Craniological series from the graveyard around the "40 Holy Martyrs" church

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Abstract

Objectives. This study examines the anthropometric characteristics of the cranial series from the necropolis around the "40 Holy Martyrs" that dates back in the second half of the 13th -14th c. AD, revealing new data about the population of the capital of the second Bulgarian Kingdom.
Material and methods. Determination of the morphological characteristics of the studied population was based on craniofacial anthropometry. The measurements were performed using the standard spreading caliper with scale. The analysis is concentrated on the male series.
Results and conclusion. Cranial index (mean value – 78.25) describes the series as mesocranial, a result supported by the distribution of its values. Brachycranial and hyperbrachycranial skulls represent 23.1 % of the studied population, while dolichocranial ones – 15.4 %. The length-height index (M = 73.1, orthocranial) presents a distribution of values with most cases included in the orthocranial rubric (76.9 %). Distribution of high breadth index and correlations with the height, from the *porion* show high variability. Facial profile is orthognathous (one strongly divergent skull). Faces are relatively broad, considering the mean value of the facial index (84.4, euryprosopic), but its distribution has 44.4 % euryprosopic faces, while in 22.2 % of the cases the length prevails (determining leptoprosopic faces). The use of the Virchow's method increases the proportion of faces for which the height is predominant. The latter results are confronted with those obtained for the upper face height. Orbital index describes the series as mesoconch, nasal index divides it equally between the chamaerrhine (broad nose) and leptorrhine (narrow nose) categories. Scarce data existing for the females point to a rather homogenous structure of the series.

Keywords: craniofacial anthropometry, medieval necropolises, Second Bulgarian Kingdom

Introduction

The current study aims to describe the anthropometric characteristics of the cranial series from the necropolis around the "40 Holy Martyrs" Church in Veliko Tarnovo, but also to compare the obtained results with the ones reported by some previous investigations conducted upon the osteological material found in the medieval necropolises of Bulgaria – from Bojenishki Urvich, Chirakman, Kavarna, Kabile, Pernik, Perperikon, and Tatul to name a few).

For the same purpose of revealing new data about the population living in the capital of the second Bulgarian Kingdom, it was used the comparative analysis of the Bulgarian series with some craniological series of the Late Middle Ages from Romania (Wallachia region).

Material and Methods

The necropolis situated around the church of "40 Holy Martyrs", dates back in the second half of the 13th -14th c. AD (Тотев и съавт. 1996, 2001, 2002, 2003, 2004, 2005) and represents a population from the flourishing period of the capital city of the Second Bulgarian Kingdom. This was a political, trade, religious and cultural centre of high importance for that period in the Balkans. Developing around the royal court church, the necropolis brought together corporeal remains from the members of the upper social strata of the medieval society in the town.

Sex identification of those buried there was done based on the available material from skeletons, using macroscopic methods (summarized in: Acsadi and Nemeskeri 1970, White and Folkens 2005, Walrath, Turner and Bruzek 2004) with priority being given to the results obtained from the features of the pelvic bones. Age of the adult individuals was determined by assessing the symphyseal surface of pubic bones (Todd's scale in: Schwartz, 1995), iliac auricular surface (Ubelaker 1989) and cranial sutures obliteration after timings in Olivier and Simpson (in: Алексеев, Дебец 1964), compared to the scales of Meindl and Lovejoy (1985). Metrical data are correlated to standard tables for diameters of femoral, humeral and radial heads, femoral and humeral bicondylar breadth (used in: Bass, 1971, and Kühl, 1985). The craniometrical study is done using the methods of Martin and Saller (1959). The analysis also included methods for the assessment of horizontal profile of the face considering the zygomaxillary angle and depth of the canine fossa (Алексеев, Дебец 1964). The material is highly destroyed. Most affected area appeared to be the facial part, which in many cases was lacking some of the measurements. Skulls often lacked their cranial base. The vertical profile was assessed by measuring the angle between length of the face and upper face height, derived using cosine theorem from linear measurements between length of the cranial base (basion-nasion), length of the facial section (basion-prostion) and upper face height (prostion-nasion). Choice of this angle was made according to the available equipment. Intervals of values variation for this angle were defined after an analysis of the statistical graphics of their distribution and deviation from normal distribution. Highly diverging values (obtained from skulls from graves № 29 and 99 – excessively low and from grave № 51 – high values) are excluded in obtaining the normal distribution. So, the maximal (81.37°, skull from grave № 91) and minimal (71.94°, skull from grave № 85) values of the angle and between them – two intervals 71° up to 76.25° (mean, including the mean for the series) and 76.26° up to 81.5° (high) were defined. Values under 71° were appraised as low and those over 81.6° – as very high. The fragmentary state of the material also suggested intergroup analysis of hard palate proportions using length between the craniometrical point orale to palatine suture instead of hard palate length. Based on the obtained measurements, five categories were defined, following the same procedure as described for the previous measurement. Highly deviating values from normal distribution were recorded in individuals from grave № 140 and 245 (excessively high) so that they were excluded from the normal distribution. After this procedure, maximal, 116.92 (skull from Grave № 228) and minimal, 71.43, (Grave № 202) values were defined and between them – three intervals, as follows: 69-84.999, 85-100.999, and 101-116.999, respectively, of low, mean (including the mean and the median for the series) and high values. Values under 69 were theoretically defined as very low, without any observed case, while values over 117 were considered very high – they remain in the category "over 117 – very high".

