KOM EL-DIKKA 2014: HUMAN BONES FROM AREA U

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Abstract: Archaeological excavations of the medieval Islamic burial ground in the northern part of area U on the Kom el-Dikka site in Egyptian Alexandria, carried out from 2012 to 2014, yielded a total of 98 graves. Of these, 75 contained human skeletal remains. The minimum number of individuals (MNI) was 156. The article presents preliminary studies on this sample. The scope of the investigation was limited, however, owing to the poor state of preservation of the bone material.

Keywords: bioarchaeology, anthropology, medieval, Islamic, cemetery, Kom el-Dikka, Alexandria, Egypt

The archaeological site of Kom el-Dikka in Egyptian Alexandria is the location of a medieval Islamic burial ground that took over the site of a late Roman academic complex, the oldest higher education facility the ruins of which have been explored. The Polish–Egyptian archaeological mission digging the site since 1960 has also been excavating the cemetery (Promińska 1972: 16). To date, more than a thousand graves have been explored and approximately 2500 individuals have been studied from an osteological point of view.

Archaeological exploration in area U began in 1980–1981. Islamic graves uncovered at the time were for the most part disassembled to give access to earlier layers (Rodziewicz 1984: 237, 241; 1991: 75); no records exist of the skeletal material being subjected to anthropological analyses. Excavation resumed by Grzegorz Majcherek in 1990–1991 did not unearth any new graves at the time (Majcherek 1992: 7–8). A number of Islamic graves was explored methodically and documented when the excavation commenced again in the northern part of area U in 2012 (Majcherek 2015: 31; Kulicka 2015: 65–71). In the end, they were disassembled to allow exploration of subsequent layers.

The widely accepted division of the cemetery into three major chronological phases (Meyza 2000: 41–42; Promińska 1972: 46–50) dates the graves of the so-called Lower Necropolis to the 8th–9th century (Majcherek 2015: 31), the Middle Necropolis to the 9th–10th century, and the Upper Necropolis to the 11th and 12th century (Kulicka 2015: 62–63).

MATERIAL

Archaeological excavations conducted in the northern part of area U between 2012 and 2014 yielded 23 graves in the Upper Necropolis, 16 graves in the Middle Necropolis (Kulicka 2015: 65, 67) and a total of 59 inhumations in the Lower Necropolis (see above, Kulicka 2016, in this volume). In the case of 17 graves of the Upper Necropolis, five graves of the Middle Necropolis and 53 graves of the Lower Necropolis, the bones were not completely dissolved. The recovered remains were transferred to the field laboratory and were subjected to anthropological analysis.

The poor state of preservation of human remains and their extensive commingling are commonly observed on Kom el-Dikka (Mahler 2012: 55–56), but the material from area U surpassed all expectations in this respect [see ***Table 2***]. The bones were so seriously fragmented and so badly eroded that in many cases researchers were faced with a pile of small pieces of bones [***Fig. 1***]; this could be compared to working with bones collected from a pyre rather than a regular skeletal burial. Not a single skull from the 156 individual burials was recovered in any condition allowing key measurements of the vault or facial part to be taken. The pieces that were recovered did not support a potential reconstruction of any of the skulls.

METHODS

The bones were cleaned mechanically of soil residue in the field laboratory and all save for the skulls were reconstructed with an alcohol-soluble adhesive. Anthropological data collection procedures were modified to fit the abundance of the material and the time constraints imposed by the study conditions on site. The very laborious

Fig. 1. Bones from one of the better preserved graves of the Lower Necropolis (U 315) before analysis (Photo R. Mahler, PCMA archives)

assessment procedure for postcranial skeleton preservation was reduced to a five-level scale (from 0 to 4), where 0 stands for no postcranial bones present, 1 for less than one third present, 2 between one third and two thirds present, 3 more than two thirds present, and finally 4, more or less all bones (more than 90%) present [see ***Table 4***]. This method proved to be very time-efficient. For reasons of poor preservation, skull analysis was reduced to a minimum. Cranial fragments were used to estimate age-at-death and sex of the individuals and were examined carefully in search of pathological conditions. Upon completion of the assessment, all cranial fragments were labeled and stored in on-site storage in expectation of more elaborate approaches being feasible in the future.

A Minimum Number of Individuals (MNI) buried was determined for every grave that contained bones (White 2000: 291–292). The resulting MNI for the whole sample is a simple sum of MNIs determined for every identified discrete assemblage.

