Headless but still eloquent! Acephalous skeletons as witnesses of Pre-Pottery Neolithic North-South Levant connections and disconnections

Fanny Bocquentin, Ergul Kodas, Anabel Ortiz

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F. Bocquentin, E. Kodas and A. Ortiz

Abstract: *This paper discusses the practice of skull removal in the Late Epipalaeolithic and Pre-Pottery Neolithic in the Northern and Southern Levant, a feature which may serve as a basis for comparison of funerary customs between regions. Even though the topic of skull removal has been widely debated, factual data remain incomplete and funerary treatment is complex and highly variable. We have undertaken a preliminary synthesis based on 65 sites (MNI: 3001 individuals) distributed across the Southern and Northern Levant, the Upper Tigris and Central Anatolia from the Early Natufian period (13000 cal. BC) through to the first half of the 7th millennium BC. All burial categories were taken into account but the focus of the article is on acephalous skeletons. They represent 6.1% of the corpus but interestingly this proportion changes over time and space. An increase in skull removals is noticed at the beginning of the Pre-Pottery Neolithic but a clear break between the Southern and Northern Levant took place in the MPPNB. Removal then appears to be very selective in the North while it affects more than a third of the dead in the South. In the Southern Levant, removal mostly affects only the cranium and seems to be later in time. Nevertheless, out of this standard interpretative framework, a forgotten grave in Jericho calls into question the probability of pre-burial retrieval and encouraged to be vigilant in digging and interpreting Pre-Pottery Neolithic graves.*

Résumé : *L'objectif de cette contribution est de proposer un fil conducteur pour une comparaison entre le Nord et le Sud Levant du point de vue des pratiques funéraires (Épipaléolithique final et Néolithique précéramique). Les obstacles à une telle approche sont nombreux à cause notamment du manque de données disponibles et de traitements funéraires complexes et variés. Bien que le prélèvement du crâne soit un sujet largement débattu, les données factuelles demeurent incomplètes et dissociées. Nous avons entrepris une synthèse préliminaire basée sur 65 sites (NMI : 3001 individus) attribués à la période qui va du Natoufien ancien (13000 cal. BC) à la première moitié du 7e millénaire (cal. BC) et situés au Levant nord et sud, dans la haute vallée du Tigre et en Anatolie centrale. Toutes les catégories d'inhumation ont été inventoriées et les squelettes acéphales ont fait l'objet d'une attention spécifique. Ceux-ci représentent 6,1 % du corpus, mais cette proportion varie en fonction des zones géographiques et au fil du temps. Au début du Néolithique Précéramique, la pratique du prélèvement se développe conjointement de part et d'autre du Levant. Mais le PPNB moyen marque une rupture claire alors que le prélèvement devient très sélectif au nord mais concerne, au contraire, plus d'un tiers des défunts au sud. Les données qualitatives apportent également quelques éléments de discussion sur le processus de prélèvement et sur les chaînes opératoires liées au traitement funéraire. Au sud, le prélèvement concerne en majorité le seul bloc crânio-facial et semble intervenir plus tardivement qu'au nord. Toutefois, hors de ce cadre interprétatif standard, une sépulture oubliée de Jéricho témoigne d'un prélèvement antérieur à l'inhumation du cadavre, nous encourageant à davantage de prudence lors de la fouille et de l'interprétation des sépultures du Néolithique précéramique levantin.*

Keywords: *Skull removal; Cranium removal; Quantitative bioarchaeological data; Funerary* chaîne opératoire*; Corpse dismemberment.*
Mots-clés : *Prélèvement du crâne ; Prélèvement du bloc crânio-facial ; Données anthropologiques quantitatives ; Chaîne opératoire funéraire ; Démembrement du cadavre.*

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INTRODUCTION

Burial customs are a valuable field of research in which to undertake inter-regional comparisons. The different aspects of the treatment of the dead can help in the detection of group identity and differences in social behaviours. Pre-burial treatment, position and orientation of the corpse, grave structures, containers, associated items, secondary handling, etc., are best compared for the Neolithic of the Near East on a site by site basis and region by region, in order to reconstruct cultural and symbolic links that may have existed in parallel to technical or economic trade and exchanges (*e.g.*, Rollefson 1983; Verhoeven 2002; Kuijt 2008a and b). Despite interesting reviews of the period (*e.g.*, Goring-Morris 2000; Croucher 2012; Goring Morris and Belfer-Cohen 2014), it nevertheless has to be said that few attempts have been made to create a comprehensive interregional dataset on some aspects of burial customs for the Near East (*e.g.*, Bonogofsky 2006; Koutsadelis 2007; Benz 2010; Kanjou *et al.* 2015). Indeed, despite several thousand Neolithic graves having been unearthed in the Levant, it is today difficult to make a clear synthesis of funerary behavior based on clear quantitative data.

Several reasons for that have been suggested (*e.g.*, Kuijt 2008a). Besides the common difficulties inherent to all comparative and synthetic studies (for instance, missing data and uncertainty as to the contemporaneity of sites), burial custom analyses for the Neolithic in the Levant face specific obstacles that we have classified into five categories:

1) Data are too often partially published and emphasis is made on some graves while others remain undescribed. In the end, the exact number of graves per site and the proportion of the different customs observed cannot be measured. For about 2/3 of the Neolithic corpus studied here, individual descriptions are not available and thus it is not possible to crosscheck data and look for relations between the different parameters, like biological identity, position, location of the grave, etc.;
2) We also suffer from a lack of common vocabulary and methods. What is a primary/secondary/reduction burial? How to recognize a plural successive interment from a simultaneous deposit? The same is true for sex, age determination or counts of Minimum Numbers of Individuals (MNI). As protocols have changed over time and are still today quite heterogeneous, comparison site by site implies some bias;
3) Contextualization is also problematic because numerous graves were found long ago and/or during salvage excavations, resulting in incomplete and uneven records;[1] furthermore as very few anthropologists are present in the field, archaeothanatological aspects are not usually taken into account;
4) The periods under discussion are dealing with very dense site occupations with partial destruction of previous layers: this leads to the fragmentary nature of a great number of burials and to the presence of many scattered bones on-site, which are often counted as graves. In addition, preservation of the skeletons is usually poor;
5) The complexity of Neolithic burial treatment (including various positions of deposit, secondary handling, huge collective graves, funerary building, etc.) makes its reconstruction challenging; all the more so because we are dealing with great intra and inter-site variability.

Despite this, source of optimism is found in recent doctoral researches that have attempted to bring together several strands of data on which to base interpretation (*e.g.*, Yilmaz 2010; Ortiz 2014; Kodas 2014; Chamel 2014; Khawam 2014). Additionally, discoveries and recent analyses of exceptional sites with numerous well-preserved graves (*e.g.*, Karul 2011; Erdal 2015) are another reason for optimism.

SKULL REMOVAL: PROVIDING US WITH ARIADNE'S THREAD?

In order to avoid the difficulties listed above, this paper will focus on one specific aspect of Neolithic burial customs that is well documented: the practice of skull removal. Acephalous skeletons and isolated skulls are found in sites all over the Levant and are considered to be one testimony, amongst others, of close connections between North and South. Moreover this remarkable custom was described as early as the 1950s and is still a focus of attention, which warrants a better set of data for inter-site and inter-regional comparison. Therefore, skull removal appears to be an effective and reliable criterion with which to discuss North-South similarities and differences.

Skulls may have been removed from the grave or just displaced, painted or even plastered, exhibited and/or reburied. Observed in the site of Jericho by K. Kenyon, this "careful preservation of actual human skulls" was first described as a

1. See for instance an historical background in Bocquentin 2003 or Chamel 2014.

"Cult of Skulls" (Kenyon 1957: 60-63). If Kenyon briefly mentioned the hypothesis that isolated skulls could be the outcome of heads decapitated by enemies, she rapidly endorsed the idea that skull removal was part of a specific burial custom linked to a "Cult of venerated Ancestors" (*Ibid.*). This interpretation was supported by the remarkable fieldwork performed by I.W. Cornwall, a zooarchaeologist (and physical anthropologist) ahead of his time (Bocquentin and Wagemaker 2014). Digging acephalous skeletons from multiple graves at Jericho, he deduced on the basis of the scrupulous observation of anatomical dislocations that the crania were taken from corpses in an advanced state of decomposition on occasions of successive burials (Cornwall 1956). Further discoveries led the scientific community to the agreement that skull removal was one of the key features of Pre-Pottery Neolithic funerary treatment. In parallel, the 'ancestor cult' has become specified, contextualised, theorised and generally accepted, mainly supported by the plastered skulls found in the Southern Levant. The veneration of ancestors has been linked to the need to consolidate identity and collective solidarity in a climate of increased social stratification. It has been proposed that through time, personal identity is deleted and dead people became a new collective lineage (*e.g.*, Wright 1988; Goring-Morris 2000; Stordeur et Khawam 2007; Kuijt 2008b; Milevski *et al.* 2008; Benz 2010; Bonogofsky 2011). Others consider that skull treatment needs to be understood within a wider context of social competition and conflict and that part of the corpus might be the consequence of trophies or hostile treatment rather than funerary (positive) treatment (*e.g.*, Schmandt-Besserat 2002; Testart 2008; Santana *et al.* 2012).

