DATA FROM THE AVAR-PERIOD CEMETERY EXCAVATED AT THE SITE OF BIATORBÁGY-HOSSZÚRÉTEK

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Abstract: *This paper summarizes the results of the physical anthropological examination of the middle and late Avar-period cemetery, excavated in 2003 at the site of Biatorbágy-Hosszúrétek. Distributions of gender and age at death are described along with the morphometric analysis, stature estimation, taxonomical description and the observations of the anatomical variations, pathologies, and the dental status. The most important results indicate the presence of the pure Mongoloid type individuals in such a high ratio that the population origin definitely can be traced back to Central Asia.*

Keywords: *Avar period, physical anthropology, taxonomy, paleopathology*

INTRODUCTION

In 2003, during a rescue excavation at a side-branch of the stream Hosszúréti-patak at Biatorbágy, prehistoric settlement features, a trench system from the Roman period and sixty-four Avar graves were uncovered.[1] The borders of the cemetery were found on three sides.[2]

The burial place was opened in the late 7th century and continued until the beginning of the 9th century. The excavated part of the cemetery contained nine SSW–NNE directed rows of 4 to 7 graves each. Due to contemporary grave robbers, many graves were destroyed. The graves of men, women and children were not spatially separated. There were high proportions of weapons next to the buried individuals, but there were no horse burials.

According to the preliminary archaeological report, the cemetery was probably the burial place of a small and moderately wealthy armed community. In the vicinity of this site a number of further Avar cemeteries are known, which shows that the region was densely populated in this period.[3]

MATERIAL AND METHOD

The general quantitative and qualitative representative values of the sample are medium, so the possibility of any biological reconstruction is very limited as regards the individuals and the series. There are many incomplete skeletons, partially due to the above-mentioned contemporary grave robbery.[4] Besides, some skulls or postcranial bones disappeared after the excavation.[5] More-

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1 The excavation was carried out by the staff of the Budapest History Musem.

2 Further graves can be expected in the south-easterly direction outside the expropriated territory (HORVÁTH ET AL. 2004, 29; REMÉNYI–TÓTH 2004, 164–166).

3 The nearest cemetery located at Biatorbágy, Budapark (HORVÁTH ET AL. 29–34).

4 Sometimes the skulls were not placed back into the grave after violation, while the lower parts of the graves had not usually been disturbed.

5 It occurred in the case of Grave No. 2 (children), Grave No. 17 (adult), Grave No. 47 (adult), Grave No. 52 (adult), Grave No. 60 (adult), Grave No. 63 (adult), Grave No. 64 (adult).

10.55722/Arpad.Kiad.2017.3.2_04

over, in Grave No. 13, beside the children's burial there was a skull of an adult male, which got the number 13/II. In Grave No. 25, contrary to the excavation diary, there were skeletal remains of three individuals: the main and most bones belonged to a female (25/I), while surplus limb bones to a male (25/II), and further arm bones and skull fragments to another female (25/III).

The estimation of the age at death in the case of children (0–14 years) was based on the development and eruption sequence of deciduous and permanent teeth[6] and on the length of the long bones.[7] In case of juveniles (15–20 years) we used the tables detailing the epiphyseal union sequence.[8] Estimates of adults' age (20–x years) were based on the stage of cranial suture closure,[9] the extent of dental attrition,[10] the changes of the symphyseal face of the pubic bone,[11] and the trabecular changes of the proximal end of *humerus* and *femur*.[12]

Morphological sex was determined according to the traditional procedure based on the metric and morphological variables of the skull and postcranial bones.[13]

Measurements were carried out on the skulls and long bones employing the Martin–Saller system,[14] while the values thus gained were assigned to categories as defined by Alekseyev–Debetz.[15] We examined eleven morphological traits on the skulls.[16] Cranial capacity was calculated by the method of Lee–Pearson.[17] Taxonomical analysis was based on the works of Bartucz and Lipták.[18]

Stature was estimated using two methods: the first is applicable to all population types,[19] while the second has been worked out for people who lived in the Carpathian Basin.[20]

We describe the so-called hereditary anatomical variations,[21] pathological changes,[22] and dental status.

The skeletal material is inventoried at the Department of Anthropology of the Hungarian Natural History Museum under the inventory numbers 2011.53.1–2011.53.63.

RESULTS

DEMOGRAPHIC ANALYSIS

Table 1 presents the individual demographic data of the buried individuals, while *Table 2* shows the gender and age distribution of the series. Since the cemetery has not been entirely excavated and the number of the examined burials is small, a detailed paleodemographic analysis (e.g. preparation of mortality table and graph, the evaluation of the life expectancy at birth) is not feasible.

Nevertheless, the following trends could be observed. The proportion of neonates (0–1 year) is low (4.7%), despite the fact that mortality rate is generally the highest around birth in all archaeological and historical periods.[23] After that, the ratio of children is close to the expected val-

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6 SCHOUR–MASSLER 1941; UBELAKER 1989.
7 STLOUKAL–HANÁKOVÁ 1978; BERNERT ET AL. 2007.
8 FEREMBACH ET AL. 1979; SCHINZ ET AL. 1952.
9 NEMESKÉRI ET AL. 1960; MEINDL–LOVEJOY 1985.
10 MILES 1963; PERIZONIUS 1981.
11 TODD 1920.
12 NEMESKÉRI ET AL. 1960.
13 ÉRY ET AL. 1963.
14 MARTIN–SALLER 1957.
15 ALEKSEYEV–DEBETZ 1964.
16 MARTIN–SALLER 1957; LIPTÁK 1962; LIPTÁK 1963; LIPTÁK 1965; LIPTÁK 1983.
17 LEE–PEARSON 1901.
18 BARTUCZ 1934, 104–109; BARTUCZ 1938; LIPTÁK 1962; LIPTÁK 1963; LIPTÁK 1965; LIPTÁK 1967.
19 SJØVOLD 1990.
20 BERNERT 2005; BERNERT 2005a; BERNERT 2008.
21 HAUSER–DE STEFANO 1989.
22 AUFDERHEIDE–RODRÍGUEZ-MARTIN 1998; ORTNER 2003.
23 ACSÁDI–NEMESKÉRI 1970.

ues (29.6%), while the proportion of the juvenile (7.8%) shows again a decreasing tendency. Among grown-up individuals again the general trends can be seen, namely, that the highest mortality rate occurs among adults (23–39 years, 29.7%), followed by a decreasing mortality trend. The ratio of the mature age group individuals (40–59 years) is 23.4%, while it is 1.6% in the senile age group (60–x years).

The proportion of males and females is not even, since a female surplus is observable (17 male, 23 female). The mortality rate of females is higher in the adult age group, while among males it is higher in the mature age group, which is a general phenomenon.[24]

In sum, the age and gender distribution of the Biatorbágy population shows rather balanced proportions, but it has to be emphasized that we do not know who had been interred (children? males? females?) in the graves beyond the investigated area.

The sexualisation of the Biatorbágy population

Sexing was performed by examining the metric and morphological features of the skulls and the postcranial bones, then calculating the sexualisation index (*Table 3*).[25]

The sexualisation values of males range between +1.60 and ±0.00, that of females between -1.78 and +0.19. The mean sexualisation value is +0.88 for males and -0.82 for females. Based on this, we may define a significant sexual dimorphism.

The most expressly marked features of males are the *caput femoris* (+1.60), the *cotilo-incisura* index (+1.50), the *incisura ischiadica maior* (+1.42) and the *facies zygomaticus* (+1.27), while the *ischio-pubis* index (0.00±), the *trigonum mentale* (±0.00) were indifferent. Among females the most distinctive characteristics are the *angulus subpubicus* (-1.78), the *incisura ischiadica maior* (-1.42) and the *sulcus praeauricularis* (-1.39), while the less expressed are the *margo supraorbitalis* (-0.25) and the *tuber frontale* and *parietale* (-0.31).

The greatest variation between the two genders could be noted on the pelvic bone, in the case of the *incisura ischiadica maior* (2.83) and the *sulcus praeauricularis* (2.72).

We found a relatively significant sexual dimorphism. The most marked features for both genders were found on the postcranial bones, while the skull had less pronounced diagnostic traits. In some cases we observed a high development of the so-called riding muscles on the *pelvis* and on the *femur*, which reflect a mobile, riding lifeway.

Metric and morphological evaluation of the finds

The morphometric analysis was possible only in a few cases on the Biatorbágy skulls. *Table 4* and *Table 5* present the individual skull sizes and indices of males (N=5) and females (N=6).