Sex determination for adults was performed using a set of morphological methods (Buikstra and Ubelaker 1994; Piontek 1996; White 2000). These methods were successful with regard to individuals at puberty only in relatively obvious cases; the typically female features of the skull and typically male features of pelvis should not be taken into account (Buikstra and Ubelaker 1994: 16). Sex determination of younger individuals, due to the unreliability of the methods available, was not attempted at all.

Age-at-death was assessed using a range of standardized macroscopic methods. Adult age-at-death estimation was based on the degree of obliteration of cranial sutures (Buikstra and Ubelaker 1994: 34–35) with composite scoring by Meindl and Lovejoy (1985) (compilation by White 2000: 348). Dental age, based on attrition, was determined using tables by C.O. Lovejoy (1985: 49–50). When possible, symphyseal face changes of the pubic symphysis were taken into account as described by Todd (1920; using pictures by Folkens, see White 2000: 352–253) and revised by Suchey with Brooks (Brooks and Suchey 1990) with drawings by P. Walker (Buikstra and Ubelaker 1994: 23–24) (compilation by White 2000: 356–357). Also changes of auricular surfaces of the ilium by Lovejoy et al. (1985) were scored (using pictures by Folkens, see White 2000: 358–359). As a hint to age-at-death in general, but not as an actual determinant, the overall bone morphology (overall picture of degenerative changes etc.) was noted.

Age-at-death of non-adult individuals was determined, when possible, on the basis of teeth eruption stages according to the tables compiled by D.H. Ubelaker (1978: 47) for American Indians, and when this was not possible (teeth sockets not available), on measurements of long bone shafts employing the tables assembled by M. Schaefer with S. Black and L. Scheuer (2009). In cases where further clarification was needed, the results obtained were supplemented with data on development and ossification of bones (Schaefer, Black and Scheuer 2009). In case of juveniles and young adults the age-at--death determination was based mainly on the degree of epiphyseal fusion (Piontek 1996: 148).

Overall morphology and pathological changes of the bones were presented as objectively as possible, as called for by

Ch. Roberts and K. Manchester (2005: 7, 9), keeping in mind a verifiable diagnosis (Ortner 2003: 112; Waldron 2009: 2–7). Hoping for a general picture of the population, particular attention was given to pathological conditions commonly observed on bones: degenerative changes of joints (Buikstra and Ubelaker 1994; Rogers and Waldron 1995) and porosities with cribra orbitalia in the first place (Steckel et al. 2006: 12–13).[1]

Measurements of the long bones were taken in millimeters according to R. Martin and K. Saller (1959).[2] Here only the lengths of the long bones will be reported [*Table 4*] as useful in reconstructing the intravital (body?) height.

Statures of the individuals under study were calculated using regression equations by M.H. Raxter et al. (2008). These are based on the intravital (body?) height reconstructed using the revised Fully technique (Raxter, Auerbach, and Ruff 2006; Raxter, Ruff, and Auerbach 2007) for a series of ancient Egyptian skeletons.[3] The choice of this particular method was based on an educated guess only, taking into consideration the recent date of the solution and the relative geographical closeness of the samples. To date, studies of the skeletal samples from Kom el-Dikka have employed three different regression formulae: L. Manouvrier (1892), K. Pearson (1899), and M. Trotter and G.C. Gleser (1952; 1958). As raised in a relatively recent study of the material from Kom el-Dikka (Mahler 2012: 55), choosing a particular stature reconstruction method for a more comprehensive study of the cemeteries from this site requires further study.[4] If the special status of Alexandria is taken into account, the medieval inhabitants of this city, biologically, could have had more in common with populations of other Mediterranean towns than with Egyptians of the Old Kingdom living to the south. As raised by M. Giannecchini and J. Moggi-Cecchi (2008) for pre-modern samples from Italy, the most consistent results were obtained when Pearson's regression formulae were employed (1899). It must be stressed, however, that the method employed for the purpose of the reported study, as well as a more recent one developed by Ruff (Ruff et al. 2012) for Europe, were not taken into account in that investigation.

The widely accepted and long used division of the Islamic cemeteries under study into three subsequent phases of the Upper, Middle and Lower Necropoleis (described above) will presumably undergo revision as a result of the present excavation results. It is applied here to ensure consistency with the research published previously.

1 Left and right eye orbits were scored separately.

2 For a short list of measurements with references to the most popular handbooks, see Brickley and McKinley 2004: 30. One has to be particularly careful, however, when using this list as the descriptions of tibia length measurements given there are labeled erroneously.

3 Most of the skeletons in the sample came from Giza and were dated to the Old Kingdom (89% of males and the same share among females), while only 3% of men were of Roman date from Luxor.