Results and discussions

Table 1. Mean values of basic skull measurements, for males and females

Dimension	Measurements		Males			Females		
	No	Landmarks	N	M	σ	N	M	σ
Neurocranium								
Maximum cranial length	1	g-op	41	184.96	1.12	6	176.33	3.58
Maximum cranial breadth	8	eu-eu	41	145.01	0.97	4	143.25	0.75
Cranial height (Basilo-Bregmatic Height)	17	ba-b	28	134.55	1.18	3	133.83	4.51
Cranial height (porion)	20	po-b	39	114.41	1.94	6	109.03	7.23
Minimum frontal breadth	9	ft-ft	52	98.55	0.75	7	96.07	1.68
Occipital breadth	12	ast-ast	40	113.29	0.82	6	106.25	1.49
Cranial base length	5	ba-n	22	103.64	1.46	3	95.83	4.69
Facial part								
Facial length	40	ba-pr	14	98.62	2.51	2	89.00	8.00
Maximum Bizygomatic Breadth	45	zy-zy	11	133.27	2.23	2	127.25	2.25
Upper facial breadth	43	fmt-fmt	27	105.51	1.04	5	101.10	1.85
Zygomaxillary breadth	46	zm-zm	28	96.48	1.19	4	90.00	1.81
Total face height / Morphological Facial Height	47	n-gn	16	114.97	2.61	3	112.83	3.44
Upper face height	48	n-pr	29	68.76	1.05	3	66.67	3.53
Nasomalar angle	77	fmo-n-fmo	6	142.6	3.65	3	17.00	0.29
Zygo-maxillary angle		zm-ss-zm	20	125.5	1.51			
Facial length-height angle	-	ba-pr-n	15	75.3	1.4	2	77.9	-
Orbital breadth	51	mf-ect	31	41.70	0.49	4	42.25	0.85
Orbital height	52		30	33.20	0.35	4	36.13	0.52
Nasal height	55	n-ns	29	51.83	0.70	3	50.00	2.89
The maximum breadth of the pyriform aperture	54	al-al	25	26.47	0.62	3	24.33	1.20
Piriform aperture height	55.1	rhi-ns	9	34.50	1.55			
Dakrial breadth	49.a	d-d	19	23.37	0.59	3	22.33	1.20
Dakrial height	DS		17			1	11.00	-
Nasal bones breadth	57		17	10.56	0.89	2	7.50	2.50
Nasal bones length	56	n-rhi	10	25.55	1.53			
FC			40	5.33	0.28	8	3.69	0.28
Alveolar process height	48.1	ns-pr	34	17.88	0.68	7	15.07	0.87
Palatal breadth	63	enm-enm	35	36.53	0.62	7	35.26	0.76
Palatal anterior length			35	38.07	0.74	7	36.50	1.14
Palatal length	62	ol-stph	25	47.18	1.01	5	43.20	1.97
Mandible								
Symphysial height	69	id-gn	46	32.32	0.57	9	28.27	0.67
Breadth at mental foramen	69.3		47	11.80	0.30	10	10,.05	1.18
Angle breadth (Bigonial Breadth)	66	go-go	33	102.31	0.87	6	96.17	1.74
Mental breadth	67	ml-ml	12	46.33	0.93	3	46.50	1.04
Projection length	68		38	81.54	1.45	6	68.83	4.70
Branch height	70		34	61.84	1.28	8	59.50	2.48
Branch smallest breadth	71		42	31.99	0.45	8	29.28	0.98
Mandible angle (Angle of the Lower Jaw)	79		40	122.98	0.97	7	123.00	3.10

No – number after Martin-Saller (1959)

Craniological series includes mostly male skulls, while females are presented in single finds (Table 1). For this reason, the analysis of the obtained results concentrates upon the male series. The descriptive statistical analysis of the main indexes of the neurocranium shows that the series is a mesocranial one (mean value of cranial index was 78.25). Distribution of this index values into categories supports this result with 61,5 % mesocranial skulls (Table 2). Meanwhile, a high degree of the brachycranisation process is observed, with 23.1 % of brachy- and hyperbrachycranial skulls. 15.4 % of the skulls are dolichocranial. These results find an interpretation in two directions – one as a result of investigation of a heterogeneous population, and second, as a consequence of the brachycephalization process. The height-length/vertical index shows a distribution pattern of values closer to the mean of the series (M = 73.1, orthocranial, SEM = 0,693) with 76.9 % of the skulls falling within the limits of the orthocranial category (Table 2). The height-breadth index and height-length and heigh-breadth indexes, with height measured from *porion (po),* show high variability regarding the distribution of values into the basic categories.

