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Short fieldwork report

Human remains from Djedkare's pyramid complex, Saqqara, Egypt, 2018–2019

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The Djedkare's royal cemetery, known also as El-Shawaf El-Qbly, is located in south Saqqara, adjacent to the pyramid complex of king Djedkare of the late Fifth Dynasty. The cemetery dates to the Old Kingdom, c. 2414–2375 BCE, and is located approximately 24km south of Giza, Egypt (29°51′05″N, 31°13′18″E). Part of the king's pyramid complex was excavated between 1945 and 1946 by Alexandre Varille and Abdel Salam Hussein (Verner 2001:410) and in 1952 by Ahmed Fakhry; during these excavations a number of human skeletal remains were found inside and outside of the pyramid of Djedkare (Batrawi 1947). After minor excavations in the 1980s (for the history of the exploration of the cemetery see Megahed 2016:66-70), the Egyptian archaeological mission headed by Mohamed Megahed began to explore Djedkare's pyramid complex in 2009, first concentrating on the previously excavated areas. In 2018 and 2019, however, their efforts focused on a previously unexcavated part of the monument, namely, the northern part of the king's funerary precinct and the southern part of his wife Setibhor's precinct (Megahed 2011a, 2011b, 2014, 2016; Megahed & Jánosi 2017; Megahed et al. 2017; 2018; 2019; Vymazalová & Hashesh 2019).

In the so-called area T.g. (Megahed et al. 2019:19-34), south of the queen's pyramid, many human skeletons were found interred in a cemetery that attests to later burial activities in the royal pyramid complex. The burials show east-west and north-south orientation, with their heads to the east, west, north, or south (**Figure 1**) (Megahed et al. 2019:19-22,24). Several individuals were buried in a supine position and were well preserved, although some were incomplete, likely due to continuous activities on the site in antiquity (Megahed et al. 2019:33-34). There was also some variability in the artifacts associated with the dead, with only juveniles and females buried with a variety of grave goods, which has been interpreted as a sign of fertility and protection (Vymazalová & Hashesh 2019). Based on the archaeological context, the burials were dated from the Late Second Intermediate Period, probably to the 1st millennium BCE (Megahed et al. 2019; Vymazalová & Hashesh 2019) (**Table 1**).

