 2015; Kuijt, 2008a, b; Tsuneki, 2011). Understandably, mortuary practices have long been evaluated in different ways, and researchers have drawn attention to various elements of the topic (Binford, 1971). For example, in a consideration of plastered skulls and their possible relation to ancestor worship/veneration some researchers draw attention to the sexes and ages of the remains (plastered skulls) (Bonogofsky and Graham, 2011). While others focus on the techniques and traces of postmortem treatments and taphonomical processes (e.g. traces of cut marks, dye/pigment) (Erdal, 2015; Haddow and Knüsel, 2017; Kanjou et al., 2013). However, generally, evaluations of Near Eastern Neolithic mortuary practices focus on regional similarities and are usually associated with a specific cultural background (Croucher, 2012; Kuijt, 1996; 2004; Özbek, 2009; Pilloud et al., 2016; Verhoeven, 2002). In some of this research, similarities within and between regions in mortuary practices, in the context of ancestral culture, collective memory, and common beliefs are discussed (Bonogofsky, 2011; Kuijt, 1996, 2001; Verhoeven, 2002). Additionally, it has been emphasized that funerary ceremonies were planned in detail and they were practices open to the participation of many people (Kuijt, 1996). In fact, Kuijt (2008a,b) has argued that practices related to skull removal and modelling skulls as secondary interventions to the dead bodies were an important means to prevent social imbalances/conflicts arising from the new lifestyle. Nevertheless, a continual flow of new information presents itself with recent archaeological expeditions. This has helped many researchers to emphasize the spectacular

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differentiation among settlements even those in close proximity to one another (Erdal, 2013, 2015; Guerrero et al 2009; Kuijt, 2008b). Thereby, with the new examples and the newest approaches, examining the locations of the burials, burial and grave types, and containers for the corpse have become more important in the assessment of burial groups. Researchers argue that detailed, but refined information coming from burial grounds and local knowledge of more settlements would contribute to not only understanding the variety, but would also allow us to negotiate cultural transformations through middle range theories (Kuijt, 2008b).

Clearly, the analysis of the behavior of the living towards the dead is not always easy to comprehend in an archaeological setting (Osterholtz et al., 2013; Lorentz, 2016). Group burials, amongst other burial practices, vary substantially among human populations and are one of the most difficult cases from which to collect data. Collective burial, an example of diachronic deposition of bodies to the same place, is a good example of this situation (Roksandic, 2001). Collective burials, defined as the consecutive deposition of bodies into the same grave, are mostly unearthed in a way that the bones of the individuals are disarticulated and commingled (Bocquentin and Garrard, 2016; Osterholtz et al., 2013; Ubelaker, 2001). Especially when considering the graves with a high number of individuals. Collective burials have an additional importance since they are not typically encountered in Neolithic settlements. However, there are some examples of collective burials from the Neolithic Near East and Anatolia. These include Çatalhöyük, Abu Hureyra, D'ja de and Ba'ja (Akkermans and Schwartz, 2003; Boz and Hager, 2013; Coqueugniot, 1999; Gebel, 2010; Gebel et al., 2006; Haddow et al., 2016; Moore and Molleson 2000). The Skull Building at Çayönü Tepesi, a site dated to the PPN, is one of the most significant examples of a collective burial (Erim-Özdoğan, 2011; Özbek, 1989, 1990; Özdoğan and Özdoğan, 1989; Yılmaz, 2010).

Collective burials, especially those with a large number of individuals and unearthed from distinctive places, have the potential to reveal a plethora of information about human populations and cultures. These can be things such as the demographic composition of populations, inter and intra group dynamics, social organization, and belief systems. Despite all this, the number of bioarchaeological investigations on burials involving a large number of individuals and secondary interventions in the Neolithic of the Near East is not sufficient. And, it is clear that detailed studies are needed to understand the relationship established with death in ancient societies (Mickleburgh and Wescott, 2018). Because of the significance of the information they carry, it is necessary to separately evaluate and assess this type of burial. In this study the BB collective burial from Neolithic Tepecik-Çiftlik is discussed (Bıçakçı, 2012; Bıçakçı et al., 2011; Büyükkarakaya et al., 2012). The aim of the study is to examine and understand the formation process of the BB burial. In this treatment, the skeletal remains from the BB collective burial were described in terms of location, taphonomy, sex, age, and total number.

2. The settlement and material

2.1. Tepecik-Çiftlik

Tepecik-Çiftlik is located in the lowlands of the Çiftlik district of Niğde province, 1 km from the district center (38°10′20″N 34°29′38″) (see Fig. 1) (Bıçakçı, 2001: 26; Bıçakçı et al., 2011, 2017). Excavations of the settlement have been organized under the direction of Associate Professor Erhan Bıçakçı of Istanbul University's Prehistory Department. The Çiftlik Plain is approximately 1500 m above sea level and is formed by pumice and ashes from volcanic eruptions and alluvial layers from the surrounding mountains (Bıçakçı et al., 2007; 2011: 26; Kuzucuoğlu, 2013). The mound is elevated 9.60 m above the plain and the size of the ovoid shaped mound is 300 m × 170 m (Bıçakçı et al., 2011). Pre-Pottery Neolithic, Pottery Neolithic, Early Chalcolithic, and Late Roman-Early Byzantium levels were discovered during the excavations (Bıçakçı et al., 2007, 2011, 2017). A great amount of information about the Neolithic period has been obtained from the 5th, 4th, and 3rd levels (Bıçakçı et al., 2011, 2017). Few architectural features are found on the 5th level, which is mainly represented by pits and fireplaces, suggesting the importance of outdoor activities. Also, the presence of graves suggests the site's use as a burial ground (Bıçakçı, 2012). In the 4th level, a layout consisting of distinctly separated structures was observed (Bıçakçı, 2012). Conversely, many dwellings from early and the late periods of the 3rd level display diachronically changing features including house plans and settlement patterns (Çakan, 2013). The ^{14}C analysis demonstrated that levels 3., 4. and 5. are dated to 6800–6100 cal BC[1] (Çakan, 2013).

Animal remains from the Neolithic and Chalcolithic levels reveal that both livestock raising and hunting were a part of daily life and the consumption of animals played an important role in the society (Bıçakçı et al., 2007; Campana and Crabtree, 2017). Evidence from archaeobotany indicates that several plant species (including mostly cereals and legumes) were consumed at the site. Consistently, recent studies have uncovered primary and secondary evidence for plant-based foodstuffs, including hand mills, grinding slabs, storage silos, grains and seeds (Bıçakçı et al., 2007, 2011; Ridky, 2009). From a technological point of view, it can be said that pottery production at the site would have gradually become more nuanced and delicate through time. Obsidian related activities were also a major part of daily life (Balcı, 2016; Bıçakçı et al., 2011, 2017; Godon, 2012). Indeed, Tepecik-Çiftlik is located very close to some of the obsidian sources known to have been extensively exploited in the Near East during the prehistoric period. It is known that obsidian tools and cores obtained from the famous Göllüdağ mountain and from neighboring sources located nearby the settlement, were 'exported' to regions as far away as Cyprus and the Levant (Balkan-Atlı and Binder, 2011; Binder, 2002; Şevketoğlu, 2006, 2008). Workshops within the settlement indicate that the production and use of obsidian were significant parts of everyday life (Balcı, 2016; Bıçakçı, 2012). Following the archaeological findings, such as the quality and variety of products (including seals), it is thought that the Tepecik-Çiftlik people must have played a major role in controlling and regulating the obsidian sources. Since the site also has unexcavated PPN levels and is located very close to obsidian sources, it has the potential to provide important findings in the future.