According to Alekseyev and Debetz's categories the average absolute measurements of the skulls of males are medium long-long (M1), broad (M8), and high/medium high (M17, M20), while they are long, medium broad, and low among females. The forehead (M9) is medium broad for both genders. The mean values of the face are broad (M45) and high, very high (M47, M48) again for both genders. The nose (M51, M52) are medium broad and broad, again is the same for both genders. The orbits (M54, M55) are very broad and broad in the case of males, while medium high among females. Cranial capacity (M38) which is (medium) *euencephal* indicates again the same for both genders.

On the basis of the average indices male skulls are short-high and broad (M8:M1; M17:M1; M17:M8) (*brachy-, hypsi-tapeinocran*). Among females the same values are medium-long, short and broad (*meso-chama*e- and *tapeinocran*). The frontoparietal index (M9:M8) is narrow (*stenometop*) as regards males and medium-broad (*metriometop*) among females. The facial (M47:M45) index is medium broad (*mesoprosop*) among males, while narrow (*leptoprosop*) among females. The upper facial indexes (M48:M45) are medium broad (*mesen*) for both gender. The orbital index (M51:M51)

[24] Acsádi–Nemeskéri 1970.
[25] Éry et al. 1963.

are high (*hypsiconch*) for males, and medium high for females. The average nasal index (M54:M55) is high (*hyperchamaerrhin*) in the case of males, while the same is medium high (*mesen*) for the other gender.

The results of the morphological characteristics show that the form of the brain-case in *norma vertical* view is mainly sphenoid (when the cranium is short) and ovoid (when the cranium is longer). In view from *occipitale* these are house and bomb-shaped for both genders and characterised exclusively by a curvoccipital nape profile. Variations arising from sexual dimorphism can be noted in the prominence of the *glabella* and the external occipital protuberance. The shape of the *orbita* of males is mainly angular, while among females it is round. In the case of males the lower margin of the *apertura piriformis* is strongly varied, while among females it is mainly infantile. The *fossa canina* is usually shallow or medium.

The few data of the individual morphometrical analysis is scarcely enough to outline precise information of the population. In sum, only some difference was found between males and females. As a trend we may recognize the dominance of the short/medium short-skulled (*meso-brachycran*) and mainly long and medium broad-faced (*leptoprosop/lepten, meoporosop/mesen*) individuals among both genders.

STATURE

The individual measurements of postcranial bones, the indices and the estimated stature are presented in *Table 6* and *Table 7.* We were able to calculate the body height of eleven males and twenty-one females.

The main stature values of males according to the Sjøvold calculation method is 164.62 (medium) and 166.1 (small-medium) according to Bernert. In the case of females the same values are 163.0 (medium) by the formulae of Sjøvold and 162.9 (medium-tall) by Bernert's method.

The individual stature data show heterogeneity among both genders. Males' stature falls in the small, small-medium category, while females show much more heterogeneity: small, small-medium, medium-tall and tall stature individuals occurred among them.

As we may see, values differ between the two calculation formulae. The Bernert method shows higher stature, which is generally observable in other series too. This is due to the fact that these two methods were developed in different populations and calculate with different long elements. In addition, Bernert's method takes the limb ratio into account, which is different between genders, while Sjøvold does not count with it.[26]

TAXONOMIC ANALYSIS

Because of the relatively poorly preserved material taxonomic analysis can be performed within certain limits.[27] During the examination we had to consider that an individual skeleton can rarely be assigned to a particular taxon. In case of this material, however, the solution of the problem seemed much easier as we shall see below.

In our material – with a very few exceptions only – he pure Mongoloid types (Graves No. 1, 7, 18, 20, 27, 28, 31, 32, 33, 37, 41, 46, 48, 53, 54, 56, and 59) are dominant. The real distinctive features of this taxon such as short or medium long (*brachycran* or *mesocran*) skulls, slope forehead, lambdoid flattening, broad and sometimes extraordinarily high face, flat and broad or the so called "blown-up" nasal bones, frontal positioned *malar* bones, shallow or medium *fossa canina*, small anterior *nasal spinale*, marked *alveolar prognatism*, etc. occur in such a high ratio[28] that it is not simply a Europo-Mongoloid population we can speak of but immigrants of real Central Asian origin.

In more detail, in Graves No. 18, 20, 33, and 54 the Sayanic-type features occurred (*Fig. 1. 1–2; Fig. 2. 1*), the main characteristics of which are the moderately *brachycranic* skull, broad but relatively low face, and medium tall stature. In Graves No. 1 and 32 the Central Asian type (*Fig. 2. 2; Fig. 3. 1*) occurred with the *brachycran* skull, *stenometop* forehead, and very high and narrow face.

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[26] BERNERT 2008, 393.

[27] Here we would like to thank Antónia Marcsik for helping us distinguish between Mongoloid taxonomical types.

[28] BARTUCZ 1934, 104–109; LIPTÁK 1983, 22.

The stature was medium. In Grave No. 59 a Sinid-type female was buried (*Fig. 3. 2*). This individual is characterized by a relatively higher and longer cranial vault. Due to this, the main skull index falls into the *mesocranic* category. The face is medium broad and very high, so the main facial index is definitely *leptoprosop*. In Grave No. 27 within the mixed Europo-Mongoloid-type, the Eastern Mediterranean component is detectable with longer skull and narrower face than the earlier types.

The above mentioned facts indicate the eastern origin of the population. We may assume that they were pure-bred Zhuan-zhuans, who were fleeing west in front of the Turks and had entered into alliance with the Byzantine Emperor first and turned against him later.[29]

From Central Asia to Biatorbágy this community travelled in a manner that it barely mixed with any Europid ethnic groups on the way (Graves No. 12, 13/II). However, the population was not homogeneous, since different Mongoloid types can be observed in it. This suggests that in the population buried at Biatorbágy several traits can be identified.

Based on earlier studies, pure Mongoloids occur only sporadically or as mixed with the Europid type. Nonetheless, entirely homogeneous Mongoloid types are also known from this period (e.g. from Mosonszentjános, Nemesvölgy, Csorna, etc.).[30]

Anatomical variations

Although there is much debate among physical anthropologists whether the so-called anatomical variations or nonmetric traits are hereditary or environmentally determined, we observed and investigated these traits. The following section offers an overview of the most frequent and most distinctive traits observed on the bones.

The most common variation is the *metopic suture*, which occurred on the skulls of six individuals, mainly males (Graves No. 8, 35, 59: males, Graves No. 13/I and 50: children, Grave No. 64: female).

The second most frequent variation is the *lambdoid ossicle*, which we found on the left and right side of the *lambdoid suture* in three cases (Grave No. 13/I: children, Grave No. 20: female, Grave No. 51: male) and twice on the left side of the *lambdoid suture* (Graves No. 8 and 59: male).

Os *epiptericum* is registered on both sides at the *pterion* point in the case of two females (Graves No. 27 and 32), and only on the right side of the skull in the case of one male (Grave No. 191). *Os apicis* occurred twice (Grave No. 8: male, Grave No. 27: female). *Torus maxillaris* also occured in two cases (Grave No. 53: female, Grave No. 59: male). *Os astericum* was observable only on one male skull, interred in Grave No. 59. *Ossa suturae saggitalis* was found in the case of one child (Grave No. 13/I), while the so-called *inca bone* in the case of one male (Grave No. 182).

On the postcranial skeleton the perforation of the *olecranon fossa* at the *distal* end of the *humerus* was registered on both sides in the case of one juvenile individual (Grave No. 5), while only on the right side in two cases among females (Graves No. 14 and 40).

In conclusion we may say that the nonmetric morphological traits described above do not allow for identifying family ties or groups. This is mainly due to the bad preservation of the skeletal material, which did not allow us to examine it systematically.

Pathological analysis

The pathological investigation of a population is strongly associated with biological reconstruction and may contribute important elements to it. The following section provides an overview of macroscopically observed diseases. Detailed, comparable statistical analysis will be presented in a later study.

Among traumatic injuries, fractures could be observed only in one case. In Grave No. 7 (adult male) the *distal* end of the right *tibia* fractured and healed with a dislocation, shortening and *callus* formation (*Fig. 4. 1*). Since there is a lot of incomplete skeletal material in the series, we may assume more traumatic lesions.

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29 Czeglédy 1969.

30 Due to the absence of inhumation Hun graves, we do not know the antecedents of the Mongoloid presence in the pre-Avar period (Éry 1983).