Table 2. Distribution of values and means of the main indexes of cerebral section of the skull, males and females

			dolichocranial	mesocranial	brachycranial	hyperbrachycranial	ultrabrachycranial	M	σ
Skull index, 8:1		N	dolichocranial	mesocranial	brachycranial	hyperbrachycranial	ultrabrachycranial	M	σ
	M	39	6	24	5	4	-	78.25	0.6
	%		15.4	61.5	12.8	10.3	-	meso-	
	F	4		2	1	-	1	82.55	2.8
	%			50.0	25.0	-	25.0	brachy-	
Height-length index		N	chamaecranial	orthocranial	hypsicranial			M	σ
ba, 17:1	M	26	2	20	4			73.1	0,7
	%		7.7	76.9	15.4			ortho-	
	F	3			3			76.81	0.9
	%				100			hypsi-	
po, 20:1	M	37	5	11	21			61.9	1.1
	%		13.5	29.7	56.8			ortho-	
	F	6	1		5			62.13	4.6
	%		16,7		83.3			ortho-	
Height-breadth index		N	tapeinocranial	metriocranial	acrocranial				
ba, 17:8	M	27	10	11	6			93.6	1.1
	%		37.0	40.7	22.2			metrio-	
	F	3	1	1	1			93.64	3.7
	%		33.3	33.3	33.3			metrio-	
po, 20:8	M	38	19	13	6			78.9	1.3
	%		50.0	34.2	15.8			tapeino-	
	F	4	1	3				80.0	1.7
	%		25.0	7.,0				metrio-	

8:1 – correlation of measurements, numbered by Martin, Saller (1959)

The obtained results describe the facial section of the series as orthognathous, based on the jaw index, with a mean of 96.3 corresponding to 71.4 % orthognathous skulls (14 individuals) (Table 2). Values of this index for three skulls (21.4 %) fall into the category of mesognathy and only one is prognathous (7.1 %). Only nine skulls allowed calculation of the facial index – M = 84.4, euryprosopic (Table 3). Its distribution is highly heterogeneous with 44.4 % relatively broad faces, while in 22.2 % of the skulls the height measurement prevails (with 11.1 % in each category of lepto- and hyper- leptoprosopic). The facial index, calculated by the Virchow's method, with

middle face breadth (between zygo-maxillary points), includes more material (14 skulls). Based upon it, the proportion of faces with predominance of breadth measurement increases up to 57.2% (hyperchamaeprosopic and chamaeprosopic), but the distribution of the values in the series remains heterogeneous. Values of both latter indexes are highly influenced by the reconstruction with the lower jaw, which varies according to dental attrition, fixation in occlusion, different irregular bites, post-mortal deformation, massiveness of the skulls affecting in different degree the height of the lower jaw and eventually the face height. Nevertheless, the results of the analysis carried out on these indexes, obtained with the upper face height, draw a similar picture. Upper-face index is measured for 11 skulls and presents a mean value of 51.7, falling into the mesen category, represented by 54.5 % of the investigated skulls. The second place of occurrence in the distribution of skulls after the upper-face index belongs to those with predominance of the breadth measurement, 27.3 % (3 skulls).

Table 3. Distribution of values and means of main indexes of facial section of skull, males and females

			N	hyper-euryprosopic	euryprosopic	mesoprosopic	leptoprosopic	hyperlepto-prosopic	M	σ
Face	Face, 47:45	M	9	3	1	3	1	1	84.4	2.7
		%		33.3	11.1	33.3	11.1	11.1	euri-	
		F	2	-	1	1	-	-	87.0	2.2
		%		-	50	50	-	-	meso-	
	Upperface, 47:45				euryen	mesen	lepten			
		M	11		3	6	2		51.7	1.0
		%			27.3	54.5	18.2		mesen	
		F	2		1		1		51.8	3.8
		%			50.0		50,0		mesen	
After *Virhow*	Face, 47:46			hyperchamaeprosopic	chamaeprosopic	orthoprosopic	leptoprosopic		M	σ
		M	14	4	4	3	3		118.6	3.0
		%		28.6	28.6	21.4	21.4		chamae-	
		F	3	-		2	1		125.9	3.7
		%		-		66.7	333		ortho-	
	Upper-face, 48:46	M	23	2	12	x	9		72.1	1.3
		%		8.7	52.2	-	39.1		chamae-	
		F	3	-	1	-	2		74.3	2.3
		%		-	33.3	-	66.7		chamae-	
Jaw, 40:5					orthognathous	mesognathous	prognathous		M	σ
		M	14		10	3	1		96.3	2.4
		%			71.4	21.4	7.1		ortho-	
		F	2			2			89.74	2.6
		%				100			meso-	
Orbital, 52:51			N		camae-conch	meso-conch	hypsi-conch		M	σ
		M	30		7	18	5		79.8	1.1
		%			23.3	60.0	16.7		meso-	
		F	4			2	2		85.6	1.2
		%				50.0	50.0		hypsi-	
Nasal, 54:55			N		leptorrhine	mesorrhine	chamaerrhine	hyperchamaerhinae	M	σ
		M	22		9	4	8	1	51.3	1.9
		%			40.9	18.2	36.4	4.5	meso-	
		F	3		1	1	1	-	48,8	1.9
		%			33.3	33.3	33.3	-	meso-	
Palatal, 63:62			N		lepto-staphyline	meso-staphyline	brachy-staphyline			
		M	20		12	2	6			
		%			60.0	10.0	30.0			
		F	4		2	2				
		%			50	50				
Anterior palatal			N		low	medium	high	very high	M	σ
		M	31		8	11	10	2	96.6	2.7
		%			2.,8	35.5	32.3	6.5	medium	
		F	7			5	2	-	97.1	3.4
		%				71.4	28.6	-	medium	