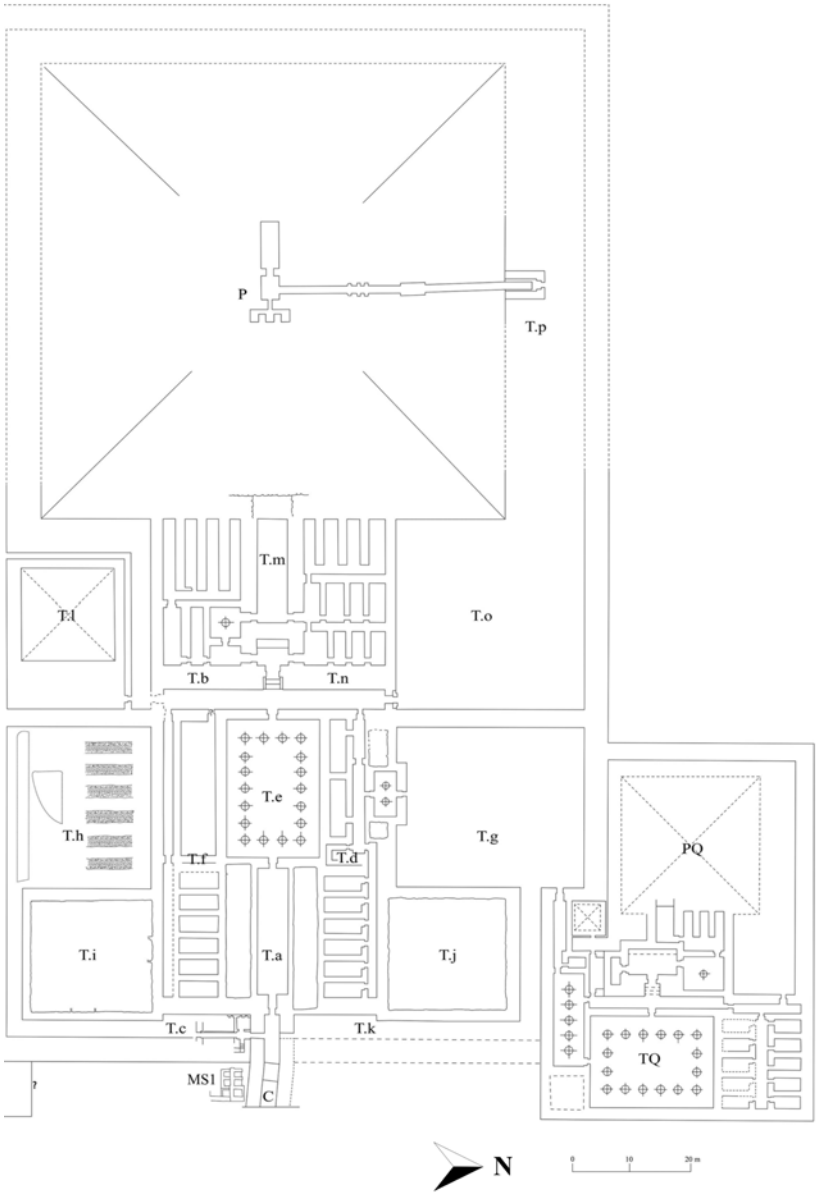

Figure 1. Plan of Djedkare's pyramid complex with area T.g in the north (after Maragioglio & Rinaldi 1977; drawing by Mohamed Megahed).

Table 1. Summary of human remains from area T.g of Djedkare's pyramid complex.

Excavation No.	Skeleton	Burial	Sex	Age-at-death
DJ-F45-2018	1	primary	unknown	young child
DJ-F54-2018	2	primary	unknown	young child
DJ-F67-2018	3	primary	unknown	older child
DJ-F75-2018	4	primary	female	middle adult
DJ-F76-2018	5	primary	unknown	older child
DJ-F123-2018	6	primary	unknown	young child
DJ-F124-2018	7	primary	female	adolescent
DJ-F124-2018	8	secondary	female	young adult
DJ-F129-2018	9	primary	unknown	older child
DJ-F127-2018	10	primary	unknown	infant
DJ-F128-2018	11	primary	unknown	infant
DJ-F131-2018	12	primary	female	middle adult
DJ-F131-2018	13	secondary	unknown	adult
DJ-F139-2018	14	primary	female	young adult
DJ-F139-2018	15	secondary	unknown	adult
DJ-F139-2018	16	primary	unknown	older child
DJ-F139-2018	17	primary	female	adolescent
DJ-F143-2018	18	primary	unknown	infant
DJ-F139-2018	19	secondary	unknown	older child
DJ-F139-2018	20	secondary	unknown	adolescent
DJ-F149-2018	21	primary	female?	adolescent
DJ-F189-2018	22	primary	unknown	older child
DJ-F189-2018	23	secondary	unknown	young child
DJ-F190-2018	24	primary	male	adolescent
DJ-F195-2018	25	primary	unknown	infant
DJ-F197-2018	26	primary	unknown	young child
DJ-F227-2018	27	primary	unknown	young child
DJ-F263-2018	28	primary	female	young adult
DJ-F267-2018	29	primary	unknown	young child
DJ-F284-2018	30	primary	unknown	infant
DJ-F286-2018	31	primary	female	middle adult
DJ-F267-2018	32	secondary	unknown	infant
DJ-F342-2018	33	primary	unknown	infant
DJ-F342-2018	34	primary	unknown	infant
DJ-F342-2018	35	primary	unknown	infant
DJ-F40-2018	36	primary	male	young adult
DJ-F46-2018	37	primary	unknown	older child
DJ-F50-2018	38	primary	male	young adult
DJ-F50-2018	39	secondary	unknown	older child
DJ-F50-2018	40	secondary	female?	adult

Table 1. (continued)

