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CRANIOMETRIC CHARACTERISTICS OF SOME EARLY MEDIEVAL SKELETONS FROM BOROVCE (PIEŠŤANY DISTRICT, SLOVAKIA) CONNECTED WITH ALLOCHTHONIC SPUR WITH A BUCKLE FOR TYING: A MULTIVARIATE ANALYSIS (PCA)

ABSTRACT: Anthropological and statistical analysis was applied to a group of skeletons (six adults and four infants) from an early medieval burial site at Borovce (district of Piešťany, Slovakia), connected chronologically and locally with burial 221/92 that contained atypical spurs with a buckle for tying. The morphological similarity, based on craniometric relationships among the individuals of that group and a part of the remaining burial site, was analysed using principal component analysis (PCA) which, however, did not reveal any allochthonic influences.

KEY WORDS: Early Middle Ages – Skulls – Metrics – Principal component analysis – Atypical artefacts

INTRODUCTION

Long-term archaeological investigations at Borovce have been under way since 1986, with several interruptions. The study site is over 8,000 m^2 in area (Staššíková-Štukovská 2005). By 2005, altogether 440 discovered burials have been analysed in the Department of Anthropology of the Natural History Museum, Slovak National Museum.

As regards history and geography, the burial site lies in an area inhabited, from the 6th century AD onwards, mainly by Slavs. According to the present concepts, they started inhumating their dead at the turn of the 8th and 9th centuries AD. Therefore, the beginning of the burials in the study site is placed roughly to the 8th century and their end to the first half of the 12th century AD. A more precise dating of its beginning is the topic of an ongoing research (Staššíková-Štukovská 2001, 2005). Early Middle Ages are the major topic of the research, but the finds come from various time horizons from the Neolithic up to the 13th century AD.

MATERIAL

The present paper concentrates on anthropological analysis of a group of 10 burials from the site at Borovce, chronologically and geographically connected with burial 221/92 that contained spurs with buckles for tying, rarely found in early medieval burials in Slovakia and Moravia.

The spurs of this type end in a rectangular buckle. As regards the production and way of fastening, spurs of this type differ from most Great Moravian ones found in central Europe. Among the 55 localities that yielded spurs in Slovakia, hybrids spur forms occurred, besides Borovce, in finds made at Pobedim (Bialeková 1977). Of the total 43 specimens of medieval spurs found in that locality, only one ended in a buckle for tying (Bialeková 1977). In the burial site at Borovce, spurs occurred in seven burials, but the pair of spurs ending in a buckle for tying was only found in burial 221.

In Moravia, this type of spur occurred in two localities, viz., in burial 1750 at Mikulčice–Kostelisko (Klanica 1985) and in burial 14 in Olomouc–Slavonín (Kouřil 2001).

Spurs with a buckle for tying also occur in localities in Dalmatia, Croatia. Within the European burials in that country, their concentration is greater in terms of numbers and frequency of occurrence, accounting for a third of approximately a hundred spurs found (Jakovac 1997, Kouřil 2001). A less important geographic centre of occurrence of these spurs lies in the environs of Lake Balaton, where they were found in six localities (Kouřil 2001).

The occurrence of spurs with buckle for tying is probably connected with the earliest horizons of Great Moravian skeletal cemeteries, that is, with the late 8th and the first third of the 9th centuries AD.

The Croatian finds make it possible to consider a still earlier dating (for example, burial no. 1 at Biskupija near Knin also contained two gold solids of the Byzantine emperor Konstantin V Kopronymos and his son Leo IV, coined in Syracuse, Sicily, between 760 and 775), even though there are different opinions on the dating of that burial (Werner 1978/79).

Opinions on the origin of the type of spurs with a buckle for tying differ (Wachowski 1992, Kouřil 2001). In the late 9th and the 10th centuries, spurs showing the type of ending described above occur in burials in the north of Europe (Kind 2002). The way of fastening them with a buckle for tying is typical of Medieval and New Age spurs in the 13th to 16th centuries (without any documented relation to a concrete cultural environment), as the buckle for tying is obviously the perfect way of fastening them.

The spurs from burial 221 at Borovce are an important source for the genesis and true interpretation of the spurs with buckle for tying, particularly for the complicated ethnic and cultural situation in the late 8th and early 9th centuries AD in central Europe. Besides the spurs and other equipment and grave goods of the buried individual, the burial shows a combination of still not examined features, such as the surface modification of the grave in a circular, probably timber building, the niche grave of the "podmola" type. It may be the result of interactions of different cultural environments.

Around burial 221, the remaining ones are conspicuously concentrated, showing a characteristic orientation that differs from the more southern but identically dated parts of the burial site. Although the evaluation of finds from the Borovce burial site has not yet been finished, the available analytical results unequivocally show that burial 221 and the ones lying closest to it form a distinct horizon dating of the late 8th and the first half of the 9th centuries AD, that is a transition period between the earlier and middle phases of burials.

The burials 221/92, 222/92, 223/92, 234/92, 239/92, 244/92, 245/92, 254/92, 256/92, and 303/92 were selected for analysis because of the possible occurrence of allochthonic southern European elements in the Borovce skeleton population. In case that more marked differences should be detected between the autochthonous and allochthonic populations, there could even occur certain anatomical differences between their somatic characteristics. The present contribution is connected with a paper by D. Staššíková-Štukovská (in prep.).

METHODS

Anthropological analysis

The skeletal remains were subjected to morphoscopic and morphometric analyses (Martin, Saller 1957, Knussmann 1988). Basically, their sex and age were evaluated using the complex method of Acsádi and Nemeskéri (1970), taking into account the recommendations of Ferembach *et al.* (1979). The degree of development of sexual diagnostic characters was determined according to Acsádi and Nemeskéri (1970) using degrees of sexualisation (DS), ranging between –2 (hyper-feminine characters) and +2 (hyper-masculine characters). To precise the sexing of the group of individuals underlying the present paper, we employed the COMPUTSEX programme (Houët *et al.* 1999) based on pelvic dimensions, as the shape and dimensions of the pelvis are among the most reliable sex diagnostic characters (Bruzek 2002). Body height was estimated according to Manouvrier (1893), Pearson (1899), Telkkä (1950), Breitinger (1937), Bach (1965), Olivier *et al.* (1978), and Sjøvold (1990). The MANDAT anthropological computer software (Gašparovič *et al.* 1999) was used for processing the morphometric data.

Statistical analysis

Since the skull is considerably individual in terms of craniometrical characters (Schimmler *et al.* 1993), these characters showing a high degree of interpopulation differences (Lahr 1996), it was these characters which we used in the statistical analysis.

For a statistical comparison of the craniometrical data, we used multivariate analysis of the principal components (Principal Component Analysis, PCA) (Jolliffe 2002, Johnson, Wichern 1999, Mardia *et al.* 2000), realised by means of the S-Plus 4.5 computer programme (Vanables, Ripley 2000). This statistical procedure makes it possible to examine the structure of data variability without any bias due to clustering. In this, the procedure differs from those of discriminant analyses in which each individual is included (successfully or unsuccessfully) in a pre-created group on a certain probability level (Pinhasi, Semal 2000).

The PCA is a multidimensional statistical method serving to reduce the number of variables, in our case the number of measured characteristics participating in the variability of the assemblage under study (Vanables, Ripley 2000). The point is to find such linear combination of the original variables so that the new variables, i.e. the sample principal components (PC), being independent, their number smaller than that of the original variables, and their rank determined on the basis of decreasing sample

variance (Holcová, Maslowská 1994). As a rule, the PCA works with standardized variables (z-score) that have no physical dimension and have a zero mean and unit variance (Zvára 1999).

Our computations are based on the craniological database obtained from 112 individuals (51 males, 57 females, and 4 individuals of unidentified sex), exhumed during the diggings on the burial site until 1992, denoted as "Group".