This debate reminds us that archaeological distinction between an 'ancestor cult' and the more wide-spread practice of 'trophy heads' is not straightforward insofar as the processing of the skulls may be comparable, and these two categories are often porous over time (see also Croucher 2006; Bonogofsky and Graham 2011; Valentin and Rolland 2011; Schulting 2015); even often complementary and inseparable (Lemonnier 2009). Moreover, the mode of procurement of skulls has been little debated from an anthropological point of view (Santana *et al.* 2012; Bocquentin 2013; Kanjou *et al.* 2015; Pilloud *et al.* 2016). Instead, plastered skulls, the most spectacular product of this complex treatment, are the main focus of discussions. This practice of remodelling is, however, known only in two regions geographically distant from each other: the Southern Levant and Anatolia. While it appears only in the Late Pottery Neolithic in Anatolia (6300-5000 cal. BC), it is specific to the Middle and Late Pre-Pottery Neolithic B (8200-7200 cal. BC) in the Southern Levant. The eyes, eyebrows, nose, lips, cheeks, chin and ears are modelled in a more or less explicit and realistic fashion. At the time of the transformation process, the skulls were dry, or at least perfectly clean: the orifices, including the smallest, and all of the cavities, are empty and receive an artificial fill (*e.g.*, Kenyon 1957; Strouhal 1973; Rollefson 1983; Hershkovitz *et al.* 1995; Goren *et al.* 2001; Stordeur et Khawam 2007; Fletcher *et al.* 2008; Kodas 2014; Slon *et al.* 2014); there is thus a preliminary defleshing process, whether of a passive or active nature. With about 70 specimens known so far, plastering is likely to have been a marginal option of skull treatment. A few painted skulls, which are mostly plain skulls, have been found in larger quantities usually grouped together in clusters or in caches all over the Near East. Detached skulls are found in all chrono-cultural contexts but show variations in terms of quantity, spatial organization and selection of the dead (for a recent synthesis: Benz 2010). The proportion of skull-less *versus* complete skeletons or isolated skulls is unknown. Precise quantitative data on the topic are missing although they are of major importance in the reconstruction of burial customs and the evaluation of the place of skull treatment within the Neolithic funerary system and beyond (Santana *et al.* 2012). Re-examining the primary contexts is an urgent necessity: skeletons, either with or without their skulls, have certainly not said their last word yet. Our goal in this paper is not to fill the mentioned gap but to propose some guidelines for future debate.

FROM DESCRIPTION TO INTERPRETATION: ADVOCACY FOR BETTER COMMUNICATION

An incomplete skeleton can be the testimony of many different deliberate or accidental actions, this is why a precise description of the burial can contribute to a reliable interpretation. The treatment of the head in past populations raises specific issues which can be properly discuss with a clear terminology and a precise field record (*e.g.*, Boulestin et Henry-Gambier 2012a; Knüsel 2014; Boulestin 2015). In anatomical terminology 'skull' refers to the complete cephalic extremity; this is to say the cranium together with the mandible. 'Skull removal' is thus inappropriately used when only the cranium has been removed. However, it is today understood as a generic term and it is probably better to maintain it together with a clear description of the bones actually removed or missing, though unfortunately these are rarely itemized in the literature available to date. The presence or absence of the first cervical vertebrae, and the hyoid bone is also important, together with their

Fig. 1 – *Acephalous skeleton from the PPNC occupation of Beisamoun (*Locus *276) and close up on the two first cervical vertebrae partly overlapped by the mandible. This adult was lying on his left side tightly flexed. His cranium was removed at a late stage in the decay process. On this occasion the mandible and the hyoid bones (**#1**) were reversed. The atlas appeared on its superior face (**#2**) while the axis (**#3**) was, in contrast, near its hypothetical initial position lying on its left side. The rest of the cervical column was not present, probably not preserved, like most of the thoracic level (© F. Bocquentin and H. Khalaily).*

state of connection or dislocation if present. Moreover bones should be thoroughly observed in order to look for potential modification marks (cutting, scraping, breakage, etc.). Altogether, these data will permit a discussion of the time and modality of the removal (*e.g.*, Boulestin et Duday 2012).

'Removal' from the grave as a secondary step in the funerary treatment, as suggested first by I.W. Cornwall, will be recognized easily if the process implies disturbance of already decayed joints (fig. 1). Indeed the observation of dislocation/displacement of cervical vertebrae and/or the mandible (and sometimes the thorax and the shoulders as well), points to intentional removal of the cranium in the course of the decomposition process. The presence of isolated upper teeth is also clear testimony of *in situ* decay of the cranium as single rooted teeth sometimes fall from their alveolar process when the ligaments decay. The first and possibly also the second cervical vertebrae (C1 and C2, also named atlas and axis respectively: fig. 2), whose connections are more enduring, may still be attached to the occipital region and either removed from the grave together with the cranium or separated by torsion or even with a knife (*e.g.*, Andrews *et al*. 2005). If removal takes place after the decay process is complete and with special care, it might not involve any disturbance and the cervical column will be found in perfect anatomical connection (fig. 3). In both cases, during or after decay, the removal of the mandible is likely to reflect a deliberate choice as the temporo-mandibular joint is labile and *a priori* dislocates early in the course of the decay process (*e.g.*, Duday 2009).

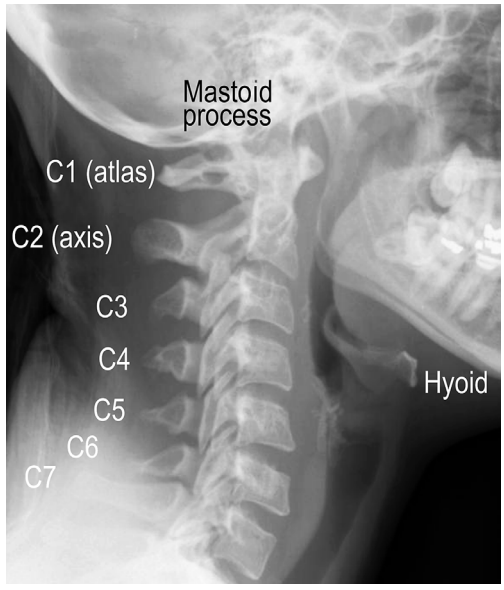

Fig. 2 – *Anatomical features mentioned in the text are illustrated* in situ *in an X-Ray of a generic human head and neck (lateral view).*

'Decapitation' refers to severing of the head of a living person (who is put to death), or to the active separation of the head from the neck on a fresh corpse.[2] The latter may be performed

2. In French, these two situations are sometimes named differently: "decapitation" for execution; "decollation" for post-mortem dismembering (Thiol 2000) but the nuance, admittedly difficult to make in some archaeological cases, does not exist in English (Boulestin et Henry-Gambier 2012b).

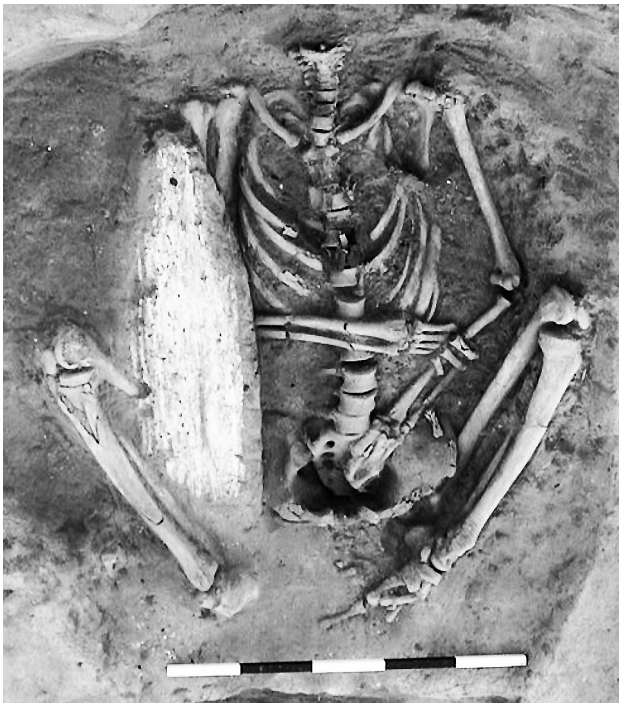

Fig. 3 – *Acephalous skeleton from the site of Çatalhöyük (EPN occupation, grave F492, skeleton 4593). The deceased was lying on its back, the axial part of the body, including neck, protected by a wooden plank (removed before picture). The cervical column is found in strict anatomical connection. However, in this particular case, the atlas displays some cutmarks. This points towards an early removal of the skull. Post-depositional retrieval is more likely although a pre-burial dismemberment cannot be ruled out definitively (after Andrews* et al. *2005).*

either for head hunting or in the framework of complex funerary behaviour and *a priori* both involve comparable modifications. Cutmarks will be found on the cervical vertebrae—preferentially between C2 and C3—the weakest anatomical area of the neck (Thiol 2000, but great variations are documented, *e.g.* Pereira *et al*. 2012). They might be abundant and various and present on different sides of the bones (anterior, posterior and lateral). In contrast, in the case of a lethal wound, the expected cutmarks are sharp and unidirectional (*e.g.*, Montgomery *et al*. 2011). Sometimes cutmarks can also be found on the hyoid bone or on the ascending ramus of the mandible, and on the mastoid processes of the cranium with cuts located at a higher level than the neck (Montgomery *et al*. 2011; Boulestin et Duday 2012). It should be noted that a separation of the cranium from the first cervical vertebrae is very difficult to perform on a fresh corpse (*e.g.*, Thiol 2000; Andrews *et al*. 2005). Consequently, in most of the cases, a decapitated body should also lack, at least, the first or two first vertebrae in addition to its skull. Moreover the skeleton, if not disturbed later, should not display any joint dislocation.