2.2. General traits of mortuary practices at the site and BB collective burial

Primary inhumations in simple pits were the preferred method of inhumation (Büyükkarakaya, 2017a, b; Büyükkarakaya et al., 2009: 128, 2012). However, ten jar (pot) burials for infants, were also discovered from the 5th, 4th, and 3rd levels. The oldest graves come from level 5 and very few structures have been found from level 5, and one of them is the BB space. In this level, besides the BB collective burial, twelve primary and four secondary burials were detected in the open spaces. It is not until the 4th level that burials are witnessed within residential areas and other structures. Most of the graves coming from the 4th level were discovered in the AY and BA structures that are connected to the AK complex (Bıçakçı et al., 2011). Whereas the majority of the individuals discovered in these structures are infants younger than 12 months of age, older children and adults are also found in the AY structure. In total, 33 primary and two secondary burials were unearthed in this level. Almost all the graves found in the 3rd level (the end of the Neolithic period at the settlement) were discovered in open

[1] Latest date of level 3: Lab. ID: KN-Nr. 5914; Material: Charcoal; 14C Alter: 7420 + /-80 BP; Calibrated date*: 6435–6097 Cal BC (95.4% probability).Earliest date of level 5: Lab. ID: Col-173; Material: Charcoal; 14C Alter: 7880 + /-49; Calibrated date*: 6848–6610 Cal BC (78.7% probability).*The date is calibrated with OxCal V4.3.2 (Ramsey, 2017); IntCal13 atmospheric curve (Reimer et al, 2013).

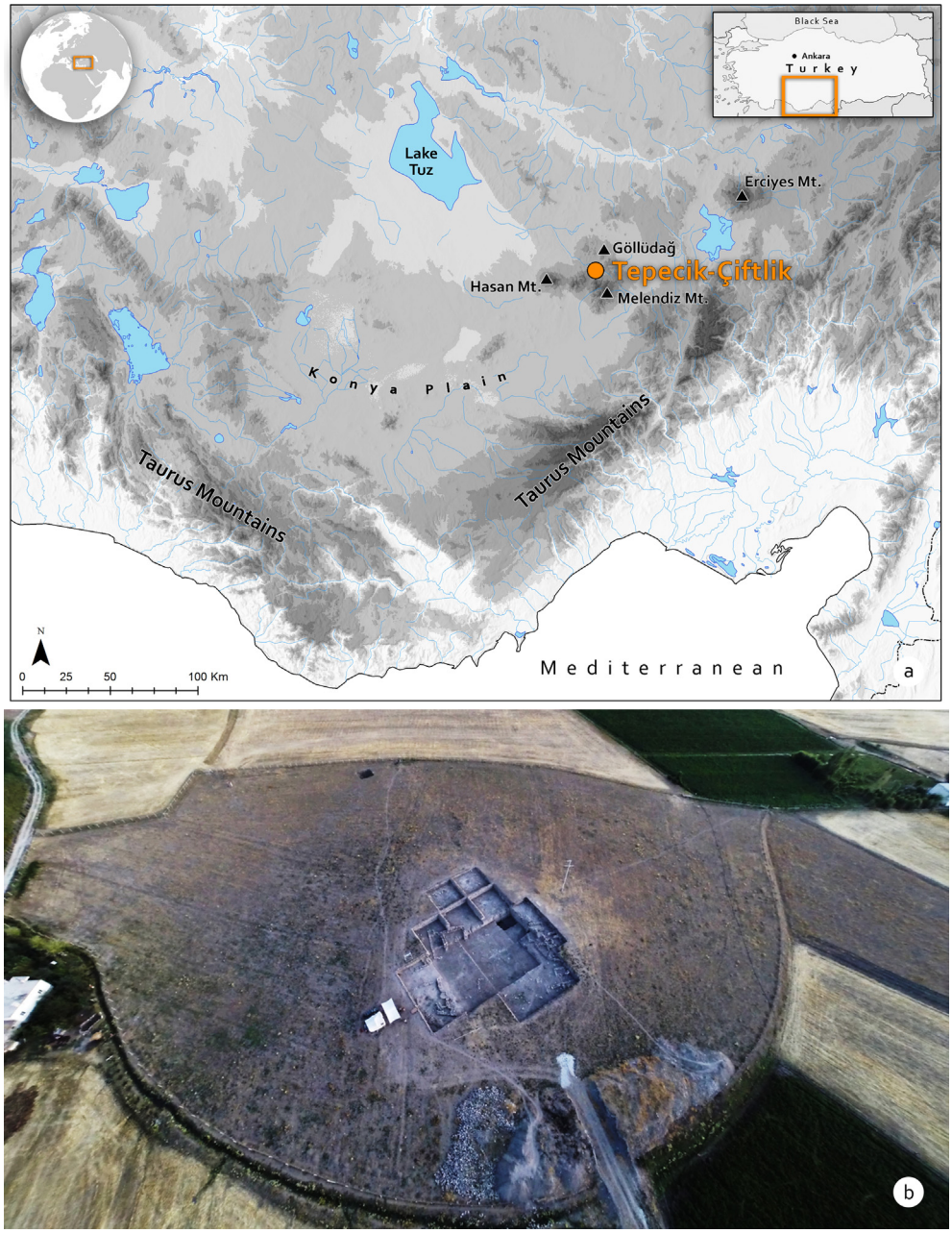

Fig. 1. Settlement's location in Central Anatolia and a general view of Tepecik–Çiftlik mound.

spaces related to houses and residential buildings while some graves are found actually inside the structures. The number of primary and secondary burials in this level are 44 and 9, respectively (Büyükkarakaya, 2017a, b; Büyükkarakaya and Erdal, 2014).

Grave goods are found in a quarter of the Neolithic Period graves at Tepecik-Çiftlik, and most of the graves including grave goods belong to infants younger than 12 months of age (Büyükkarakaya et al., 2012; Büyükkarakaya and Erdal, 2014). Moreover, some observations indicate that treatments to the deceased at the settlement were part of complex ritual activities involving stages rather than simple practices (Büyükkarakaya et al., 2009; Büyükkarakaya and Erdal, 2014). For example, most of the graves belonging to children and adults were reopened after some time to remove the skulls of the individuals. In some instances, other body parts such as long bones were also removed. Furthermore, it was discovered that some of the graves were reopened and the collected bones of those individuals were re-interred in secondary deposits. When mortuary practices of the Near Eastern Pre-Pottery and Pottery Neolithic periods are examined, a great variety amongst regions and populations is witnessed (Croucher, 2012). The diversity of mortuary practices and mortuary behavior at Tepecik-Çiftlik also reveals data about the population's symbolic world; the concept of death and dying and their belief system. The burial practices of the settlement also bear resemblances to other contemporary Pre-Pottery Neolithic populations (Boz and Hager, 2013; Büyükkarakaya, 2017a, b; Büyükkarakaya and Erdal, 2014; Croucher, 2012; Öztan, 2010).

The BB collective burial (Fig. 2, see also Fig. 5) is found in the main trench of the site in 2009 and the excavation of the burial completed in 2010. It is located in level 5 as the stratigraphy of the settlement and radiocarbon analysis performed on burnt wood samples date the level to 6850–6650 cal BC. Radiocarbon analysis on skeletal samples from the BB collective burial has dated the feature to between 6750 and 6635 and 6690–6595 cal BC. All of the human bones found in the BB burial are stored in the Anthropology Department's laboratory of Hacettepe

Fig. 2. BB collective burial, general view (Tepecik-Çiftlik archive).

University along with the rest of the Tepecik- Çiftlik skeletal remains.

3. Theory and methods

3.1. Bone assemblage and estimating number of individual

During archaeological excavations of the BB collective burial, numerous procedures and recording methods were applied. In the field process, every bone and groups of bone were labeled, numbered, identified with associated ones, and their anatomical orientations recorded. By recording the fully or semi-articulated bones, the researchers attempted to understand the possible connection between the individual elements. Additionally, digital records were established by taking numerous pictures of different levels and angles and all soil recovered from the burial was screened (Lorentz, 2016). In the lab process, all the bones were cleaned and restored. The human remains from the BB burial were categorized into bone groups and the number of the bones found in the burial was calculated following after small and fragmented pieces which could possibly belong to different bones were omitted. It was observed that most of the bones (especially long bones) obtained from the BB burial were considerably well preserved in terms of bone integrity. Skeletal elements were inventoried, sex and age was estimated, and osteometric measurements recorded. During the pair-matching process, gross morphology elements such as size, robusticity, skeletal muscle markers, epiphyseal dimensions, sex and age traits were taken into consideration (Adams and Konigsberg, 2008; Byrd and Adams, 2009; Ubelaker, 2001).