"Group A", discovered around burial 221/92, consists of 6 adults (males 221/92, 222/92, 254/92, individuals of undetermined sex 223/92, 239/92, 244/92) and 4 infants (234/92, 245/92, 256/92, and 303/92).

As our anthropological analyses showed, the important individual with spurs with a buckle for tying, 221/92, was a male, we compared it – and additional two male skeletons in the selected "Group A" – with the male part of database B. In the selected group, it was impossible to identify unequivocally the sex of another three individuals that, therefore, were not included in the subsequent statistical analyses. Even the infantile specimens were excluded from the statistical analyses, as it was impossible to estimate reliably their sex and age and, moreover, their skull dimensions could not be compared with those of adults.

The skull dimensions accounted for 68 variables. The computation was carried out using two factors. Factor 1 consists of divided databases into "Group A", the rest of the database being denoted as "Group B". Sex is factor 2. As mentioned above, we have limited our analyses to the male sex only.

First, according to Bräuer (1988), we divided the variables into 16 categories from which we formed the following six groups:

Group 1: neurocranium (length and height);
Group 2: neurocranium (height, circumference, arches, chords, and perpendicular lines);
Group 3: facial part of skull (lengths, widths, heights);
Group 4: facial part of skull (dimensions in the orbital and nasal region);
Group 5: facial part of skull (dimensions of maxilla and mandible);
Group 6: facial part of skull (angles).

The computations were carried out at one time in all other character groups, attention being paid to individuals showing extreme variable values in which they differed from other individuals. The separation of variable values made it possible to specify more closely the metric differences between the groups under study.

Individuals missing some of the above data were left in the database, but those who lacked more than ¼ of the characters in a given group were excluded. Analogically, if a variable lacked more than ¼ data it was also excluded from further analyses. If an individual or a variable lacked less than ¼ characters, the missing characters were supplemented by ordinary least-square estimators, computed from individuals that showed no lacking values of particular variable.

The PCA included those principal components that explained the variability to over 90%. The results were illustrated in biplots and scatter plots (Gabriel 1971) and in bar plots of correlation coefficients of dimensions in the respective groups and their respective PC.

RESULTS AND DISCUSSION

Morphoscopic analysis of Group A skeleton remains

Burial 221/92

Preservation: Almost a whole skeleton showing a rather high degree of decomposition. The most preserved skull parts included jaws with nearly complete dentition; of the post-cranial skeleton, above all, the diaphyses of long bones and damaged parts of the pelvis. Irregular, almost totally black blotches occur in some of the bones (sacral bone, pelvis).

Morphological characteristics: Fragmentary, robust cranium with mighty muscular relief (MR), glabella +1, *margo supraorbitalis* slightly rounded (+1), *processus retromarginalis* big (+2), *margo inferior aperturae piriformis* of anthropine form, *fossae caninae* deep. The preserved parts of *sutura sagittalis* and *s. lambdoidea* open. Mandible defective, robust, with medium muscle relief, chin prominent in lateral view, with a broad edge in inferior view, *planum alveolare* and *mentum* visible in superior view. Simple *foramina mentalia* below P2, *spina mentalis* spine-shaped, mandibular angles everted, form of dental arch of mandible intermediate between parabolic and U-shaped. Most teeth show degree 1 of abrasion (cusps worn off). Of the total number of permanent teeth, six are carious (molars). Teeth in both jaws show hypoplastic changes of enamel (most distinct on upper incisives). Incisives markedly spatulate, dental calculus present mainly on incisives of the mandible. *Trigonum mentale* – bilateral protuberance (+2), *corpus mandibulae* in the area of M2 thick (+1), mandibular angles with moderate eminences (0), *processus mandibulae* large (+1).

Fragmentary, robust vertebrae (2? cervical, 4? thoracic, 4? lumbal), a fragment of the proximal part of the sacral bone (bilateral sacralisation of L5), fragments of medium robust ribs.

Medial epiphyses fusing with clavicles, the right one more arched than the left one, the left one longer, fragments of scapula. Right humerus fragmentary, left one defective, on the left a *perforatio septi humeri*. Both radii defective, right ulna fragmentary, the left one defective, fragmentary carpal and metacarpal bones.

Pelvis defective, of medium structure, great sciatic notch +1?, pubic angle 72° ? (+1), *arc composé* in the form of a fluently joining arch, lower edge of ischio-pubic ramus steeply bending into the *crista phallica*, *ramus superior ossis pubis* prismatic, relief of symphysis –1.

Femora damaged to fragmentary, robust to medium robust, with a medium muscle relief, epiphyses synostosed, *crista*

hypotrochanterica, *linea aspera* medium, bilaterally marked (0). Long bones of foreleg damaged to fragmentary.

Metric characteristics (mm), see *Table l.*

Deviations and pathological changes: Incisors shovel-shaped, hypoplastic changes of tooth enamel, dental calculus, bilateral sacralisation of L5, latero-posterior region of left ulna with a groove in the proximal metaphysis, resembling an incision perpendicular to the bone axis (6 by 1 mm).

Conclusion: Judging from the degree of sexualisation (DS) of the skull (+ 1.2), the post-cranial skeleton (+ 1.0), and the rather robust skeleton structure, this was a tall male (ca 171 cm) who died at the adult I age (20–30 years). The method of determining sex according to Houët *et al.* (1999) could not be applied.

Burial 222/92

Preservation: Almost complete damaged skeleton.

Morphological characteristics: Cranium medium robust, damaged, with medium MR, *norma verticalis* ovoid, *norma occipitalis* medium high arch with parallel walls, base twice vaulted, glabella +1, *arcus superciliaris* arched (+1), *margo supraorbitalis* rounded (+2), *tubera frontalia* indicated, *frons* declining, *tubera parietalia* indicated, *foramen parietale* on the left, at pterion a broad *sutura sphenoparietalis*, occiput elongate, *protuberantia occipitalis externa* moderate (0), surface of *squama ossis occipitalis* with marked nuchal lines and occipital crest (+1), *processus mastoidei* large (+1), *arcus zygomaticus* very thick (+2), *processus retromarginalis* large (+1), *margo inferior aperturae piriformis* of anthropine form, *fossae caninae* deep, *torus palatinus* indicated.

Mandible undamaged, medium robust to robust, with mighty MR, chin prominent in lateral view, a fluent arch from below, *planum alveolare* and *mentum* visible in superior view. *Foramina mentalia* simple, *spina mentalis* spine-shaped, mandibular angles everted, dental arch of mandible parabolical, tooth wear degree 2 to 4. Of the total 32 permanent teeth, three are carious, three lost ante mortem, dental calculus weak. *Trigonum mentale* with bilateral protuberances (+2), *corpus mandibulae* thick (+1), mandibular angles with marked eminences (+1), *processus articularis mandibulae* large (+1).

Vertebrae are damaged, medium robust to robust, medium-sized. Supernumerary lumbal vertebra L6 is synostosing, through a pseudo-arthrosis, with undamaged, narrow and high sacrum that consists of the normal number of five vertebrae. Damaged sternum, damaged robust ribs, undamaged medium robust clavicles with medium MR, strongly curved.

Damaged, fragmentary, medium robust scapulae, robust humeri with mighty MR, medium robust to robust radii with medium MR, undamaged robust to medium robust ulnae with mighty MR.

Medium robust pelvic bones with medium MR. Pelvis as a whole high and abrupt (+1), *aditus pelvis* circular, medium broad (0), *obturator foramen* intermediate (+1), great sciatic notch +1, pubic angle +1, ischio-pubic index +1, *sulcus praeauricularis* narrow and shallow, *arc composé* in form of a fluently joining arch, the shape of the lower edge of the ischio-pubic ramus steeply bending in *crista phallica*, *ramus superior ossis pubis* resembling a saddle roof, *facies auricularis* forms a sharper angle without any constriction, *tuberculum musculi piriformis* heavily indicated. Relief of *symphysis ossis pubis* III.

