

BIOARCHAEOLOGY OF THE MEDIEVAL ĐAKOVO CEMETERY; ARCHAEOLOGICAL AND ANTHROPOLOGICAL EVIDENCE FOR ETHNIC AFFILIATION AND MIGRATION

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The results of a multidisciplinary, bioarchaeological analysis of the medieval cemetery from Đakovo show that this site was, from the 11th to the 16th century, inhabited by two different populations. The first population, which inhabited this site from the 11th to the first half of the 13th century, and which comprises the first burial phase in the Đakovo cemetery, can archaeologically be defined by shallower graves and the presence of Bijelo Brdo culture, and early Croatian jewelry. Discriminant function analysis of crania from this burial phase indicates that this population belongs to the group of early Medieval Croat populations, the same populations which inhabited the sites of Nin-Ždrijac, Danilo and Mravinci. Discriminant function analysis also indicates that there is a clear difference between crania from this phase, and crania from the second burial phase. The second burial phase is archaeologically defined by deeper graves and a general paucity of material remains among which earrings made from simple open-ended wires and rings with a widened, decorated field were the most frequently recovered. Differences in cranial morphology between the two phases are primarily present in cranial length and width, and in facial breadth. Crania from the second burial phase represent the presence of a different population which inhabited Đakovo from the second half of the 13th to the 16th century. The identity of this population is, at present, unknown. The datation and geographical location of some of the sites inhabited by Early Medieval Croat populations is also of considerable interest. Use of the Nin-Ždrijac cemetery, located on the Eastern Dalmatian coast, is dated from the 8th to the 10th century. The Gomjenica cemetery in northern Bosnia is dated from the 10th to the 11th century, while the first Burial phase from Đakovo is dated from the 11th to the first half of the 13th century.

The demographic profiles of the two burial phases are very similar, reflecting a similar lifestyle, and in all probability, a continuance of exploitation of the same resources necessary for survival.

Key words: Biological distance, cranial variation, multivariate statistics, medieval Đakovo

Introduction

Archaeologists employ various lines of evidence for developing and testing hypotheses about ethnic or archaeological affinities of multicomponent cemeteries. However, there are problems in using artifactual data to infer behavior that is only indirectly related to the artifacts, as Allen and Richardson (1971) have noted. Many types of social behavior and events have, however, biological consequences, allowing hypotheses about them

to be tested with biological data. Previous bioarchaeological studies have, for instance, successfully identified specific ethnic affinities in prehistoric cemeteries (Owsley and Jantz 1978; Owsley et al. 1982; Byrd and Jantz 1994), and skeletal variation has also been used to infer posmarital residence patterns (Lane and Sublette 1972; Konigsberg 1988).

In this paper archaeological and osteological data are used to infer the ethnic composition of the medieval Đakovo cemetery in continental Croatia.

The town of Đakovo is located approximately 200 km south-east of Zagreb, in the continental part of Croatia. Đakovo is first mentioned in historical sources as an estate which was given in a deed by the Croatian-Slavonian prince Koloman to the bishop of Bosnia in 1239. The see of the bishop gradually developed into a market, and subsequently a town. The medieval cemetery is located in the center of modern Đakovo, in an area behind the present Church of All Saints. Excavations carried out from 1995 to 1997 revealed the presence of 486 graves (Filipec, 1996; 1997). Archaeological evidence indicates two phases of burial in the cemetery. These phases are recognizable by different stratigraphic relationships, as well as by specific material remains. The first phase begins in the middle, or the second half of the 11th century and lasts up to 1242 when it was interrupted by the Mongol invasion. The second phase begins in the period immediately following the Mongol invasion and lasts until 1536 when Đakovo was captured by the Turks.

Recently developed discriminant functions (Šlaus 1998) allow the separation of medieval crania into four large population groups: Avaro-Slav populations east of the Danube, Avaro-Slav populations west of the Danube, populations belonging to the Bijelo Brdo culture, and

Early Medieval Croatian populations. Skeletal material from the Đakovo cemetery will therefore be separated into two groups, based on affiliation with the two archaeologically established burial phases, and osteological data will be used to answer the following questions: 1) to which large population group do Đakovo crania from the first burial phase belong? 2) do crania from the second burial phase belong to the same population group or do they represent another ethnic group which settled in this area in the wake of the Mongol invasion?

Two types of osteological data will be used in this investigation. The first is metric cranial data, analyzed with multivariate statistical procedures. The second is paleodemographic data which will be compared to determine if there were significant differences in demographic profiles between the two analyzed burial phases.

Archaeological context

Excavation of the Đakovo cemetery began in 1995 as essentially a rescue excavation undertaken because of the construction of a business center in an area behind the church of All Saints in Đakovo. After it was

1,	1a,	2,	4,	5,	7,	13,	15,	32,	34,	35,	38,	40,	46,
47,	49,	49a,	50,	56,	57,	58,	61,	62,	63,	66,	67,	71,	72,
73,	79,	82,	83,	84,	85,	87,	89,	90,	93,	93a,	99,	107,	110,
111,	112,	115,	116,	119,	124,	125,	126,	127,	131,	133,	136,	139,	140,
146,	148,	154,	159,	160,	162,	163,	164,	165,	167,	180,	181,	182,	183,
184,	185,	186,	187,	190,	191,	192,	194,	197,	199,	209,	213,	214,	215,
216,	217,	228,	230,	232,	235,	251,	252,	257,	258,	262,	266,	274,	276,
294,	297,	299,	302,	303,	313,	314,	315,	316,	317,	318,	319,	320,	321,
322,	323,	324,	327,	328,	329,	330,	331,	332,	333,	334,	338,	340,	348,
349,	350,	358,	359,	359a,	367,	375,	376,	377,	378,	379,	380,	391,	393,
397,	397a,	402,	404,	407,	408,	411,	414,	418,	435				

Table 1. The distribution of graves according to burial phase.