The cases of *spondylosis deformans* and *spondylarthrosis* are called as degenerative changes of the spine in the literature. These comprise the greatest percentage of pathological alterations in the osteotological material from the early prehistory onward and in the Biatorbágy series too. The most frequent alteration on the vertebral column was *spondylosis deformans*, which occurred in six cases, mainly on the lumbar section (Grave No. 1: male, Grave No. 3: male, Grave No. 17/II: ?, Grave No. 51: male, Grave No. 57: female, Grave No. 64: female). On the thoracic vertebrae we found it in five cases (Grave No. 3: male, Grave No. 28: male, Grave No. 36: female, Grave No. 51: male; *Fig. 4. 2*). As may be seen, differences between genders are not notable. In its aetiology heavy strain, monotonous work, some kind of trauma, infections, etc. play a role.

Schmorl-hernia occurred in five cases (Grave No. 1: male, Grave No. 3: female, Grave No. 28: male, Grave No. 36: female, Grave No. 51: male). These diseases again can be linked to repeated heavy strain, trauma, etc.

Degenerative changes of the postcranial bones was much rarer. It was registered on the distal end of a mature male's femur (Grave No. 41; *Fig. 4. 3*). The low incidence of this alteration may be explained again by the fact that the ends of postcranial bones were incomplete.

The second most frequent alteration in the population was *enthesopathy*. Its occurrence shows a variant of excessive bone growth caused by increased strain. This deformation takes the form of ridges and crests at the attachment of muscles and tendons. It is generally caused by hard physical work, excess walking, though it can be a side-symptom of other diseases (e.g. *spondylarthritis*, DISH, trauma, etc.). It occurred mainly on the heel bone (Grave No. 1: male, Grave No. 12: female, Grave No. 32: female, Grave No. 51: male, Grave No. 57: female, Grave No. 59: female, Grave No. 64: female; *Fig. 4. 4*).

The so-called non-specific inflammation (*periostitis* or *osteomyelitis*) of the bones, which usually starts in the *periosteum* or in the bone marrow, occurred in a very low ratio. It was observable only in a child's femur (Grave No. 64).

Among developmental anomalies block vertebra (their fusion) was observed in the cervical bone of a mature male interred in Grave No. 3 (*Fig. 4. 5*).

In sum, we may say that the pathological deformations recorded at Biatorbágy are of all the types that were common in other prehistorical and historical populations. The low number of fractures indicated that the population lived in a peaceful period. Based on the number and degree of degenerative diseases of the spine and enthesopathic alterations we may assume that the examined population had excessive physical workload and a mobile way of life.

DENTAL STATUS

The study of the teeth is just as important as the morphometrical analysis and pathological studies, since the general characteristics of a population's dental status enable us to reconstruct dietary customs, oral hygiene, and, to a certain extent, the way of life. During the examination we recorded the number of the remained and the *ante mortem* lost teeth. Teeth affected by caries and the various abscesses/cysts caused by inflammations were evaluated separately. We were able to investigate the teeth of thirteen males and twenty-two females. The number of surviving teeth was 358, *ante mortem* tooth loss was twenty-five, while the *post mortem* tooth loss was not examinable.

Dental caries, which is the best known and most frequent disease of the teeth, occurred very rarely in our material. Carious frequency among males were found only in one case (1/142, 0.70%), while among females it occurred twice (2/216, 0.92%) and affected one molar each. The observed carious cavities affected the younger, adult-aged individuals; twice it occurred on the neck of the tooth and on the occlusal surface in the case of one female.

Ante mortem tooth loss can be caused by caries, various periodontal diseases and abrasion. It affected males only in one case with two *ante mortem* tooth loss, while among females it occurred in the case of five individuals and affected twenty-four teeth. It occurred most frequently in the molars of elderly individuals.

The abscesses/cysts may form in association with general periodontal infection, considerable tooth wear, or caries. It occurred only in the case of one male, who has carious lesions too; it justifies that the formation of abscesses/cyst is closely linked to dental caries.

We registered alveolar resorption too which means that all the teeth were lost mainly because

of advanced age or dental pathology. It was registered once, in the case of a mature-senile-aged individual.

Among children the examinable seven individuals with thirteen deciduous and twenty-five permanent teeth did not show any tooth pathologies.

In sum, we may say that the general oral pathological status of the Biatorbágy population was fairly good. The low frequency of dental caries, alveolar abscess/cyst can be explained with sufficient dietary habits, carbohydrate rich nutrition, and adequate dental hygiene.

Summary

Despite the partial uncovering, the statistically small number and incomplete state of the examined skeletal material from the middle and late Avar period, excavated at the site of Biatorbágy-Hosszúrét, the series is very important from the anthropological point of view. The anthropological examination was carried out on the remains of sixty-four individuals.

According to the demographic analysis, the population of the series was blessed with realistic mortality parameters. We may establish a relatively appropriate number of children (34.3%) and a slightly unequal gender distribution (female surplus). Among the grown-up individuals, compared to previously expected values, a higher mortality rate is visible in the adult age group.

We found relatively significant sexual dimorphism between the two genders. The skeletons of females were mainly gracile, while males may have been robust with well expressed muscular attachment surfaces.

The morphometric analysis of the series shows that the skulls of both genders are mainly long and broad, or even high in case of males and low in case of females. The average skull index is *brachycran* among males and *mesocran* among the other gender. The forehead is mainly medium broad among both genders. The face is medium high/high and broad, but show different indices for the two genders (*mesoprosop, mesen* among males and *leptoprosop, lepten* among females). The calculated stature data show a slight tendency towards the small, small-medium, medium body height groups.

Based on the morphometrical and stature data the taxonomical picture of the population shows the prevalence of Mongoloid traits in such a high rate that the people buried here may well have originated directly from Central Asia. The community might have arrived in the Biatorbágy region in such a way that during their migration they hardly mixed with Europid-type peoples (it is detectable only in case of very few skeletons).[31]

A comprehensive publication established earlier that the anthropological material of the early Avar period was exclusively Europid, while the Late Avar period skeletal material shows much more hybridization, resulting in a higher frequency of Europo-Mongoloids.[32] Later this theory became forgotten and, based on the newly unearthed cemeteries/analysed skeletal material, recent anthropological studies offer a much more nuanced description of this period.[33]

Based on the craniometric features and statistical analysis, Kinga Éry identified four regional groups. The first was located between the Danube and the Tisza rivers. In this area the population of some excavated cemeteries indicate the occurrence of the Mongoloid type, yet the Europid type is dominant. In the second, East Transdanubian group pure Europid ethnic groups were common, while again in the West Transdanubian group Mongoloid individuals appear, though some of them in a small number of sites, with dominance of the Europid type people.[34] Finally, the so-called northwest group is characterized by a pure Europid population.[35]

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31 To the present day anthropological research has revealed several skeletons/cemeteries with pure Mongoloid-type individuals, which suggest a continuous cultural influence of the Eurasian region.

32 Lipták 1983.

33 Éry 1983; Fóthi 1998; Fóthi 2000.

34 It should be noted, however, that the regional separation of East- and West-Transdanubia is refused by several anthropologist (e.g. Guba 1999).

35 Éry 1983, 49–51.

In one of her studies Erzsébet Fóthi ascertained that the distribution of the Avar period's anthropological history cannot be described by one factor only, due to taxonomical heterogeneity, regionality, and chronology.[36] Certainly, the Carpathian Basin was not uniform in this period, neither from the archaeological, nor from the anthropological point of view. Morever, the nature of the typotaxonomical distribution does not fully match the archaeological heritage.

Finally, according to the pathological investigation, the absence of injuries indicates a peaceful way of life. However, marks of heavy physical work and a mobile way of life were detected. This is in line with the preliminary archaeological conclusion, namely, that the community buried here had probably been moderately wealthy. Similarly to nomadic peoples, the oral pathological examination revealed a general low frequency of carious lesions, alveolar abscesses and cysts, which suggest an adequate dental hygiene and a proper diet.

The above outlined results and interpretations certainly raise further questions. The anthropological examination of considerably more skeletal material may help us to clarify several problems of this period.

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[36] FÓTHI 1998, 505.

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ANTROPOLÓGIAI ADATOK A BIATORBÁGY-HOSSZÚRÉTEK LELŐHELYEN FELTÁRT AVAR TEMETŐBŐL

Jelen tanulmányban a Biatorbágy-Hosszúrétek lelőhelyen feltárt, 64 síros közép és késő avar temető antropológiai vizsgálatának eredményeit mutatjuk be. Az embertani anyag a Magyar Természettudományi Múzeum Embertani Tárában található.

A csontanyag alapvetően közepes megtartású, viszonylag sok a hiányos váz. A kevés egyénszám miatt a részletes paleodemográfiai elemzés nem volt elvégezhető. Annyi azonban megállapítható, hogy a gyermekek előfordulási aránya közelít az előzetesen várt értékekhez. Felnőttek esetében az *adultus* korban elhaltak aránya a legmagasabb, melyet az életkor előrehaladtával fokozatos csökkenés követ. A nemek szerinti megoszlás minimális nőtöbbletet mutat.