Most of the material allows calculation of the upper-face index according to Virhow's method (Table 3). Results of this index confirm the prevalence of relatively high faces in the series, but not as pronounced, as shown by the distribution of the values of the upper face index. Following Virhow's method, 23 skulls of males were measured, from which 14 (60.9 %) fall in the category chamaeprosopic and hyper-chamaeprosopic as the mean value was 72.1. The distribution of the obtained values shows a relatively high portion of skulls with the predominance of breadth measurement (39.1 %, or 9 male skulls and two out of the three measured female skulls).

The orbital index (Table 3) is obtained in 30 cases. Its values point to the non-homogeneous character of the series. Mean value of 79.8 falls into the mesoconch category, where 60 % of the skulls are included. In 23.3 % of the cases (7 skulls), the breadth measurement (chamaeconch) predominates and 16.7% from the orbits (5 skulls) are described as high (hypsiconch).

Nose index is established for 22 skulls and divides the series between both categories of leptorrhine (predominance of high measurement and narrow proportions) 40.9% (9 skulls) and chamaerrhine (wide nose, with predominance of breadth measurement) 40.9% (9 skulls) (Table 3). Only 18.2 % of the cases and the mean value fall in the mesorrhine category.

When considering the palatine index, the skulls with the leptostaphyline form of the hard palate (60.0 %) prevail. Scarce data for females present a more homogenous structure (Table 1-5).

As the jaw index, angles of face profile describe the faces as intensively profiled (Table 4). Canine fossa in most cases is of medium to deep profile (Table 5).

Table 4. Distribution of values and means of the main angles of horizontal and vertical profile, males and females

		N	very small	small	medium	big	M(°)	σ
Zygo-maxillary	M	20	8	8	3	1	125..5	1..5
	%		40.0	40.0	15.0	5.0	small	-
	F	3	-	3	-	-	128.8	0,.6
	%		-	100.0	-	-	small	
		N	small	medium	big	very big	M(°)	σ
Length-height face angle,	M	15	2	7	5	1	75.3	1.4
	%		13.3	46.7	3.,3	6.7	medium	
	F	2	-	1	1	-	77.9	2.9
	%		-	50	50	-	big	

Table 5. Measurements of canine fossa

		N	very shallow	shallow	medium	deep	very deep	M	σ
Canine fossa	M	40	1	16	12	7	4	2.93	0.2
	%		2.5	4.,0	30.0	17.5	10.0	very shallow	
	F	8	-	7	1	-	-	2.2	0.1
	%		-	87.5	12.5	-	-	very shallow	

Cranioscopical analysis was carried out on highly fragmented finds (Table 6). Development of the relief in the supra-orbital region and *glabella* was evaluated according to *Broca's scales (*in: *Алексеев, Дебец, 1964)*. Both *anthropina* (61 cases, 67.8 %) and *fossa praenasalia* were recognized in the form of the lower margin of the nose aperture. Based on the development of the feature, the latter was divided into two degrees – the first, slightly developed, where the lower margin is smoothened, the outline of both fossae is not sharply pronounced (16 cases, 17.8 %) and, the second, fully developed, in which both fossae have clear outline (13 cases, 14.4 %). The development of the marginal tubercle of the zygomatic bone was also classified into

three categories: the absence of any trait category, the trait development category, with protuberance on the zygomatic process, and the highly developed trait category, with pronounced mass on the lateral side of the zygomatic process. The absence/presence of the metopic suture on the frontal bone and ossicles in cranial sutures were registered in the description of the individual anatomical variation. Sex distribution of the relief in the supraorbital region and marginal tubercle was obtained only from skeletons, whose sex was independently determined considering more than one feature of the pelvic bones. The statistical regression method showed significant sexual dimorphism in the development of these traits. In opposite, no connection between sex and the distribution of metopic suture and Inca bones was ascertained. Metopic suture appeared in 10.6 % of cases, (10 skulls), Inca bones – in 44.2 % of cases, with different localizations and various prevalence on one skull. Data for lateralization of the trait were scarce, but indicated no such tendency. *Os intraparietale* (ossicle in the sagittal suture) was found on one skull, combined with *Inca bone* (Grave № 163, male) and in one – *os epiptericum*, at left side (Grave № 129, male).