Undamaged femora robust, with mighty MR, epiphyses synostosed, *trochanter tertius* very small, *crista hypotrochanterica*, *linea aspera* narrow and high (+1). Long bones of foreleg undamaged, medium robust, with mighty MR.

Metric characteristics (mm), see *Table 1.*

Deviations and pathological changes: Degenerative changes (Schmorl's nodes, *spondylosis deformans*) of the vertebral column visible mainly in lumbal vertebrae, between sacrum and the supernumerary L6 a left-sided pseudo-joint.

Conclusion: Judging from the degree of sexualisation (DS) of the skull (+1.15), postcranial skeleton (+0.85), and the overall DS (+1.01), this was a tall male (ca 163 cm high) who died at the age maturus II (50–55 years). According to Houët *et al.* (1999) it was a man with a 1.00 probability.

Burial 223/92

Preservation: Almost complete, slightly damaged skeleton of an adult individual.

Morphological characteristics: Undamaged, medium robust and asymmetrical cranium with a medium MR. *Norma verticalis*: ovoid, *norma occipitalis*: medium high arch with tapering walls and twice vaulted basis, *norma frontalis*: angular. Glabella +1, *arcus superciliaris* arched (+1), *margo supraorbitalis* rounded (+2), *tubera frontalia* indistinct (+1), *frons* declining, *tubera parietalia* indistinct (+1), *sutura metopica* between orbits (5 mm), *os Incae totum* present, *sutura sphenoparietalis* broad, occiput oblong, *protuberantia occipitalis externa* poor (0), surface of *squama ossis occipitalis* with marked nuchal lines and occipital crest (+1), *processus mastoidei* medium (0), *arcus zygomatici* thick (+1) and *phenozygia*, *processus retromarginalis* large (+1), europoid orbitae squared (+2), facial relief medium marked, nasal bones biconcave, their profile convex in lower part, nasal prominence large, *margo inferior aperturae piriformis* of anthropine form, *spina nasalis anterior* 3, *fossae caninae* shallow, *torus palatinus* partly developed, *sutura palatina transversa* asymmetrical.

Mandible robust, undamaged, with mighty MR, chin prominent in lateral view, narrow parabola with a peak in the middle in inferior view, *planum alveolare* as well as *mentum* visible in superior view. *Foramina mentalia* bilaterally simple, *spina mentalis* elevated, mandibular angles everted, dental arch of maxilla semicircular, that of the mandible parabolic, anterior openbite, toothwear degree 1 to 2. Of the total 32 permanent teeth, two are carious, right I^2 anomalous in shape, left ^3M microdont peg-shaped.

Trigonum mentale inverted T in shape, protruding (+1), *corpus mandibulae* thick (+1), mandibular angles with marked eminences (+1), *processus articularis mandibulae* large (+1).

Vertebrae undamaged, gracile and medium-sized. *Spina bifida* in L5. Sacrum damaged, narrow and high. Sternum damaged, with a medium large, narrow and free *manubrium*, corpus medium long and narrow, with partial *fissura sterni*; ribs undamaged, medium robust to robust; clavicles damaged, medium robust, with medium MR, their curvature medium, epiphyses free.

Scapulae damaged, medium robust, their epiphyses not fused in *margo medialis*. Humera undamaged, medium robust, with medium MR and fusing epiphyses, bilateral *perforatio septi humeri*. Radii undamaged, medium robust, medium MR. Ulnae undamaged, medium robust, with medium MR and distinct *crista supinatoria*.

Pelvic bones medium robust, damaged, with medium MR. Pelvis as a whole high and abrupt (+1), *aditus pelvis* circular, medium broad (0), *foramen obturatum* oval, with rounded rim (+1), great sciatic notch +1, pubic angle +1, ischio-pubic index +1, *sulcus preauricularis* narrow and shallow, *arc composé* in a form of fluent arch, lower margin of *ischiopubic ramus* slightly and fluently everted, *ramus superior ossis pubis* resembling a saddle roof, *facies auricularis* at a sharper angle without constriction, *tuberculum musculi piriformis* heavily indicated. Relief of *symphysis ossis pubis* I.

Femora undamaged, medium robust to robust, with mighty muscle relief, epiphyses synostosed, *fossa hypotrochanterica*, *linea aspera* narrow and high (+1). Long bones of foreleg undamaged, medium robust, with medium MR.

Metric characteristics (mm), see *Table l*.

Deviations and pathological changes: Upper right I^2 deformed, upper left M^3 peg-shaped, L5 with *spina bifida*, partial *fissura sterni*, marked *crista supinatoria*.

Conclusion: Judging from the degree of sexualisation (DS) of the skull (+0.9), postcranial skeleton (+0.47), summed up (+0.69), and the more robust skeleton, it could be the case of a medium tall male (ca 164 cm) who died at age adultus I (20–25 years). According to Houët *et al.* (1999), basing on the dimensions of the left *os coxae*, there is a 0.97 probability that this is a man, yet basing on the dimensions of the right one, there is a 0.63 probability that it is a woman. Hence, the sex of individual 223/92 cannot be unequivocally determined.

Burial 234/92

Preservation: A damaged skeleton of a child with bone surfaces heavily disturbed.

Morphological characteristics: Skeleton gracile, weak muscle relief, *cribra orbitalia* and other pathological changes, *sutura metopica* obliterated.

Metric characteristics: Length of diaphysis of left tibia, 109? mm.

Conclusion: Judging from dental age (developmental degree of still not emerged permanent teeth), the age is ca 3 years. According to the length of measurable long bone diaphyses, this is l.5 years. It is a child that died at the age of 2–3 years (infans I).

Burial 239/92

Preservation: A damaged skeleton of an adult individual with a gracile skull and medium robust post-cranial skeleton.

Morphological characteristics: Calvarium damaged to fragmentary, gracile in structure, MR weak. *Norma verticalis*: pentagonoid, *norma occipitalis*: high vault with parallel walls and biconvex basis. Glabella –2, *arcus superciliaris* slightly delimited (–1), *margo supraorbitalis* sharp (–1), *tubera frontalia* medium-sized (–1), *frons* vertical, *tubera parietalia* medium-sized (–1), *sutura metopica* between the orbits, *sutura sphenoparietalis* broad, occipital region elongated, *protuberantia occipitalis externa* hardly visible (–1), surface of *squama ossis occipitalis* with distinct nuchal lines and occipital crest (0), *processus mastoidei* very small (–2), *arcus zygomaticus* medium thick (0), *processus retromarginalis* large (+1).

Mandible damaged, gracile, with weak MR, chin prominent in lateral view, narrow and blunt in inferior view, *planum alveolare* visible in superior view. *Foramina mentalia* simple bilaterally, *spina mentalis* flat, mandibular angles everted, tooth wear degree 3–4. Considerable ante mortem losses of teeth, many teeth carious, mandible showing senile resorption. *Trigonum mentale* inverted T in shape, protruding (+1), *corpus mandibulae* narrow (–1), mandibular angles with incipient eminences (–1), *processus mandibularis* large (+1). Indicated *cribra orbitalia*.

Vertebrae damaged, gracile and medium-sized. Sacrum damaged, very narrow and very high, containing one additional vertebra, while there are only five lumbar ones. Vertebrae L4, L5 and *processus articularis superior ossis sacri* show arthrotic changes. Sternum fragmentary, with a small *manubrium*, ribs fragmentary, gracile.

Clavicles gracile, damaged, with feeble MR and strongly curved, epiphyses free. Scapulae gracile, damaged; humeri undamaged, medium robust to robust, their MR medium to mighty; radii undamaged, medium robust, with a medium MR; ulnae damaged, medium robust, their MR medium.

Pelvic bones medium robust, damaged, with medium MR. Pelvis as a whole low and broad (–1), great sciatic notch –1, *sulcus praeauricularis* broad and deep, *arc composé* in form of two arches intersecting in imaginary lines, *facies auricularis* a rather obtuse angle with a constriction, *tuberculum musculi piriformis* feebly indicated.