Excavation No.	Skeleton	Burial	Sex	Age-at-death
DJ-F50-2018	41	secondary	male?	adult
DJ-F52-2018	42	primary	female	adult
DJ-F55-2018	43	primary	female	young adult
DJ-F56-2018	44	primary	female?	young adult
DJ-F58-2018	45	primary	unknown	adolescent
DJ-F60-2018	46	primary	female	middle adult
DJ-F60-2018	47	primary?	female?	adult
DJ-F62-2018	48	primary	male	young adult
DJ-F69-2018	49	primary	female	middle adult
DJ-F69-2018	50	secondary	unknown	adult
Dj-F72-2018	51	primary	unknown	older child
Dj-F73-2018	52	primary	unknown	young child
Dj-F78-2018	53	primary	unknown	young adult
Dj-F78-2018	54	primary	unknown	older child
Dj-F80-2018	55	primary	male	adult
Dj-F81-2018	56	primary	female	young adult
Dj-F81-2018	57	primary	female	middle adult
Dj-F85-2018	58	primary	male	young adult
Dj-F85-2018	59	primary	male	middle adult
Dj-F87-2018	60	primary	female?	young adult
Dj-F88-2018	61	primary	male	middle adult
Dj-F89-2018	62	primary	male	adult
Dj-F91-2018	63	primary	female	middle adult
Dj-F93-2018	64	primary	unknown	adolescent
Dj-F94-2018	65	primary	unknown	older child
Dj-F94-2018	66	secondary	unknown	adult
Dj-F266-2018	67	primary	unknown	infant
Dj-F92-2018	68	primary	unknown	older child
Dj-F95-2018	69	primary	male	young adult
Dj-F101-2018	70	primary	unknown	young child
Dj-F102-2018	71	primary	male	middle adult
Dj-F118-2018	72	primary	female?	adult
Dj-F119-2018	73	primary	female	adult
Dj-F119-2018	74	primary	unknown	infant
Dj-F121-2018	75	primary	female?	middle adult
Dj-F121-2018	76	primary	female?	adolescent
Dj-F125-2018	77	primary	male	adolescent
Dj-F121-2018	78	primary	unknown	older child
Dj-F126-2018	79	primary	female	young adult
Dj-F126-2018	80	secondary	unknown	young child

Table 1. (continued)

Excavation No.	Skeleton	Burial	Sex	Age-at-death
Dj-F130-2018	81	primary	male	young adult
Dj-F130-2018	82	primary	female	young adult
Dj-F132-2018	83	primary	unknown	young child
Dj-F136-2018	84	primary	unknown	young child
Dj-F133-2018	85	primary	unknown	young child
Dj-F133-2018	86	secondary	unknown	young child
Dj-F134-2018	87	primary	unknown	adult
Dj-F134-2018	88	primary	female	young adult
Dj-F140-2018	89	primary	female	adult
Dj-F68-2018	90	primary	male	young adult
Dj-F68-2018	91	secondary	male?	adult
Dj-F68-2018	92	primary	female	adolescent

The osteological analysis and recording system used were based on the standards presented in Buikstra and Ubelaker (1994). Any metrics that would provide an estimation of sex or stature were taken where possible (Bass 1995; Buikstra & Ubelaker 1994). Sex and age-at-death assessment were based on the pelvic or cranial dimorphic traits where preservation allowed (Buikstra & Ubelaker 1994). Age-at-death estimation for juveniles was carried out using epiphyseal fusion status (Scheuer & Black 2004) and dental development (AlQahtani et al. 2010). Adult age-at-death was assessed using the pubic symphysis and the auricular surface (Brooks & Suchey 1990; Lovejoy et al. 1985). Age group designations were derived following Baker (2005) for juveniles and Buikstra and Ubelaker (1994) for adults.

The human remains from area T.g were analyzed by visual examination and where necessary with the aid of a magnifying glass. Several disarticulated remains were found scattered at the site, and as a result a Minimum Number of Individuals (MNI) was calculated. Pathological conditions in adults were recorded based on Bruwelheide et al. (2001) as well as on the guidelines by Buikstra and Ubelaker (1994), Mann and Hunt (2005), Ortner (2003), and Waldron (2009). Degenerative joint disease was scored based on Waldron (2009). Spinal joint disease recording methods were based on Brothwell and Roberts (1997). Congenital pathological conditions were identified following Barnes (2012). Additionally, evidence of healing and healed trauma were documented according to Galloway (1999) and Sauer (1998). Fracture identification was based on Lovell (2008) and Ortner (2003), *cribra orbitalia* and porotic hyperostosis were recorded following Waldron (2009). Periosteal lesions were identified based on White et al. (2012) and Ortner (2003); subadult pathological conditions were recorded based on Lewis (1998).

Table 2. Occurrences of pathological lesions in Djedkare's pyramid complex cemetery.