In bioarcheological and forensic anthropological studies several methods are used for estimating the number of individuals in multiple or collective burials (Bocquentin and Garrard, 2016; Robb, 2016; Ubelaker, 2001). Researchers have suggested that the incident's unique requirements are important for deciding which methodological approach to employ (Osterholtz et al., 2013). Previous studies conducted on collective burials have used certain methods for estimating the number of individuals (Boz and Hager, 2013; Cunha and Silva 1997; Nagaoka et al 2012; Adams and Konigsberg, 2004). In this study, by estimating the specific features of the BB burial such as preservation and pair matching conditions of the bones and the size of the sample, two different methods for estimating the number of individuals were used. The first method is very similar to the Minimum Number of Individual (MNI) estimation technique that is frequently used when studying commingled mass graves (Byrd and Adams, 2009; Adams and Konigsberg, 2008). In this alternative method, known as the Grand Minimum Total (GMT), left (L) and right (R) sides of the long bones are estimated and paired (P) long bones are also included in the calculation ($GMT = L + R - P$) (Adams and Konigsberg, 2004; Lyman, 2008). In this method, every unpaired left and right bone is calculated as a separate individual. The second method used in this study estimates the original population size instead of the minimum number of individuals by also considering further taphonomic processes affecting the articulation of disorderly arranged/commingled bones (Adams and Konigsberg, 2004; 2008). This method, recently suggested by Adams and Koningsberg (2004) to be applied to human skeletal remains is named the Most Likely Number of Individual (MLNI) and is a modified version of the Lincoln Index that was originally used in zoological researches ($(((L + 1)(R + 1)/(P + 1)) - 1)$ (Adams and Konigsberg, 2004; 2008). In addition to these calculations, recovery probability (r) for MLNI is estimated for every long bone ($(2P/L + R)$ (Adams and Konigsberg, 2004; 2008). An Excel spreadsheet from the following website was used for calculations (http://konig.la.utk.edu/MLNI.html) (Adams and Konigsberg 2004; 2008).

It is useful to consider the age-at-death, sex, overall bone size, and other information as well as duplication of bones on both sides to estimate the number of individuals in commingled human skeletal remains (Ubelaker, 2001). For this reason, sex and age data of every single bone available is used to monitor the above-mentioned methods.

3.2. Demographic profile

Sex and age of the BB collective sample were estimated using certain morphological characteristics. For estimating the age of death from subadults, features associated with dental calcification phases (and dental eruption in a few instances), diaphyseal bone length, and epiphyseal closure were used (Ubelaker, 1989; WEA, 1980; Buikstra and Ubelaker, 1994). Chronological and degenerative changes of the auricular surface, pubic symphysis, sternal ribs ends, and cranial suture closure were used for estimating the age at death of the adults (Loth and İşcan, 1989; Lovejoy vd.1985; Meindl et al. 1985; Meindl and Lovejoy, 1985). Sex-related differences of the skull and pelvis (e.g., supra-orbital margin, nuchal crest, mental eminence, greater sciatic notch, subpubic concavity, ventral arc) were used for sex assessment (Buikstra and Ubelaker, 1994; Krogman ve İşcan, 1986; WEA, 1980).

3.3. Formation process or taphonomy of the BB

Taphonomical examinations were employed for the BB collective burial. Taphonomy, coined by Efremov (1940), has been used as a term to define the transformation process from the biosphere to the lithosphere. Effects of biotic and abiotic factors on the body after death offer a general framework for this term (Knüsel and Robb, 2016; Lyman, 2008; Martin et al 2013). However, in many publications the term taphonomy is used to refer to 'natural' causes, whilst actually human behavior can have a big impact in multiple or collective depositions and recent bioarchaeological approach tends to focus on both 'natural' and 'cultural' aspects of taphonomy (Bello and Andrews, 2006; Martin et al., 2013; Ubelaker, 2001). With the theoretical contributions of forensic anthropology, recognizing human factors alongside nonhuman factors as taphonomic agents have made it easier to apply this term to archaeological contexts (Haglund and Sorg, 2006; Roksandic, 2001; Ubelaker, 2006). In fact, 'violent' activities such as skull removal and other secondary interventions are considered as such agents, and it has also accurately been proposed to consider taphonomic effects in laboratory studies after excavations (Knüsel and Robb, 2016; Martin et al., 2013). In this regard, this approach is deemed to be a suitable tool for analyzing the formation process of the BB. Macroscopic observations on bones were made to detect traces of cutmarks caused by post-mortem and post-depositional interventions (Andrews and Bello, 2006; Andrews et al 2005; Buikstra and Ubelaker, 1994; Erdal, 2015; Ortner, 2003; Robb et al., 2015). Cultural and/or natural factors were evaluated; factors involved in the formation were documented based on the observed data. Hence, both natural (e.g., weathering and animal damage) and cultural factors (specifically funerary behavior and arrangements related to depositions) were taken into consideration.

The BB burial was examined through detailed recording and

photography of related articulated and disarticulated bones and bone groups during excavation and in post-excavation studies This archaeothanatological approach aims to provide the taphonomic history of the corpse in a burial context using observations and records (Duday, 2009a; Knüsel, 2014; Mickleburgh and Wescott, 2018). It can be said that, in the field study of BB collective burials, observations and recordings were made in a similar vein. It should therefore be stated that especially after the laboratory studies, the archaeothanatological approach is used to maintain terminological unity. For example, the original placement of the corpse is defined as a primary deposit and the final tomb where the human remains are placed following their movement from the primary location is defined as a secondary deposit (Andrews and Bello, 2006; Roksandic, 2001; Duday, 2009a, b). Rearrangements observed in some burials could include displacement and piling up the bones of different individuals together, known as reduction (Duday, 2009a, b). Technically, whether primary or secondary, if several individuals have been buried in the same deposit, the burials are named multiple burials (Duday, 2009a, b; Martin et al 2013). Additionally, whether primary or secondary burials, decomposition-related changes such as breaking down of the joints is considered as disarticulation (Knüsel, 2014; Mickleburgh and Wescott, 2018; Roksandic, 2001), and specific bone parts with preserved anatomical connections found separate from the rest of the bodies of the individuals are evaluated as intentional dismemberments (Boz and Hager, 2013).

4. Results and discussion

4.1. The bone assemblage and estimations of the number of individual

The bone assemblage of BB collective burial consists of all bone types. The fact remains that there is a diverse representation of different parts of the body (Table 1). These data provide clues when estimating the number of individuals. For example, while 14 crania were found in the BB burial, the count of mandibles alone raises the number of individuals to 33. This differentiation applies for the duplicate bones found in pairs in the body as well. While 36 left ulnae were detected, there were only 25 right ulnae. This differentiation might be considered a result of the preservation status of the BB burial human remains. However, the bones of both subadults and adults excavated from different levels of the burial are remarkably well-preserved. Considered as exceptional cases, some dry bone (post-mortem) fractures are found resulting from various reasons as explained below.

Table 1
Summary bone count from the BB burial.

Bone group	*Left*	*Central & Paired (*)*	*Right*
Crania		*14*	
Mandible		*33*	
Atlas		*14*	
Axis		*15*	
Vertebrae		*431*	
Rib		*288*	
Clavicle	*17*		*19*
Scapula	*14*		*15*
Humerus	*29*	*24**	*27*
Ulna	*36*	*21**	*25*
Radius	*34*	*20**	*28*
Carpal		*203*	
Metacarpal		*156*	
İlium	*21*		*21*
Ischium	*18*		*19*
Pubis	16		14
Sacrum		*17*	
Femur	*32*	*28**	*33*
Tibia	*32*	*27**	*29*
Fibula	*26*	*19**	*25*
Patella	*20*		*17*
Tarsal		*197*	
Metatarsal		*162*	
Phalanges (total)		*696*	

Table 2
Estimates of the number of individuals in the BB assemblage.