Table 6. Development of cranioscopical traits, for males and females

| Supraorbital relief (degree)	M		F		Glabella (degree)	M		F		Tubercullum marginale	M		F	
	N	%	N	%		N	%	N	%		N	%	N	%
0	-	-	1	8.3	0	-	-	2	16.7	absent	4	10	3	33.3
1	8	10.5	10	83.3	1	1	1.3	7	58.3	developed	4	10	3	33.3
2	55	72.4	1	8.3	2	17	22.4	3	25	pronounced	32	80	3	33,3
3	13	17.1	0	0	3	38	50	0	0					
					4	18	23.7	0	0					
					5	2	2.6	0	0					
Tt	26	-	12	-	Tt	26	-	12	-	Tt	62	-	9	-

Even though the small number of individuals in the series does not allow a statistical confirmation of the obtained results, some groups of skulls with close craniological features can be defined in the investigated series. When considering the remaining complex of the craniological features (Table 7, Figure 1), three different groups can be recognized among the *mesocranial* skulls. The first one, which includes 12 skulls (from Graves № 36 II, 141, 144, 169, 176, 223, 233, 251, 264, 279), appears more homogenous. The incomplete skulls in Graves № 253 and 269 with the indexes of the facial part resemble this group *by virtue of the indexes calculated for the facial part*. The height indexes of the neurocranium describe relatively high skulls, respectively - hypsi and *acrocranial* (with heights from *basion*), and high and average-high skulls, *ortho-* and *acrocranial*, (according to *porion* heights). Within this group, the main indexes of the facial section of the skulls show very close values. The *upper face* index describes them as c*hamae-*, (one case of *hyperchamae-) prosopic*, with average to high breadth. Midface profile angle is small, orbits, described by orbital index, are from medial high to high, (*mesoconch* in five cases and *hypsiconch* in two cases*)*, and the nose index, found in only two skulls, falls into the category of c*hamae-* and *mesorrhine*. The lower margin of the nose aperture is formed as *anthropina* (11 cases) with one exception of *fossa praenasalia*. The dakrial index, depth of *fossa canina* and palatal index show diverse values.

Other 11 *mesocranian* skulls (from Graves № 96, 99, 100, 111, 203, 206, 215, 217, 226) are grouped by their close values of the upper face index, which describes them as *leptoprosopic*, of the orbital index – with values in the category of *mesoconch* (six cases), one exception of

hypsiconch type, narrow nose, *leptorrhine* (five cases) and form of the lower margin of the nose aperture as *fossa praenasalia* (one exception – *anthropina*). Vertical profile of the upper face is obtained in three cases. Values are low to medium, or 67.05° (Grave № 99), 73.14° and 74.99° (Graves № 215 and 226 respectively). Same skulls show jaw index with values in the *meso-* category. *Dakrial* index has medium to high values, *fossa canina* is shallow, palatal index has values in the *lepto-* category (three cases) and one – *mesostaphyline*. Values of the height indexes with measurement from *basion*, fall in the categories which describe medium high skulls – *ortho-* and *methriocranial*, with one exception, out of seven cases, of *hypsicranial,* relatively high skull. According to the height-length and -breadth indexes, skulls from this group are divided in rubrics of *tapeino-* and *metriocran* (three and four skulls, respectively). According to the height- and breadth-length indexes with measurement from *porion*, and depth of *fossa canina,* the skull from grave № 216 can be ascribed to this group. Other feature – the form of the lower margin of nose aperture, *anthropina*, is not as characteristic for this group. Indexes that describe the facial section of the skulls from the Graves № 221 and 237 are similar to this group, but their preservation state does not allow description of the cerebral part.

