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Cranial series from medieval necropolis in Drustar (Silistra) – anthropological investigation

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The medieval town of Drustar was the most important Bulgarian fortress of lower Danube. Furthermore, Drustar was one of the first places, where the Slavic people and the Bulgars were settled after they passed over Danube. Because of this, study of bone material from this region, is of great importance for biological reconstruction and explanation of the Bulgarian nation ethnogenesis. The aim of this study was to perform anthropological characterization on cranial series from medieval necropolis in Drustar (9^{th} -15^{th} C.). A total of 120 crania of adult individuals were studied (70 male and 50 female). On the basis of our results we concluded, that the individuals were belonged to European race with slight to moderate manifested Mongoloid admixture. It could be explained with the Mongoloid roots of Bulgars, as well as with Torkils and Pechenegs invasions in Northeastern Bulgaria during 11^{th} century and the following metisation.

Key word: anthropological characterization, cranial series, racial affiliation

Introduction

The medieval town of Drustar was the most important Bulgarian fortress of the lower Danube. Drustar was an inheritor of the Roman town Durostorum, called Dorostol from the Byzantines. From the Ottoman period in Bulgaria till today the town carries the name Silistra. This town was connected with the earlier history of Bulgaria. Furthermore, Drustar was one of the first places, where the Slavic people and the Bulgars were settled after they passed over Danube [16]. Because of this, study of bone material from this region is of great importance for the biological reconstruction and explanation of the Bulgarian nation ethnogenesis. Moreover, changes in the anthropological characteristic of the skull could be traced in Bulgarian's land from the Neolithic till today. The

intensive migration processes during the different historical periods undoubtedly were contributed to the variations in basic measurement of the skull [1]. In this connection, the aim of this study was to perform an anthropological characterization on cranial series from medieval necropolis in Drustar (9^{th} -15^{th} century AD).

Matherial and Methods

The study was performed on a cranial series from medieval necropolis in Drustar. The necropolis was situated around and within the basilica, which was near to the northern fortress wall. The basis of the basilica was revealed in 1993, during excavations in the National archaeological reserve "Durostorum-Drustar-Silistra", supervised by associate professor Stefka Angelova [7]. The necropolis was dated 9^{th} -15^{th} century, but the burials from the 14^{th} century were the most numerous. The cranial series included a total of 120 crania of adult individuals, 70 of which were males and 50 were females.

Sex of the investigated individuals was determined on the basis of metric and scopic features on cranium and postranial skeleton by the methods of Martin-Saller [3], Pashkova [14], Nikityuk [13].

The age of the individuals was determined by the degree of obliteration of the cranial sutures after Olivier [4] and by the degree of attrition of the chewing surfaces of the teeth after Gerasimov [9].

Four linear and two angular features were measured by the classical methods of Martin-Saller [3]. Seven indices were calculated as well [3, 6]. The categories "very small", "small", "middle", "large" and "very large" characterizing the measurements, angles and indices were used after Alekseev, Debrts [6]. The rubrications of the indices were given after Martin-Saller [3]. Determination of the racial affiliation was performed after Roginskii and Levin [15] on the basis of the mean values of the measurements, angles and indices in the male cranial series.

The data from this investigation were computed by SPSS, version 16.0. The established sexual differences were assessed for statistical significance by the Mann-Whitney's U-test at $p<0,05$.

Results and Discussion

The comparison between both male and female series showed that the bizygomatic breadth and upper facial height were the only measurements, which displayed statistically significant sexual differences and was larger in the male series (table 1). Three of the calculated indices also showed statistically significant sexual differences (table 2). The cranial index (8:1) was larger in the female series. This is common and is due to the more pronounced robustness in the male skulls, which contributes to a greater extent to enlargement of the skull's length compared to the skull's breadth [15]. The height-length index (17:1) was significantly larger in the female series too, probably by the same reason. The simotic index (SS:57) was significantly larger in the male series and reflected the more projected and narrower nasal bone in male crania compared to female ones.