To conclude, correct anatomical words and precise archaeological contexts are extremely important for interpretation. If joint dislocation is a specific marker of skull removal in a skeletonized body, the absence of such disturbances cannot be considered definitive evidence for pre-burial removal, neither can the presence of cutmarks. An array of data must be taken into account, including bone inventory, joint dislocation or connection, and burial position, in order to evaluate the likelihood of the different possible scenarios.

CRANIUM OR SKULL REMOVAL: SOME MEASURABLE GUIDELINES

In order to provide preliminary quantitative data on skull removal, we have built a database for Near Eastern sites, which includes most of the currently available data published in articles or field reports spanning the Epipaleolithic to the mid-7th millennium (including PPNC/FPPNB or EPN according to regional chrono-cultural identities). Sixty-five sites have been selected and attributed to four geographical areas following four major geo-cultural regions commonly defined based on various elements of the material culture (*e.g.* Kozłowski and Aurenche 2005): the Southern Levant, the Northern Levant (which encompasses in this current article the Upper Euphrates Valley), the Upper Tigris valley and Central Anatolia (table 1; fig. 4). If the number of sites per area is unequal, the Minimum Number of Individuals registered in the database is better balanced due essentially to the fact that the site of Çatalhöyük has provided a large number of skeletons. The MNI shown in Table 1 was obtained by summing the MNI counts for each site. This MNI by site is the result of a nearly comprehensive collection of data, grave by grave. The number obtained is as close as possible to the real minimum number as the graves from a single architectural complex or an identical level have been considered as potentially complementary. Furthermore, we have estimated independently the MNI from cranial

Table 1 – *Number of sites (attributed from the Early Natufian to the first half of the 7th millennium) and Minimal Number of Individuals involved in this study according to the four regions selected.*

	Central Anatolia	Northern Levant	Upper Tigris	Southern Levant	Total
No. of sites	6	14	11	34	65
MNI	721	699	593	988	3001

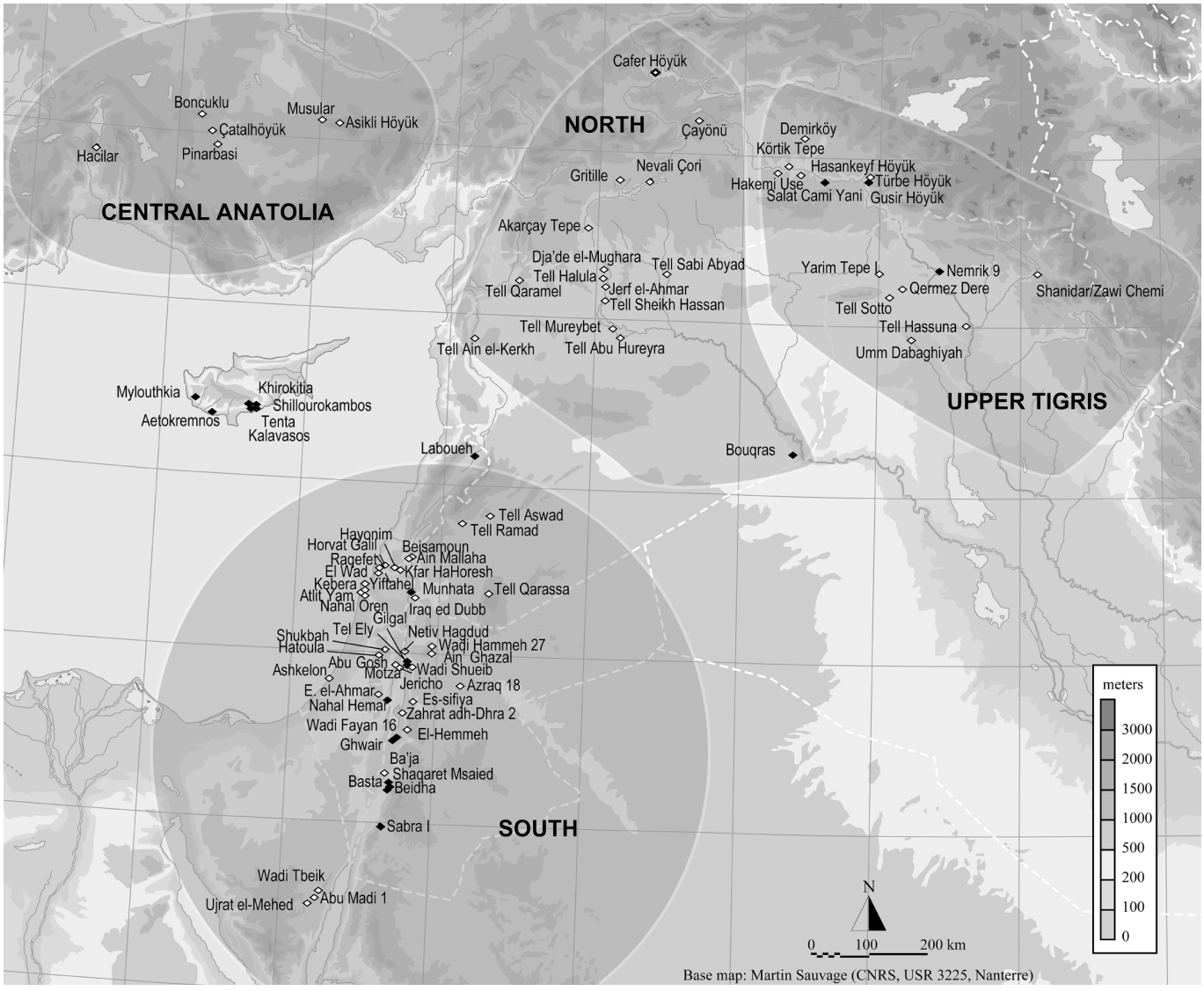

Fig. 4 – *Map of the studied geographical region divided into four areas, and major Epipaleolithic and Neolithic sites with human graves. White diamonds: sites taken into account in our data base. Black diamonds: other sites (© base map: M. Sauvage).*

remains and from infra-cranial remains and have used the greatest number. Finally the database comprises 3001 individuals[3] for whom a minimum of data concerning the context of discovery could be noted. The number of individuals available for investigation reduces as criteria of analyses (age, chronological attribution, precise funerary context, bone representation etc…) increases. This is why the MNI will be different in each of the tables or graphs presented here.

We have clustered the human deposits according to 12 categories (table 2) in order to clarify the contexts of discovery and to select the most relevant data available for inter-site comparisons and for investigation of basic quantitative data on common or distinctive treatment of cranial and infra-cranial remains.

If we consider clear primary burials (H+I+J), it appears

3. For some sites, we collected data from selected well-published structures (for instance, we took into account only the skull building at Çayönü (Yilmaz 2010) or only the graves unearthed up to 2007 at Kfar HaHoresh (Simmons *et al.* 2007). We could not take into account articles where only general data are published instead of individual information for each skeleton unearthed. Concerning Jericho, the data were collected from Kenyon and Holland (1981) and Cornwall (1981), as the MNI given by Kurth and Röhrer-Ertl (1981) are totally aberrant compared to the field description.