A férfiak és a nők vázcsontjai között jelentős nemi különbséget találtunk. A nők csontváza többnyire nagyon gracilis, míg a férfiak – az izomtapadási reliefek fejlettsége alapján – kifejezetten izmosak lehettek. Néhány esetben megfigyelhető volt a medence úgynevezett lovagló izmainak erőteljes fejlettsége.

A morfometriai elemzés, valamint a becsült termetértékek alapján az ide temetkező népesség heterogén összetételű volt. A tiszta mongoloid jellegek ugyanakkor olyan domináns arányban fordultak elő (pl. 18., 20., 33., 54. sír – szajáni típus; 1., 32. sír – belső-ázsiai típus; 59. sír – szinid típus), hogy nem egyszerűen europo-mongoloid népességről, hanem egyértelműen belső-ázsiai eredetű mongoloid populációról beszélhetünk. A továbbiakban azt is feltételezhetjük, hogy erről a területről e közösség úgy érkezhetett Biatorbágyra, hogy közben alig keveredtek bele europid elemek (12., 13/II. sír). A különböző mongoloid típusok sorozattöredéken belüli előfordulása arra utalhat, hogy Belső-Ázsiában is több szálra vezethető vissza e népesség múltja.

A paleopatológiai vizsgálat eredményei szerint a sérülések teljes hiánya a népesség békés életmódjára utal. A gerincoszlopon megfigyelhető degeneratív ízületi megbetegedések, valamint a sarokcsonton viszonylag gyakran jelentkező *enthesopathiá*s elváltozások fokozott fizikai munkát, aktív és mobil életmódot feltételeznek. A nomád népekre jellemző napi rendszerességű állati fehérjefogyasztás okán a fogazat szinte ép, fogszú- és tályogmentes volt.

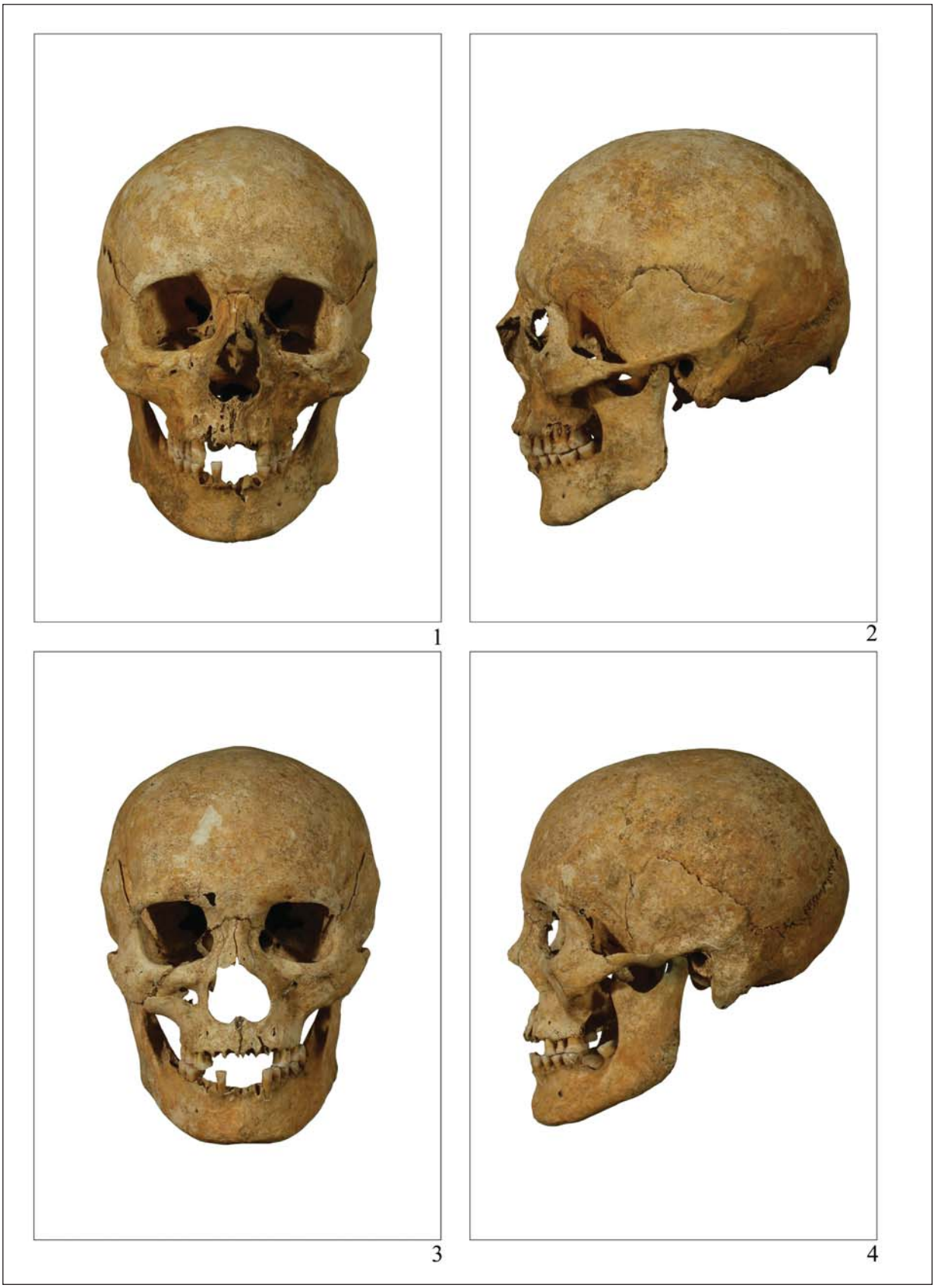

Fig. 1. 1–2: Sayanic-type male, Grave No. 18; 3–4: Sayanic type female, Grave No. 20
1. kép 1–2: Szajáni típusú férfi, 18. sír; 3–4: Szajáni típusú nő, 20. sír