Femora damaged, medium robust to robust, with a medium to mighty MR, *linea aspera* poor, delimited only laterally (–1). Long bones of foreleg damaged, medium robust, with a medium MR.

Metric characteristics (mm), see *Table 1*.

Deviations and pathological changes: Cranium in the lambda area flattened, dentition heavily worn and carious, without *cribra orbitalia*, degenerative changes particularly in the thoracic and lumbal vertebral column

TABLE 1. Craniometrics and postcranial dimensions (according to Bräuer 1988) in individuals of Group A (N – No data, M – male, X – gender not identifiable).

Cranium	**Grave No.**	**221/92**	**222/92**	**223/92**	**239/92**	**244/92**	**254/92**
	Gender	**M**	**M**	**X**	**X**	**X**	**M**
Dimensions/Indices							
g–op	1.	N	171	161	180	180	187
m–op	1c.	N	178	169	187	177	185
n–op	1d.	N	167	154	177	176	185
g–l	3.	N	171	170	172	173	178
n–ba	5.	N	102	98	95	98	107
ba–o	7.	N	35	33	34	36	40
eu–eu	8.	N	143	135	134	134	142
ft–ft	9.	N	92	92	94	92	104
co–co	10.	N	124	111	115	114	125
au–au	11.	N	125	120	121	126	129
ast–ast	12.	N	106	106	108	106	113
ms–ms	13.	N	103	91	101	106	107
For. magnum breadth	16.	N	N	32	30	31	31
ba–b	17.	N	134	126	133	133	137
po–b	20.	N	128	122	124	109	120
g–op–g arc	23.	N	530	494	521	512	536
po–b–po arc	24.	N	331	309	314	311	329
n.o arc	25.	N	378	373	385	376	378
n.b arc	26.	N	129	126	134	126	132
b.l arc	27.	N	131	131	130	134	121
l.o arc	28.	N	116	124	125	116	125
n–b	29.	N	127	108	113	103	112
b–l	30.	N	N	N	115	115	109
l–o	31.	N	115	98	98	96	102
ba–pr	40.	N	N	89	N	96	107
fmt–fmt	43.	N	98	98	102	99	107
fmo–fmo	43(1).	N	97	93	96	92	98
ek–ek	44.	N	N	94	N	94	98
zy–zy	45.	N	124	122	N	N	N
zm–zm	46.	N	93	90	N	96	93
n–gn	47.	N	N	108	N	117	N
n–pr	48.	N	N	62	N	66	72
mf–mf	50.	N	N	22	N	25	27
mf–ek	51.	N	N	38	N	39	39
Orbital height	52.	N	36	32	N	33	33
Nasal breadth	54.	26	23	21	N	25	27
n–ns	55.	N	N	45	N	51	53
Simotic chord	57.	N	N	N	N	N	12
pr–alv	60.	N	N	49	N	N	58
ekm–ekm	61.	N	56	62	N	61	63
ol–sta	62.	N	N	48	N	N	54
enm–enm	63.	N	38	39	N	40	N
kdl–kdl	65.	N	119	115	N	120	125
go–go	66.	105	103	103	N	93	108
Bimental breadth	67.	47	44	45	42	46	45
id–gn	69.	37	35	29	27	31	33
Ramus height	70.	72	58	62	63	56	64
Ramus breadth	71.	34	32	32	30	31	31
n–pr–OAE angle	72.	N	N	82	N	84	84

TABLE 1. Craniometrics and postcranial dimensions (according to Bräuer 1988) in individuals of Group A (N – No data, M – male, X – gender not identifiable). (Continued)

Cranium	**Grave No.**	**221/92**	**222/92**	**223/92**	**239/92**	**244/92**	**254/92**
	Gender	**M**	**M**	**X**	**X**	**X**	**M**
Dimensions/Indices							
n–ns–OAE angle	73.	N	N	84	N	84	87
ns–pr–OAE angle	74.	N	N	67	N	71	75
n–rhi–OAE angle	75.	N	N	62	N	N	N
Nasal angle	72.–75.	N	N	20	N	N	N
fmo–n–fmo angle	77.	N	146	130	N	138	129
Orbital slope angle	78.	N	N	93	N	98	98
Ramus angle	79.	130	115	123	123	112	126
Dental arc maxilla	80.	N	44	42	N	N	N
Dental arc mandible	80a.	61	41	43	N	N	N
Dental arc maxilla	80(1).	N	59	60	N	N	N
Dental arc mandible	80(1).	71	64	63	N	N	N
P^1 – M^3 length	80(2).	N	39	N	N	N	N
M^1 – M^3 length	80(3).	N	N	23	N	N	N
Fossa canina depth	FC	6	N	31	N	N	N
P^1 – M^3 length	N	32	N	22	N	N	N
DC	49a.	N	N	11	N	N	22
DS	49b.	N	121	132	N	N	13
zm' – ss – zm'	N	N	93	89	N	115	114
zm' – zm'	N	N	N	N	N	94	N
I 1		N	83.63	83.85	74.44	74.44	75.94
I 2		N	78.36	78.26	73.89	73.89	73.26
I 3		N	93.71	93.33	99.25	99.25	96.48
I 4		N	74.85	75.78	68.89	60.56	64.17
I 5		N	89.51	90.37	92.54	81.34	84.51
I 9		N	25.28	25.51	25.53	25.98	25.56
I 11		N	37.76	38.83	38.54	40.51	39.21
I 12		N	74.19	82.88	81.74	80.70	83.20
I 13		N	64.34	68.15	70.15	68.66	73.24
I 14		N	74.13	78.52	80.60	79.10	79.58
I 16		N	101.55	103.97	97.01	106.35	91.67
I 17		N	89.92	98.41	93.28	92.06	94.70
I 18		N	88.55	94.66	96.15	86.57	103.31
I 19		N	34.13	33.78	34.81	33.51	34.92
I 20		N	34.66	35.12	33.77	35.64	32.01
I 21		N	30.69	33.24	32.47	30.85	33.07
I 22		N	98.45	85.71	84.33	81.75	84.85
I 24		N	N	N	88.46	85.82	90.08
I 25		N	99.14	79.03	78.40	82.76	81.60
I 29		N	108.49	92.45	90.74	90.57	90.27
I 33		N	N	96.97	88.24	86.11	77.50
I 37		N	149.33	140.67	149.00	149.00	155.33
I 38		N	N	88.52	N	N	N
I 39		N	N	50.82	N	N	N
I 40		N	83.06	84.43	N	N	N
I 41		N	75.00	73.77	N	N	N
I 42		N	N	84.21	N	84.62	84.62
I 42(1)		N	N	31.15	N	N	N
I 42(2)		N	N	51.61	N	50.00	45.83
I 46a		N	N	23.40	N	26.60	27.55

TABLE 1. Craniometrics and postcranial dimensions (according to Bräuer 1988) in individuals of Group A (N – No data, M – male, X – gender not identifiable). (Continued)

Cranium	**Grave No.**	**221/92**	**222/92**	**223/92**	**239/92**	**244/92**	**254/92**
	Gender	**M**	**M**	**X**	**X**	**X**	**M**
Dimensions/Indices							
I 48		N	N	46.67	N	49.02	50.94
I 51(1)		N	18.55	17.21	N	N	N
I 54		N	N	126.53	N	N	108.62
I 55		N	45.16	50.82	N	N	N
I 56		N	N	55.06	N	N	54.21
I 58		N	N	81.25	N	N	N
I 60		N	N	90.82	N	97.96	100.00
I 61		N	N	106.33	N	N	N
I 63		47.22	55.17	51.61	47.62	55.36	48.44
I 64		N	86.55	89.57	N	77.50	86.40
I 67 maxilla		N	134.09	142.86	N	N	N
I 67 mandible		116.39	156.10	146.51	N	N	N
I 68		N	38.24	N	N	N	N
I 69		N	N	55.28	N	53.33	57.22
I 71		N	86.71	90.37	N	N	N
I 72		N	93.88	93.88	92.16	92.93	97.20
I 73a		N	74.19	75.41	N	N	N
I fronto–mandib.		N	111.96	111.96	N	101.09	103.85
I dacryal		N	N	N	N	N	59.00
I simotic		N	N	N	N	N	58.30