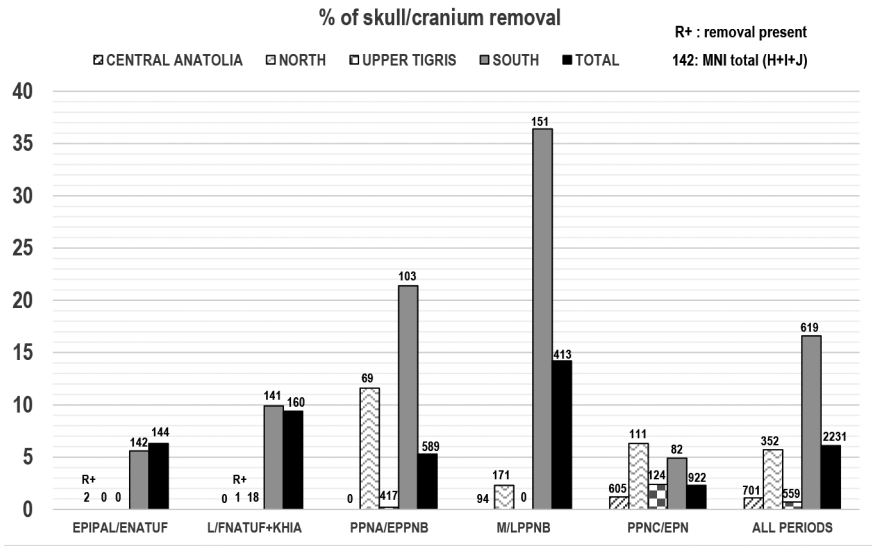

Fig. 5 – *Percentage of cephalic extremity removal from well identified primary burial contexts (see contexts H, I, J in table 2) from the Early Natufian to the Early Pottery Neolithic in the three regions studied.*

Table 2 – *Context of discovery of the human remains and Minimum Number of Individuals discovered in each of them. This table does not take into account the fact that the deposits are single or multiple; the term "isolated" must be understood from an anatomical point of view. Context F is a kind of* pot-pourri *of numerous Neolithic graves for which it is unclear if they are secondary deposits or successive burials or contemporaneous burials with secondary handling.*

Code	Archeo-anatomical contexts of discovery	MNI
A	Plastered crania isolated from infracranial	21
B	Crania isolated from infracranial	157
C	Plastered skulls isolated from infracranial	35
D	Skulls isolated from infracranial	42
E	Mandible isolated from cranium and infracranial	27
F	Dislocated skull together with infracranial (secondary/primary successive/secondary handling)	377
G	Dislocated infracranial without cranium or skull (secondary deposit/secondary handling with removal)	77
H	Primary with cranium removal	77
I	Primary with skull removal	58
J	Primary complete	2096
K	Cremation/burnt remains (skull present in great majority)	63
L	Skeleton eroded or truncated (data on skull not availaible)	121

that 6.1% of them have been subject to skull/cranium removal (H+I) (table 2). This number increases to 9.2% if we also take into account secondary deposit or secondary handling (for instance, reduction of corpses) where infra-cranial remains remained intact (G). In those more complex contexts, removal (or differential selection of bones from primary deposits) occurred at some point but when exactly in the *chaîne opératoire* of funerary handling is unknown. This is why in this paper, we focus on well-understood primary contexts (H, I, J).

REMOVAL IN SPACE AND TIME

For a diachronic approach we have grouped together several cultural phases, following some consensual clusters, in order to solve quantitative issues and avoid problematic chronological attribution (fig. 5). Skull removal is not yet known in Geometric Kebaran contexts but may already appear at Pinarbaşi (Middle Epipaleolithic) on the Anatolian plateau (Baird *et al*. 2013). In the Levant, it seems to develop at the very beginning of the Natufian. During the Early Natufian, no clear illustration of this treatment is available with the exception of a dearth of crania and mandibles from Grave VI in Hayonim Cave which may testify to this treatment for adults and children (Belfer-Cohen 1988; Bocquentin 2003: 212). In the Natufian site Azraq 18, where two skulls were covered by red pigment in the collective grave, removal and reburial is highly probable (Bocquentin and Garrard 2016). Additionally, isolated skulls have been found in several Early Natufian sites (*e.g*., Perrot et Ladiray 1988; Neuville 1951). Altogether, it seems that skulls or crania might be incidentally removed within the process of managing and reorganizing successive burials within the same grave.

During the later Epipaleolithic (Late/Final Natufian) and very beginning of the Neolithic (Khiamian), skull removal increases and is found in most of the sites from the Southern Levant (except Mallaha: Perrot et Ladiray 1988; Bocquentin 2007). For the first time, removal is completed from single or multiple primary graves (fig. 6). This means that these graves were reopened specially in order to remove the cephalic extremity. It is not an opportunistic treatment but would have been

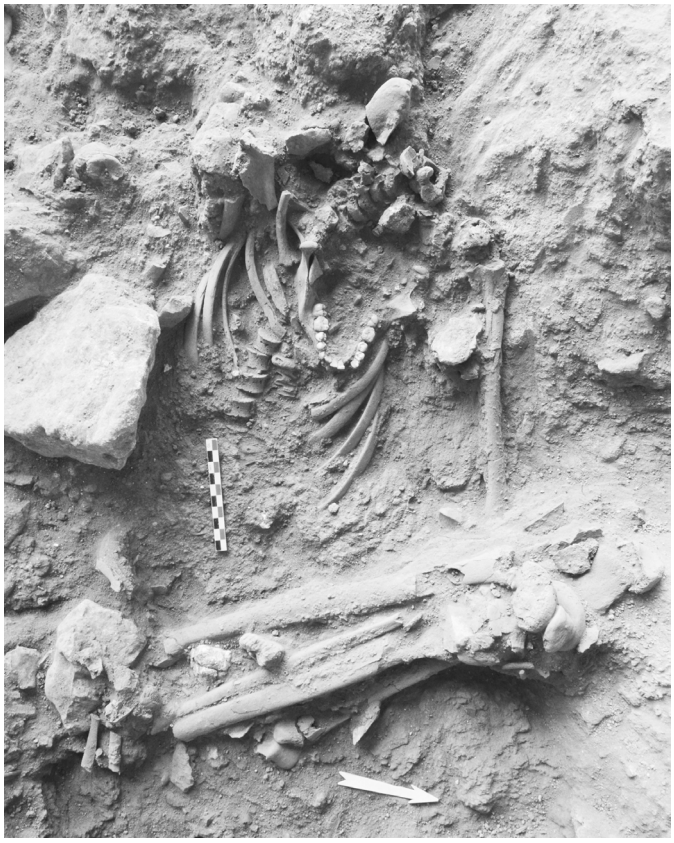

Fig. 6 – *Acephalous skeleton from the Late Natufian cave of Raqefet. Homo 28 is an adolescent deposited on his back, lower limbs flexed towards his left side. The mandible fell into the thorax area during the decay process due to an initial upright position of the neck and shoulders. The right half of the first cervical vertebrae was found still in connection and cemented to the axis by calcrete. The upper left central incisor was also found nearby. These elements point towards a late and cautious removal of the cranium, after the end of the decay process at the time when calcrete starts to develop. The left part of the atlas, possibly cemented to the occipital condyle, has followed the cranium (© D. Nadel).*

planned as early as the primary burial. Indeed the position of the skull is perfectly known, maybe marked, and minor disturbances are made to the skeleton even though most of the individuals concerned were buried directly in earth[4] (Bocquentin 2003: 319). From the Late Natufian, skull removal becomes a planned, selective and cautious treatment mostly practiced in single graves in the Southern Levant. With certain nuances this will become the foundation of Neolithic removal practices.

At the beginning of Pre-Pottery Neolithic (PPNA and Early PPNB) the database contains a large corpus of graves in all of the areas except Central Anatolia. Skull/cranium removal is well attested in the Northern Levant (11.6%) and increases significantly (p-value = 0.047)[5] in the Southern Levant (21.4%) (fig. 5). In all sites where graves exceed a dozen in number, skull removal is usually attested. In the Upper Tigris, the site of Körtik Tepe yielded 413 complete skeletons. In these exceptionally well-preserved graves, very complex funerary practices are observed but skull removal is absent (Erdal 2015 and Erdal personal comm., 2014). However, in the nearby site of Demirköy, skull removal is attested (Rosenberg 2011) and isolated crania were found at Qermez Dere (Watkins *et al.* 1991).

The Middle/Late PPNB period marks a clear break in the Levant. The Northern and Southern Levant seem to follow opposite directions. Skull removal in primary simple graves becomes uncommon in the North (2.3%). This is the only period during which the difference North-South reaches statistical significance (p-value < 0.001). Sites with numerous graves, such as Tell Halula totally abandon this custom (*e.g.*, Ortiz 2014). However, this does not mean that manipulations of skulls cease to occur. On the contrary, secondary collective handling including skull displacement (Cluster F and G in our data base), already present in the EPPNB, continues. In the Southern Levant, skull removal rises to 36.4% of the primary burials and is present in most of the sites. This increase is contemporaneous with the appearance of the custom of skull remodeling. In Central Anatolia despite the discovery of a large number of graves in different sites (N=94), skull removal is not attested to. No data are available for the Upper Tigris.

During the 7th millennium, no drastic change is observed in the North, where skull removal continues to be sporadic (6.3%). In Central Anatolia, represented only by the site of Çatalhöyük (Boz and Hager 2014; Pilloud *et al.* 2016[6]), skull removal is present in a very small proportion (1.2%), this is true as well for the Upper Tigris corpus (2.4%). The most significant shift concerns the Southern Levant which shows a drastic decline in skull removal (p-value < 0.001). This is not due to the fact that Middle and Late PPNB were grouped together. Indeed, if we separate the graves with robust attributions to either the Middle or to the Late PPNB, we observe a slight increase from the MPPNB (33%) to the Late PPNB (37.5%) in skull removal. Thus, the beginning of the 7th millennium marks a clear break

4. Based on archaeothanatological analysis it is possible to say that no perishable funerary container (open space burial) which would have facilitate the reopening of the grave was present.

5. χ^2 or Fisher's exact (small size samples) were used for all statistical tests.

6. This article was published after our manuscript was reviewed and we could not take into account the new data provided therein.

in this practice for the Southern Levant, in parallel with the disappearance of skull/cranium plastering.