4 Significant progress has been made, in methodology as well as fieldwork since the 1980s when a study of the stature of the inhabitants of Alexandria, based mainly on data from Kom el-Dikka, was published (Promińska 1985). To address this, a comprehensive study comprising stature analysis of the population buried in the medieval cemeteries on Kom el-Dikka is being prepared.

RESULTS

The MNI established for the skeletal assemblage recovered from area U was 156 individuals, of which 77 were buried in the Lower, 70 in the Upper, and only 9 in the Middle Necropolis.

SEX

The sample comprised 36 male and 38 female individuals [see ***Table 1, Fig. 2***], adolescents included. Altogether they constituted almost half of the total studied (47.4%). In 82 cases (52.6%), the sex of the individuals could not be determined.

Sex of individuals under the age of puberty cannot be determined by macroscopic examination of the bones. Thus, children are the most numerous group of the indeterminates. At 45 individuals, it constituted 54.9% of all cases of undetermined sex and 28.8% of all burials. Reliable determination of the sex of the deceased, being of the age allowing for such determination to be undertaken, was not possible in 37 cases, making for almost one fourth of the assemblage (23.7%).

The sex ratio for the Upper Necropolis is quite close (nearly 50/50 percent) to being equal for both sexes as is to be expected for human populations (Bagnall and Frier 1994: 95). The Lower Necropolis is slightly different in this respect as females outnumber males by 5% [see ***Table 1, Fig. 2***], which may point to cultural factors at play. Namely, that men could have been

Table 1. Sex of the individuals buried in area U

		F	M	Ch	?	Σ
Upper Necropolis	n	18	17	18	17	70
	(%)	(25.7)	(24.3)	(25.7)	(24.3)	(44.9)
Middle Necropolis	n	1	3	3	2	9
	(%)	(11.1)	(33.3)	(33.3)	(22.2)	(5.8)
Lower Necropolis	n	19	16	24	18	77
	(%)	(24.7)	(20.8)	(31.2)	(23.4)	(49.4)
Σ	n	38	36	45	37	156
		(24.4)	(23.1)	(28.8)	(23.7)	(100.0)

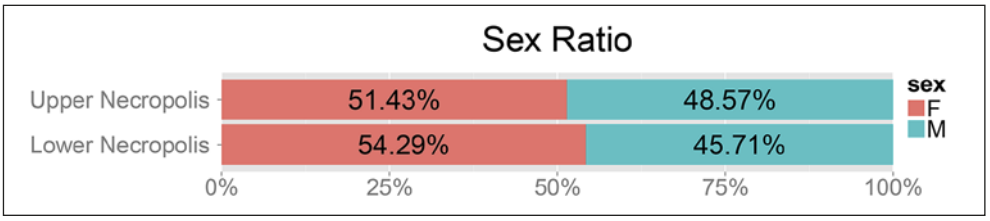

Fig. 2. Sex ratio of the individuals buried in area U (the Middle Necropolis was excluded from the diagram due to the small number of burials attributed to the phase)

buried away from home or, more often than not, that they were buried at another cemetery nearby, or that there were spatial differences dividing the cemetery into areas with different sex and age preferences.

Taphonomic factors, as shown by P.L. Walker, J.R. Johnson and P.M. Lambert (1988), need not have played a part. It is also possible that the bias is the result of the higher mortality of younger males which may have increased beyond the norm for infants and young children. The most plausible explanation, however, especially in the light of a recent new understanding of the cemetery chronology, gives credit for this to the flawed division of the necropolis on Kom el-Dikka into three phases. If the Middle Necropolis and Lower Necropolis phases are to be seen as one, the 5% difference simply disappears.

The sex of individuals in the different age categories is presented in ***Table 2***. Raw

Table 2. Age-at-death of individuals of determined sex. The number of females was multiplied by the coefficient of the women-to-men proportions calculated as 0.94 for the Upper Necropolis and 0.84 for the Lower Necropolis (the Middle Necropolis was excluded due to the small number of individuals distinguished)

		14–20 yrs		20–35 yrs		35–55 yrs		55+ yrs	
		F	M	F	M	F	M	F	M
Upper Necropolis	n	0.00	1.00	6.78	7.74	7.57	6.61	2.58	1.65
	(%)	(0.0)	(100.0)	(46.7)	(53.3)	(53.4)	(46.6)	(61.0)	(39.0)
Lower Necropolis	n	4.49	0.70	5.03	9.25	5.71	5.42	0.73	0.33
	(%)	(86.5)	(13.5)	(35.2)	(64.8)	(51.3)	(48.7)	(68.9)	(31.1)