No.	Joint Diseases					Dentition				Others	
	DJD[1]	Arth.[2]	Ost.[3]	SN[4]	Attr.[5]	Caries	PD[6]	EH[7]	Fr.[8]	CO[9]	SBO[10]
1						–	–	–		+	
2						–	–	–	–	–	
3						–	+	+	–	–	
4	+	–	+	–	–	–	–	+	+	–	
5											+
7					–	–	–	+	+		
8						+		+			
10						–	–	–	–	–	
12	+	+	+	+	+	–	–	–	+	–	–
14	+	+	–	+	–	+	+	–	+	–	
16					–	–	–	–	–	+	+
17					+	–	+	–	–		–
18					–	–	–	–	–	–	
19					–	–	–	–	–	–	–
21							+	+	–	+	–
22									–	–	
23									–	–	
24					+	–	+	+	–	–	+
25									–	+	
27						–	–	–	–	+	
28					+	–	–	–		–	
29									–		
30							–	+	–	–	
31	+		+	+	+	+	+	+		–	
36	–	–	–	+	–	–	–	–	–	–	
37									–		
38	–	–	+	+	+	+	–	–	–	–	–
39									–		
40	–								–		
41	–								–		
42	–	–	+	–	+	+	+	–	–		
43	–	–	+	–	–	+	–	–	–	–	
44	–	–	–	–					–		–
45	–	–							–		

[1] DJD – degenerative joint disease [2] Arth. – arthritis [3] Ost. – osteophytes
[4] SN – Schmorl's nodes [5] Attr. – attrition [6] PD – periodontal disease
[7] EH – enamel hypoplasia [8] Fr. – fractures [9] CO – *cribra orbitalia*
[10] SBO – spina bifida occulta

Table 2. (continued)

No.	Joint Diseases				Dentition				Others		
	DJD[1]	Arth.[2]	Ost.[3]	SN[4]	Attr.[5]	Caries	PD[6]	EH[7]	Fr.[8]	CO[9]	SBO[10]
46	–	–	+	–	–	+	–	+	–	–	
47	–	–	+	–					–		+
48	–	–	–	–	–	–	–	–	–	–	
49	–	+	+	–	+	–	–	+	–	–	–
50	–	–							–		
51			–	–					–		–
52			–	–	–	–	–	–	–	+	–
53	–	–	+	–					–		
54	–								–		
55	–	–							–		
56	–	–	+	+	–	+	–	–	–	–	+
57	–	+	+	+	+	–	–	–	–		–
58	–	–	–	–	+	+	–	+	–	–	+
59	+	+	+	+	+	–	–	+	+		–
60	–	–	+	+	+	–	–	–	–		–
61	–	–	–	–	–	–	–	+	+	–	–
62	–	–							–		
63	–	–							–		
64	–	–							–		
65	–	–	–	–					–		–
67	–	–	–	–	–	–	–	–	–	–	
68	–	–	–	–	–	–	–	+	–	+	–
69	+	–	+	+	–	–	–	+	–	–	–
70			–	–	–	–	–	–	–	–	–
71	+	–	+	–					–		+
72	–	–	+	–					–		–
73	–	–							–		
74									–		
75	–	–	–	–	–	–	–	–	–	–	
76	–	–	–	–	–	–	–	–	–	+	+
77	–	–	–	–	+	–	+	–	–		–
78	–	–							–		
79	–	–	–	–	–	–	–	+	–	–	–
80									–		

[1] DJD – degenerative joint disease [2] Arth. – arthritis [3] Ost. – osteophytes
[4] SN – Schmorl's nodes [5] Attr. – attrition [6] PD – periodontal disease
[7] EH – enamel hypoplasia [8] Fr. – fractures [9] CO – *cribra orbitalia*
[10] SBO – spina bifida occulta

Table 2. (continued)

No.	Joint Diseases				Dentition				Others		
	DJD[1]	Arth.[2]	Ost.[3]	SN[4]	Attr.[5]	Caries	PD[6]	EH[7]	Fr.[8]	CO[9]	SBO[10]
81	–	–							–		–
82	–	–							–		
83			–	–					–		
84					–	–	–	–	–	–	
85									–		–
86					–	–	–	–			
87					–	–	–	+	–		
88	–	–	–	–	–	+	–	+	+	–	+
89	–	–	–	–					–		
90	–	–	+		–	+	–	+	–	–	

[1] DJD – degenerative joint disease [2] Arth. – arthritis [3] Ost. – osteophytes
[4] SN – Schmorl's nodes [5] Attr. – attrition [6] PD – periodontal disease
[7] EH – enamel hypoplasia [8] Fr. – fractures [9] CO – *cribra orbitalia*
[10] SBO – spina bifida occulta

A total of 63 burial contexts comprising 92 individuals were studied during two study seasons between 2018–2019, with special focus being placed on the demographic profiles of the assemblage that is currently curated in the south Saqqara field storeroom. Basic data for 92 skeletons retrieved from the primary contexts in area T.g are presented in the **Tables 1** and **2**.