Estimates of the number of individuals in the BB assemblage						
	L	**R**	**P**	**GMT**	**MLNI**	**r**
Femur	32	33	28	37	37	0.861
Tibia	32	29	27	34	34	0.885
Fibula	26	25	19	32	34	0.745
Humerus	29	27	24	32	32	0.857
Radius	34	28	20	42	47	0.645
Ulna	36	25	21	40	42	0.688

Estimations for the number of individuals through different methods reveal that both methods provide similar results (Table 2). According to the GMT calculations, it is understood that the number of radii provide the minimum number of individuals found in the BB burial, which is 42 individuals.

Good preservation conditions of the bones, an adequate number of paired long bones (over 7 pairs), and recovery probability calculated above 0.5 improve the reliability of the calculation when using the MLNI method (Adams and Konigsberg, 2004). Although some of the bones from the BB burial are not well preserved, the long bones in particular, are in a considerable state of good preservation. When the recovery probability is calculated for every single bone, it is determined that the number is higher than 0.5 for all of them. Additionally, for every bone group there are a minimum of seven matched pairs. This reveals that the sample meets the minimum requirement criteria necessary for applying the MLNI method. According to the MLNI results, which not only calculates the recovered bones but estimates the actual/original population size to a high probability, the radius bone group again provides the highest number for the skeletal assemblage with an estimation of 47 individuals.

4.2. Sex/age groups

Individuals over 15 years old were evaluated for sex as the morphological features of secondary sex characteristics appear in late adolescence. The skull and pelvis are the most reliable bones in estimating sex when compared to long bones and other post-cranial bones. When the sample is considered in this respect, 8 skulls from individuals over 15 years old could be examined. From these 8 skulls, 5 of them represent male, and 2 of them represent female characteristics (one of them belongs to a female under twenty years old), while sex determination was not possible for one individual. The total number of innominates with defined morphological characteristics is 8. Five of the pelves are from male individuals, while 3 are from females. All of the innominates are from individuals older than 20 years of age. Using the pelvis bones (5 males and 3 females), with the skull belonging to a female under twenty years of age additionally included, the minimum number of individuals in terms of sex is calculated. The data show that there are a minimum of 9 individuals of estimated sex; five males and four females (Table 3).

The skulls and pelvis were also used for estimating age in adult

Table 3
Sex distribution of the BB Collective Burial.

Sex	Skull	Pelvis	Accepted Total
Female	2	3	4
Male	5	5	5
Indeterminate	1	0	0
Total	8	8	9

Table 4
Age distribution of the BB Collective Burial.

Age Group	Number of Individual
Infant (0–1.4)	0
Infant (1.5–2.4)	2
Child (2.5–14)	12
Young Adult (15–29)	7
Adult (30–44)	7
Old Adult (45+)	1

skeletons. A total of 7 skulls could be examined for age, with 3 of the skulls belonging to young adults, 3 to middle adults, and 1 to an old adult. In addition to these individuals, there are 3 pubic symphyses thought to belong to other individuals. When all the pelvic elements are taken into consideration, it is understood that of 11 individuals, there are 3 young adults, 7 middle adults, and 1 old adult (Table 4).

The most preferred and accurate age estimation method applied to sub-adults is based on dental calcification. Dental calcification, including the third molars, is informative for the period until approximately 20 years of age. Mandibles and maxillae are ubiquitous in the sample and were examined (there are more mandibles than maxillae). For at least 18 individuals, it was possible to determine the age of death (Table 4). Including sub-adults, practically every age range is present up to approximately 20 years of age. It should also be mentioned that infants under the age of 1.5 years are not represented in the BB collective burial (the youngest individual's age is estimated as 1.5–2 years old).

4.3. Formation process of BB collective burial

4.3.1. The structure and burial

When assessing the BB collective burial, it is pertinent to consider how, why, and when the structure housing almost all the skeletal remains was formed. During the archaeological excavations, overall architectural features of the structure were evaluated. The BB structure, which was used for housing the collective burial, is roughly square shaped and its interior dimensions are 1.70 m × 1.35 m. The structure is located in the central part of the excavation area. The walls of the structure are built on a slope with a declining elevation of 0.25 m from south to north. The walls of the southwestern corner of this quadrilateral building have been destroyed. Most of the bones of the BB collective burial assemblage are found inside the structure while some of them were found spilled up to 1 m outside the southwestern side of the building (Fig. 2).

It is understood that the surviving wall remaining from the previous level was used during the construction of the BB structure. The wall that surrounds the south part of the BB structure is constructed in a different style from the rest. Only one row of this double-faced wall has been preserved, while the other walls of the structure are single-faced but have survived up to 3–4 rows. This wall does not have solid construction, unlike the other structures of the settlement where stones are laid appropriately and masonry work is refined. It is calculated that this wall probably was not higher than 1 m since the loose and sloppy walling would not have allowed the wall to hold itself. It is difficult to come to an absolute decision about the upper parts of the structure. Preliminary examinations show that during the time the structure was in use, the walls were restored more than once (Bıçakçı, 2012). However, those renovations do not apply to every wall and were probably done to specific areas whenever needed.

At this point, the question whether the human remains were covered with soil during the time of use can be raised. For example, there might have been a temporary wooden mat covering the top of the building or some kind of organic mat (e.g. straw) that would have been used to cover the bodies. In a great portion of Neolithic graves at Tepecik-Çiftlik, organic residue related to straw mats was present. However, no evidence of this has been found in the BB structure. Moreover, no signs resulting from direct contact of bodies or bones to the air are observed (Behrensmeyer, 1978). On the contrary, most of the bones representing primary burials are found in intact anatomical positions with smaller bones maintaining their anatomical relations, and most importantly the absence of movement of the bones related to the decay process (Duday, 2009a, b). All of which suggests that the bodies of the BB structure were buried in a filled space. The platform on which the skeletons were found and the parallel leaning of the walls indicate that the structure is built on a slope. It is understood that no terracing or land leveling was done before building the structure.

The features of the structure such as its erection on a slope, the building technique of the walls, and the quality of the performed renovations reveal that this structure does not have the characteristics of a residential building. Both the small size and the building technique of the southern part of the structure indicate that this building belongs to an earlier occupational phase (level 6). Architectural features such as hearths, fireplaces, silos or berms suggesting that the structure was used as a residential area are absent. Moreover, the continuity between the bone piles found in the southwest part of the structure and the ones reaching outside demonstrates that part of the building was intentionally left open without a wall. Thus, it is possible to say that rather than as a household, this structure was built for the purpose of burials.

Whether the structure was designed as a deposit for the burials or whether the area was used for several burials before its transformation into a special burial ground should be considered. It is almost impossible to determine this, however, the restoration phases, the elevation of the ground from north to south, the relative level differences of the bone piles, and the general situation of the individuals with intact anatomical body parts reveal that this structure has been used in succession over time. When these factors are considered together with other lines of evidence, the data indicate that the structure was transformed into a long-term burial deposit at the same time as the former burials, and the structure was rearranged in a way to include both the previous and future burials. Radiocarbon dates obtained from the human skeletal remains support the argument that the structure was in use for a prolonged period of time. The first radiocarbon date obtained from individual BB 4-23 falls between 6750 and 6720/6705-6635 cal BC, and individual BB 3-35 was dated to 6690-6595 cal BC. Radiocarbon dating on individual TP SK 40, found near the BB collective burial, is 6680-6590 cal BC and the BB structure's probable and proposed formation process seems consistent with the result of the radiocarbon analyses as well.