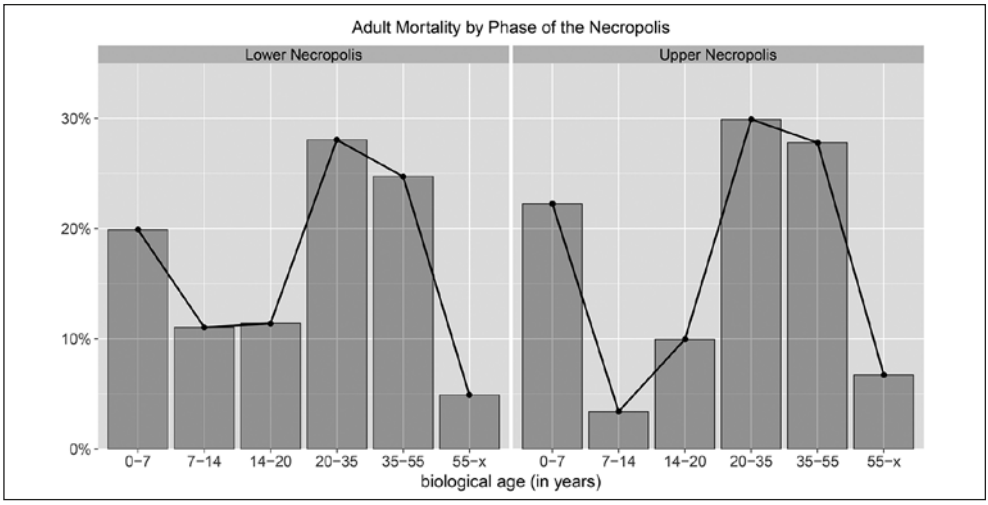

Fig. 3. Mortality for all sexes by necropolis phase (the Middle Necropolis was excluded from the diagram due to the small number of burials attributed to the phase)

counts of female individuals were multiplied by 0.94 for the Upper Necropolis and 0.84 for the Lower Necropolis to compensate for the sex ratio bias for each phase separately. In case of the Lower Necropolis, women were more numerous than men in every age group except the young adults (20–35 years of age). A similar situation was observed in the case of the Upper Necropolis except for adolescents (14–20 years of age). The small size of this group, however, might be the reason behind this unexpected result. The sex ratio in favor of women for both phases is especially pronounced in the group of 55 and more years of age, and in the case of the Lower Necropolis among adolescents. The distribution is very different from observations made in the earlier analysis (Mahler 2012: 53); therefore, the relatively small size of the sample and the exceptionally poor state of the bones in this sample might have played a crucial role in this discrepancy.

AGE AT DEATH

The mortality for both the Upper and Lower Necropoleis is very much alike [see ***Fig. 3***], especially if only adults are taken into account. The highest mortality rate

Table 3. Age-at-death of individuals buried in area U

		0–7 yrs	7–14 yrs	14–20 yrs				20–35 yrs			
				F	M	?	Σ	F	M	?	Σ
Upper Necropolis	n	15.57	2.37	0.00	1.00	5.96	6.96	7.21	7.74	5.98	20.93
	(%)	(22.2)	(3.4)	(0.0)	(14.4)	(85.6)	(9.9)	(34.4)	(37,0)	(28.6)	(29.9)
Middle Necropolis	n	1.47	1.53	0.00	0.00	0.00	0.00	0.00	1.67	0.50	2.17
	(%)	(16.3)	(17.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(77.0)	(23.0)	(24.1)
Lower Necropolis	n	15.32	8.50	5.34	0.70	2.73	8.77	5.99	9.25	6.36	21.60
	(%)	(19.9)	(11.0)	(60.9)	(8.0)	(31.1)	(11.4)	(27.7)	(42.8)	(29.4)	(28.1)
Σ	n	32.36	12.4	5.34	1.7	8.69	15.73	13.2	18.66	12.84	44.7
		(20.7)	(7.9)	(0.0)	(0.0)	(0.0)	(10.1)	(29.5)	(41.7)	(28.7)	(28.7)