The cemetery contained individuals of both sexes and all age-at-death categories. Females were more common at the cemetery (32% of the total number of the skeletons) than males (17%) while individuals of unknown sex were most common (51%), a difference that may reflect some peculiarity in the spatial organization of the cemetery (Vymazalová & Hashesh 2019). The majority of subadults were aged between three months and twelve years (Vymazalová & Hashesh 2019), the adult individuals represent all age-at-death categories except older adults (**Table 1**): 18 individuals were young adults between 20–35 years and 11 individuals were mature adults between 35–50 years. The relatively low average age-at-death among adults suggests that the local population was relatively heavily affected by environmental stress factors (Mays 2015; Márquez-Grant 2015:315).

Subadults represent 51% of the whole assemblage (11 infants, 27 children, and 10 adolescents), with a relatively high share of the younger children presenting with evidence that they may have suffered from risks produced after weaning (Sellen 2006; Shidner 2018). Weaning in ancient populations was typically completed between the ages of 2–3 years (Bogin 1997:74); according to *Ani Instruction* weaning was un-

Figure 2. Spinal pathologies: a) cervical vertebrae (C3-C7) with osteophytes, skeleton 49; b) thoracic vertebrae (T10-T12) with Schmorl's nodes, skeleton 38.

dertaken at three years of age in Egypt (Janssen & Janssen 2007:15). Additionally, mortality of older children was increased by malnutrition and early start of engagement into agricultural works, as attested in ancient Egyptian society (Shidner 2018; Janssen & Janssen 2007). A high degree of growth stress was recorded in five individuals from the cemetery who exhibited large differences in age-at-death assessed using both dental development and long bone measurements (Shidner 2018).

Stature was calculated using Raxter et al. (2008) formulae for 15 females and 13 males with at least one complete and fully developed long bone. Female stature ranged between 149.6–160.1cm and was higher than in the females from Giza whose

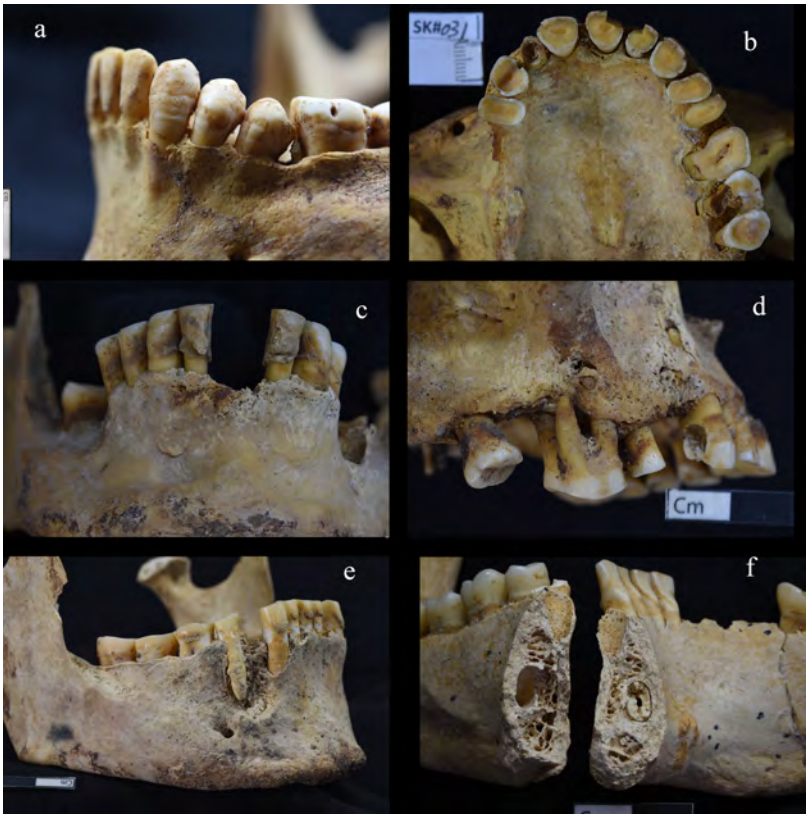

Figure 3. Dental pathologies: a) linear enamel hypoplasia, skeleton 24; b) extensive wear, caries and antemortem tooth loss, skeleton 31; c) calculus on the mandibular anterior teeth, skeleton 43; d) periodontal disease in the maxilla, skeleton 43; e) apical abscess in the mandible, skeleton 49; f) transmigration of the mandibular canine, skeleton 88.

stature was between 133–154cm (Raxter et al. 2008). The males from the cemetery were 163–172.5cm tall, and were also taller on average than males from Giza, who ranged between 145–174cm (Raxter et al. 2008). Both males and females from the cemetery were robust, with well-developed muscles that may indicate a hard physical lifestyle.