Postcranial dimensions												
Grave No.	**221/92**		**222/92**		**223/92**		**239/92**		**244/92**		**254/92**	
Gender	**M**		**M**		**X**		**X**		**X**		**M**	
Humerus	R	L	R	L	R	L	R	L	R	L	R	L
1.	N	337?	328	319	311	301	324	322	300	300	360	355
2.	N	N	323	316	308	297	320	318	295	N	357	N
5.	N	21?	22	22	20	20	23	22	20	19	27	26
6.	N	18?	18	17	15	16	18	18	17	16	20	19
7.	N	61?	62	62	58	56	67	63	61	59	74	70
8.	N	N	140	138	129	123	143	142	N	142	165	N
6:5.	N	85.7	81.8	77.3	75.0	80.0	78.2	81.8	85.0	84.2	74.0	73.0
7:1.	N	18.1	18.9	19.4	18.6	18.6	20.6	19.5	20.3	19.6	20.5	19.7
Radius												
1.	N	N	241	236	238	240	247	N	234	N	276	275
1b.	N	N	236	233	235	236	244	N	232	N	275	N
2.	N	N	228	227	227	228	233	N	222	227	260	259
3.	N	41?	40	41	39	37	46	N	38	38	46	45
4.	N	16?	17	17	14	14	17	16	16	14	20	20
5.	N	12?	12	12	10	11	11	11	10	10	12	13
3:2.	N	N	17.5	18.1	17.2	16.2	19.7	N	17.1	16.7	17.7	17.4
5:4.	N	75.0?	70.6	70.6	71.4	78.6	64.7	68.8	62.5	71.4	60.0	65.0
Ulna												
1.	N	N	263	262	259	259	N	263	N	N	295	295
2.	N	N	234	232	227	230	234?	233	N	N	258	258
3.	N	43?	39	41	35	34	34	33	36	29	43	42
11.	N	N	13	13	11	11	11	11	10	10	16	15

TABLE 1. Craniometrics and postcranial dimensions (according to Bräuer 1988) in individuals of Group A (N – No data, M – male, X – gender not identifiable). (Continued)

Postcranial dimensions												
Grave No.	**221/92**		**222/92**		**223/92**		**239/92**		**244/92**		**254/92**	
Gender	**M**		**M**		**X**		**X**		**X**		**M**	
12.	N	N	14	17	14	14	15	14	13	14	23	22
3:2.	N	N	16.7	17.7	15.4	14.8	14.5	14.1	N	N	16.6	16.2
11:12.	N	N	92.9	76.5	78.6	78.6	73.3	78.5	76.9	71.4	69.5	68.1
Femur												
1.	467?	N	409	41	425	428	443	444	N	434	491	494
2.	N	N	406	409	423	424	442	444	N	434	488	489
6.	27	28	29	29	26	26	28	28	26	27	32?	32
7.	26	27	27	28	25	25	30	30	28	30	29	30
8.	87	86	89	89	80	81	93	95	88	89	98	98
9.	30	31	31	30	31	29	36	35	32	32	32	33
10.	26	26	27	27	22	23	26	25	24	25	27	28
18.	N	N	45	45	41	41	44	44	47	47	54	53
19.	N	N	47	47	43	43	45	45	47	47	54	53
20.	N	N	151	150	136	136	146	145	151	N	173	169
28.	N	N	16	15	19	12	12	14	N	5	28	N
8:2.	N	N	21.9	21.8	18.9	19.1	21.0	21.4	N	20.5	20.1	20.0
(6+7):2.	N	N	13.8	13.9	12.1	12.0	13.1	13.1	N	13.1	12.5	12.7
6:7.	103.8	103.7	107.4	103.6	104.0	104.0	93.3	93.3	92.9	90.0	110.3	106.7
10:9.	86.6	83.8	87.1	90.0	71.0	79.3	72.2	71.4	75.0	78.1	84.4	84.8
19:18.	N	N	104.4	104.4	104.9	104.9	102.3	102.3	100.0	100.0	100.0	100.0
(19+18):2.	N	N	22.7	22.4	19.9	19.8	20.1	20.0	N	21.7	22.1	21.7
Tibia												
1.	N	N	343	345	358	357	379	376	N	N	N	N
1a.	N	N	349	350	363	361	386	385	362	365	N	N
1b.	N	N	339	338	355	355	376	376	N	352	N	416
3.	N	N	71	72	66	66	76	80	N	N	N	N
6.	N	N	43	42	39	40	43	44	57	N	N	62?
8.	27	29	28	26	25	25	30	30	27	27	34	33
8a.	N	N	35	31	29	29	33	33	31	31	36	38
9.	22	22	21	20	19	19	21	21	21	22	24	23
9a.	N	N	23	22	19	20	23	24	23	24	25	24
10b.	72	75	77	75	66	68	76	76	74	74	82	83
9:8.	81.4	75.8	75.0	76.9	76.0	76.0	70.0	70.0	77.7	81.4	70.5	69.7
9a:8a.	N	N	65.7	71.0	65.5	69.0	69.7	72.7	74.1	77.4	69.4	63.1
10b:1.	N	N	22.4	21.7	18.4	19.0	20.0	20.2	N	N	N	N
Fibula												
1.	N	N	336	340	N	N	N	374	341	N	N	414
2.	N	N	17	14	12	12.0	15	15	12	13	15	16
3.	N	N	12	11	10	10.0	11	12	11	12	12	12
4a.	N	N	33	32	31	31.0	N	39	33	34	39	43
3:2.	N	N	70.6	78.6	83.3	83.3	73.3	80.0	91.6	92.3	80.0	75.0
4a:1.	N	N	9.8	9.4	N	N	N	N	9.6	N	N	10.3
R1:H2	N	N	74.6	74.7	77.3	80.8	77.1	N	79.3	N	77.3	N
T1b:F2	N	N	83.5	82.6	83.9	83.7	85.0	84.6	N	81.1	N	85.0
(H2+R1):(F2+T1b)	N	N	75.7	73.9	70.2	68.9	69.3	N	N	N	N	N

(Schmorl's nodes, *spondylosis deformans*), sacrum with a supernumerary vertebra, arthrotic changes on L4, L5, and *processus articularis superior ossis sacri*.

Conclusion: Judging from the degree of sexualisation (DS) of the skull (–0.7) and the rather gracile skeleton, this could probably be a tall female (ca 166 cm) who died at age maturus I (40–50 years). According to Houët *et al.* (1999), the dimensions of the left *os coxae* suggest a female with 0.53 probability, yet the dimensions on the right one suggest a male with 0.53 probability. Thus, the sex of individual 239/92 cannot be unequivocally determined.

Burial 244/92

Preservation: Partly damaged skeleton of an adult individual.

Morphological characteristics: Cranium damaged, medium robust, with medium MR. *Norma verticalis*: pentagonoid; *norma occipitalis*: medium high arch with parallel walls and univaulted base; *norma frontalis*: ellipsoid. Glabella 0, *arcus superciliaris* delimited (0), *margo supraorbitalis* sharp (–1), *tubera frontalia* small (0), *frons* convex, *tubera parietalia* moderate (0), *os fonticulorum apicis* present, *sutura metopica* obliterated, *sutura sphenoparietalis* broad, occiput vaulted, *protuberantia occipitalis externa* poor (0), surface of *squama ossis occipitalis* with distinct nuchal lines and occipital crest (0), *processus mastoidei* large (+1), *arcus zygomatici – phenozygia*, *processus retromarginalis* medium (0), leaning europoid orbits of intermerdiate shape (0), facial relief marked, nasal region damaged, *margo inferior aperturae piriformis* anthropine in shape, *fossae caninae* shallow, *torus palatinus* not developed.