4.3.2. Mortuary behavior and formation process

All the evidence suggests that the BB structure was used for collective depositions. In this burial, both sexes and all age groups (except infants under the age of 1.5 years) are represented. Even though there are some known examples of collective burials in the Neolithic of the Near East, they are not common practices. Some Natufian collective burial practices have been discovered (Bocquentin and Garrard, 2016; Byrd and Monahan, 1995). In some Pre-Pottery Neolithic settlements such as Çayönü, Dja'de and Abu Hureyra, special houses or burial structures containing a large number of individuals have also been found (Akkermans and Schwartz 2003; Boz and Hager, 2013; Moore and Molleson, 2000; Özbek, 1987; Özdoğan and Özdoğan 1989). Considering the period, it is clear that the BB collective burial is a rare and spectacular example of this type of burial in Anatolia and the Near East. For this reason, it is necessary to examine the interventions to bodies in every aspect in order to enlighten the formation process of the burial.

The use-history of the BB structure is marked by the commingled situation of the bones that belong to different individuals (Figs. 1, 3a). Commingled bones make it difficult to understand the connection of the bones within the context. Nevertheless, bone distribution can be sorted under general categories. Bones are found in 4 different states in the

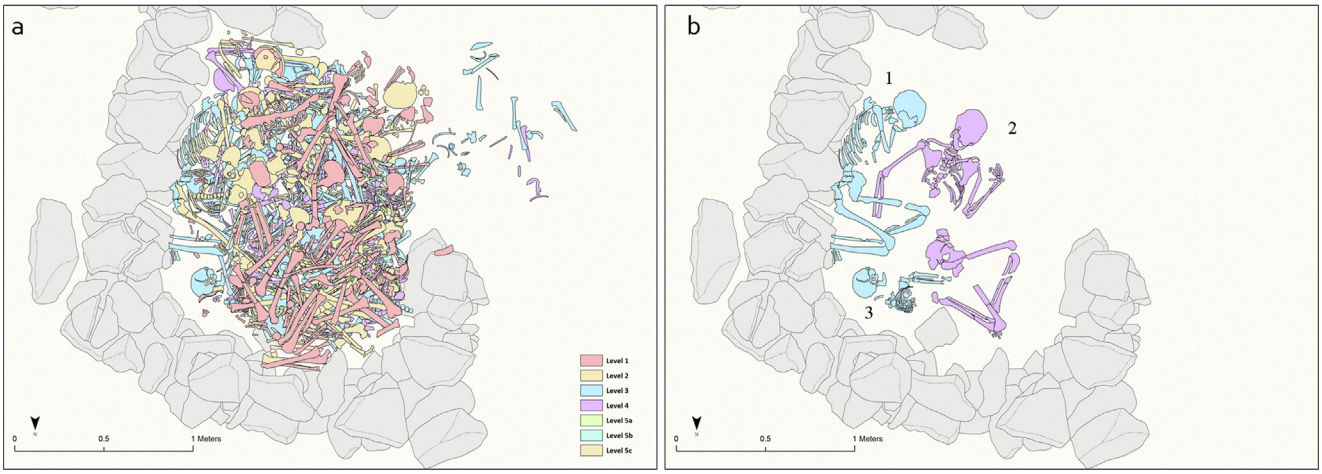

Fig. 3. (a) General view of the BB burial feature (b) Anatomically intact individuals found in the BB burial.

structure: (1) individuals who are anatomically connected, (2) skeletal parts with intact anatomical positions, (3) bone piles belonging to one or more individuals, and (4) scattered/isolated bones.

In the collective burial, 3 individuals with most body parts and joints still in anatomical connection were found (Fig. 3b). The individual found in the uppermost layer (indicated by 1) was laid on the left side in a semi-flexed position, the upper limb leaned against the eastern wall. The second individual (indicated by 2) found one layer below was laid in the middle of the structure supine, head straight, and lower limbs flexed to the left. On the northern side of the structure, the third individual (indicated by 3) was found beneath the bone piles nearby the northern wall and was aligned in an east–west direction. This individual was found on the left side in a flexed position. In addition to the fact that the remains belonging to these individuals were mostly articulated, it is also important to mention that almost no other bone or bone fragments were found beneath them. Besides their general features, both persistent and unstable/labile joints of the 3 individuals remained articulated (Duday, 2009a, b). This finding indicates that they are the primary deposits/primary burials associated with the BB structure.

As mentioned above, even though primary burials are present, disarrangement in the BB structure is extraordinary. The presence of articulated vertebral columns and rib cages, which are easily disarticulated if they are moved from their original position in anatomical connection, is significant (Fig. 4). Even though these bone groups represent features of primary burials, most of the bones are missing. Evidence shows that the reason behind the missing bones is the continuous use of this structure for new burials over a long period of time. For example, it appears that when the deposit area was cleared and arranged for the burial of individual 3–36 (indicated by blue in Fig. 3b), 2–7 bone fragments belonging to subadults (indicated by yellow, level 2) were disrupted (Figs. 3 and 4). Therefore, it is probable that the BB structure may have been used for more than 3 primary burials.

A similar disorganized pattern on a smaller scale is also detected in some of the level 5 graves near the BB structure (Fig. 5), and they are important for better understanding the BB burial. In the surrounding area, many graves from an earlier phase of level 5 (5.2) and contemporary to the BB structure were found. When grave TP'10 SK 34 was arranged, some bones of TP'10 SK 39 buried just beneath the newly opened pit were removed from their original places and re-arranged (Fig. 6 a, b, c). When the instances found in the BB burial are carefully evaluated, it is understood that similar interventions were often made in this structure. However, 'secondary burial' arrangements seen in these earlier burials terminologically differ from the collective burial arrangements (Duday, 2009a, b). Since the BB structure in itself is a massive deposit, removed bones are not counted as carried to other graves. Hence, according to the archaeothanatology approach, the term 'reduction' better defines the BB burial instances. For example, it is stated that in Çatalhöyük, the same containers were re-opened and used multiple times and while doing so, the bones of the earlier buried individuals were piled up or re-arranged in the same pit (Pilloud et al., 2016).

It was also detected that the disorganization of the BB burial is mainly caused by partially arranged reductions. The general view of the BB structure shows that long bones were intensely piled at the northwestern part. Some of these long bone piles belong to the same individuals, while the rest of the heaped bones belong to different individuals. Long bone piles found in a specific part of the deposit are indicators of relatively organized reduction practices. On the other hand, it also shows that missing parts of the anatomically intact bone groups (mostly, body parts missing long bones) were often removed from the body.

Pairing of the long bones found together is also important. It is understood that for the ones who were involved in the re-arrangement practices, keeping the long bones together was not important since most of the long bones were not found in matching pairs. The laboratory studies for estimating the number of individuals also revealed that some paired bones were found in different locations of the BB structure. For example, a scapula and clavicle (Fig. 4) found in the southeastern corner were found to match with other upper limb elements such as ulna, radius, and humerus found at the center of the structure. These kinds of pairings are also seen in lower limb bone groups. Paired bones from different locations also reveal another factor that would also have had an impact on this dynamism: the decomposition status of the bodies during the time of intervention. It is concluded that body parts belonging to partially decomposed individuals were transferred to a specific area within the structure when the deposit was re-opened for new burials (Fig. 4).

Fourteen crania are found in the BB structure, three of which belong to the individuals with almost all bones present. The rest of the unaffiliated crania were located in the center and southern part of the building, away from each other. This finding reveals that cephalic skeletal parts were not arranged in a specific way. Moreover, the fact that some of the crania were found upside down indicates a lack of specific attention. Mandibles found in separate locations from the crania also reveals that a specific pattern was not followed in terms of arrangement. Following previous studies (Büyükkarakaya, 2017a, b; Büyükkarakaya et al., 2009; Büyükkarakaya and Erdal 2014), skull removal is a part of the ritual and funerary behavior of Tepecik-Çiftlik. It would appear that skull removal was often practiced in the BB burial as well. For example, a subadult individual has the upper limb bones and mandible, including the pelvic bones that underwent the reduction