Good preservation of most bone surfaces allowed for optimal recording of pathological conditions. Activity-related skeletal changes were common, including degenerative joint disease in the spine and other elements of mature individuals. Moreover, trauma (including fractures) was noted in many individuals, affecting the shoulders, femora, hands, and ossa coxae. In some cases, evidence for unilateral or bilateral spondylolysis was observed. In some subadult individuals *cribra orbitalia*, porotic

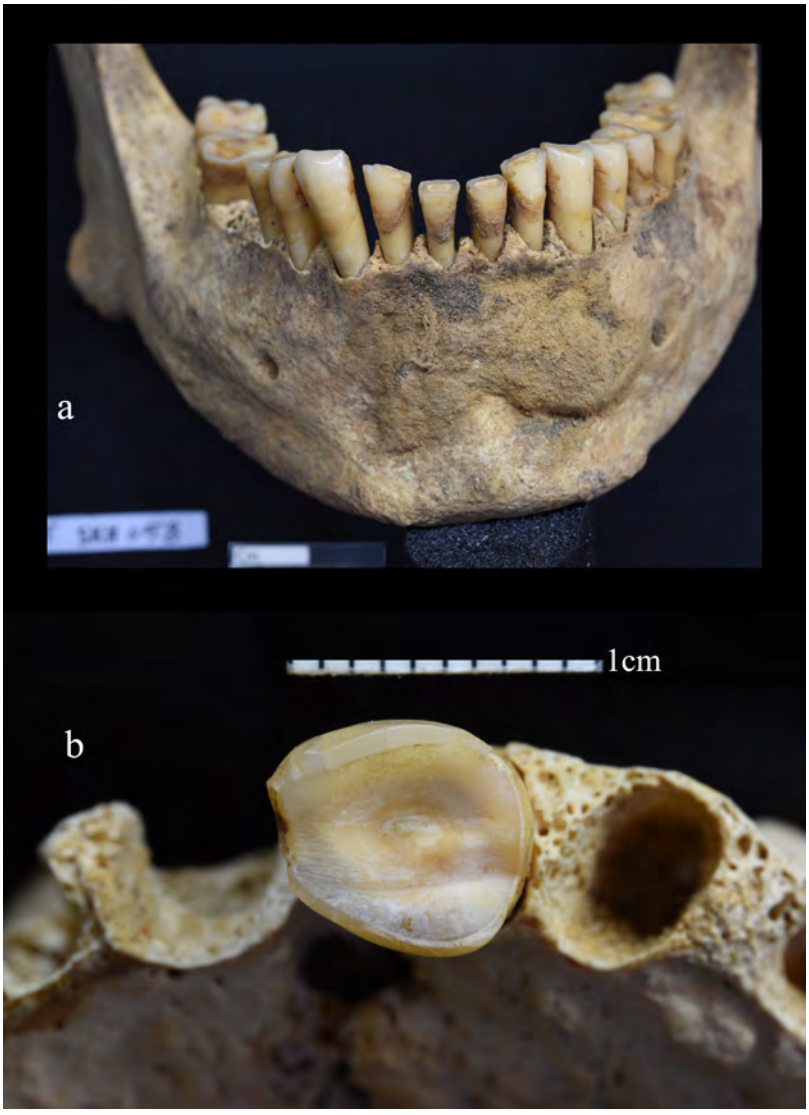

Figure 4. Dental pathologies: a) extensive wear on the mandibular incisors, skeleton 58; b) scratches and chipping on the occlusal surface of the upper left medial incisor, skeleton 57.

hyperostosis, and dental developmental disorders were present. More unusual pathological conditions included cysts in the skull of a young adult female and a possible case of blunt force trauma. In addition, several dental diseases were observed including excessive tooth attrition, abscesses, antemortem tooth loss, and dental calculus.

Figure 5. Trauma: a) compression fracture of the left radius, skeleton 61, inferior view; b) lateral compression fracture of the left pubic, skeleton 61, anterior view; c) bilateral spondylolysis at the fifth lumbar vertebra, skeleton 79, posterior view; d) blunt force trauma on the right parietal, skeleton 88, superior view.