Mandible undamaged, medium robust, MR medium, chin prominent in lateral view, fluently arched in inferior view, *mentum* visible in superior view, *planum alveolare* invisible in that view. *Foramina mentalia* simple bilaterally, *spina mentalis* elevated, mandibular angles straight, dental arch of maxilla and mandible parabolic, *labidodontia*, tooth wear degree 1–2. Of the total 32 permanent teeth, three are carious and four lost ante mortem; particularly the lower teeth are encrusted with dental calculus. *Trigonum mentale* slightly delimited (–1), *corpus mandibulae* medium thick (0), mandibular angles with moderate eminences (0), *processus articularis mandibulae* medium (0); deformation: *arthrosis temporo-mandibularis*.

Vertebrae damaged, medium-sized. Sacrum damaged, medium broad and medium high. Sternum damaged, with a medium-sized, medium narrow and free *manubrium*, corpus short and medium narrow, ribs fragmentary and medium robust.

Clavicles undamaged, gracile, strongly curved, their MR weak. Scapulae damaged, medium robust. Humeri undamaged to defective, gracile to medium robust, their MR weak. Forearm bones damaged, gracile, their MR medium distinct.

Pelvic bones are damaged, medium robust. Great sciatic notch –1, pubic angle 0, *sulcus praeauricularis* narrow and shallow, *arc composé* transitional in shape, *ramus superior ossis pubis* resembling a saddle roof, *facies auricularis* a rather obtuse angle with constriction. Relief of *symphysis ossis pubis* V-shaped.

Femora damaged, medium robust, with medium muscle relief, epiphyses synostosed, *trochanter tertius* developed on the left, undeveloped on the right, *linea aspera* –1. Long bones of foreleg damaged, gracile to medium robust, their MR weak to medium. A callus (probably after a healed fracture) on the diaphysis of left fibula between the middle and distal third of the bone.

Metric characteristics (mm), see *Table l.*

Deviations and pathological changes: *Arthrosis articularis temporo-mandibularis bilateralis*, weak *spondylosis deformans* and *spondylarthrosis* in almost all sections of the vertebral column. Schmorl's nodes in thoracic and lumbal vertebrae, synostosis of carpal and metacarpal bones as well as tarsal and metatarsal ones, traces of a probably healed fracture in diaphysis of left fibula.

Conclusion: Judging from the degree of sexualisation (DS) of the skull (–0.21), postcranial skeleton (–0.10), together –0.16, and the gracile to medium robust skeleton, this is a sexually unidentifiable individual approximately 160 cm tall, who died at the senile age (60–65 years). It was impossible to apply the method of Houët *et al.* (1999).

Burial 245/92

Preservation: Almost complete skeleton of a child with fragmentary skull.

Morphological characteristics: Skeleton gracile, with feeble MR, without *cribra orbitalia* or other pathological changes, *sutura metopica* obliterated. Almost complete temporary dentition without caries. Great sciatic notch broad and shallow, *arc composé* in the form of a fluent arch.

Metric characteristics: Radius sin. (diaphysis length): 78 mm; femur dex. (diaphysis length): 142 mm; femur sin. (diaphysis length): 141 mm.

Conclusion: Judging from dental age (degree of development of not erupted permanent teeth) and the length of measurable long bone diaphyses, this is a child that died at the age of 2–3 years (infans I).

Burial 254/92

Preservation: Almost complete, slightly damaged skeleton of an adult individual.

Morphological characteristics: Cranium damaged, robust, with robust MR. *Norma verticalis*: ovoid, *norma occipitalis*: medium high arch with parallel walls and unvaulted base, *norma frontalis*: ellipsoid. Glabella 0, *arcus superciliaris* arched (+1), *margo supraorbitalis* intermediate (0), *tubera frontalia* moderate (+1), *frons* convex, *tubera parietalia* moderate (0), *sutura metopica* obliterated, *os asteriacum* bilateral, *os epiptericum* on the right, *os asteriacum mastoideum* bilateral, *os paramendosum* bilateral; on the left a broad *sutura sphenoparietalis*, on the right *os epiptericum*, occiput elongate, *protuberantia occipitalis externa* massive (+2), surface of *squama ossis occipitalis* coarse, nuchal lines and occipital crest with rough surface (+2), *processus*

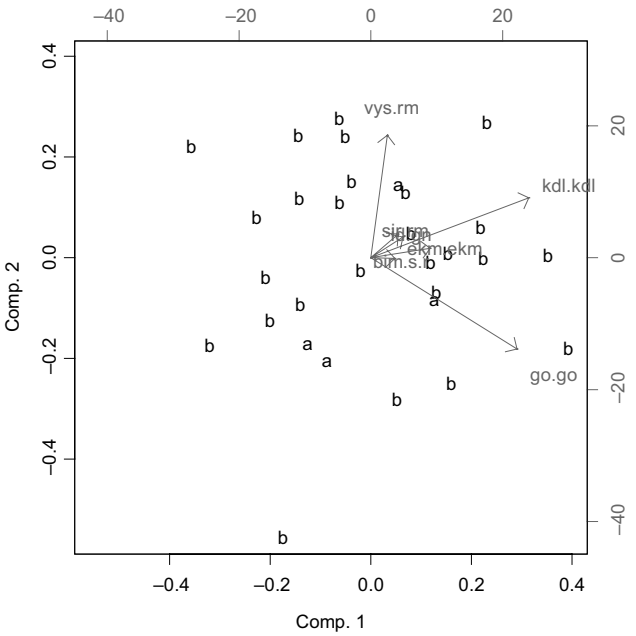

FIGURE 1. Biplot of the first two principal components PC 1 and PC 2 of Group 5, where a = Group A, b = Group B.

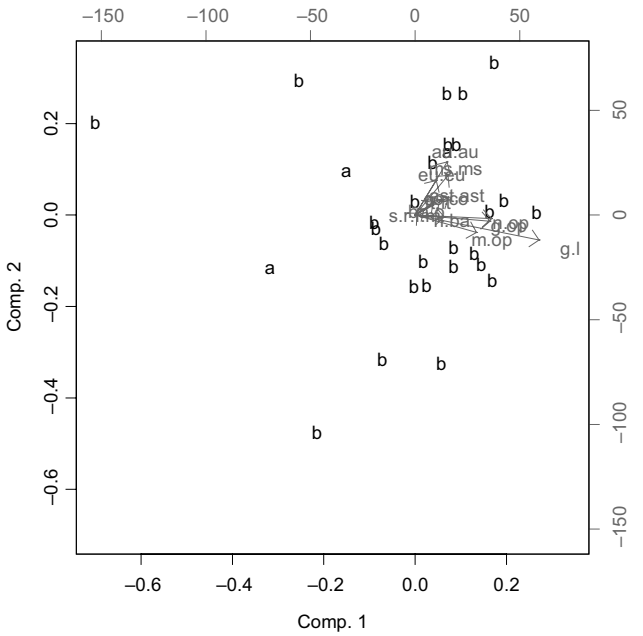

FIGURE 2. Biplot of the first two principal components PC 1 and PC 2 of Group 1, where a = Group A, b = Group B.