To conclude, in the Southern Levant, skull/cranium removal was taking its first hesitant step during the Early Natufian but can be considered part of the funerary protocol, planned in advance and standardized, from the Late Natufian onwards. With time, it progresses towards the Northern Levant quite linearly up to the EPPNB although some sites in the Northern Levant seem to have ignored this custom. From the Middle PPNB this practice becomes rare in the Northern Levant while it continues a remarkably constant progression in the South until it involves more than one third of the dead by the end of the LPPNB. By the 7th millennium, skull removal does still exist but only to a very minor extent everywhere in the Levant. While data for Central Anatolia are less robust, it seems that skull removal appears early in this area as well, but occurs in a low frequency. In the Upper Tigris removal is attested in only a few sites and seems to be a marginal practice throughout the Neolithization process.

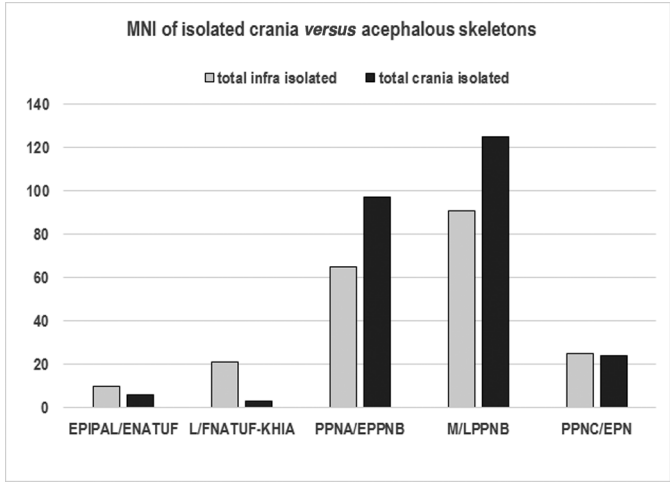

Fig. 7 – *Comparison of MNI based on isolated crania/skulls* versus *MNI based on isolated infracranial remains (acephalous skeletons/ secondary deposit of infracranial remains) over time.*

CRANIA *VERSUS* ACEPHALOUS SKELETONS MNI

A general overview, that encompasses all areas together, based on MNI counts of isolated skull/cranium (A+B+C+D) on the one hand and on infra-cranial remains on the other (G+H+I) suggests that a shift may have occurred in the way of handling human remains (fig. 7). During the Natufian, skeletons without the cephalic extremity are more numerous than isolated crania/skulls but the trend is reversed from the beginning of the PPN.[7] The 'missing' Natufian crania may not have been reburied or may have been buried a certain distance away from the dwelling area and burial grounds. The 'surplus' of Neolithic crania, identically observed in the four areas, requires more attention. It may attest to better preservation of this anatomical part due to a different context of reburial compared with the rest of the skeletons (for instance, long-term protected zones or caches); or the reburial may have taken place in areas more systematically surveyed by excavators (concentrated closer to buildings than the majority of the primary burials, which can be more dispersed). Alternately, it may reflect that skull removal is not the sole source of crania and that part of the corpus is the result of exchanges, decapitation or dismemberment, which may induce totally disconnected patterns of handling cranial and infra-cranial remains of the same individual, the latter eventually not buried. One cannot avoid thinking of the funerary cycle described by P. Lemonnier (2009), in the Asmat community (south coast of New Guinea) where skull removal of a member of the community is possible once decapitation of an outsider is accomplished. A thoughtful comparison of the context of discovery of isolated skulls *versus* other kinds of funerary deposits, which is beyond the scope of this paper, may provide some clues towards an interpretation. A comparison of biological parameters and isotopic signatures between skulls found *in situ* in complete burials and isolated skulls would also be of great interest. Meanwhile, one should keep in mind that there is a general tendency for the over representation of isolated crania/skulls *versus* acephalous skeletons during the Pre-Pottery Neolithic.

QUALITATIVE GUIDELINES BASED ON ACEPHALOUS SKELETONS

Data collected on 128 of the best documented acephalous skeletons in the available corpus (table 3) allows us to parse the removal process itself. Of the individuals 57% were subject to cranium removal only; the mandible in this case was found in the primary grave together with the infra-cranial skeleton. However this percentage is quite heterogeneous in the different geographic areas considered. In the Northern Levant, Central Anatolia and Upper Tigris,[8] the complete skull is more

7. Early Natufian: no statistical significance; Late Natufian: $p < 0.01$; PPNA/PPNB: $p < 0.05$; PPNC/EPN: no statistical significance.

8. Too few cases in these two late areas to be fully significant.

Table 3 – *List of the 128 acephalous skeletons included in the analyses of the current paper.*

Site	Area	Period	No.	Selected References
Abu Gosh	South	MPPNB	4	Lechevallier 1978; Khalaily and Marder 2003
Abu Hureyra	South	MPPNB	4	Moore 2000
Beisamoun	South	PPNC/EPN	4	Bocquentin and Khalaily personal obs.
		MPPNB	1	Lechevallier 1978
Cafer Höyük	North	EPPNB	2	Cauvin *et al*. 1999
Çatalhöyük	Central Anatolia	PPNC/EPN	8	Andrews *et al*. 2005; Boz and Hager 2014
Çayönü	North	MPPNB	1	Yilmaz 2010
Demirköy	Upper Tigris	PPNA	1	Rosenberg 2011
D'jade	North	EPPNB	1	Chamel 2014
El Wad Terrace	South	L Natufian	4	Weinstein Evron 2009
Hatoula	South	PPNA	1	Le Mort 1994
Hayonim Cave	South	L Natufian	4	Belfer Cohen 1988
Hayonim Terrace	South	L Natufian	2	Valla 2012
Jerf el Ahmar	North	PPNA	1	Stordeur 2015
Jericho	South	M/LPPNB	21	Kenyon and Holland 1981
		PPNA	8	*Ibid.*
Kfar Hahorech	South	M/LPPNB	5	Simmons *et al.* 2007
Motza	South	EPPNB	3	Khalaily *et al*. 2007
Nahal Oren	South	M/LPPNB	3	Noy *et al.* 1973
		L/F Natufian	3	Noy 1989; Bocquentin 2003
Netiv Hagdud	South	PPNA	9	Belfer-Cohen and Arensburg 1997
Nevali Çori	North	EPPNB	2	Hauptmann 2011
Pinarbaşi	Central Anatolia	Epipalaeolithic	1	Baird *et al*. 2013
Raqefet	South	L Natufian	1	Nadel *et al*. 2012
Tell Ain el-Kerkh	North	PPNC/EPN	7	Tsuneki *et al*. 2011; Chamel 2014
Tell Aswad	South	MPPNB	1	Khawam 2014
		LPPNB	7	Khawam 2014
		EPPNB	1	Khawam 2014
Tell Hassuna	Upper Tigris	PPNC/EPN	2	Lloyd and Safar 1945
Tell Mureybet	North	Khiamian	1	Chamel 2014
Tell Qaramel	North	PPNA	2	Kanjou 2009; Chamel 2014
Tell Ramad	South	M/LPPNB	1	Contenson 2000
Wadi Shueib	South	LPPNB	5	Simmons *et al*. 2001
Yiftahel	South	MPPNB	7	Garfinkel *et al.* 2012; Khalaily *et al*. 2008; Milevski, personal comm.

frequently removed (fig. 8).[9] In the Southern Levant, where skull removal was more frequent than cranium removal during the Natufian (63%), the majority of the removals performed during the Pre-Pottery Neolithic involved only crania (72%). Are these proportions reflected within the corpus of isolated cranial remains? Interestingly for this parameter, the situation is different again in the South and North. In the South, the proportion of isolated crania *versus* skulls is roughly identical to the one observed in the primary partial graves. In the North, the proportion is the inverse of the expected one: isolated crania are much more numerous than isolated skulls. This sug-

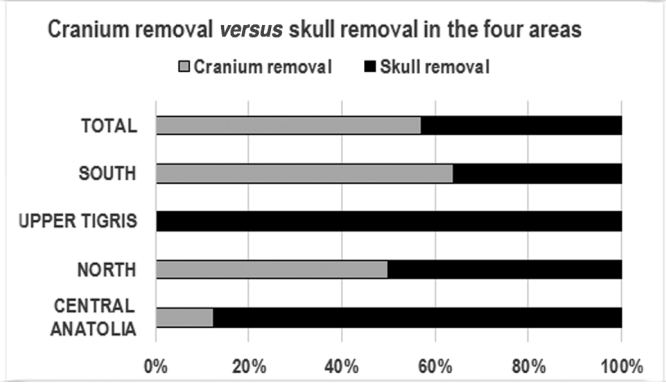

Fig. 8 – *Percentage of cranium* versus *skull removal within primary graves from the four regions, all periods together.*

9. The differences between areas do not reach statistical significance yet (p=0.06) but should be considered as an interesting trend.