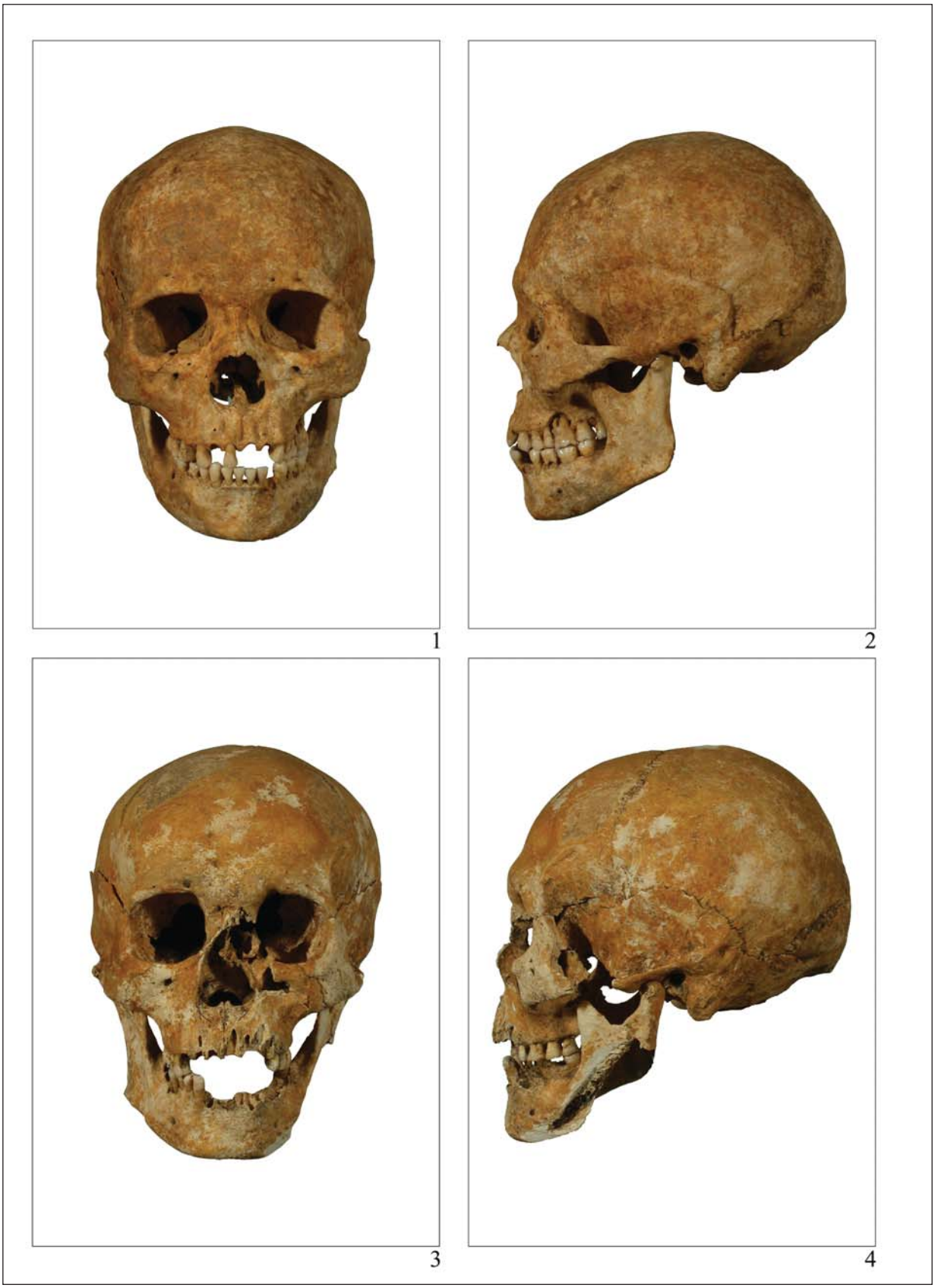

Fig. 2. 1–2: Sayanic-type male, Grave No. 33; 3–4: Central Asian-type male, Grave No. 1
2. kép 1–2: Szajáni típusú férfi, 33. sír; 3–4: Közép-ázsiai típusú férfi, 1. sír

Fig. 3. 1–2: Central Asian-type female, Grave No. 32; 3–4: Sinid-type male, Grave No. 59
3. kép 1–2: Közép-ázsiai típusú nő, 32. sír; 3–4: Szinid típusú férfi, 59. sír

Fig. 4. 1: Fracture of a right tibia (Grave No. 7, mature male); 2: Spondylosis deforans on lumbal vertebrae (Grave No. 51, mature male); 3: Osteoarthrosis on the distal end of a right femur (Grave 41, mature male); 4: Enthesopathy on a heel-bone (Grave No. 51); 5. Block vertebrae (Grave No. 3, mature male)

4. kép. 1: Jobb oldali sípcsonttörés (7. sír, maturus korú férfi); 2: Spondylosis deformans ágyéki csigolyákon (51. sír, maturus korú férfi); 3: Osteoarthrosis jobb oldali sípcsont distalis végén (41. sír, maturus korú férfi); 4: Enthesopathia sarokcsonton (51. sír, maturus korú férfi); 5. Blokk csigolya (3. sír, maturus korú férfi)

Appendix – Függelék

Table 1. Individual data of the sex and age (page 139–140)
1. táblázat. Egyéni alapadatok (139–140. oldal)

Inventory No.	*Obj. No.*	*Grave No.*	*Gender*	*Age (year)*	
				from	*to*
2011.53.1.	35	1	male	30	39
2011.53.2.	36	3	male	40	49
2011.53.3.	67	4	?	10	12
2011.53.4.	68	5	?	15	17
2011.53.60.	69	6	?	0	1
2011.53.61.	72	9	?	2	3
2011.53.5.	70	7	male	45	44
2011.53.6.	71	8	male	40	49
2011.53.7.	73	10	female	50	59
2011.53.8.	74	11	male	17	19
2011.53.9.	75	12	female	50	54
2011.53.10.	76	13/I	?	13	13
2011.53.11.	76	13/II	male	40	44
2011.53.12.	90	14	female	60	64
2011.53.13.	91	15	?	3	3
2011.53.14.	92	16	?	7	8
2011.53.15.	93	17/II	?	4	5
2011.53.16.	94	18	male	40	44
2011.53.17.	95	19	?	10	11
2011.53.18.	96	20	female	35	39
2011.53.19.	98	21	?	11	12
2011.53.20.	99	22	?	2	2
2011.53.21.	100	23	?	0	1
2011.53.22.	101	24/I	male	30	59
2011.53.23.	101	24/II	?	6	6
2011.53.24.	102	25/I	female	40	59
–		25/II	male	20	74
2011.53.25.		25/III	female	20	24
2011.53.26.	106	26	female	20	24

2011.53.27.	107	27	female	23	24
2011.53.28.	108	28	male	23	24
2011.53.29.	109	29	male	23	24
2011.53.30.	110	30	?	4	5
2011.53.31.	111	31	?	9	10
2011.53.32.	112	32	female	50	59
2011.53.33.	129	33	male	45	54
2011.53.34.	130	34	?	3	4
2011.53.35.	131	35	male	15	17
2011.53.36.	132	36	female	40	44
2011.53.37.	133	37	female	30	39
2011.53.38.	134	38	?	3	3
2011.53.39.	135	39	female	30	39
2011.53.40.	136	40	female	15	17
2011.53.41.	137	41	male	40	49
2011.53.42.	171	42	?	9	10
2011.53.43.	172	43	female	23	24
2011.53.44.	173	44	?	7	8
2011.53.45.	175.	45	male	40	49
2011.53.46.	176	46	female	25	29
2011.53.47	179	48	female	23	24
2011.53.48.	180	49	?	15	17
2011.53.49.	181	50	?	5	6
2011.53.50.	182	51	male	45	49
2011.53.51.	185	53	female	23	24
2011.53.52.	186	54	female	25	29
2011.53. 53.	187	55	female	20	24
2011.53.54.	188	56	female	23	24
2011.53.55.	189	57	female	30	34
2011.53.56.	190	58	?	1	2
2011.53.57.	191	59	male	35	39
2011.53.58.	234	61	?	9	9
2011.53.59.	277	62	?	1	1
2011.53.62.	298	63	female	50	59
2011.53.63.	303	64	female	35	39

Age groups / Gender	*?*	*Males*	*Females*	*Together*
Neonates (0–1 year)	3	-	-	3 (4.7%)
Infans I. (1–6 years)	10	0	0	10 (15.6%)
Infans II.(7–14 years)	9	0	0	9 (14.0%)
Juvenile (15–22 years)	2	2	1	5 (7.8%)
Adult (23–39 years)	0	4	15	19 (29.7%)
Mature (40–59 years)	0	9	6	15 (23.4%)
Senile (60–79 years)	0	0	1	1 (1.6%)
? (23–x years)	0	2	0	2 (3.2 %)
Total	24 (37.5%)	17 (26.6%)	23 (35.9%)	64 (100.0%)

Table 2. Distribution of the buried individuals according to sex and age
2. táblázat. Az eltemetettek nem és életkor szerinti megoszlása

Sexing traits		*Males*			*Females*			*Distances*	
		M	*N*	*Repr (%)*	*M*	*N*	*Repr (%)*	*Repr (%)*	
1.	*Tuber frontale et parietale*	+0.43	7	46.67	-0.31	13	52.00	49.33	0.74
2.	*Glabella. Arcus superciliaris*	+0.70	10	66.67	-0.54	13	52.00	59.33	1.24
3.	*Processus mastoideus*	+0.75	12	80.00	-0.68	19	76.00	78.00	1.43
4.	*Protuberantia occipitalis externa*	+1.10	10	66.67	-0.94	16	64.00	65.33	2.04
5.	*Planum occipitale*	+0.80	10	66.67	-0.88	16	64.00	65.33	1.68
6.	*Margo supraorbitalis*	+0.88	8	53.33	-0.25	8	32.00	42.67	1.13
7.	*Arcus zygomaticus*	+1.11	9	60.00	-0.70	10	40.00	50.00	1.81
8.	*Facies zygomaticus*	+1.27	11	73.33	-0.43	14	56.00	64.67	1.70
9.	*Corpus mandibulae*	+0.78	9	60.00	0.19	16	64.00	62.00	0.59
10.	*Trigonum mentale*	+0.00	10	66.67	-0.81	21	84.00	75.33	0.81
11.	*Angulus mandibulae*	+0.67	9	60.00	-0.95	19	76.00	68.00	1.61
12.	*Caput mandibulae*	+1.14	7	46.67	-0.07	15	60.00	53.33	1.21
13.	*Pelvis maior*	+1.40	5	33.33	-1.08	13	52.00	42.67	2.48
14.	*Pelvis minor*	+0.80	5	33.33	-1.09	11	44.00	38.67	1.89
15.	*Angulus subpubicus*	+0.50	4	26.67	-1.78	9	36.00	31.33	2.28
16.	*Foramen obturatum*	+0.40	5	33.33	-1.20	10	40.00	36.67	1.60
17.	*Incisura ischiadica maior*	+1.42	12	80.00	-1.42	24	96.00	88.00	2.83
18.	*Ischio-pubis index*	0.00	5	33.33	-1.17	6	24.00	28.67	1.17
19.	*Cotilo-incisura index*	+1.50	6	40.00	-0.83	12	48.00	44.00	2.33
20.	*Sacrum*	+1.00	5	33.33	-0.92	13	52.00	42.67	1.92
21.	*Caput femoris*	+1.60	10	66.67	-0.83	24	96.00	81.33	2.43
22.	*Linea aspera*	+0.75	12	80.00	-0.76	25	100.00	90.00	1.51
23.	*Sulcus praeauricularis*	+1.33	9	60.00	-1.39	23	92.00	76.00	2.72
	Mean	+0.88		55.07	-0.82		60.87		