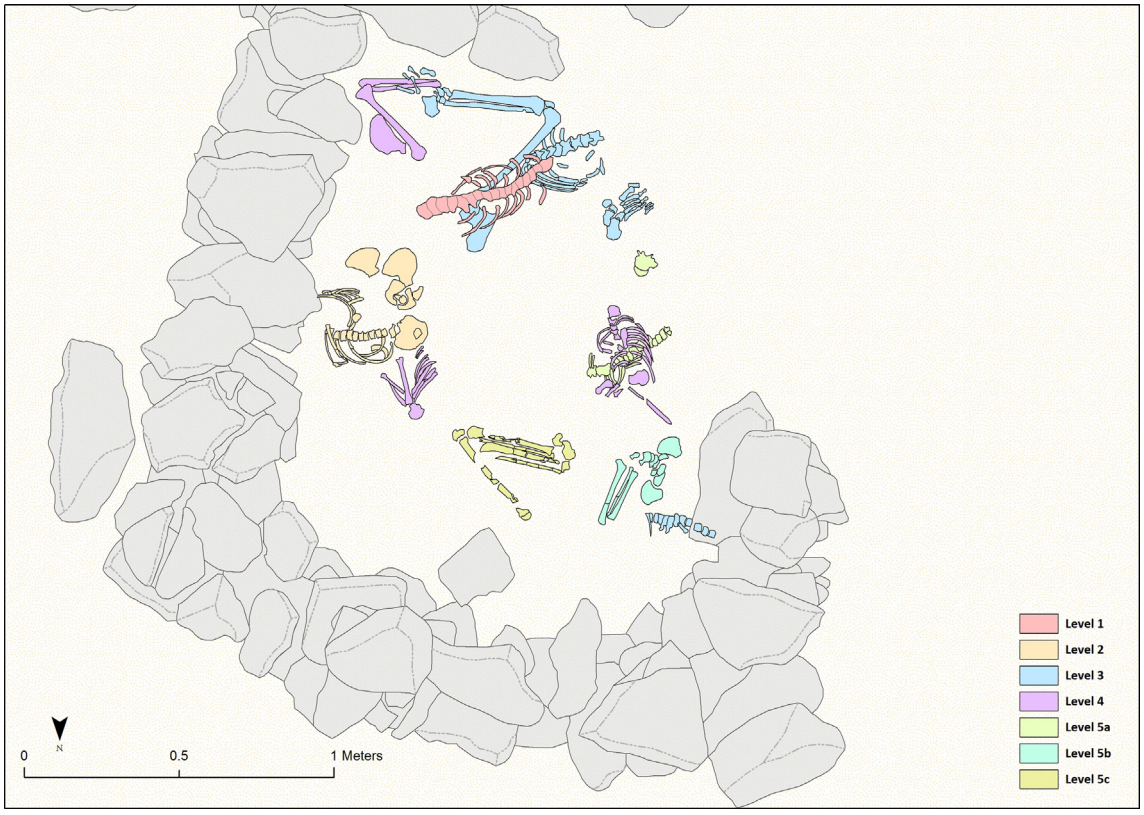

Fig. 4. Skeletal parts with intact anatomical positions found in the BB burial.

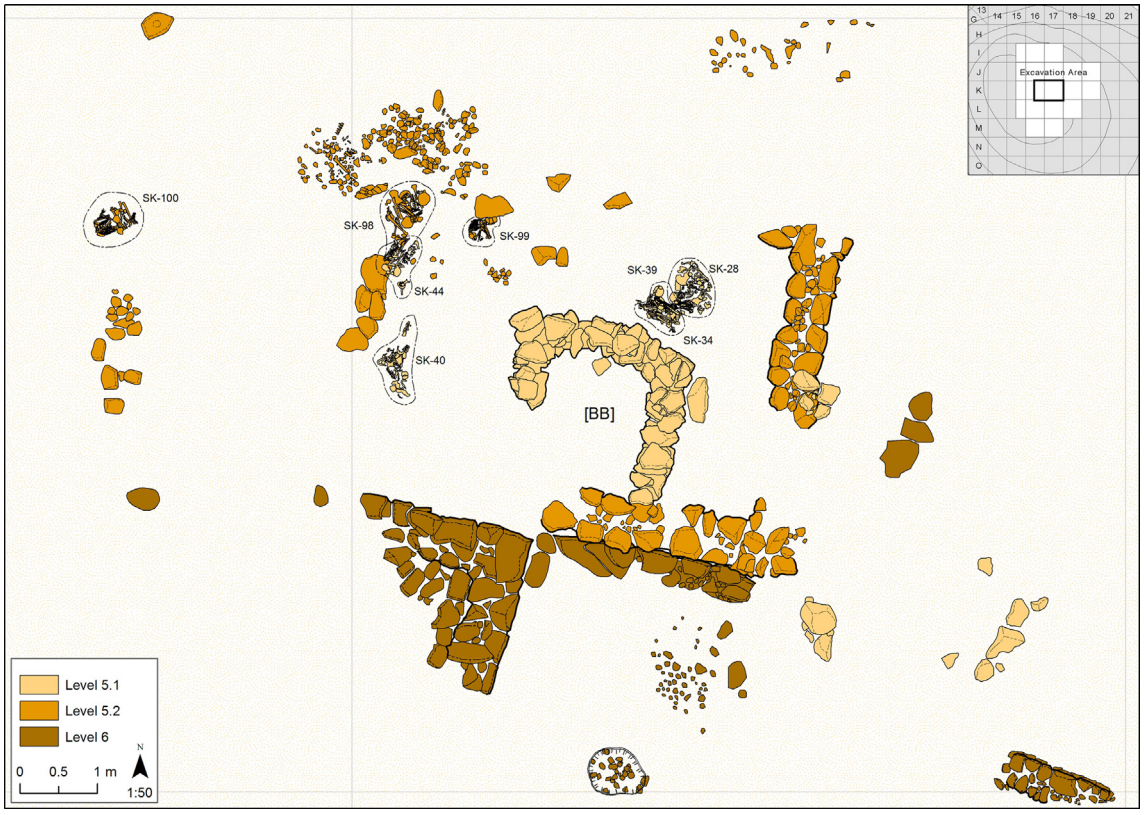

Fig. 5. The BB Structure and nearby burials (layout sheet).

Fig. 6. a, b and c. The most vicinal burials: TP'10 SK 34, TP'10 SK 39, TP'10 SK 28 (only present in the drawing).

of long bones was not found with a cranium. It is only possible to pair the crania obtained from the BB structure with anatomically intact and articulating body parts (especially vertebrae/and rib groups); however, aDNA studies in the future will help to address this.

The main elements defining the BB collective burial are re-burials, reductions, and skull removals. However, other factors were also evaluated to understand whether they have any effect on the burial patterns of the BB structure. It is known that secondary burial practices are one of the characteristics of funerary behavior in the Tepecik-Çiftlik population. Thus, it is important to identify whether or not the BB structure was a secondary deposit for some individuals to understand the nature of disorganization in the BB collective burial and to have a better understanding of the ritual behavior.

As Duday (2009 a, b) states, defining secondary burials and deposits depends on negative arguments. Disarticulated remains and especially labile joints are very informative keys to defining secondary deposits (Duday, 2009a, b). However, since decomposition of the body and disarticulation of the joints can be very complex (Mickleburgh and Wescott, 2018) the decomposition status of the individuals in a re-opened grave can cause difficulties in interpretation of secondary deposits, and this may become more difficult especially in multiple or collective burials. Some information obtained from the BB burial and its surroundings can provide important information on this subject. The first one is the bone count and calculations of the minimum number of individuals. It was stated that the minimum number of individuals represented in the BB burial was 42. However, this number is based on a theoretical approach and, as can be seen from the bone count, no bone group meets this number. In other words, most of the bones that belong to the individuals represented in the BB burial were not found in the deposit. One reason for this is undoubtedly the interventions which occurred to the primary burials for reasons including skull removal practices, re-arrangement, and movement of body parts to create space for new burials. For example, removed skulls (specifically crania) may not have been replaced into the deposit and this might be the reason for the missing skeletal units (Bello and Andrews, 2006). Similarly, it may be claimed that other skeletal parts (such as the sacrum or scapula) have also drawn similar attention by means of being considered trophies. However, it can be said that most of the skeletal parts are not as attractive as the skull, in terms of trophy taking (Knüsel and Robb, 2016), and no such phenomenon was detected in the secondary burials found in Tepecik-Çiftlik. It is necessary to emphasize that some of the skeletal remains represented in the BB burial might actually have been secondary burials without excluding the possibility that a number of cranial and postcranial skeletal parts may have been removed for ritual purposes by the relatives of the dead.