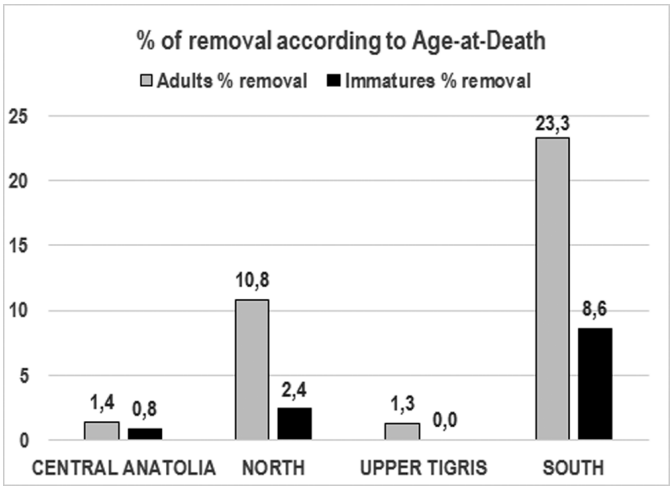

Fig. 9 – *Percentage of removal practice according to age-at-death in the four areas, all periods together (N=128).*

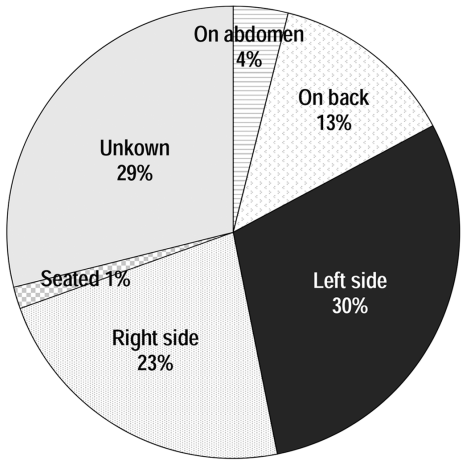

Fig. 10 – *Burial position of the corpus of skull/cranium-less skeletons. All periods and areas together (N=128).*

gests that the fate of cranium and mandible once removed from primary graves was not necessarily the same. Indeed mandibles found in isolation are more numerous in the Northern Levant than in the South.

A SELECTIVE PRACTICE WITHIN A STANDARDIZED FRAMEWORK

Skull removal concerns a small portion of the dead, so it is clear that selection must have taken place. Criteria for selection may have been multiple, including those linked to biological identity. The process of selection has been largely debated concerning the specific case of the plastered skulls although no definitive answer has yet been provided (*e.g.*, Ferembach 1970; Strouhal 1973; Kurth and Röhrer-Ertl 1981; Arensburg and Hershkovitz 1989; Bonogovsky 2006; Croucher 2006; Flechter *et al.* 2008). A comparison of age-at-death, sex, kinship, disease, stress markers etc., of skull-less skeletons *versus* complete skeletons and isolated skulls of the complete Neolithic corpus available would certainly result in an immense improvement in our understanding of the phenomenon. Unfortunately, available individual data on biological identity are today scarce and unsuitable for comparisons. If sex and age determinations are infrequently accessible in published documents, then methodological issues remain a great handicap for a global approach.[10] As a result, we have to settle for large categories of age-at-death: adults or immature individuals (from infants to adolescents). It is enough to say that a process of selection based on age criteria is attested to with a larger proportion of adults having been subject to skull removal (fig. 9).[11] However, adolescents but also young children (5-6 years old) and, more exceptionally, infants do 'benefit' sometimes from this treatment. The more common the removal process, the larger the proportion of immature individuals involved in this practice (p-value <0.01). In the case of adults, it is worth noting that young adults (<30 years old) are most numerous amongst the headless individuals (see references in table 3). Interestingly, the same overrepresentation[12] of young adults is true for plastered skulls/crania (*e.g.*, Bonogovsky 2006; Croucher 2006) or plain skulls (Goring-Morris 2000; Benz 2010; Santana *et al.* 2012). A specific recruitment favoring young adults is also observed in the ritual PPNB site of Kfar HaHoresh (Eshed *et al.* 2008), or in the Early Natufian at Hayonim Cave (Bocquentin 2003) and amongst ornamented dead in all Natufian sites (Byrd and Monahan 1995; Belfer-Cohen 1995; Bocquentin 2003) raising the question of the status of the young adults amongst the living or the acquired specific status in the case of an early death.

No specific pattern can be isolated from the position or orientation of the skull-less skeletons. A great majority were lying on their side, left or right (fig. 10), which seems also to be the

10. The methods used are different, the pelvis is usually poorly preserved, and sexing skulls is very problematic: >20% of mistakes at least (*e.g.*, Meindl *et al.* 1985; Bruzek 1996).

11. The differences of treatment according to age reach high statistical significance in the North and South Levant (p <0.001 in both cases).

12. Compared to what is expected in case of a natural mortality profile (Ledermann 1969; Wood *et al.* 2002).

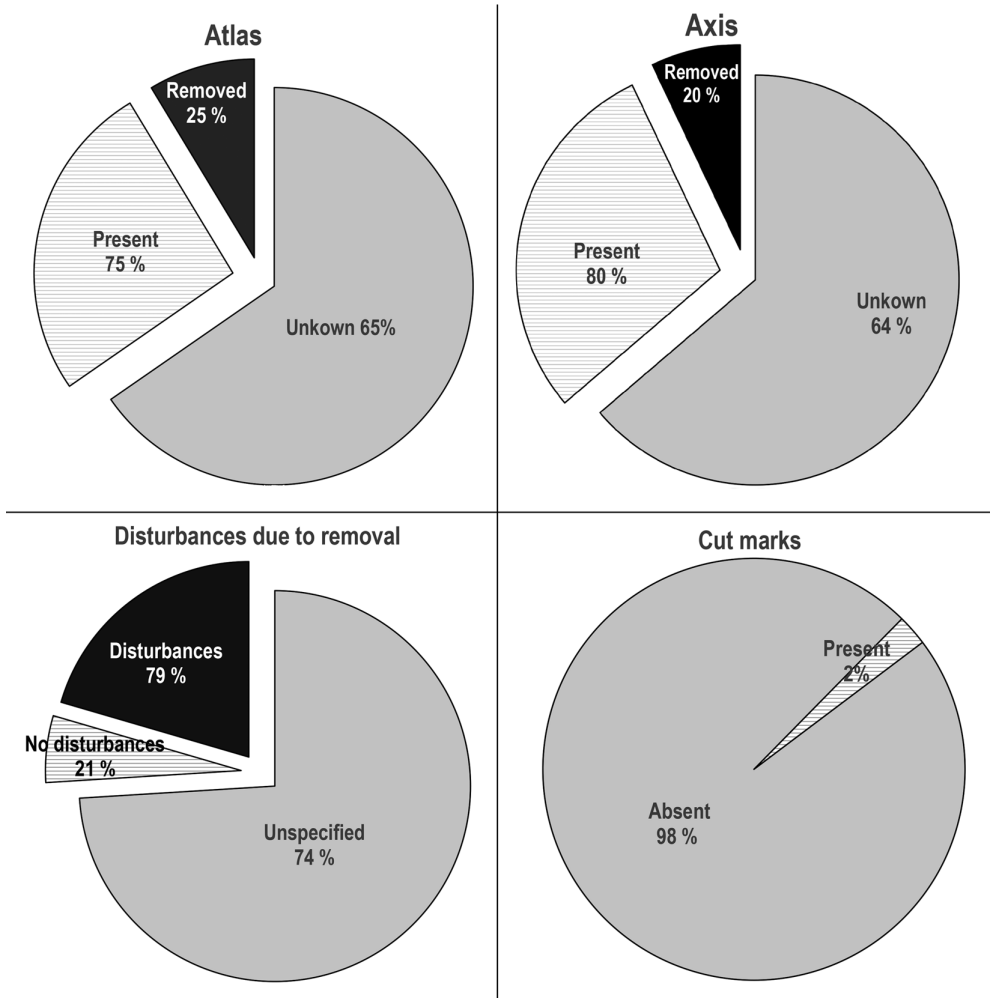

Fig. 11 – *Elements for the discussion of the removal process (N=128): Presence/absence of atlas and axis, of disturbances and cutmarks (unspecified considered as absence for the last graph).*

case of the rest of the Neolithic population (with the exception of the numerous seated burials at Tell Halula (Ortiz *et al*. 2013; Ortiz 2014) or the few discovered at El Hemmeh: (Makarewicz and Rose 2011), although the exact proportions are unknown. Orientation is highly variable. Single or multiple burial does not seem to be a criterion that affected the removal pattern either. In sum, acephalous individuals, whatever their age at death or geographic area, follow the funerary norms in most of the cases. That being said, a few acephalous skeletons attest to a particular treatment (context of deposit and position), which may indicate specific social/death status (*e.g*., Jerf-el-Ahmar: Stordeur 2015; Çatalhöyük, sk. 19593[13]). The presence of the atlas in the case at Jerf-el-Ahmar points towards a late removal of the skull although the cervical column is perfectly articulated.