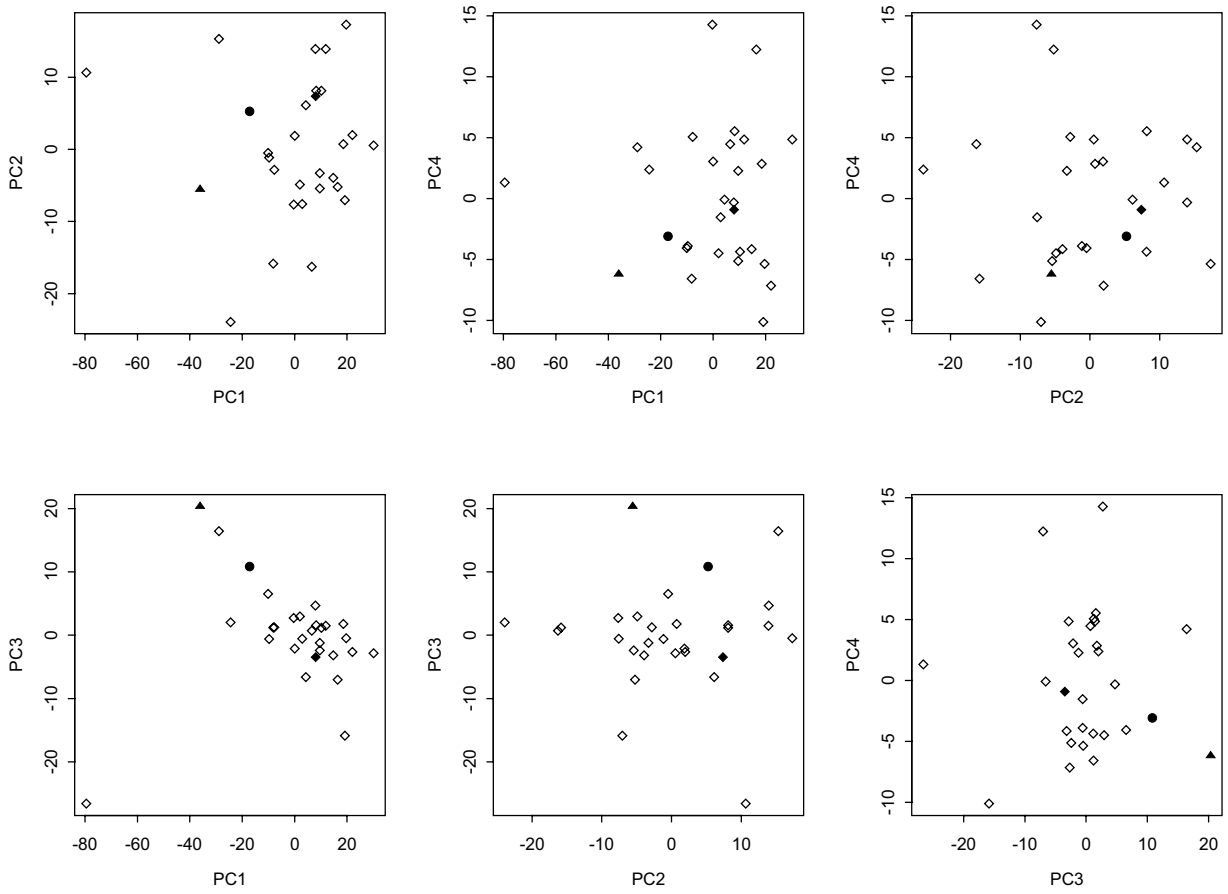

FIGURE 3. Principal component scores PC_i vs. PC_j in Group 1, where i < j; i. j = 1, 2, 3, 4 (n = 29, ◇ = B, ● = skull No. 222/92, ▲ = skull No. 223/92, full ◇ = skull No. 254/92).

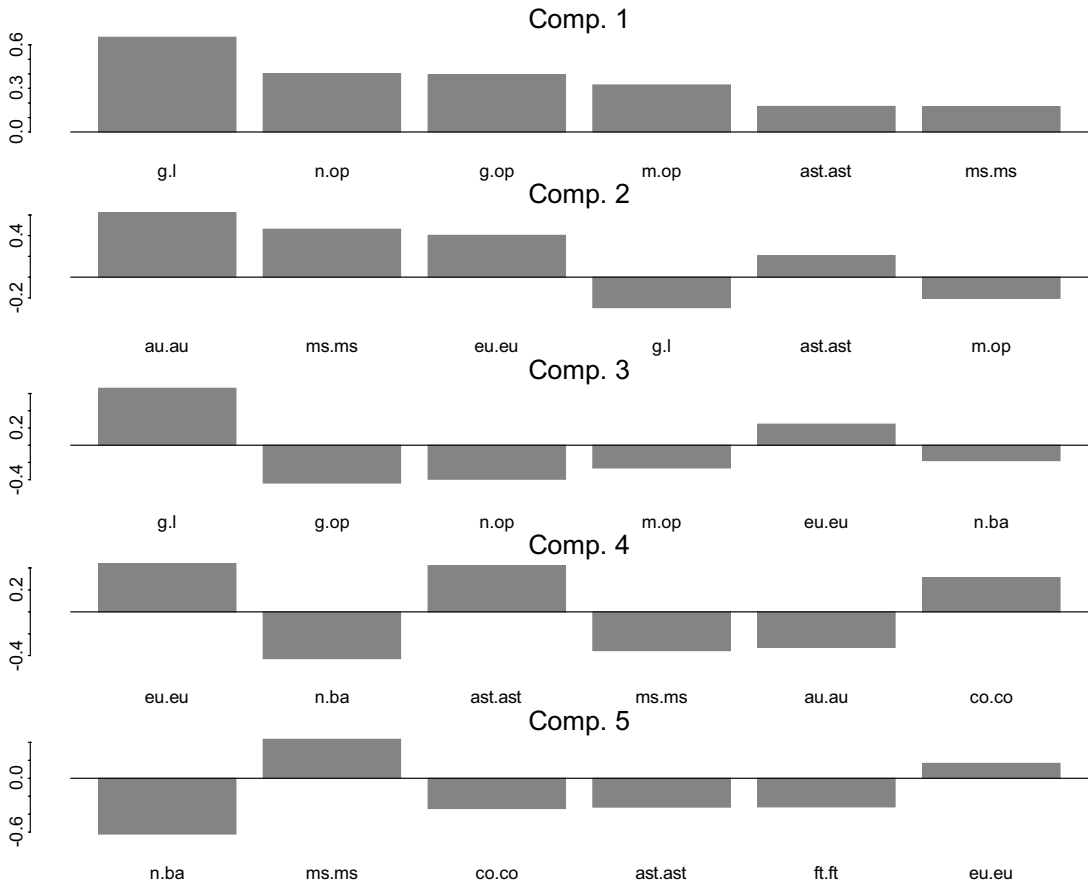

FIGURE 4. Barplots of correlation coefficients of the measurements inside Group 1 with the respective principal components.

mastoidei very large (+2), *arcus zygomaticus* medium (0), *cryptozygia*, *processus retromarginalis* medium (0), leaning europoid orbits slightly squared (+1), facial relief marked, nasal bones biconcave, nasal prominence medium, *margo inferior aperturae piriformis* of anthropine form, *fossae caninae* deep, *torus palatinus* indicated, *sutura palatina transversa* deviating in the forward direction, with reversed medium tip.

Mandible damaged, medium robust to robust, its MR mighty, chin prominent in lateral view, blunt and narrow chin in inferior view, *mentum* visible and *planum alveolare* invisible in dorsal view. *Foramina mentalia* simple bilaterally, *spina mentalis* elevated, mandibular angles straight, dental arch of maxilla and mandible parabolic, dental abrasion degree 1–2. Of the total eight preserved permanent teeth, one is carious, preserved I^1 and I^2 on the left shovel-shaped. *Trigonum mentale* medial, delimited (0), corpus mandibulae medium thick (0), mandibular angles with strongly marked eminences and lateral directed angles (+2), *processus articularis mandibulae* large (+1).

Vertebrae damaged, robust and large. Sacrum damaged, medium broad and strongly arched. Sternum damaged, with a medium broad and free *manubrium*, *corpus medium* broad, ribs damaged, robust.