Figure 1. Skulls, mesocranial group, frontal, lateral, vertical and occipital view. 1.1. Grave N 169, female, ca. 45-50 years at death. 1.2. Grave N 100, male, ca. 55-60 years at death. 1.3. Grave N 191, male, ca. 40-50 years at death. 1.4. Grave N 99, male, ca. 40-45 (50) years at death
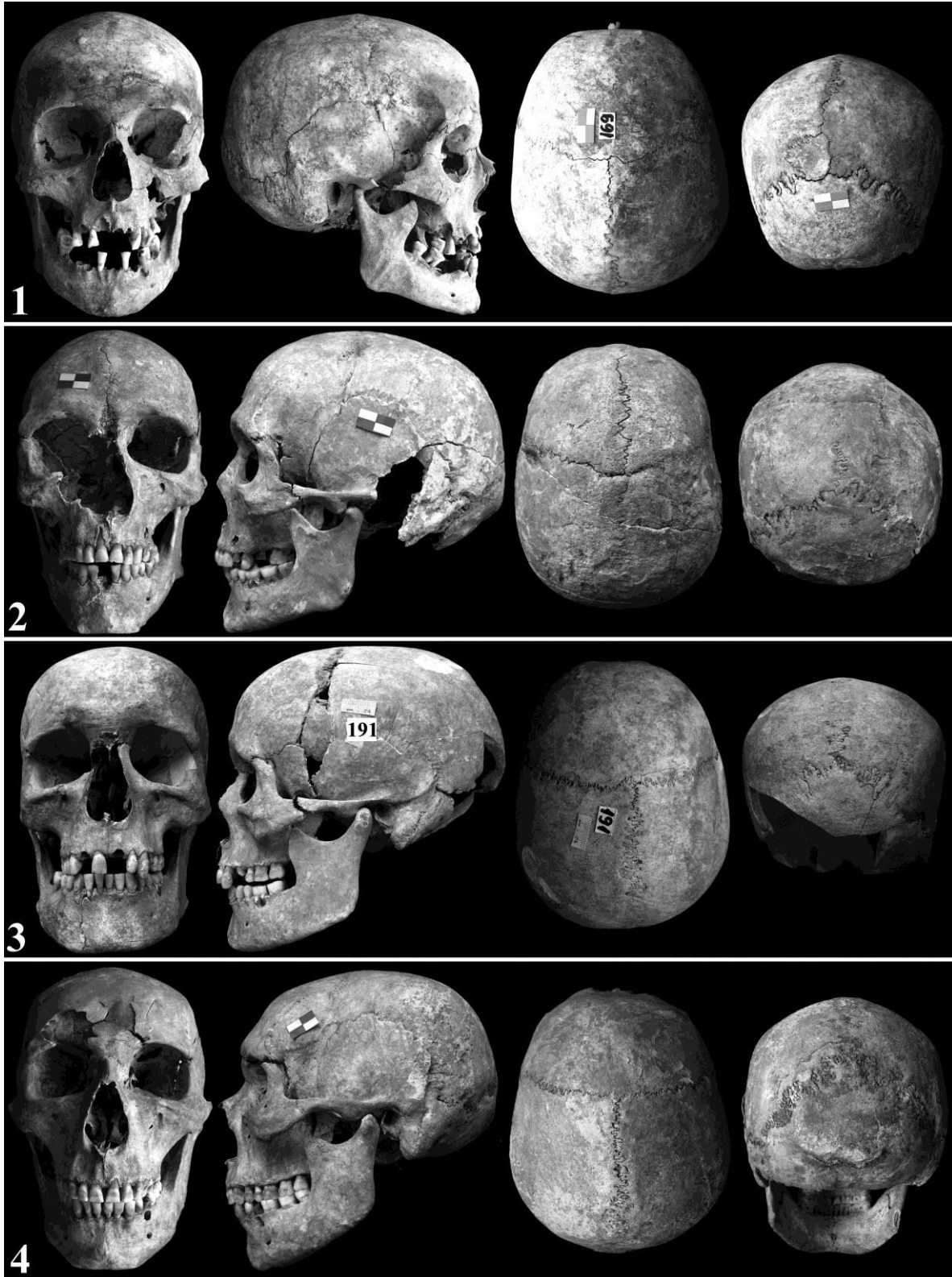
The skull from Grave № 99, having a high-breadth index (with both measurements from *basion* and from *porion*), which describes it as low, expresses alveolar prognathism of the vertical profile and deviates from this group and from the whole craniological series, remaining an exceptional case among this population.

The third group of the skulls with cranial index in the mesocranial category (from Graves № 4, 38, 166, 191, 202, 232) looks homogenous as regards the values of height-breadth and -length indexes of the cerebral section in the categories of ortho- and metriocranial. According to the height from *porion*, they have more often a low form in height-breadth and -lenght index. In this group, the form of the lower margin of the nose aperture is appraised as *anthropina*, the jaw index falls into the category of orthognathous, the values of the vertical upper-face index are medium to high, grouped around 75.74°. The remaining indexes of facial section show lack of homogeneity – two cases of chamae- and one hyperchamaeprosopic and one case of leptoprosopic, two cases of meso- and by one chamae- and hypsiconch after the orbital index, two cases of meso- and one hyperchamae- and one leptorrhine after the nose index. Similar distribution is to be seen in the values of dakrial index. The canine fossa is from medium to very deep, both cases, which allowed calculation of palatal index present values in the leptostaphyline category.

Table 7. Mean values of measurements and indexes in the defined groups, male and female combined

		mesocranial 1		*mesocranial 2*		*mesocranial 3*		*brachycranial*		*hyperbrachy cranial*		*dolichocranial*	
		N	Mean	N	Mean	N	Mean	N	Mean	N	M	N	M
Indexes	Skull	10	77.22	9	77.79	6	76.80	5	82.20	4	86.24	6	73.43
	Height-lenght	5	78.32	6	73.26	6	72.89	3	72.08	2	71.56	3	72.42
	from *po*	9	65.19	7	62.73	6	53.30	5	65.70	4	66.00	6	58.89
	Height-breadth	5	101.09	6	93.6	6	94.92	3	88.51	2	82.67	3	97.78
	from *po*	9	84.40	7	80.87	6	69.45	5	79.94	4	76.54	6	80.19
	Upper-middle face	6	68.81	4	76.44	4	*70.58*	2	86.32	1	94.81	2	95.76
	Jaw	1	87.10	2	94.63	5	93.89	3	67.95	1	80.43	2	74.97
	Orbital	7	82.41	6	81.18	4	*81.61*	3	*84.62*	3	78.53	4	75.71
	Nose	5	51.61	4	45.99	4	*50.89*	2	50.31	3	46.48	2	49.68
	Dakrial_	3	*45.13*	2	51.41	3	*51.67*	4	84.07	2	79.36	0	
	Palatal	5	*86.37*	3	75.37	2	67.15	2	55.95	4	44.68	1	53.85
Measurement	Jaw angle	1	80.79	2	74.04	5	75.74	2	81.64	1	74.93	2	75,.0
	Middle face angle	5	127.20	3	129.00	2	123.50	2	127.75	1	140.00	2	127,.0
	Canine fossa	11	*5.36*	5	3.30	3	*6.57*	4	4.00	3	3.83	6	6.17
	The lower edge of the pyriform aperture	12	*Anthropina* (91,7%)		*Fossa*		*Anthropina*	12	*Anthropina fossa praenasalia*				*Anthropina* (80 %)	