In total, 34 individuals suffered from pathological conditions of the dentition, 20 adults showed osteoarthritis (**Figure 2**), fractures were present in 8 individuals, 10 individuals suffered from hematological disorders, 16 had congenital disorders, and four individuals exhibited infectious diseases.

Dental diseases were the most common pathological condition in the assemblage (**Figures 3** and **4**), affecting 19 females, 8 males, 6 subadults, and 1 individual of unknown sex. Calculus was the most common dental disease, and 21 individuals suffered from slight to moderate calculus. Ten individuals suffered from dental caries, which suggests a relatively high dietary sugar intake, probably from fruits and honey. Five individuals exhibited antemortem tooth loss, two suffered from tooth crowding, and single individuals exhibited tooth transmigration (Skeleton 88, a young female – **Figure 3**), abscess, heavy attrition, periodontal disease, and enamel hypoplasia. Additionally, scratches and chipping were present in individuals 57 and 58, suggesting they used their teeth as tools (King et al. 2005).

Spinal osteophytes were recorded on 11 females (three young adults, five middle-aged adults, and three adults), five males (three young adults and two middle-aged adults) and one young adult with unknown sex, which suggests that a number of individuals were carrying heavy loads. Trauma was also common and related rather to

Figure 6. Hematological disorders: a) *cribra orbitalia*, skeleton 52, inferior view; b) porotic hyperostosis in the same individual, posterior view.

accidents than to inter-personal violence. Traumatic lesions were noted in six females and two males (**Figure 5**). Skeleton 88 exhibited a healed blunt force trauma on the skull and skeleton 79 exhibited bilateral spondylolysis on the vertebral arches of the fourth and fifth lumbar vertebrae (**Figure 5**). Some observed fractures were completely healed (skeletons 61, 88), while the remainder were in the process of healing (i.e.,

Figure 7. Congenital anomalies: a) sacral spina bifida and fifth lumbar vertebra sacralized on the left side, skeleton 14, posterior view; b) sacral spina bifida, skeleton 56, posterior view; c) complete sacralization of the fifth lumbar vertebra, skeleton 81, posterior view; d) partial syndactyly of the left 4th and 5th metacarpals, skeleton 48, anterior view, superior is down.

skeletons 79, 59, 12, 14 and 31). The documented traumatic injuries were probably related to daily activities, except skeleton 88 that had injuries in the skull.

Ten individuals suffered from some stress indicated by the presence of *cribra orbitalia*. Only two individuals were young adults of unknown sex, while three indi-

Figure 8. Infectious diseases: a) woven bone formation on distal left tibia and fibula, skeleton 61, medial and lateral view; b) woven bone formation on proximal left tibia, skeleton 70, medial view; c) cysts on the endocranial side, skeleton 88.

viduals were older children, three were young children (**Figure 6**), one individual was one year-old, and one was an adolescent. Sixteen individuals had enamel hypoplasia which reflects childhood stress such as malnutrition or disease. Males and females had the same rate of enamel defects, which suggests that they were consuming diets of similar nutritional value and experience similar rates of physiological stress.

Of the individuals analyzed from the cemetery, 16 exhibited evidence of a congenital condition: eight females, six males, and two juveniles. Skeleton 81 was a middle adult male with complete sacralization of the fifth lumbar vertebra, while skeleton 14 exhibited incomplete sacralization (**Figure** 7). Skeleton 48 was a young adult male with fusion between the 4^{th} and 5^{th} left metacarpals (**Figure** 7), reflecting a partial syndactyly (Barnes 2012:154).

Only four individuals (61, 70, 76 and 88) suffered from infection (**Figure 8**), including one male, two females, and one young child. Skeleton 61 was a middle adult male showing traces of woven bone apposition in both medial and lateral aspects of the distal end in both right and left tibiae and fibulae. This could be a result of infection or trauma. In skeleton 70 (a young child) woven bone was present on the medial diaphysis of the proximal left tibia. Skeleton 79 (a young adult female) shows a woven layer on fragments of the right scapula and the right distal sixth rib

which was also abnormally wide. One male showed evidence of sinusitis and a cyst was noted in Skeleton 88 (a young adult female) on the left frontal and parietal bones.

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References

AlQahtani S., Hector M., Liversidge H. (2010), *The London atlas of human tooth development and eruption*, American Journal of Physical Anthropology 142:481–490.