Clavicles damaged, medium robust, feebly curved, their MR medium. Scapulae damaged, robust. Humeri damaged, their MR mighty, *perforatio septi humeri* on the right. Forearm bones damaged, robust, their MR mighty.

Pelvic bones damaged, robust, with mighty MR. Pelvis as a whole high and abrupt (+1), *aditus pelvis* narrow, heart-shaped (+1), *foramen obturatum* intermediate (0), great sciatic notch +2, pubic angle +1, *sulcus praeauricularis* narrow and shallow, *arc composé* a fluently joining arch, lower margin of *ischiopubic ramus* steeply deviating in

TABLE 2. Loadings of the measurements inside Group 1 according to the adequate principal components (lengths and breadth cranium dimensions).

	Comp. 1	**Comp. 2**	**Comp. 3**	**Comp. 4**
g–op	0.394	–	–0.439	–
m–op	0.323	–0.204	–0.263	–
n–op	0.402	–	–0.395	0.262
g–l	0.652	–0.293	0.660	–0.135
n–ba	0.154	–	–0.179	–0.426
ba–o	–	–	–	–0.121
eu–eu	0.111	0.403	0.244	0.439
ft–ft	–	0.147	–	–

crista phallica, *ramus superior ossis pubis* prismatic, *facies auricularis* at a sharper angle without any constriction, *tuberculum musculi piriformis* feebly indicated, *spina ischiadica* flat angular. Relief of *symphysis ossis pubis* III.

Femora damaged, their MR mighty, epiphyses synostosed, *crista hypotrochanterica* bilaterally, *linea aspera* very narrow and very high (+2). Long bones of foreleg robust, their MR mighty.

Metric characteristics (mm), see *Table l*.

Deviations and pathological changes: Indicated *cribra orbitalia*, arthrotic changes in costo-sternal angle of first rib, spondylotic changes in thoracic and lumbar vertebrae.

Conclusion: Judging from the degree of sexualisation (DS) of the skull (+0.80), postcranial skeleton (+0.91), together +0.85, and the robust structure of the skeleton, this is a tall to very tall male (ca 180 cm high) who died at the age maturus II (50–60 years). It was impossible to apply the method of Houët *et al.* (1999).

Burial 256/92

Preservation: Very fragmentary skeleton of a child, with individual teeth in the maxilla and almost complete mandibular dentition.

Morphological characteristics: Skeleton gracile, MR feeble, no pathological changes, *sutura metopica* obliterated. Teeth without caries, mandible with erupted first permanent molars (M_1).

Metric characteristics: Ulna sin. (length of diaphysis): 136 mm; radius dex. (length of diaphysis): 117 mm.

Conclusion: Judging from dental age (erupted first molars) and the length of measurable long bone diaphyses, this child died at the age of 7–8 years.

Burial 303/92

Preservation: Very fragmentary gracile skeleton of a child, showing rudimentary deciduous teeth.

Conclusion: Judging from dental age, this child died at ca six months of age (infans I).

Results of statistical analysis

Of the six dimension groups mentioned above, only the first one, specified by length and breadth dimensions of the cranium, yields metric data of a single male, 222/92, in Group A. Unfortunately, of the metric characteristics of the important individual 221/92, it was only possible to use the dimensions of its mandible, analysed in metric group 5 focused on the facial part of the skull (maxilla and mandible). In that group, no individual of Group A was selected, not even the individual 221/92 (*Figure 1*).

In the first group, the first two PC account for 76.42% of total variance, the principal components 3 and 4 completing the explanation of variability to 90.31%, the following being the participating dimensions with variable loadings (*Table 2*) suggesting the weight of the dimensions: in PC 1, *g–op* (0.394), *m–op* (0.323), *n–op* (0.402), *g–l* (0.652); related to PC 2, *eu–eu* (0.403), *au–a*u (0.622), *ms–ms* (0.464); related to PC 3, *g–op* (–0.439), *g–l* (0.660); related to PC 4, *n–ba* (–0.426), *eu–eu* (0.439), *ast–ast* (0.422). The mutual situation of individuals in Groups A and B according to the particular components is shown in diagrams (*Figures 2* and *3*).

In the anthropological sense, the former four PC represent the following situations: PC 1, the dominance of length dimensions of the cranium over the breadth ones; PC 2, the contrast between the length and breadth dimensions of the cranium; PC 3, the partial contrast between the length and breadth dimensions of the cranium, except for dimensions *g–l* and *ms–ms*; PC 4 cannot be specifically interpreted in terms of anthropology.

From Group A, the PC 1 and 2 selected skulls 222/92 and 223/92 (*Figures 2* and *3*). However, the skull 223/92 (with approximate co-ordinates –0.3 for PC 1 and –0.1 for PC 2 – in the diagram in *Figure 2*) was later not taken into consideration as its sex was not unequivocally determined. Several skulls (14/86, 83/87, 142/88, 172/89, and 187/89) were also selected from Group B, which fact is the evidence of certain heterogeneity.

It is evident from the comparison of individual PC shown in diagram in *Figure 2* that the plots of PC 1 and PC 2 place the skull 222/92 apart from the remaining ones.

The situation of the individual components is clearly shown in the graphic representation of the correlation of the PC with the respective major components (*Figure 4*). In the case of PC 1, in agreement with the logical presumption, the strongest correlations are found among the basic length dimensions *g–l, n–op*, and *g–op*; in the case of PC 2, it is among the breadth dimensions *au–au, ms–ms*, and *eu–eu*.

Metrical analysis did not reveal any significant differences in skull dimensions. It remains a question whether or not other techniques, such as e.g. frequency of epigenetic characters (Czarnetzki 1971, Carpenter 1976, Donlon 2000) or relationship analysis by means of DNA markers (Merriwether *et al.* 1994, Simoni *et al.* 2000, Oota *et al.* 2002) would reveal any morphological or biological relationships among the individuals grouped around the important burial 221/92 and difference of that group from the rest of the burial site.

CONCLUSION

Using anthropological analysis, we have determined that Group A around burial 221/92 consists of six adults, among them three males (221/92, adultus 1, 20–30 years of age; 222/92, maturus II, 50–55 years; 254/92, maturus II, 50–60 years) and three individuals of unidentified sex (223/92, adultus I, 20–25 years; 239/92, maturus I, 40–50 years; 244/92, senilis, 60–65 years) as well as four children (234/92, infans I, 2–3 years; 245/92, infans I, 2–3 years; 256/92, infans II, 7–8 years; 303/92, infans I, 6 months of age).

Among the adults showing paleopathological changes, the predominant cases include degenerative changes of the

vertebral column (Schmorl's nodes, *spondylosis deformans*, *spondylarthrosis*). Individual 244/92 showed arthrotic changes of several joints and traces of a healed fracture of left fibula, two adults showed traces of *cribra orbitalia*.

Individual 221/92 revealed hypoplastic changes of dental enamel, probably connected with nutrition stress during childhood. Individual 223/92 showed two teeth anomalous in shape.

Congenital deviations included, in one case (222/92), a supernumerary lumbal vertebra L6, and in another case (239/92), a supernumerary sacral vertebra S0.

The principal aim of the present study was to examine the problem of allochthonic origin of the Group A individuals, based on information from the initial archaeological sources which were examined by means of multivariate morphometric analysis of cranial dimensions. As revealed by the general statistical analysis of the metric characters, one may state in general that the Group A individuals analysed are homogeneous in craniometrical terms to the extent that no allochthonic origin can be assumed in the individual members of Group A (not even in individual 221/92 whose burial contained the spurs with a buckle for tying). Only the individual 222/92 differed from the other group members in a single metric group (Group 1) that analyses length-breadth dimensions; this difference, however, cannot be taken a sufficient reason of the man's isolated status. In terms of morphometric skull configurations, the members of Group A do not differ markedly from those of Group B, which represents a wider population sample.

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