Differences between both series in the common indices rubrications were established only with regard to the cranial index (fig. 1). In male series the index was predominately mesocran followed by dolichocran, while in female one was mainly brachycran followed by mesocran. Besides the cranial index, the common rubrications of the other indices were similar in both sexes: othocran (17:1), tapeinocran (17:8), mesen (48:45), leptorhin (54:55) and brachyuran (61:60) (Figs. 2,3,4,5 and **6).**

Table 1. Biostaistical data for the linear and angular measurements

No by Martin		Male						Female						U - value
		n	mean	min	max	SD	Sx	n	mean	min	max	SD	Sx	
45	Bizygomatic breadth	21	137.60	125.00	150.00	6.28	1.37	15	127.77	116.00	143.00	6.81	1.76	0.000*
48	Upper facial height	24	72.00	65.00	80.00	4.19	0.85	26	67.50	56.00	79.00	5.57	1.09	0.004*
52	Orbital height	28	33.30	22.00	37.00	2.71	0.51	22	33.34	30.00	38.00	1.90	0.40	0.590
-	***Fossa canina***	35	6.56	4.00	11.00	1.76	0.30	27	5.85	3.00	9.50	1.92	0.37	0.184
74	Alveolar angle	20	81.20	75.00	92.00	5.08	1.14	16	80.50	74.00	89.00	4.44	1.11	0.702
77	Nasomalar angle	25	133.74	113.10	142.00	6.58	1.32	19	134.81	120.80	144.30	6.08	1.40	0.705

*statistically significant sexual differences at p<0,05

Table 2. Biostatistical data for the calculated indices

No by Martin		Male						Female						U - value
		n	mean	min	max	SD	Sx	n	mean	min	max	SD	Sx	
1	8:1	26	76.45	67.00	84.88	4.57	0.90	21	79.34	70.41	84.15	3.26	0.71	0.014*
2	17:1	22	71.69	64.50	76.84	3.04	0.65	17	74.39	67.60	84.18	4.13	1.00	0.039*
3	17:8	21	92.50	82.17	101.81	5.92	1.29	15	93.01	84.56	101.36	5.52	1.42	0.950
39	48:45	14	52.08	46.00	58.08	3.36	0.90	14	51.97	45.74	57.63	3.42	0.91	0.946
-	SS:57	26	58.00	34.78	77.78	12.62	2.47	16	49.73	33.33	63.64	8.62	2.15	0.017*
48	54:55	27	46.38	37.07	57.69	4.74	0.91	24	46.21	35.71	55.81	5.43	1.11	0.970
54	61:60	31	119.22	101.72	139.58	9.36	1.68	24	120.83	102.04	142.55	10.33	2.11	0.519

*statistically significant sexual differences at p<0,05

Determination of the racial affiliation in accordance to the metrical characterization showed that more of the features lied on the borderlines between European and Mongoloid race (table1). The Bizygomatic breadth was "large", which is typically mongoloid feature and showed the mongoloid admixture in the studied individuals. On the other hand it also could be due to the traces from the proto-kromanionian type. The upper facial height was "middle" and lies on the borderlines between the two races, as in Europeans is typical from small to middle upper facial height, while in Mongoloids is typical from middle to large upper height of the face. The established "middle" orbital height is characteristic of Europeans. The canine fossa was "large" i.e. deep and this is also a typically European feature.

The angular characterization was typical for the European race with "large" alveolar angle and "very small" nasomalar angle (table 1).

There was also established slight Mongoloid admixture, concerning the index characterization (table 2). Upper facial index (48:45) was "middle" and characteristic of Europeans. The established "large" simotic index (SS:57) clearly showed europeidity with the typically projected and narrow nasal bones. The nasal index (54:55) was "small" and lied on the borderlines between the two races. Low values of the nasal index are typical in Europeans, while in Mongoloids are typical from low to middle values. Maxilloalveolar index was "middle" and characteristic of Mongoloids.

In summary, the investigated individuals were belonged to European race, as the mongolian admixture was established to a different degree through some of the features.