Aufderheide A.C., Rodriguez-Martin C. (1998), *The Cambridge encyclopedia of human paleopathology*, New York: Cambridge University Press.

Baker B.J., Dupras T., Tochen M. (2005), *The osteology of infants and children*, College Station: Texas A&M University Press.

Barnes E. (2012), *Developmental defects of the axial skeleton in paleopathology*, Niwot: University Press of Colorado.

Bass W. (1995), *Human osteology: A laboratory and field manual*, Columbia: Missouri Archaeological Society.

Batrawi A. (1947), *The pyramid studies. Anatomical report*, Annales du Service des Antiquités, Cairo 47:97–111.

Brooks S., Suchey J.M. (1990), *Skeletal age determination based on the os pubis: A comparison of the Acsádi-Nemeskéri and Suchey-Brooks methods*, Human Evolution 5:227–238.

Buikstra J.E., Ubelaker D.H. (eds.) (1994), *Standards for data collection from human skeletal remains*, Fayetteville: Arkansas Archeological Survey.

King T., Humphrey L., Hillson S. (2005), *Linear enamel hypoplasias as indicators of systemic physiological stress: Evidence from two known age-at-death and sex populations from Postmedieval London*, American Journal of Physical Anthropology 128:547-559.

Lovejoy O., Meindl R., Pryzbeck T., Mensforth R. (1985), *Chronological metamorphosis of the auricular surface of the ilium: A new method for the determination of adult skeletal age at death*, American Journal of Physical Anthropology 68:15–28.

Márquez-Grant N. (2015), *An overview of age estimation in forensic anthropology: Perspectives and practical considerations*, Annals of Human Biology 42(4):308–322.

Mays S. (2015), *The effect of factors other than age upon skeletal age indicators in the adult*, Annals of Human Biology 42(4):332–341.

Megahed M. (2011a), *The pyramid complex of 'Djedkare's queen' in south Saqqara: Preliminary report 2010* [in:] "Abusir and Saqqara in the year 2010", M. Bárta, F. Coppens, J. Krejčí (eds.), Prague: Charles University in Prague, Faculty of Arts, pp. 616–634.

Megahed M. (2011b), *Neue Forschungen im Grabbezirk des Djedkare-Isesi*, Sokar 22: 25–35.

Megahed M. (2014), *Die Wiederentdeckung des Pyramidenbezirks des Djedkare-Isesi in Sakkara-Süd*, Sokar 28:6–19.

Megahed M. (2016), *The pyramid complex of Djedkare-Isesi at south Saqqara and its decorative program*, unpublished PhD dissertation, Charles University, Prague.

Megahed M., Jánosi P. (2017), *The pyramid complex of Djedkare at Saqqara-South, recent results and future prospects* [in:] "Abusir and Saqqara in the year 2015", M. Bárta, F. Coppens, J. Krejčí (eds.), Prague: Czech Institute of Egyptology Faculty of Arts, Charles University in Prague, pp. 237–256.

Megahed M., Jánosi P., Vymazalová H. (2017), *Djedkare's pyramid complex: Preliminary report of the 2016 season*, Prague Egyptological Studies 19:37–52.

Megahed M., Jánosi P., Vymazalová H. (2018), *Djedkare's pyramid complex: Preliminary report of the 2017 season*, Prague Egyptological Studies 21:34–44.

Megahed M., Jánosi P., Vymazalová H. (2019), *Exploration of the pyramid complex of King Djedkare: Season 2018*, Prague Egyptological Studies 23:12–36.

Raxter M., Ruff C.B., Azab A., Erfan M., Soliman M., El-Sawaf A. (2008), *Stature estimation in ancient Egyptians: A new technique based on anatomical reconstruction of stature*, American Journal of Physical Anthropology 136(2):147–155.

Scheuer L., Black S. (2004) *The juvenile skeleton*, London: Elsevier Academic Press.

Shidner A. (2018), *Growing up in Tell El-Amarna: An examination of growth and non-specific stress indicators in New Kingdom Children*, unpublished PhD dissertation, University of Arkansas, USA.

Verner M. (2001), *Archaeological remarks on the 4th and 5th dynasty chronology*, Archiv Orientální 69(3):363–418.

Vymazalová H., Hashesh Z. (2019), *Secondary burial ground in the pyramid complex of king Djedkare: A preliminary report on burials with grave goods*, Annals of the Náprstek Museum 40(1):75–101.