Concerning the method of removal, well-documented cases are unfortunately rare[14] (fig. 11). Among those, the first cervical vertebra (atlas) is removed together with the cranium in about 25% of instances; the second cervical vertebra (axis) follows the removal in 20% of the cases. Again, no relevant differences are noticeable between the Northern and Southern Levant. Disturbances have been noted in 79% of the reopened burials. These are usually limited to the mandible, which can

13. Hodder I. (ed.), *Çatalhöyük 2012 Archive Report*. Unpublished preliminary field report [http://www.catalhoyuk.com/downloads/Archive_Report_2012.pdf].

14. For this reason percentages given here should be considered as rough indicators.

be reversed or displaced and/or to the first cervical vertebrae being slightly displaced. Exceptionally, disturbances also affected the clavicles, first ribs and the hand bones when they were originally placed next to the chin or under the head.

NON-STANDARD BEHAVIORS: SHOULD WE RECONSIDER OUR INTERPRETATIVE SCHEME?

In 21% of cases examined here, the removal process did not involve any bone displacement. Are these cases testimony of very cautious secondary removal or should we consider them as pre-burial decapitation previous to the decay process? The first hypothesis is supported, at least, by several cases in the Southern Levant (Raqefet, Hayonim, Nahal Oren, Motza, Beisamoun) for which we were able to cross-check archaeo-thanatological data (bone displacement) and direct biological observations and confirm the absence of cut marked bones.

Early removal is nevertheless suspected in a few cases in the Northern Levant where cutmarks have been found. In these cases, cut-marked vertebrae are found in primary context still articulated to the rest of the vertebral column while anatomical segments above it (cranium, mandible and sometimes atlas) are absent in the grave. The best documented cases show the complexity in interpreting the exact handling process. In the skull-less skeletons 1466 and 4593 at Çatalhöyük, cutmarks are present but seem too light to be the result of the decapitation of fresh corpses and retrieval from the partly decomposed body is hypothesized (Andrews *et al.* 2005). An open space burial and a specific initial upright position of the head would have allowed early removal without disturbing the rest of the body. An acephalous skeleton with cutmarks was also identified at the PPNA site of Tell Qaramel. Individual T5-07-9, buried seated, displays clear cutmarks on the odontoid process and the superior articular facet of the second cervical vertebra (Kanjou *et al.* 2015). Although the state of dislocation/connection of the skeleton is not described, the cutmarks are considered, as in Çatalhöyük, to attest the active retrieval of the skull using stone tools on a partially decomposed body (*Ibidem*).[15]

Cutmarks were also reported from secondary contexts (*e.g.*, Tell Qaramel: Kanjou *et al.* 2015; Çayönü: Yilmaz 2010; Mureybet: Chamel 2014; Atlit Yam: Hershkovitz and Galili 1990; Kfar HaHoresh: Simmons *et al.* 2007; Basta: Shultz *et al.* 2007; Tell Qarassa: Santana *et al.* 2012) including on plastered skulls (‘Ain Ghazal: Schmandt-Besserat 2002; Jericho: Bocquentin 2013). These cutmarks are usually interpreted as part of defleshing activities in order to complete the ongoing natural decay process. Disarticulating and cleaning seems to be the targeted action within a funerary sequence linked to skull removal and processing, as cranium and mandible are by far the most frequently represented cut-marked bones. At Körtik Tepe, cutmarks are found on complete and articulated skeletons, on cranium and infra-cranial bones. Defleshing fresh corpses or during early stages of decay is proposed (Erdal 2015), opening future research towards yet unknown funerary *chaînes opératoires*.

At Çatalhöyük, notwithstanding the absence of cutmarks, active dismemberment of a partly decomposed body (probably exposed on the surface within a fenced and protected area) prior to burial was clearly demonstrated (Andrews *et al*. 2005; Boz and Hager 2014). It reminds us that more complex funerary gestures involving a length of time, several stages of intervention, and active defleshing/dismembering, although rare, should be kept in mind when analyzing unclear Neolithic burials. Not only fresh corpses were handled by the community, but also putrefied and skeletonized bodies were manipulated, as well as dry bones. Moreover, phenomenon of natural desiccation may also have produced all kinds of states of preservation and completeness of the manipulated body. Yet too often, potential complex cases are classified as ‘secondary burial’ or ‘primary disturbed’ without any further considerations.[16]

In the Southern Levant, pre-burial treatment, such as exposure, has been addressed (Simmons *et al*. 2007) but seems exceptional. The poor preservation of the skeletons compared to those found further North might be an impediment to such identification. However, a forgotten grave at Jericho sheds some light on possible complex pre-burial treatment in the Southern Levant. Grave FI 6 (XVIIa, 31; PPNB) is described as a multiple, primary disturbed deposit (probably when searching for crania, which are absent: Cornwall 1956 and 1981: 398-401). Two areas were distinguished (and yet it is not clear if it is part of the same grave or two graves lying next to each other): Burial 6A with only one individual lying in ana-

15. It should be noted that in these two publications the authors used the term “decapitation” but conclude that early post-depositional removal took place.

16. Although not interpreted as such by the authors (Mazurowski 2005; Chamel 2014: 121), active dismemberment might well be considered at Tell Qaramel, where one skeleton was found without a skull and upper limbs (PPNA: *Locus* 30), and at Dja’de, where fully articulated segments of skeletons were no longer in anatomical coherence. Grave 283-C, EPPNB: the right lower leg and foot are lying over the right thigh and ossa coxae and the left leg and foot are placed under the right thigh. Both legs appear in antero-superior view, this is to say inverse of their expected anatomical position (Chamel 2014: Figs. 67 and 69). Grave 245: field documents are less explicit but the description of the fully articulated skull lying between the lower limbs is also highly questionable (*Ibid.*: Fig. 73).

Fig. 12 – *Grave 6A at Jericho: This photograph illustrates the upper level of the excavation (see fig. 13). Note the anatomical side inversions of the lower limbs in relation to the thorax and the left leg turned end-to-end. The pre-burial dismemberment treatment together with the position of the mandible and of the left foot in relation with the cervical vertebrae, point towards a dismemberment of the cranium with the three first vertebrae before burial (after Kenyon and Holland 1981: Pl. 62a. Reproduced by permission of the University of Cambridge Museum of Archaeology & Anthropology).*

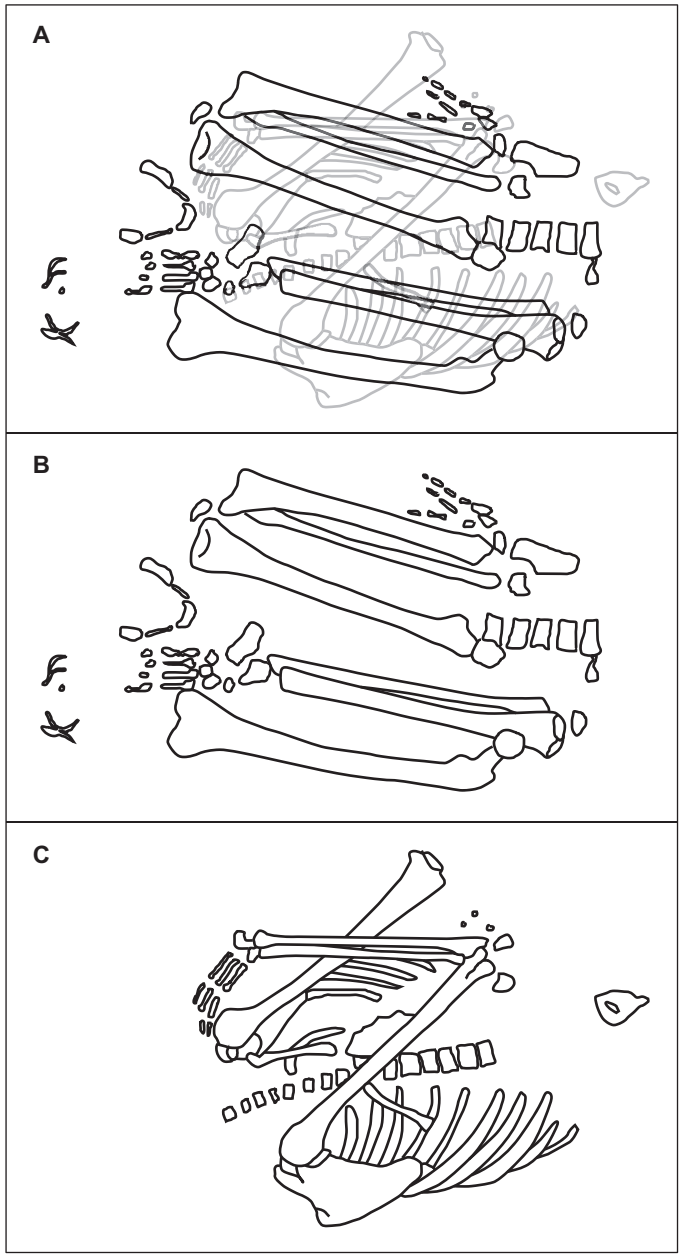

Fig. 13 – *Grave 6A at Jericho: Drawing of the first (B) and second levels (C) of the excavation shown separately and superposed (A) (after Cornwall 1981: Fig. 16. Reproduced by permission of the University of Cambridge Museum of Archaeology & Anthropology).*

tomical position, and Burial 6B comprising comingled partial anatomical segments and dislocated bones from several individuals. We will focus on individual 6A, an acephalous skeleton, lying on its back, and apparently tightly flexed (fig. 12-13). Most of the joints, enduring as labile, are in strict anatomical connection, which confirms a primary deposit. However, the skeleton is incomplete. The cranium, the first three cervical vertebrae, the two coxae, the left forearm and hand are missing. Additionally, some anatomical inconsistencies were noted: "the right leg and foot had been disarticulated at the knee and turned end-for-end before their replacement after disturbance of the burial" (Cornwall 1981: 399).