Other evidence supporting the idea that the BB structure was also used a secondary deposit can be obtained through the archaeothanatological approach. The limited number of 'small bones' is an important indicator of secondary deposits since they can be easily dropped or lost (Duday, 2009a, b; Knüsel, 2014; Roksandic, 2001). Connective soft tissues such as muscles and ligaments of the phalanges of hands and feet decompose faster than other skeletal elements (Duday, 2009a). This is especially true for the rapid decomposition of the interphalangeal joints (Duday, 2009a: 25), which may lead to the loss of these bones. The counted number of hands and feet bones from the BB structure indicates a much smaller number of individuals than the minimum number of individuals; the MNI was identified as 16 when utilizing both metacarpals and metatarsals (Table 1). Moreover, the total number of hand and foot bones of the BB assemblage is 696 and subsequently the MNI should be 13. However, this amount is lower than the calculated MNI for metacarpals and metatarsals. Relevantly, long bones, which are well preserved, are the most encountered bone group in the BB assemblage. Studies on the subject show that in secondary burial practices particular bones are often chosen and preferred to be taken to secondary deposits and especially small bones are 'forgotten' or not taken from their primary deposition (Bello and Andrews, 2006; Duday, 2009a, b). From this point of view, it is seen that the findings from examining the BB burial bone count are consistent with secondary burial practices.

As mentioned above, graves/burials around the BB structure contain both descriptive information and related elements for understanding the formation of the BB burial feature. For example, burial TP'10 SK 28 found to the north of the BB structure is definitely a secondary burial (Fig. 7a, Fig. 6 c, shown in blue). What makes this burial remarkable is the absence of the skull and long bones in the grave. It is obvious that the missing skeletal parts of the re-arranged secondary burial were transported to another place. Whether this place (the secondary deposit) is the BB structure or not should be examined in detail in further studies; however, it is possible that the long bones of this individual were moved to the collective burial right next to the grave. Another instance is the burial located on the northwestern side of the BB structure, TP'10 SK 40 (Fig. 7b). Besides containing the commingled bones of more than one individual, this burial suggests a connection with the BB structure since no long bones are present in the deposition. Hands and feet with intact anatomical features are documented. Both findings contribute to the elucidation of missing and overlapping skeletal parts. As in SK 28, to provide a definitive conclusion further studies are needed; however, it can be confidently stated that it seems likely that TP'10 SK 40 and the BB burial contain pieces of the same puzzle.

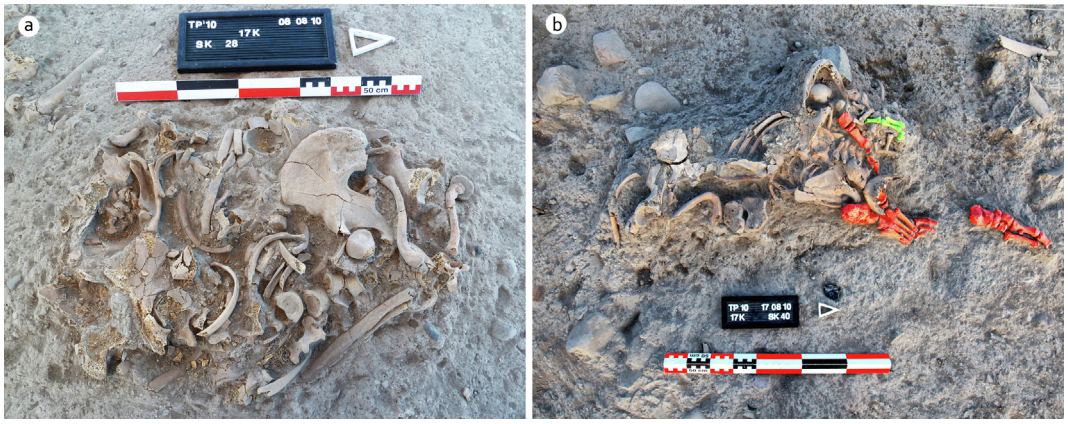

Fig. 7. (a) TP'10 SK 28, (b) TP'10 SK 40.

The demographic profile is one of the most important details which should be considered while evaluating the formation of the BB collective burial. Excluding infants below 1.5 years of age, all age groups are accounted for in the BB burial, as well as both sexes. It is therefore obvious that there is an interesting selectivity with regards to the individuals who are repsesented in the burial. In addition to the inferences made so far that are helpful for undertsanding the formation of the BB burial, these data need clarification. Studies on the funerary practices in Near Eastern Neolithic populations have revealed that the behavioral patterns of these people was planned rather than being arbitrary, and researchers have attempted to unfold the ideas behind these practices and rituals (Kuijt, 1996; 2000; Kuijt and Goring-Morris, 2002; Rollefson, 2000). Currently, it is difficult to explain exactly why infants under the age of 1.5 years were excluded from the burial; however, the results of a trace element study (Büyükkarakaya et al., 2017) allow a hypothesis to be formed. The results indicate that the weaning process begins at the age of 1 year at Tepecik-Çiftlik. Although the data on when the weaning process was exactly completed could not be gathered due to the sample population, the similarity with the commencement of weaning age with other Central Anatolian populations allows us to make inferences that the completion time may be similar to these populations, which is around 2 years. The representative ratio of the infants in the BB collective burial does not reflect the archaeological populations, especially considering Neolithic communities' increased fertility rates and infant mortality rates (Bocquet-Appel and Bar-Yosef, 2008; Lewis, 2007). Infant mortality rates in the general population is 43.6% (Büyükkarakaya, 2017a, b). For this reason, it is possible to say that the weaning process is one key biocultural factor regarding the composition of the BB burial. Ethnographic data have indeed identified that different funerary behaviors are practiced regarding infants in some small-scale populations and has shown that this might be related to belief systems (Altuntek and Erdal, 2013; Carr, 1995; Hertz, 1960; Mchugh, 1999; van Gennep, 1960). Carr (1995:185), when discussing his tests on middle range theories, stated that burying infants in different locations in relation to burial grounds and age group parameters is connected to belief systems. It is also known that in both archaeological populations and modern small-scale populations, burial practices related to infants show great diversity (McHugh, 1999). Goody (1962) states that in LoDagaa's, breastfed infants are believed to have not yet achieved a social persona. Varying internment strategies for the dead according to age groups has also been observed in Near Eastern Neolithic communities. During the MPPNB when standardization in burial practices increased, skull removal was generally not applied to infants (Croucher, 2012; Kuijt, 1996, 2004; Rollefson, 2000). Burial practices are often associated with burial locations and other features related to burials (Boz and Hager, 2013; Hamilton, 2005; Hodder, 2011). Skull removal was not applied to infants in Tepecik-Çiftlik, which also supports the idea that concepts of social persona and social belonging are affected by age-related criterion. To claim that similar circumstances apply for the other Neolithic populations mentioned before exceeds the limitations of this study. However, considering all the data available, it can be argued that the weaning process and/or reaching a certain level of biological maturity also affects the formation process and composition of the BB burial.

In regards to post-mortem/secondary treatments related to the deceased, no cut marks were found. In some Neolithic populations, evidence for defleshing has been observed (Erdal, 2015; Robb et al., 2015). However, consistent with information obtained from other burials at Tepecik-Çiftlik, cut marks related to skull removal or defleshing were not detected on the skulls, long bones, or post-cranial skeletal elements. Consistently, although some of the examples have been found to have various traces of skull removal from different settlements, it can be said that the number of such samples is not much in Near Eastern Neolithic (Andrews et al., 2005; Haddow and Knüsel, 2017; Kanjou et al., 2013).