		35–55 yrs				55+ yrs				Sum
		F	M	?	Σ	F	M	?	Σ	
Upper Necropolis	n	8.05	6.61	4.80	19.46	2.74	1.65	0.31	4.70	70
	(%)	(41.4)	(34.0)	(24.7)	(27.8)	(58.3)	(35.1)	(6.6)	(6.7)	(100)
Middle Necropolis	n	1.00	1.33	0.70	3.03	0.00	0.00	0.80	0.80	9
	(%)	(33.0)	(43.9)	(23.1)	(33.7)	(0.0)	(0.0)	(100.0)	(8.9)	(100)
Lower Necropolis	n	6.80	5.42	6.82	19.04	0.87	0.33	2.57	3.77	77
	(%)	(35.7)	(28.5)	(35.8)	(24.7)	(23.1)	(8.8)	(68.2)	(4.9)	(100)
Σ	n	15.85	13.36	12.32	41.53	3.61	1.98	3.68	9.27	156
		(38.2)	(32.2)	(29.7)	(26.6)	(38.9)	(21.4)	(39.7)	(5.9)	(100)

was noted among young adults (20–35 years old). It is slightly lower for middle-aged individuals, and only a small number of them would live to a more advanced age. Mortality of children for the Upper and Lower Necropoleis is not the same. A major difference is evident in the 7–14 years group [see ***Fig. 3***], in case of which mortality decreases considerably over time. Human bones from the graves of the Upper Necropolis were, in general, much better preserved than the bones excavated in earlier layers. Taking into consideration the relatively poor survivability rate of fragile bones of young children, in comparison to adult skeletons (Walker, Johnson, and Lambert 1988: 187), the share of infants distinguished in the assemblage from the Upper Necropolis should be higher, assuming the same mortality rates for both phases. Therefore, a slight increase in the share of the youngest group and an apparent drop in the mortality of individuals of 7 through 14 years of age may be cautiously interpreted as an overall improvement in the well-being of the population or, which might be more significant in this case, improved child status within the family. It must be stressed, however, that the 7–14 age group is not numerous, so all inferences based on it should be treated with reserve.

Overall mortality may be blurred by the counting procedure involving fractional values when the age-at-death determination range extended to more than one age category [see ***Table 3***].[5] It clearly shows, however, the relatively high mortality in early adulthood, which resembles the situation known from other areas of the cemetery (Mahler 2007: 43; 2012: 53). A similar state is also reflected in most other studies of pre-modern populations from all over the world. It forms a well known "population pyramid" (Chamberlain 2006: 16) with its wide basis of fragile bones of children often heavily reduced by diagenesis. Surprisingly, earlier studies from Kom el-Dikka showed the highest share of senile (55+ years of age) individuals (Promińska 1972: 90) in the sample.

The high share of children and juveniles among the inhumed is surprising considering the poor state of the bones. Fragile and only partially ossified bones of the young (before puberty) should be the first to give in to diagenesis. In area U, their remains constitute 28.6% of all the individuals buried there, compared to 22.1% (Mahler 2012: 52) and 13.8% (Mahler 2007: 42) in earlier studies. The observed differences may be due to exploration techniques more careful than was the case before. However, further research on the topic including archaeological data should be undertaken to support the statement.

Child mortality for the times studied is assumed to have been around 50% (Parkin 2013: 49–50). Such high mortality of infants and children in the past resulted from a wide variety of interdependent factors (Lewis 2007: 84). The most important ones were infectious diseases, the high incidence of which resulted from a general lack of hygiene. The immature immune systems of children were attacked with fatal effects; especially in urban circumstances, where higher population density must have been conducive to spreading pathogens (Vögele 1994: 401).

[5] The six age-at-death categories employed reflect the ontogenetic pattern of human life (Malinowski and Bożiłow 1997: 303).

Nutrition deficiencies and weaning stress in particular must have played a part as well (Parkin 2013: 55).

Child mortality in the modern world has been reduced considerably by means of unlimited access to fresh water, vaccinations, antibiotics, balanced diet and, last but not least, public health care services. Most infant deaths in industrialized countries are now caused by endogenous, that is, maternal influence during pregnancy and genetic factors (Lewis 2007: 84).

STATURE

A highly ecosensitive trait, stature is commonly used as a simple measure of wellbeing of a particular (Steckel and Rose 2002: 19–22). In case of the sample under study, reconstruction of stature based on linear regression by Raxter et al. (2008) was possible for 13 individuals only [see ***Table 4***].

The mean intravital body height for men from the Upper Necropolis in area U was 166 cm (n=5) and for women 153 cm (n=5). Both mean values are very similar to the results obtained in a recent study (Mahler 2012: 54): 166 (n=48) for men and 154 (n=49) for women, being at the same time considerably different from the results obtained by E. Promińska (1985: 210): 171 (n=171) for men and 161 (n=182) for women. Such comparisons, however, need to be treated with caution as different authors use different methods of stature reconstruction. The results for the Lower Necropolis were too few to make a comparison of the mean values feasible; it was 166 cm (n=1) for men and 152 cm (n=2) for women respectively. In case of the Middle Necropolis, not one stature estimation could be produced for the study assemblage.