For more accurately estimation of europeidity and mongoloidity we tried to apply a formula used by Kondova and Cholakov [2] after Schwidetzky (1984). The formula combines four features and gives the profiling of the facial part of the skull. However, applied to our male series, the result determined the investigated individuals as Europeans and did not assess any mongoloid admixture. This eventually could be explained with the strongly profiled and pronounced nasal region, with more projected and narrower nasal bones as was established in our previous study [5]. Furthermore, simotic index, the angle of nasal projection and nasomalar angle characterize profiling of the nasal region. These features took part in the formula as variables, which were probably influenced on the result. On the other hand it also could be due to the small sample size.

Kondova and Cholakov [1] studied the epochal changes in the skull configuration and the process of brachichephalization in male skulls from the Neolithic to the beginning of the 20th century. The comparison between their results for some of the features during the different epochs and ours result is presented in tables 3 and 4. Some of the

Table 3. Comparison between the mean values of measurement during the different epochs

Epoch	Measurements									
	45		48		52		77		FC	
8th-10th	132.6*	137.6**	70.9*	72.0**	**32.8***	33.3**	137.5*	133.7**	5.1*	6.6**
10th-12th	**133.8***		**71.6***		**32.8***		139.4*		5.2*	
12th-14th	133.2*		70.0*		32.3*		138.7*		**5.6***	
15th-17th	133.7*		70.4*		32.2*		**137.2***		5.4	

* mean values of the measurements in different epochs after Kondova, Cholakov (1993, 1994)
** mean value according to our results

Table 4. Comparison between the mean values of indices during the different epochs

Epoch	Indices									
	8:1		17:1		17:8		48:45		SS:57	
8th-10th	77.7*	76.45**	74.7*	71.69**	96.2*	92.50**	53.9*	52.08**	52.0*	58.00**
10th-12th	**76.2***		**72.9***		96.3*		53.4*		54.8*	
12th-14th	77.4*		73.8*		**95.2***		**52.5***		**58.1***	
15th-17th	77.8*		74.1*		95.5*		52.6*		49.0*	

* mean values of the indices during the different epochs after Kondova, Cholakov (1993)
** mean value according to our results