Table 3. Results of the examination of the sexual traits
3. táblázat. A nemi jellegek vizsgálatának eredményei

Martin No.	*Grave 1.*	*Grave 7.*	*Grave 18.*	*Grave 28.*	*Grave 33.*	*Grave 59.*
1.	182	(192)	180	(184)	184	190
5.	136	-	99	-	102	100
8.	151	145	148	136	147	144
9.	100	94	97	98	94	98
10.	127	(119)	123	114	118	125
11.	107	124	133	125	131	125
12.	108	116	116	115	117	114
17.	142	-	136	-	131	127
20.	107	-	115	-	105	110
23.	542	543	528	528	538	535
40.	134	-	93	-	106	99
43.	108	105	109	102	112	108
44.	102	100	102	-	105	99
45.	(143)	-	141	-	(139)	120
46.	104	-	100	-	111	100
47.	128	-	128	-	123	126
48.	70	-	78	-	72	75
51.	44	38	40	-	41	39
52.	41	(34)	36	-	32	33
54.	(30)	(26)	26	-	29	26
55.	50	-	54	-	49	52
60.	58	55	-	-	59	58
61.	65	-	66	-	70	61
62.	44	45	-	-	49	44
63.	44	-	43	-	52	38
65.	125	-	130	125	131	-
66.	-	105	109	108	104	95
68.	79	80	74	76	78	76
69.	29	35	(35)	(28)	35	35
70.	71	60	66	60	62	60
71.	41	40	33	35	35	35
72.	85	-	88	-	89	88
75.	-	-	126	-	109	-
75/1.	-	-		-		-
79.	119	125	120	129	130	130
38.						
8:1	83.0	(75.5)	87.8	(73.9)	79.9	75.8
17:1	78.0	-	75.6	-	71.2	66.8
20:1	58.8	-	63.9	-	57.1	57.9
17:8	94.0	-	86.1	-	89.1	88.2
20:8	70.9	-	72.8	-	71.4	76.4
9:8	66.2	64.8	61.4	72.1	63.9	68.1
47:45	(89.5)	-	90.8	-	88.5	105.0
48:45	(49.0)	-	55.3	-	51.8	62.5
52:51	93.2	90.0	90.0	-	78.0	84.6
54:55	(60.0)	-	48.1	-	59.2	50.0
61:60	112.1	-	-	-	118.6	105.2
63:62	100.0	-	-	-	106.1	86.4

Table 4. Individual skull measurements and indices – Males

4. táblázat. Egyéni koponyaméretek és jelzők – férfiak

Martin No.	*Grave 20.*	*Grave 27.*	*Grave 32.*	*Grave 39.*	*Grave 54.*
1.	176	170	170	173	187
5.	-	92	95	91	(105)
8.	143	139	133	139	137
9.	98	90	88	86	97
10.	117	114	114	112	(118)
11.	127	121	122	120	119
12.	117	106	113	118	112
17.	-	128	122	119	121
20.	105	99	107	-	-
23.	521	504	502	503	(540)
40.	-	90	94	97	-
43.	108	98	103	-	107
44.	98	94	98	-	-
45.	136	(123)	132	-	-
46.	101	96	100	-	-
47.	112	109	121	-	-
48.	67	63	74	-	-
51.	38	38	41	-	-
52.	31	33	32	-	-
54.	30	25	26	-	-
55.	50	46	50	-	-
60.	-	-	52	-	59
61.	-	67	62	-	67
62.	-	-	43	-	48
63.	41	42	40	-	42
65.	127	(126)	117	-	121
66.	103	102	95	-	100
68.	79	81	76	-	79
69.	27	27	31	-	32
70.	66	55	60	-	59
71.	32	35	32	-	35
72.	88	85	84	-	-
75.	116	-	116	-	-
75/1.		-		-	-
79.	124	125	125	-	121
38.				-	
8:1	81.3	81.8	78.2	80.3	73.3
17:1	-	75.3	71.8	68.8	64.7
20:1	59.7	58.2	62.9	-	-
17:8	-	92.1	91.7	85.6	88.3
20:8	73.4	71.2	80.5	-	-
9:8	68.5	64.7	66.2	61.9	70.8
47:45	82.4	(88.6)	91.7	-	-
48:45	49.3	(51.2)	56.1	-	-
52:51	81.6	86.8	78.0	-	-
54:55	60.0	54.3	52.0	-	-
61:60	-	-	119.2	-	113.6
63:62	-	-	93.0	-	87.5

Table 5. Individual skull measurements and indices – Females

5. táblázat. Egyéni koponyaméretek és jelzők – nők

Table 6. Individual postcranial measurements and the stature – Males (page 144–145)
6. táblázat. Egyéni hosszúcsont-méretek és a becsült testmagasság – férfiak (144–145. oldal)

Martin No.		*Grave 1.*		*Grave 3.*		*Grave 7.*		*Grave 17.*		*Grave 18.*			
		d	s	d	s	d	s	d	s	d	s		
Clavicula	*1.*	151	157	-	150	-	150	153	-	155	149		
	6.	41	41	-	41	-	43	43	-	42	42		
	6:1	27.1	26.1	-	27.3	-	28.6	28.1	-	27.1	28.2		
Humerus	*1.*	304	302	328	-	-	320	314	310	329	327		
	2.	301	301	323	-	-	318	307	304	324	322		
	4.	59	60	66	-	-	52	65	62	67	65		
	7.	64	62	67	63	68	65	65	63	66	65		
	7:1	21.1	20.5	20.4	-	-	20.3	20.7	20.3	20	20		
Radius	*1.*	232	235	254	-	-	-	-	230	(257)	252		
Ulna	*1.*	-	255	274	-	-	-	253	-	275	270		
Femur	*1.*	419	425	441	443	454	447	416	(416)	(438)	(438)		
	2.	415	416	437	439	448	442	416	-	(436)	-		
	6.	27	27	27	28	30	31	29	28	29	29		
	7.	27	27	28	28	28	28	29	31	27	27		
	8.	84	84	85	87	92	91	90	92	86	86		
	9.	34	34	34	35	34	32	35	35	36	34		
	10.	25	25	25	26	28	29	27	27	27	27		
	19.	48	48	45	46	48	50	47	48	-	-		
	21.	-	82	(79)	82	82	82	82	-	-	-		
	8:2	20.2	20.2	19.4	19.8	20.5	20.6	21.6	-	19.7	-		
	6:7	100	100	96.4	100	107.1	110.7	100	90.3	107.4	107.4		
Tibia	*1.*	322	328	360	-	330	355	320	-	-	-		
	1b	320	324	357	-	330	352	321	(321)	-	-		
	3.	72	71	74	-	75	72	75	-	-	-		
	8a	33	32	34	35	34	33	35	37	35	36		
	9a	23	23	22	22	24	23	23	22	22	22		
	10b	75	72	74	72	-	76	73	74	72	72		
	10b:1	23.3	21.9	20.6	-	-	21.4	22.8	-	-	-		
Fibula	*1.*	-	327	352	-	340	-	-	319	-	-		
Coxa	*17a*	(100)	-	-	-	-	-	-	-	-	-		
	15a	(99)	-	-	-	-	-	-	-	-	-		
	17a:15a	(101)	-	-	-	-	-	-	-	-	-		
	14.1.	42	44	-	-	-	-	-	-	-	-		
	31.	32	33	-	-	-	-	-	-	-	-		
	14.1.:31	131.3	133.3	-	-	-	-	-	-	-	-		
Body proportion	*C1:H2*	50.2	52.2	-	-	-	47.2	49.8	-	47.8	(46.3)		
	R1:H2	77.1	78.1	78.6	-	-	-	-	75.6	(79.3)	(78.3)		
	T1b:F2	77.1	77.8	81.7	-	73.7	79.6	77.2	-	-	-		
Stature	*Sjøvold*	159.1		167.4		167.2		(159.6)		(168.7)			
	Bernert	162.1		167.9		166.9		(160.9)		(167.0)			