It is impossible to draw any meaningful inferences about the wellbeing of the population from such a small number of stature estimations (five for males and five for females from the Upper Necropolis). These results, however, can contribute to the site-wide database, which in turn will add to the overall picture of the population burying their dead on Kom el-Dikka.

PATHOLOGY

The most common pathological condition observed in the sample were slight degenerative changes of the joints (Grade 2 according to *The Global History of Health Project. Data Collection Codebook*, see Steckel et al. 2006: 32). There were also more extensive degenerative changes (Grade 3) observed and a case of a healed hand trauma.

The only pathological condition recorded that could reflect environmental stress in general or genetic burden of the population under study had the state of preservation been better is cribra orbitalia (Smith-Guzmán 2015: 11; Walker et al. 2009: 119). It could be scored only in the case of 41 individuals. Eleven of these (26.8%) suffered from a light form of lesion, whereas more pronounced anaemia-induced changes were observed in three (7.3%) skulls, all three being recovered from the Middle Necropolis. They constituted the only cases in which the assessment was possible for the skeletons from this phase. Cribra orbitalia was recorded in 4 (25%) out of 16 individuals recovered from the Upper Necropolis with at least one eye orbit preserved, and in 7 (31.8%) out of 22 individuals from the Lower Necropolis with at least one eye orbit preserved.

*Table 4. Assessments and measurements of individuals in the area U sample. Measurements of long bones were taken with maximum length in mind – number 1, according to R. Martin and K. Saller (1959). The only exception to this rule is the tibia, in which case the so-called complete length is given – number 1, according to R. Martin and K. Saller (1959: 572). The SEE column contains equation-specific standard error of the estimate of the stature estimation method (Raxter et al. 2008: 150). Measurement error is marked with asterisks: * indicating low uncertainty of the determination or measurement, ** moderate uncertainty (acceptable for most purposes) and *** calling for treating the results with reserve.*

grave	ind.	preservation	sex	age	cribra orbitalia		humerus		radius		ulna		femur		tibia		fibula		height	SEE
					d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.		
UPPER NECROPOLIS																				
U105	1	less than 1/3	F	40–50	1*	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	less than 1/3	M***	40–55	1*	1***	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	less than 1/3	?	16–21	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	4	less than 1/3	?	20–55	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	5	less than 1/3	?	0–2	1**	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U106	1	more than 2/3	F**	35–45	1	0	–	281	216	–	–	233	386*	–	–	–	–	–	151	2.732
	2	less than 1/3	?	25–45	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	1/3–2/3	M	20–25	0	0	–	–	–	–	–	–	434*	–	–	–	–	–	162*	3.218
	4	1/3–2/3	F	20–25	1	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	5	less than 1/3	?	0.5–1.5	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U109	1	1/3–2/3	F	21–22	0	0	–	–	219	–	–	–	–	–	–	–	–	–	152	4.057
	2	less than 1/3	M	17–20	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Table 4. Continued

grave	ind.	preservation	sex	age	cribra orbitalia		humerus		radius		ulna		femur		tibia		fibula		height	SEE
					d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.		
U109	3	less than 1/3	M**	24–35	0	0	–	–	–	251	–	–	–	–	–	–	–	–	167	3.731
	4	less than 1/3	F***	30–40	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	5	less than 1/3	?	1–3	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	6	less than 1/3	?	20–55	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	7	less than 1/3	?	12–20	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	8	less than 1/3	?	20–35	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U110	1	less than 1/3	M**	24–30	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U113	1	more than 2/3	M***	30–55	0	0	–	–	–	–	–	–	–	441*	339*	–	–	–	163*	3.218
	2	1/3–2/3	M***	30–60	0	0	–	350	–	–	–	–	–	–	–	–	–	–	175	4.218
	3	1/3–2/3	?	35–55	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	4	less than 1/3	?	20–50	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	5	less than 1/3	F***	20–25	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	6	less than 1/3	F***	35+	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	7	less than 1/3	F***	35+	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	8	less than 1/3	?	1–5	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U115	1	less than 1/3	M	40–50	1*	1*	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Table 4. Continued