One group of individuals has a brachycranic index of the skull (graves № 51, 129, 146, 205, 245), medium to low cerebral section, mostly considering the length-breadth index and facial section of chamaeprosopic (three skulls). The orbits have a medium (two cases) to prevalent height (one case). The nose aperture is medium narrow to narrow with lower margin formed as *anthropina,* or *fossa praenasalia*. In the group of skulls with brachycranic index falls also the one from grave № 29, which differs from other in the series, with a very low value of the angle between the upper-face height and face length (65,17°), clearly showing a prognathic form of the vertical profile of the face. Faces of skulls in this group are leptoprosopic, with orbits, described as hypsiconch (expressed predominance of the height measurement of orbits), nose of medium breadth (chamaerrhine) with lower margin, formed as *anthropina*, the dakrial index shows high value, the canine fossa is deep. The four hyper-brahycranial skulls (from graves № 147, 219, 278, 284) approach complex of the brachicranial group. Some specifics of skulls, which fall in the hyper-brahycranial rubrication are dakrial index with low and medium values (two cases) and values of the orbital index from the three defined categories (calculated for three cases). Close characteristics to the brachycranial group are ascertained also for the sole ultrabrachycranial skull (from grave № 82).

Figure 2. Brachycranial and dolichocranial groups of skulls, frontal, lateral, vertical and occipital view. 2.1. Grave N 245, male, about 50-60 years at death. 2.2. Grave N 29, male, about 30-35 years at death. 2.3. Grave N 219, male, about 30-40 years at death

The skulls grouped by the cranial index into the dolichocranial category (from grave № 163, 181, 197, 204, 220, 255, 256), are characterized by length- and breadth-height indexes of medium height and low value, while indexes calculated with height from *porion* show that this is not a homogenous group. The upper face index with breadth between both *zygomaxillary* landmarks describes faces as chamaeprosopic (two cases) and leptoprosopic (one case), orbits are low (three cases) and from medium height (one case), the lower margin of the nose aperture is formed as *anthropina* (four cases), with one exception of *fossa praenasalia*. Skulls from graves № 19 and 214 can be also ascribed to this group based on their complex of indexes characterizing the facial section.

Some already studied craniological series, which stay in close chronological and territorial relation to the one from "40 Holly Martyrs" are those from Bojenishki Urvich fortress (Боев, Кондова, Чолаков, 1979; Боев, Чолаков, 1979) from North-West and Chirakman by Kavarna (Боев, Кондова, Чолаков, 1982) from North-East Bulgaria, the Fortress by Pernik (Боев, Кондова, Чолаков, 1983) from South-West Bulgaria and Kabile, necropolis by the Norh-West Gate (Чолаков, Кондова, Боев, 1991), Perperikon (Kavgazova, Stoev and Boev, 1985) and Tatul (Боев, Чолаков, Кондова, 1978) from the Thracian region. In all of these series, the mesocranial skulls are the most widespread. In Kabile, like in the "40 Holly Martyrs", the distribution of skulls based upon the cranial index shows a higher relative number of brachy- and hyperbrachycranic skulls with the lack of dolichocranial skulls for the females, compared with those of the males. The series from Bojenishki Urvich and the XIV-XV c. necropolises from Chirakman, Kavarna, Kabile and Pernik show similarities with the cranial series from "40 Holly Martyrs" also regarding the distribution of the indexes values, which describe the height-length and -breadth relations with predominance of orthocranial skulls, orthognathous vertical profile of the face, in Bojenishki Urvich and Kabile in combination with low values of the zygomaxillary angle of the horizontal profile. Mean values, obtained from the craniometrical data of the series from Bojenishki Urvich show similar complex of features to the second mesocranial group from "40 Holly Martyrs", regarding the values of the orbital and nasal indexes. The obtained values do not strongly deviate from the ones found in the first mesocranial group from the "40 Holly Martyrs". The series from Bojenishki Urvich shows similarities to the studied one also as regards the formation of the lower margin of nose aperture and canine fossa of medium depth. A similar distribution of the values of the indexes to the first and second mesocranial group from "40 Holly Martyrs" is found in the series from Kabile, where there were also found an equal distribution of both basic forms of lower margin of nose aperture, low values of zygomaxillary angle and low to medium values of the depth of the canine fossa. In the series from Perpericon the distribution of the mean values, which describe the cerebral section, approaches to the complex of the second mesocranial group from "40 Holly Martyrs". In regard of orbital and nose indexes, this series resembles the first mesocranial group in "40 Holly Martyrs". Values of the indexes, obtained from the basic measurements of the face index in craniological series from Pernik-Fortress have a large variation. Values of the palatal index, zygomaxillary angle and depth of the canine fossa stay close to the first mesocranial group from the "40 Holly Martyrs" necropolis. Values of the nose and orbital indexes in this series remain in-between of the mean of the first and second mesocranial groups from the "40 Holly Martyrs", while the values of the upper face index, calculated by the breadth between both zygomaxillary landmarks are close to the mean value of the second mesocranial group from the "40 Holly Martyrs". As inferred from the little information available, a higher homogeny of values for the basic indexes in the females, in comparison to males is registered in most of the studied series. The series from Tatul appears as a different case compared with the one from "40 Holly Martyrs", with a high variety of craniological characteristics.