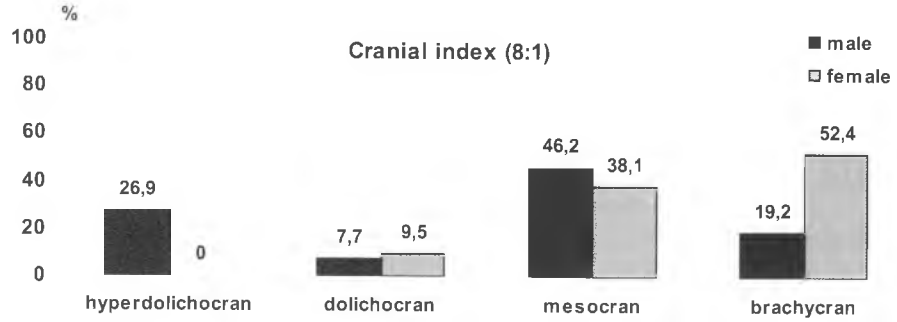

Fig. 1. Rubrications of the cranial index

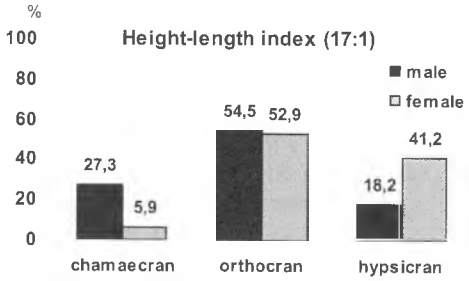

Fig. 2. Rubrications of the height-length index

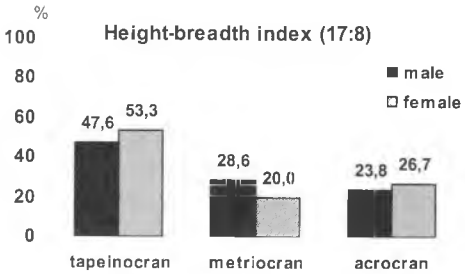

Fig. 3. Rubrications of the height-breadth index

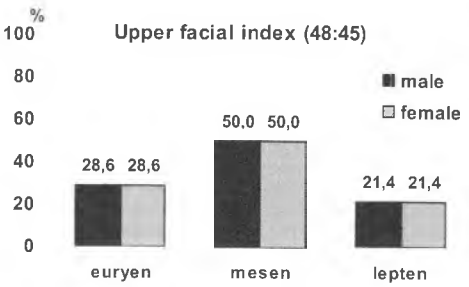

Fig. 4. Rubrications of the upper facial index

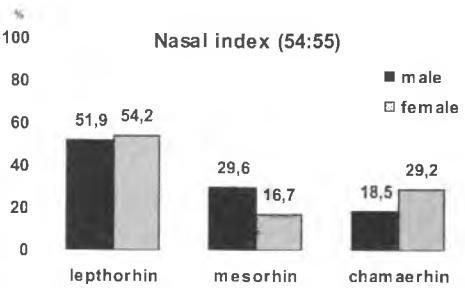

Fig. 5. Rubrications of the nasal index

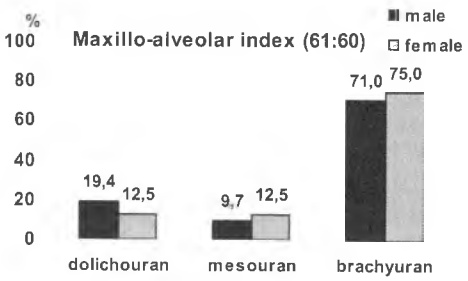

Fig. 6. Rubrications of the maxillo-alveolar index

observed differences probably were due to the large historical period in which the material from the necropolis of Drustar was dated (9^{th}-15^{th}) and also to the heterogeneity of the investigated individuals.

In a study of the changes in the facial part of the skull as a source of information about the ethnogenetical processes in medieval Bulgaria, Kondova and Cholakov [12] established, that since the Early Middle Ages (8^{th}-9^{th} C.) the mongoloid traces were best expressed in Northeastern Bulgaria. Data from other paleoanthropological investigations from Northeastern Bulgaria were similar to a great extent to our results [10, 11, 17]. There were also some differences, which could be due to the heterogeneity of the populations and other factors.

Cholakov [17] studied the medieval necropolis in Drustar situated near to the southern fortress wall and dated 12^{th}-14^{th} century. There were many parallels, concerning the metrical and index characterization of the individuals between the necropolis studied by us and those investigated by Cholakov. Furthermore, Cholakov considered that the studied population was with metis character, a mixture between European and Mongoloid races. This was confirmed to great extent by our results.

The racial analysis performed by the bone of postcranial skeleton from the same necropolis showed that the investigated individuals belonged to the European race with slight to moderate manifested admixture from the Mongoloid race. The Mongoloid admixture could be explained with the mongoloid roots of the Bulgars, as well as the Torkils and Pechenegs invasions in the Northeastern Bulgaria during the 11^{th} century and the following metisation [16]. These invasions of Koumaians, Pechenegs and Torkils in the 11^{th} century brought in new mongoloid features. Traces from them could be found in the contemporary anthropological characteristics of Bilgarian population as well as in some ethnogeografical elements and in the toponimic [8].

Conclusion

On the basis of our study we can concluded, that the individuals from the medieval necropolis from Drustar were belonged to the European race with slight to moderate manifested Mongoloid admixture. This corresponds to the previously established fact that some of the Mongoloid features were more clearly represented in the early Bulgarian necropoles from Northeastern Bulgaria. This could be explained with the mongoloid roots of the Bulgars, as well as with the Torkils and Pechenegs invasions and their settlement in the Northeastern Bulgaria during the 11^{th} century and the following metisation.

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