grave	ind.	preservation	sex	age	cribra orbitalia		humerus		radius		ulna		femur		tibia		fibula		height	SEE
					d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.		
U115	2	less than 1/3	?	1–1.5	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	less than 1/3	?	15–16	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U116	1	less than 1/3	F*	35–40	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	less than 1/3	?	20–50	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	less than 1/3	?	12–20	1	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	4	less than 1/3	?	0–2	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U117	1	1/3–2/3	F***	20–35	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	less than 1/3	M***	20–40	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	less than 1/3	?	1–3	1	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	4	less than 1/3	?	7–14	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U118	1	1/3–2/3	F**	40–50	0	0	–	–	222	–	242	–	–	–	–	–	333	-	152	4.057
	2	1/3–2/3	?	16–19	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	less than 1/3	?	7–20	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	4	less than 1/3	?	30–70	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U120	1	1/3–2/3	M	45–60	0	1***	–	–	–	–	–	–	–	–	–	–	333	–	–	–
	2	1/3–2/3	M***	45+	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Table 4. Continued

grave	ind.	preservation	sex	age	cribra orbitalia		humerus		radius		ulna		femur		tibia		fibula		height	SEE
					d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.		
U120	3	less than 1/3	M***	20–22	3***	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	4	less than 1/3	?	1–3	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U121	1	more than 2/3	F	25–35	1	1	301	297	–	–	–	–	–	–	–	–	–	–	155	2.732
	2	less than 1/3	F***	40+	0	0	–	–	–	–	236**	–	–	–	–	–	–	–	–	–
	3	less than 1/3	M***	40+	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	4	less than 1/3	?	20–55	0	0	300	–	–	–	–	–	–	–	–	–	–	–	–	–
U123	1	more than 2/3	F	20–50	1	2***	295	–	224	–	248**	245	405	409	336*	340	–	–	154	1.893
	2	more than 2/3	M	25–30	0	0	–	–	–	–	–	–	440	350	361*	363	337	355	163	3.06
	3	less than 1/3	?	14–20	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	4	less than 1/3	?	"perinatal" (±4 weeks)	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	5	less than 1/3	?	fetus 34–38 weeks	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	6	less than 1/3	?	2–5	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	7	less than 1/3	?	perinatal	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U125	1	1/3–2/3	F***	20–50	1***	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	less than 1/3	M***	25–50	1**	1**	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Table 4. Continued

grave	ind.	preservation	sex	age	cribra orbitalia		humerus		radius		ulna		femur		tibia		fibula		height	SEE
					d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.		
U126	1	1/3–2/3	F***	20–55	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	less than 1/3	?	20–55	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	less than 1/3	?	perinatal	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	4	less than 1/3	?	3–10	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U128	1	less than 1/3	F***	35+	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	1/3–2/3	M	40–45	0	0	–	–	–	–	–	275**	–	–	–	–	–	–	–	–
	3	less than 1/3	?	2–3	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U130	1	1/3–2/3	F	45+	2	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U130	2	less than 1/3	?	20–25	1*	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	less than 1/3	?	0–2	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U192	1	less than 1/3	M*	20–24	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
MIDDLE NECROPOLIS																				
U213	1	1/3–2/3	F**	40–50	2	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	less than 1/3	?	1–7	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U214	1	less than 1/3	M	24–30	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U216	1	less than 1/3	M**	45–55	2	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Table 4. Continued

grave	ind.	preservation	sex	age	cribra orbitalia		humerus		radius		ulna		femur		tibia		fibula		height	SEE
					d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.		
U217	1	less than 1/3	?	6–10	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U218	1	less than 1/3	M*	20–45	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	less than 1/3	?	50+	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	no postcranial	?	5–14	0	2***	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	4	less than 1/3	?	20–55	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
LOWER NECROPOLIS																				
U300	1	less than 1/3	F***	25–35	3**	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U301	1	1/3–2/3	M*	20–55	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U302	1	less than 1/3	?	20–60	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	less than 1/3	?	3.5–6.5	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U305	1	less than 1/3	M***	20–55	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	1/3–2/3	?	6–10	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U306	1	less than 1/3	?	9.5–14.5	0	2***	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	less than 1/3	M***	30–40	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U307	1	less than 1/3	?	adult	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Table 4. Continued

grave	ind.	preservation	sex	age	cribra orbitalia		humerus		radius		ulna		femur		tibia		fibula		height	SEE
					d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.		
U309	1	1/3–2/3	M**	12–18	3	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U311	1	less than 1/3	M**	24–40	1***	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U312	1	1/3–2/3	F**	18–23	1***	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U315	1	less than 1/3	?	35+	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	less than 1/3	?	20–45	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	less than 1/3	M	25–55	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	4	less than 1/3	?	0–7	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U316	1	1/3–2/3	F	40+	0	1***	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U317	1	less than 1/3	F	35–45	1	1**	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	less than 1/3	M**	25–40	0	1***	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	less than 1/3	F***	14–19	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	4	less than 1/3	?	1–3	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U318	1	less than 1/3	F**	35–60	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U319	1	less than 1/3	F***	35–45	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	less than 1/3	?	14–19	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Table 4. Continued