The comparison of results obtained for the "40 Holly Martyrs" necropolis with the known data for the previous period, XI-XII c AD, such as the series from the secondary interments on the mound necropolis, Kabile (Боев, Чолаков 1991), Kovachevo (Boev et al. 1977), Odartsi necropolis № 1 (Кондова, Чолаков 1993) and № 2 (Йорданов, Димитрова 2005) and Pliska, west wall (Боев, Чолаков 1992) reveals similarities with different complexes of craniological features from the one, or two of the mesocranial groups, mostly spread in the XIII-XIV c. AD. The closest complex is found in the series from Kabile and Pliska, with its mean values similar to the complex of the second and third mesocranial group from "40 Holly Martyrs". The population from Kovachevo shows again a close complex of mean values for females to the both same groups from "40 Holly Martyrs". For

the males, characteristics of the facial part remain close to the same complexes in "40 Holly Martyrs", but those of the cerebral section are closer to the defined dolichocranial group. Similar results were obtained by the comparison with the data from Pliska. In the latter series, the mean values of cranial index are close to the lower limits of the mesocranial category, but the dolichocranial skulls prevail in the distribution of the cranial index in males (Боев, Чолаков 1992, 128). This peculiarity alienates the latter series from the studied one. Similar results were obtained after the investigation of the necropolises Odartsi № 1 and 2, where mean values of cranial index fall close to the lower limit of the mesocranial category. The distribution in Odartsi 2 shows a relatively higher portion of dolichocranial and brachycranial skulls and despite the highest relative number of mesocranial skulls in the series (Йорданов, Димитрова 2005: 418, 427) it remains significantly lower than the one ascertained in "40 Holly Martyrs". Mean values of the remaining craniometrical indexes and measurements in both series from Odartsi are close to those ascertained in the "St. 40 Martyrs" for the second and third mesocranial groups. Meanwhile, a difference in the distribution of values in the categories appears between "40 Holly Martyrs" and Odartsi 2, ascertained for height-length and height-breadth indexes, the latter with the predominance of acrocranial types in Odartsi. Similar differences are observed in the distribution of the basic indexes of the facial section. In conclusion, it can be pointed out that the series from the previous period show higher diversity of the basic craniological features, while the series from "40 Holly Martyrs", as the other synchronous to it, shows significant predominance of a more homogenous community, with presence of less numerous groups, with different complex of features.

Comparison of the results from the "40 Holly Martyrs" necropolis with the craniological series of the Late Middle Ages from Romania (Wallachia region) reveals a similarity regarding the mean values of our series to that from Strǎuleşti (third-fourth decade of the XV-second half of XVI c. AD) as reported by previous studies (Popovici 1973: 22-23, tabl. 1-2). Despite this resemblance, the comparison regarding the distribution of skulls in the series of Strǎuleşti II (Popovici, 1966) highlights obvious differences, with a higher proportion of mesocranial skulls and a lower ratio of dolicho- and brachycranial skulls. In both "St. 40 Martyrs" and in Strǎuleşti necropoles, dolicho and brachycranial skulls are relatively equally represented, as also in Odartsi 2. Specific traits of the meso- and dolichocranial skulls in Strǎuleşti are similar to the complexes of the second and third meso- and dolichocranial groups identified in the "40 Holly Martyrs" series. Both brachy- and the only hyperbrachycranial skulls found in the Romanian series do not show similarities – regarding the craniological complex – to the corresponding groups in the studied Bulgarian series. As for the main craniometrical indexes, distribution of the material displays similarities between the studied Bulgarian series and that from Verbicioara, XIII-XIV centuries A.D. The comparison of mean values of the defined craniological groups in the series from "40 Holly Martyrs" with data from close chronological Romanian series, as from Bîtca Doamnei (XII-XIII c. AD) and Trifeşti (XIII c. AD) from Northern Moldova (Botezatu, Ştefǎnescu 1970: 17 Tabl. 2), also reveals differences between brachy- and hyperbrachycranial groups in Bulgarian and Romanian series regarding their main craniometrical indexes –such as the height relations, orbital, nasal and jaw indexes.

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