Natural factors may also have affected the formation processes and composition of the BB burial feature. Gradual decomposition results in the bones falling into a void created by the disappearance of soft tissue and results in the bones moving away from their original position (Duday, 2009b). In the BB collective burial, it is observed that a number of bones were not in their original positions as a result of the topographic structure and the voids created by gradual decomposition. For example, individual 4-23's lumbar vertebrae, innominates, and lower limb bones moved due to the topographic structure of the area (indicated by purple in Fig. 3b). Another instance is the slipping away of the vertebrae and ribs of a child into the pelvic void of the fully represented individual 3–36 (indicated by blue in Fig. 3b). Whilst space was being created for individual 3–36, who was laid on his back leaning against the wall, the skeletal remains of the child must have been far away; otherwise, it would not have been possible to position 3–36 (Fig. 3 and Fig. 4). The void created by the decay of soft tissue in later stages makes it suitable for this bone group. These are good examples for demonstrating that although not as decisive as cultural factors, natural factors were also at work during the formation of the BB burial. These factors affecting the bone dynamism in the BB structure are consistent with the nature of commingled burials (Roksandic, 2001). It should also be mentioned here that analyses on the bones revealed no traces related to animal activity or exposure to air. These data are also consistent with the evidence that the bodies were covered with soil.

All the evidence and related interpretations indicating the bone dynamism in the BB structure also reveal the dynamic formation process (mostly effected by cultural factors) as an underlying result of the funerary behaviour. Additionally, it can be interpreted that the BB collective burial, similar to the material culture of Tepecik-Çiftlik, reflects some cultural aspects of the PPN in the Near East. Indeed, handling dead bodies following certain rules in the Neolithic Near East and corresponding features regarding mortuary practices in some

modern-day small scale communities are mentioned in several publications (Bocquentin and Garrard, 2016; Kuijt, 2008a, b). In this regard, there can be a partial comparison between Tepecik-Çiftlik and contemporary populations. For example, the background of bone mobility and dynamic features of the BB collective burial is significant with regards to another study revealing similar findings. At Çatalhöyük, an archaeological site contemporary with Tepecik-Çiftlik, a great variety of Near Eastern Neolithic mortuary practices exist. These include primary burials, multiple burials involving several individuals, removed skulls, a plastered skull, and dismemberment (Boz and Hager, 2013; Haddow and Knüsel, 2017; Pilloud et al., 2016). Recent studies, specifically the one on possible vulture excarnation, allow us to examine the funerary behavior and death rituals in a regional context (Boz and Hager, 2013; Pilloud et al., 2016). As opposed to the BB, at Çatalhöyük, the dead were routinely buried in the buildings and a high number of infants/neonates are represented in multiple burials. When the data from Çatalhöyük are considered, it can be said that a comparison between common burial practices in the Tepecik-Çiftlik population and Çatalhöyük rather than with the BB burial feature is more appropriate and insightful.

The application of an archaeothanatological approach of the Skull Building of the PPN settlement of Çayönü successfully explained the formation of the bone deposits found in the cells of the Skull Building (Yılmaz, 2010). Similar to the BB burial feature, it is stated that the Skull Building was also used for both primary and secondary deposits (Yılmaz, 2010). This type of information suggests that there may be intellectual and practical similarities between the Skull Building and the BB structure.

Geographically more distant, rooms in Building 8 (Room 2,3) found at the Northern Mesopotamia settlement of Abu Hureyra have some features comparable to the BB structure (Moore and Molleson, 2000). Room 2 was likely for secondary deposits, whereas Room 3 (charnel room) is evaluated as being a place used for the storage of the dead. Since it is mentioned that skeletal remains found in both rooms are related, these two rooms can be considered as complementary (Moore and Molleson, 2000). The researchers suggested that these deposits should be associated with more than a single family since both Room 2 and Room 3 contain several individuals. With features that demonstrate several stages of burial rituals and representing low rates of infants and perinates in the demographic profile, the burials in Building 8 and the BB structure show similarities. The fact that Building 8 was in domestic use at the stage the burials are practiced formally differentiates it from the BB. 'The House of the Death' (*Maison des Morts*) of Dja'de also has some features comparable to the BB burial feature (Coqueugniot, 1999). Similar features include: The House of the Death was in use for a long period, there are a great number of individuals found within, both primary and secondary burials are present, separate crania are detected, and at least 38 individuals are found outside the House of the Death (Coqueugniot, 1999).

In summary, we are able to say that the BB collective burial is a unique burial in the PN of the Near East, and its formation is closely related to the populations' interference with death through burial rituals. Primary burials, direct or indirect secondary interventions to these primary burials, and the structure functioning as a secondary deposit for some individuals are the main reasons for the disarrangement in the BB bone assemblage. Within the BB collective burial, a minimum number of animal bones are detected along with the human skeletal remains and none of the animal bones have a special arrangement. The only grave good recovered was a cone-shaped ceramic bowl. Taking into account these and other findings discussed above, it is possible to say that individual status and personal identities of those buried in the deposit have gradually become insignificant with the formation of the burial feature taken place over time. The implications that it is related to the social structure of the community can be discussed within the context of researchers who have previously stated as much (Kuijt, 2008a). It can be suggested that the symbolic meaning of the burial for the living and their perceptions of life and death are closely related. This situation bears traces of funeral procedures that happen in between the biological and social deaths of the individuals and funerary rituals (Weiss-Krejci, 2011). At the same time, this situation must be handled with notions regarding the relation between belief systems and funerary practices such as a liminality/liminal period, incorporation/post liminal rituals, and together with related ethnographic data (Bloch, 1971; Goody, 1962; Hertz, 1960; Metcalf and Huntington, 1991; Van Gennep, 1960).

5. Conclusions

This study on the BB collective burial provides a basis for analyzing the funerary behavior of the Tepecik-Çiftlik Neolithic population. Examination of the BB burial feature, an uncommon burial type, revealed some significant findings. Firstly, that practices observed in the BB burial feature are included in the general funerary behavior at Tepecik-Çiftlik. Skull removal, attention to crania, primary and secondary burials are the most prominent characteristics.

Results of this study can be listed as follows:

1) Despite limitations in the number of radiocarbon dates, it is possible to say that the BB collective burial is a burial ground housing more than one generation.
2) Taphonomical analyses reveal that the individuals of the BB collective burial did not receive any extraordinary postmortem intervention.
3) According to bone count, individuals are mostly represented by post-cranial elements and a limited number of cephalic skeletal elements.
4) The GMT method has revealed that at least 42 individuals are represented in the burials whereas the MLNI indicates the existence of 47 individuals.
5) According to paleodemographic evidence, there is no sex or age discrimination; however, there were likely strict rules regarding the exclusion from the burial of infants under the age of 1.5 years. This finding seems to be related to biological maturity and the notion of social persona/social identity.
6) Formation processes along with the general funerary behavior of the population have revealed a long time of allocation for the deposit and the existence of various practices (e.g. skull removal, reduction, secondary burial).

In addition, it can be said that the results of this study revealed that the relationship between the living and the dead in the Near Eastern Neolithic populations is not a simple thing. This kind of elaborated funerary practices including multiple interventions, involving multiple households, and may be associated with different beliefs and social situations that cannot be explained solely by veneration or worship of ancestors.

Finally, it can be said that analyses relating to demography, archaeothanatology, and taphonomy together with archaeological data allow us to obtain a significant body of knowledge on the nature of burials. In this sense, synthetic approaches (Knüsel, 2010) strengthen the evaluation of a socio-bioarchaeological approach and reveal the importance of recent bioarchaeological studies/approaches. Refined local knowledge examined in this way will allow us to better understand and evaluate regional and chronological diversity.

6. Future research

Radiocarbon dating analyses of more individuals from the BB collective burial will reveal insightful data on further understanding the chronological assessment of formation processes, and future studies are planned. A study focused on the Tepecik-Çiftlik mortuary practices in general, the social dimensions of the BB collective burial and its place in

the Near East alongside other collective burials is currently in preparation for publication. Metric and nonmetric cranial and post-cranial analyses are planned besides genomic level aDNA studies to answer questions related to biological distance of the individuals found in the BB burial feature.

Declaration of Competing Interest

The authors declare no conflict of interest.

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