grave	ind.	preservation	sex	age	cribra orbitalia		humerus		radius		ulna		femur		tibia		fibula		height	SEE
					d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.		
U321	1	less than 1/3	?	20–50	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U322	1	less than 1/3	M**	25–50	0	1**	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U325	1	1/3–2/3	?	4–8	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U326	1	more than 2/3	M	25–30	2*	2*	–	–	–	247	–	270	–	456*	–	–	–	–	166	3,731
U327	1	more than 2/3	?	1–2	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U328	1	less than 1/3	?	35+	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	1/3–2/3	?	2–4	1***	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U329	1	more than 2/3	?	perinatal	0	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U330	1	1/3–2/3	M***	20–35	2**	2***	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U331	1	more than 2/3	?	4–8	1	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U332	1	less than 1/3	F*	30–40	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U333	1	less than 1/3	F***	30–40	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U334	1	less than 1/3	?	1.5–3	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	complete	?	1.5–3	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	1/3–2/3	?	7–10	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	4	less than 1/3	?	7–14	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Table 4. Continued

grave	ind.	preservation	sex	age	cribra orbitalia		humerus		radius		ulna		femur		tibia		fibula		height	SEE
					d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.		
U334	5	less than 1/3	?	adult	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U335	1	less than 1/3	M	40–55	0	1*	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U337	1	1/3–2/3	?	9.5–14.5	1***	1***	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	less than 1/3	?	35+	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U341	1	1/3–2/3	?	0–0.5	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U342	1	more than 2/3	F	25–30	1	1*	294	–	222	–	243	234**	–	–	–	–	–	–	154	2.732
U343	1	less than 1/3	?	9–11	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U344	1	less than 1/3	F***	18–22	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	less than 1/3	?	0–0.5	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U349	1	less than 1/3	F	18–20	1*	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	less than 1/3	M***	adult	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U350	1	less than 1/3	F	16–20	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U352	1	more than 2/3	?	3–6	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	less than 1/3	F***	35–55	1**	1***	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Table 4. Continued

grave	ind.	preservation	sex	age	cribra orbitalia		humerus		radius		ulna		femur		tibia		fibula		height	SEE
					d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.		
U353	1	less than 1/3	F***	30–60	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	less than 1/3	?	7–16	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U354	1	less than 1/3	?	14.5–15.5	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U355	1	less than 1/3	?	20–60	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	1/3–2/3	?	1–2	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U357	1	less than 1/3	M**	25–35	2**	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U358	1	less than 1/3	?	18–35	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U359	1	less than 1/3	M***	20–55	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U360	1	less than 1/3	M	30–35	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U363	1	less than 1/3	?	30–60	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U364	1	less than 1/3	F	18–20	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U367	1	less than 1/3	?	20–35	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	less than 1/3	?	2–5	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U368	1	less than 1/3	?	25–55	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Table 4. Continued

grave	ind.	preservation	sex	age	cribra orbitalia		humerus		radius		ulna		femur		tibia		fibula		height	SEE
					d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.		
U369	1	less than 1/3	F	20–40	0	0	-	-	210	–	–	–	–	–	–	–	–	–	149	4.057
U370	1	less than 1/3	?	25–40	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U371	1	less than 1/3	M***	20–55	0	1***	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U372	1	less than 1/3	F***	20–55	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U373	1	less than 1/3	F***	20–45	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U374	1	less than 1/3	?	7.5–12.5	2**	2**	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	less than 1/3	?	20–60	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
U635	1	less than 1/3	?	40–55	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	no postcranial	?	3–10	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–

CLOSING REMARKS

The current assemblage of 156 individuals from area U appears sufficient to support a bioarchaeological study, but the highly fragmented and deteriorated state of the collection has made it difficult to reach any meaningful conclusions. Many of the assessments and measurements are burdened with serious error, hence their limited value. Yet they constitute a noteworthy addition to a combined repository of data collected from Kom el-Dikka by three generations of researchers. In the next stage of this study, the data from area U will be combined with existing archaeological data from other areas explored to date in order to produce a more comprehensive profile of the population using the site as their burial ground.

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