Other major inconsistencies exist to which I.W. Cornwall did not pay attention. First, if the individual was placed on the back with knees tightly flexed on the thorax as described, the femurs should appear in posterior view and the lower leg bones in anterior view—which is not the case. Last but not least: not only had the left lower leg been rotated by 180° so that its foot was at knee level, but the entire left and right limbs had also been inverted. Consequently, we must consider the existence of pre-burial treatment involving the active dismemberment of the body into anatomically separate blocks, before the beginning of the decay process. The body may have been fresh and cut into several parts and buried immediately, or been exposed for a while, desiccated (naturally?) and the lower limbs pulled apart before burial. Cutmarks, which could have helped us in the interpretation were not noted and probably not sought by Cornwall. What remains certain is that the gravedigger attempted to reconstruct a coherent body from the separate pieces, but, fortunately for us, failed.

In this context, we can legitimately wonder whether the skull was not removed before inhumation. Indeed, the mandible appears quite isolated, far from the cervical vertebrae

according to the drawing (no photograph is available for the lower level of the grave). It is likely that the mandible was an isolated piece when buried. Moreover a later removal of the cranium together with the first three cervical vertebrae would have certainly disturbed the bones of the left foot placed on the residual cervical column. Active dismemberment of the neck before burial is consequently most probable. The fate of the left forearm and hand, and of the two coxae, remains undetermined: buried and later disturbed (by Grave 6B for instance)? or dislocated from the corpse and buried/used/exposed elsewhere? Grave 6A at Jericho echoes the complex funerary treatments described in Çatalhöyük in a later period or in other contemporaneous cultural contexts (*e.g.*, Li *et al.* 2013; Aoudia *et al.* 2014). It seriously questions the idea that skull removal is part of a single common *chaîne opératoire* during the PPN in the Levant and adjacent regions.

CONCLUSION

The aim of this paper was to evaluate the connections between the Northern and Southern Levant in order to advance one step further in the study of the important topic of skull removal. We have chosen to develop this topic by focusing on the general evidence for acephalous skeletons, which has been little studied to date.

Skull removal first developed during the Natufian period. The earliest cases are probably opportunistic but by the Late Natufian a clear planned and standardized custom is in place. If not already present, this practice spread to the Northern Levant at the beginning of the PPNA. Skull removal appears to have been a selective practice, applied to a limited number of adults (mainly young adults) and only few children. However, these selected individuals receive a standard inhumation comparable in all ways to the rest of the population. Generally speaking, cranium/skull retrieval happened as a secondary process when the decay process had ended. This act usually involved slight displacements of the uppermost part of the skeleton. However, sometimes removal did not entail any displacement owing to very careful removal and/or position at burial or of the grave structure, which protected the rest of the body, and/or an early removal at the start of the decay process. At the beginning of the Pre-Pottery Neolithic, the Northern and Southern Levant display a comparable increase in this custom (while Central Anatolia and the Upper Tigris exhibit a very low percentage during the whole Pre-Pottery Neolithic). Available data indicate that a geographic divergence occurred at the beginning of the Middle PPNB. While skull removal continued to develop in the Southern Levant until it involved over a third of the dead, it became very selective in the North. This coincides with the appearance in the Southern Levant of the new custom of remodelling crania (and later complete skulls), and the increasing number of skulls buried together in caches (Benz 2010: Fig. 7): a real break between North and South appears at that point.

Interestingly this break corresponds in time to the expansion of more standardized lithic production in the whole Levant (*e.g.*, Bar-Yosef and Belfer-Cohen 1989; Cauvin 1994) suggesting more intensive contact and exchange between North and South. Should we interpret our data as a reaction against this and a bid to maintain identity or due to territorial fear in the face of supra-regional cultural pressure? Further traits of mortuary practices should be taken into account as well as other aspects of material culture to discuss this matter in greater depth. During the 7th millennium cal. BC, skull/cranium removal still persists but in a low proportion, in the Northern as well as in the Southern Levant where a sudden decrease is noticed between the LPPNB to the PPNC. Within this general framework, it is worth noting that some well-documented sites with long occupations, and which have yielded over a hundred skeletons, were resistant to the prevalent custom of skull removal (*e.g.*, Eynan-Mallaha, Tell Halula, Körtik Tepe). The Zagros area also shows a certain imperviousness to this specific treatment.

In addition to the divergent development over time, the custom of skull removal in the North and in the South differs in another aspect. Removal generally involves the whole skull in the Northern areas whereas usually only the cranium is removed in the South. This may be due to a matter of preference, the mandible may have been considered as significant an element as the cranium in the North. However, the fact that, in the North again, most reburials only involve the crania shows that the mandibles had been discarded at some point. Another explanation might be related to the time of removal, earlier in the decay process in the North than in the South, the mandible in this case necessarily following the cranium. Cutmarks have been found on specimens in the North and Anatolia, this despite the fact that 75% of acephalous skeletons occur in the South. These might be further evidence of earlier removal practiced in the North. This earlier removal need not necessarily be in terms of absolute time and mourning period, but at least as regards the decay process (which might take longer in a drier environment or in specific containers). This assumption could probably be established more firmly if we had more information about the presence and absence of cervical vertebrae and hyoid bones in the graves. The current data (35% of

known cases only) do not show differences on this issue between the North and South.

This discrepancy, early *versus* late removal, is not as superficial as it may appear. Indeed, it implies different gestures for retrieval and different ways of handling the removed cephalic extremity, which might be an isolated cranium, an isolated skull or a skull with part of the cervical column. It would have technical repercussions: on cleaning (defleshing, disarticulating, possible need of tongue ablation, tooth avulsion?) and on display (surface, cache, pedestal, pole, etc.: *e.g.*, Stordeur et Khawam 2007). It may also lead to a differential perception of the remains, which might be considered either evocative of one specific dead individual or representative *de facto* of a collective ancestor, beyond personal identity. We are touching here on the frontier between funerary treatment and wider symbolic attitudes and rituals. In fact, a seemingly small detail can have a powerful impact on the understanding of past practices. Neolithic Levantine burial practices were especially variable and complex. The case of Jericho analyzed above points towards dismemberment before burial, most probably associated with cranium retrieval before burial. It echoes pre-burial treatment as discovered in a later phase of the Neolithic in Central Anatolia and suggests that graves data in the Northern Levant should also be re-examined. Certainly these cases are not part of the funerary norms: post-burial removal is without doubt the most frequent case in the Neolithic Levantine context. Nevertheless, other possible ways of acquisition should not be excluded *de facto*. The systematic over-representation of isolated crania *versus* acephalous skeletons is another reason for vigilance. More generally speaking, we must admit that, despite an effort made from a theoretical point of view (*e.g.*, Kuijt 2000 and 2008a and b), anthropological studies of Neolithic skull treatment (dominated by plastered skull analyses), are rarely integrated in a *chaînes opératoires* approach (but see Croucher 2006; Fletcher *et al.* 2008; Santana *et al.* 2012; Kodas 2014). Skulls have been the object of studies in themselves.

Sequential steps of handling, duration, symbolic and technical gestures, as more dynamic data, are often ignored. While often relegated to additional arguments, the complete skeletons and the acephalous skeletons are major elements in the understanding of the treatment of skulls in this period. Comparing the inventories and the biological identities of these two different corpuses, re-evaluating the archaeological and funerary contexts, and ensuring that we do not obscure the potential stages preceding the ultimate burial: all of these are indicators that may enable us to understand how the process was organized in time. In the field, specific attention to the neck area with documentation of the presence/absence of mandible, hyoid bone, cervical vertebrae and isolated teeth, and observed disturbances (accompanied by pictures), are indispensable. Listing all graves in preliminary reports will enable significant progress in site and regional comparisons and better define the components of a funerary system that currently appears disjointed. Understanding the variability in the treatment of the deceased and the evolution of the status of their remains before they were ultimately interred is of major importance. The complexity of Pre-Pottery Neolithic burial customs is indeed testimony to the leading role given to the dead and, consequently to ancestors, in supporting the Neolithization process and societal transformation.

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Fanny BOCQUENTIN
Ergul KODAS
CNRS, UMR 7041
Maison Archéologie et Ethnologie
René Ginouvès – 21 Allée de l'Université
92023 Nanterre Cedex – FRANCE
fanny.bocquentin@cnrs.fr
ergulkodas@gmail.com

Anabel ORTIZ
SGR SAPPO. Prehistory Department
Facultat de Filosofia i Lletres – Edifici B
Universitat Autònoma de Barcelona
08193 Bellaterra, Barcelona – SPAIN
inhija@hotmail.com

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