Martin No.		*Grave 28.*		*Grave 29.*		*Grave 33.*		*Grave 41.*		*Grave 51.*		*Grave 59.*	
		d	s	d	s	d	s	d	s	d	s	d	s
Clavicula	*1.*	-	149	-	-	151	-	145	143	148	141	144	140
	6.	-	33	-	-	43	40	41	41	42	41	39	38
	6:1	-	22.1	-	-	28.5	-	28.3	28.7	28.4	29.1	27.1	27.1
Humerus	*1.*	311	307	316	314	-	317	-	332	330	325	299	295
	2.	304	300	314	310	-	310	-	-	322	320	297	291
	4.	63	65	63	62	-	64	64	65	65	65	55	55
	7.	59	59	65	66	64	60	62	62	66	66	59	58
	7:1	18.9	19.2	20.6	21	-	-	-	18.7	20	20.3	19.7	19.7
Radius	*1.*	(236)	238	238	239	(244)	(247)	259	260	240	237	(231)	-
Ulna	*1.*	-	260	-	261	-	-	286	289	262	257	(245)	-
Femur	*1.*	428	426	430	428	(430)	436	456	433	445	448	415	409
	2.	425	424	424	425	(420)	429	454	433	444	445	412	405
	6.	25	24	26	28	28	30	28	28	35	32	27	27
	7.	27	27	25	28	28	29	28	29	28	29	25	26
	8.	80	78	82	84	85	89	89	87	97	94	82	85
	9.	32	32	34	38	35	35	35	35	31	31	35	35
	10.	27	29	25	26	25	26	24	26	27	26	27	27
	19.	49	48	51	50	47	48	49	48	50	50	44	44
	21.	80	79	-	83	81	81	78	(80)	82	82	75	75
	8:2	18.8	18.4	19.3	19.7	20.2	20.7	19.6	20.1	21.8	21.1	19.9	21
	6:7	92.6	88.9	104	100	100	103.4	100	96.5	125	119.2	108	103.8
Tibia	*1.*	326	325	346	348	335	-	374	374	359	362	330	337
	1b	324	322	342	342	333	-	373	371	358	360	328	331
	3.	75	73	78	78	75	-	74	80	78	76	69	69
	8a	32	33	36	38	33	34	32	31	36	38	34	33
	9a	20	21	28	26	25	26	23	23	23	23	25	25
	10b	69	68	79	79	78	72	68	68	70	72	70	71
	10b:1	21.2	20.9	22.8	22.7	23.3	-	18.2	18.3	19.5	19.9	21.2	21.1
Fibula	*1.*	327	-	-	342	-	-	363	367	308	308	327	331
Coxa	*17a*	97	96	-	91	-	-	-	-	95	98	-	-
	15a	94	98	-	74	-	-	-	-	92	93	-	-
	17a:15a	103.2	97.9	-	122.9	-	-	-	-	103.7	105.4	-	-
	14.1.	39	39	38	38	38	38	-	-	40	40	38	39
	31.	37	36	30	28	30	32	-	-	40	36	41	43
	14.1.:31	105.4	108.3	126.7	135.7	126.7	118.7	-	-	100	111.1	92.7	90.7
Body proportion	*C1:H2*	-	49.7	-	-	-	-	-	-	45.9	44.1	48.5	48.1
	R1:H2	(77.6)	79.3	75.8	77.1	-	79.7	-	-	74.5	74.1	(77.8)	-
	T1b:F2	76.2	76.1	80.7	80.4	(79.3)	-	82.1	85.7	80.6	80.9	(79.6)	81.7
Stature	*Sjøvold*	(160.5)		163.3		(164.1)		171.4		167		(157.5)	
	Bernert	(164.9)		165.2		(166.4)		170.7		168.4		(164.7)	

Table 7. Individual postcranial measurements and the stature – Females (page 146–150)
7. táblázat. Egyéni hosszúcsont méretek és a becsült testmagasság – nők (146–150. oldal)

Martin No.		*Grave 12.*		*Grave 14.*		*Grave 20.*		*Grave 25/I.*	
		d	s	d	s	d	s	d	s
Clavicula	*1.*	143	-	-	131	(144)	(145)	-	-
	6.	30	30	-	32	32	33	-	-
	6:1	20.9	-	-	24.4	(22.2)	(22.7)	-	-
Humerus	*1.*	277	-	289	-	-	-	-	-
	2.	275	-	285	-	-	-	-	-
	4.	55	53	-	-	-	-	-	-
	7.	51	50	52	51	59	59	-	-
	7:1	18.4	-	18	-	-	-	-	-
Radius	*1.*	(216)	(216)	-	(209)	-	-	-	-
Ulna	*1.*	-	232	-	-	-	-	-	-
Femur	*1.*	395	394	385	385	-	-	-	398
	2.	391	389	(382)	383	-	-	-	393
	6.	24	23	22	23	26	26	21	21
	7.	23	23	24	25	24	25	22	23
	8.	72	70	74	74	79	78	67	68
	9.	27	28	34	33	33	32	26	27
	10.	23	23	25	23	25)	25	20	20
	19.	41	41	42	42	43	44	-	42
	21.	70	71	-	-	-	-	-	67
	8:2	18.4	17.9	19.4	19.3	-	-	-	17.3
	6:7	104.3	100	91.6	92	108.3	104	95.4	91.3
Tibia	*1.*	312	312	-	-	-	-	311	310
	1b	311	310	-	-	-	-	311	(309)
	3.	65	64	-	-	-	-	-	62
	8a	28	27	25	25	34	32	25	25
	9a	18	18	18	19	22	21	17	17
	10b	60	60	58	59	65	62	57	58
	10b:1	19.2	19.2	-	-	-	-	18.3	18.7
Fibula	*1.*	313	310	-	-	-	-	-	-
Coxa	*17a*	-	-	-	-	-	-	-	-
	15a	-	-	-	-	-	-	-	-
	17a:15a	-	-	-	-	-	-	-	-
	14.1.	30	29	-	-	-	38	-	-
	31.	40	35	-	-	-	46	-	-
	14.1.:31	75	82.8	-	-	-	82.6	-	-
Body proportion	*C1:H2*	52	-	-	-	-	-	-	-
	R1:H2	(78.5)	-	-	-	-	-	-	-
	T1b:F2	79.5	79.7	-	-	-	-	-	78.6
Stature	*Sjøvold*	(152.2)		(151.7)		-		150.6	
	Bernert	(159.9)		(159.5)		-		160.1	

Martin No.		*Grave 26.*		*Grave 27.*		*Grave 32.*		*Grave 36.*	
		d	s	d	s	d	s	d	s
Clavicula	*1.*	-	125	-	136	137	137	-	137
	6.	27	27	29	28	32	33	-	38
	6:1	-	21.6	-	20.6	23.3	24.1	-	27.7
Humerus	*1.*	300	-	-	303	289	289	-	319
	2.	294	-	-	(299)	284	284	-	313
	4.	54	-	-	-	57	58	60	60
	7.	50	49	54	55	55	55	63	63
	7:1	16.7	-	-	-	19	19	-	19.7
Radius	*1.*	-	(234)	-	-	218	218	-	-
Ulna	*1.*	-	-	-	-	238	237	262	261
Femur	*1.*	416	419	420	416	404	399	428	431
	2.	409	413	414	410	400	397	425	427
	6.	24	23	26	25	24	24	28	26
	7.	21	22	25	25	24	25	29	29
	8.	69	69	78	78	74	76	87	88
	9.	27	26	30	30	31	31	35	34
	10.	22	22	23	24	25	25	27	25
	19.	41	41	-	41	43	43	47	46
	21.	(70)	(71)	-	-	73	73	80	78
	8:2	16.8	16.7	18.8	19	18.5	19	20.5	20.6
	6:7	114.3	104.5	104	100	100	96	96.5	89.6
Tibia	*1.*	-	339	-	(341)	-	320	342	350
	1b	-	337	341	(340)	318	318	344	345
	3.	68	67	-	-	(68)	70	75	74
	8a	26	24	30	30	27	28	30	33
	9a	19	19	22	21	23	20	21	22
	10b	61	59	66	68	64	64	71	72
	10b:1	-	17.4	-	19.9	-	20	20.7	20.5
Fibula	*1.*	-	-	-	-	315	317	350	-
Coxa	*17a*	-	-	-	-	104	102	-	-
	15a	-	-	-	-	82	83	-	-
	17a:15a	-	-	-	-	126.8	122.9	-	-
	14.1.	31	32	-	-	35	34	34	35
	31.	39	41	-	-	33	34	42	40
	14.1.:31	79.5	78	-	-	106.1	100	80.9	87.5
Body proportion	*C1:H2*	-	-	-	(45.5)	48.2	48.2	-	43.7
	R1:H2	-	-	-	-	76.7	76.7	-	-
	T1b:F2	-	(81.6)	82.4	(82.9)	79.5	80.1	80.9	80.8
Stature	*Sjøvold*	(159.3)		(159.4)		154.5		162.3	
	Bernert	(165.3)		(165.6)		161.5		165.1	

Martin No.		*Grave 37.*		*Grave 39.*		*Grave 43.*		*Grave 46.*	
		d	s	d	s	d	s	d	s
Clavicula	*1.*	-	-	-	-	-	-	154	153
	6.	-	-	-	-	-	-	30	30
	6:1	-	-	-	-	-	-	19.5	19.6
Humerus	*1.*	-	-	308	298	272	254	317	(315)
	2.	-	-	303	294	266	251	314	(309)
	4.	-	-	57	55	51	53	55	54
	7.	54	54	58	58	48	49	53	52
	7:1	-	-	18.8	19.5	17.6	19.3	16.7	(16.5)
Radius	*1.*	-	234	-	-	208	210	(249)	-
Ulna	*1.*	-	251	-	233	226	226	(266)	(263)
Femur	*1.*	-	(408)	419	423	381	383	422	416
	2.	-	(406)	417	421	371	379	419	413
	6.	24	25	26	25	22	23	24	24
	7.	24	25	24	24	21	22	25	26
	8.	73	76	76	75	67	68	75	76
	9.	29	30	30	31	26	27	33	33
	10.	20	23	23	23	21	22	21	23
	19.	41	41	41	41	41	41	42	42
	21.	-	-	70	71	73	73	72	72
	8:2	-	(18.7)	18.2	17.8	18.1	17.9	17.9	18.4
	6:7	100	100	108.3	104.2	104.7	104.5	96	92.3
Tibia	*1.*	-	-	331	341	304	307	345	345
	1b	-	-	333	339	303	306	341	339
	3.	-	-	(67)	68	67	69	67	68
	8a	29	(28)	30	30	26	26	30	31
	9a	20	(19)	22	23	19	20	20	20
	10b	61	-	70	72	57	57	67	68
	10b:1	-	-	21.1	21.1	18.7	18.6	19.4	19.7
Fibula	*1.*	-	-	-	-	305	308	343	-
Coxa	*17a*	-	-	-	-	-	-	-	-
	15a	-	-	-	-	-	-	-	-
	17a:15a	-	-	-	-	-	-	-	-
	14.1.	-	-	33	31	31	32	-	-
	31.	-	-	-	-	53	53	-	-
	14.1.:31	-	-	-	-	58.5	60.4	-	-
Body proportion	*C1:H2*	-	-	-	-	-	-	48.6	(49.5)
	R1:H2	-	-	-	-	78.2	83.7	(79.3)	-
	T1b:F2	-	-	79.8	80.5	81.7	80.7	81.4	82.1
Stature	*Sjøvold*	(159.8)		159.4		149.7		(162.6)	
	Bernert	(163.9)		165.4		157.9		(166.1)	

Martin No.		*Grave 48.*		*Grave No. 53.*		*Grave No. 54.*		*Grave No. 55.*	
		d	s	d	s	d	s	d	s
Clavicula	*1.*	-	120	127	128	-	137	145	(148)
	6.	31	30	28	28	-	30	26	23
	6:1	-	25	22	21.8	-	21.9	26.5	(24.2)
Humerus	*1.*	288	287	(280)	-	313	316	-	-
	2.	283	286	(275)	-	310	310	-	-
	4.	-	51	-	-	57	57	-	-
	7.	50	49	45	45	55	54	-	-
	7:1	17.4	17.1	(16.1)	-	17.6	17.1	-	50
Radius	*1.*	215	(210)	(234)	-	242	243	-	(235)
Ulna	*1.*	232	-	-	-	261	258	-	(246)
Femur	*1.*	393	394	393	401	447	448	420	424
	2.	390	389	390	395	443	444	417	421
	6.	22	22	21	23	28	27	25	25
	7.	22	24	21	21	25	25	27	28
	8.	68	70	65	67	82	81	80	81
	9.	28	29	28	29	31	31	32	33
	10.	20	22	22	21	27	27	23	24
	19.	41	41	39	(39)	43	43	41	41
	21.	(74)	75	-	-	75	75	74	73
	8:2	17.4	18	16.6	16.9	18.5	18.2	19.2	19.2
	6:7	100	91.7	100	109.5	112	108	92.6	89.3
Tibia	*1.*	320	320	310	(308)	353	353	335	337
	1b	318	318	309	307	351	350	334	(335)
	3.	70	-	-	-	66	67	68	(68)
	8a	28	28	27	27	32	31	30	30
	9a	21	22	20	19	22	24	20	20
	10b	62	61	57	57	69	68	56	59
	10b:1	19.4	19.1	18.4	(18.5)	19.5	19.3	16.7	17.5
Fibula	*1.*	-	309	-	-	344	342	335	341
Coxa	*17a*	93	89	-	-	98	-	-	-
	15a	79	78	-	-	90	-	-	-
	17a:15a	117.7	114.1	-	-	108.9	-	-	-
	14.1.	34	31	-	-	33	33	31	32
	31.	42	44	-	-	41	42	42	(46)
	14.1.:31	80.9	70.4	-	-	80.5	78.6	73.8	(69.6)
Body proportion	*C1:H2*	-	41.9	(46.2)	-	-	44.2	-	-
	R1:H2	75.9	73.4	(85.1)	-	78.1	78.4	-	-
	T1b:F2	81.5	81.7	79.2	77.7	79.2	78.8	80.1	(79.6)
Stature	*Sjøvold*	-		(152.5)		165.3		(159.7)	
	Bernert	-		(159.9)		170.1		(161.0)	

Martin No.		*Grave No. 56.*		*Grave No. 57.*		*Grave No. 63.*		*Grave No. 64.*	
		d	s	d	s	d	s	d	s
Clavicula	*1.*	130	125	136	-	150	(150)	138	-
	6.	24	24	30	-	31	30	32	31
	6:1	18.5	19.2	22	-	20.7	(20)	23.2	-
Humerus	*1.*	277	276	-	-	(299)	-	-	-
	2.	272	274	-	-	(295)	-	-	-
	4.	50	51	-	-	57	60	54	53
	7.	51	52	46	47	58	56	51	50
	7:1	18.4	18.8	-	-	(19.4)	-	-	-
Radius	*1.*	220	217	223	222	-	-	-	-
Ulna	*1.*	235	235	242	(240)	-	-	-	-
Femur	*1.*	396	390	389	396	414	(426)	430	435
	2.	393	387	387	395	412	(422)	428	432
	6.	25	23	25	24	26	25	29	29
	7.	22	22	26	25	28	28	25	25
	8.	70	68	78	75	82	82	86	88
	9.	27	27	31	30	34	34	28	27
	10.	20	20	21	20	24	23	24	25
	19.	41	41	42	41	45	-	44	43
	21.	71	71	76	73	(74)	77	-	77
	8:2	17.8	17.6	20.1	19	19.9	(19.4)	20.1	20.3
	6:7	113.6	104.5	96.1	96	92.8	89.3	116	116
Tibia	*1.*	318	319	310	316	335	335	328	-
	1b	318	318	311	313	-	-	327	-
	3.	66	65	74	67	-	-	73	72
	8a	27	27	27	26	31	32	30	30
	9a	19	20	21	20	21	22	23	22
	10b	60	60	62	61	70	69	70	70
	10b:1	18.9	18.8	20	19.3	20.9	20.6	21.3	-
Fibula	*1.*	-	315	307	310	335	-	-	-
Coxa	*17a*	90	91	102	103	-	-	88	-
	15a	79	76	85	81	-	-	86	-
	17a:15a	113.9	119.7	120	127.2	-	-	102.3	-
	14.1.	31	31	35	34	-	-	34	36
	31.	46	46	40	42	-	-	35	35
	14.1.:31	67.4	67.4	87.5	80.9	-	-	97.1	102.8
Body proportion	*C1:H2*	47.8	45.6	-	-	(50.8)	-	-	-
	R1:H2	80.9	79.2	-	-	-	-	-	-
	T1b:F2	80.9	82.2	80.4	79.2	-	-	76.4	-
Stature	*Sjøvold*	152.1		d		(158.5)		161.3	
	Bernert	160.4		(159.8)		(164.8)		167.5	