Phase 1

106,	157a,	161,	202,	204,	206,	207,	211,	221,	226,	227,	233,	248,	250,
259,	260,	270,	271,	277,	278,	279,	280,	281,	283,	284,	291,	295,	296,
304,	309,	335,	336,	337,	341,	368,	369,	370,	388,	392,	400,	401,	405,
409,	410,	417,	420,	421,	422,	424,	425,	426,	427,	428,	430,	431,	432,
433,	434												

Phase 2

established that the future construction site was occupied by a medieval cemetery, extensive rescue excavations and research was carried out from 1995 to 1997. A total of 486 graves was excavated during three campaigns (346 in the first year), and an area of approximately 2100 m² was excavated (Filipec 1997: 241).

The church of All Saints and the adjacent medieval cemetery are located in the north-western corner of the elevated plateau on which the present city of Đakovo has evolved. The graves were arranged in more or less regular rows. All of the deceased were buried in simple burial pits, no evidence of grave architecture was noted. The depth of the grave pits ranged from 100 to 170 cm. The grave pits were mostly trapezoidal or rectangular with rounded corners. All graves were oriented west-east, with varying degrees of deviation. The deceased were placed lying on their back, with their legs extended. Arm position varied considerably (Filipec 1996).

As already mentioned, two burial phases were established. As a rule, graves from the earlier stratum were dug at a shallower level, while later graves were deeper. Later graves were also often dug at the site of earlier ones, particularly in the area near the present church.

Material remains from the cemetery consist almost exclusively of jewelry. Objects of everyday use were rarely discovered. The first burial phase is characterized by the presence of two types of jewelry. The first belongs to the late phase of the Bijelo Brdo Culture and includes circlets with S-shaped terminals and simple individual rings. The second type of jewelry is typical early Croatian jewelry consisting of filigree jewelry, earrings with thickened joints, earrings with granulated dots and three-beaded earrings.

The second burial phase is characterized by a marked lack of finds. The most common finds were earrings made from simple open-ended wires, and rings with a widened, decorated field.

Because of complicated stratigraphic relationships, and the paucity of material remains, not all graves could be assigned to one of the two burial phases. The distribution of graves according to burial phase is presented in Table 1.

Materials and methods

The recovered osteological material from the Đakovo cemetery was in fair to poor condition. Underground water and soil acidity had eroded the outer cortex in numerous burials. Bone from the cemetery was generally fragile and dark in color. Subadult burials were particularly poorly preserved. As already mentioned, two types of osteological data were recorded in the recovered remains: paleodemographic and craniometric.

Demographic data is dependent on accurate sexing and age determination. While sex determination in complete skeletons is relatively routine, sexing fragmentary or poorly preserved remains can be challenging. The criteria selected for determination of sex in this study include pelvic (Phenice 1969) and cranial morphology (Krogman and Iscan 1986). These criteria generally provide accurate results. From a sample of skeletons of known sex, Meindl et al. (1985) reported a 3% error rate when both the pelvis and skull were evaluated. In addition, recently developed (Šlaus 1997) discriminant functions for sexing fragmentary and complete femurs were used in cases where pelvic and cranial morphology was not available. These formulae provide accurate results. In complete femora correct sexing is achieved in 93.7 % while in fragmentary femora the accuracy of sex determination ranges from 85 - 91 %. No attempt was made to estimate the sex of subadult individuals.

Age at death for subadults was determined by use of dental calcification standards (Moorrees et al. 1963) and limb bone lengths (Fazekas and Kosa 1978).

Morphological changes in the pubic symphysis (Brooks and Suchey 1990), auricular surface of the ilium (Lovejoy et al. 1985) and sternal ribs (Iscan et al. 1984, 1985) were used when age at death was determined for adults. Degree of epiphyseal closure (McKern and Stewart 1957) was also used when determining the age of young adults.

Cranial measurements were taken with standard anthropometric instruments according to criteria defined by Martin and Saller (1975). The following measurements were taken: a) maximum cranial length (Martin-Saller 1), b) maximum cranial breadth (Martin-Saller 8), c)

Burial phase	Martin-Saller variable							
	1	8	9	17	45	48	51	52
Phase 1	193,0 (n=32)	141,3 (n=33)	101,6 (n=47)	139,3 (n=32)	138,5 (n=31)	63,3 (n=39)	40,2 (n=51)	33,0 (n=54)
Phase 2	194,5 (n=25)	148,0 (n=27)	98,2 (n=31)	146,7 (n=29)	142,5 (n=24)	64,0 (n=33)	41,7 (n=39)	33,0 (n=37)

Table 2. Mean values for male craniometric data, by burial phase, in Đakovo.

minimum frontal breadth (Martin-Saller 9), d) basion-bregma height (Martin-Saller 17), e) bizygomatic breadth (Martin-Saller 45), f) upper facial height (Martin-Saller 48), g) orbital breadth (Martin-Saller 51), and h) orbital height (Martin-Saller 52).

Discriminant functions developed by Šlaus (1998) were used to classify Đakovo crania into one of the previously mentioned four large population groups: Avaro-Slav populations east of the Danube, Avaro-Slav populations west of the Danube, Bijelo Brdo culture populations, and Early Medieval Croat populations. The accuracy of the developed functions is surprisingly high. In a sample of 29 medieval Central European sites, 28 (96.5 %) were correctly classified using these functions (Šlaus 1998: 102). These discriminant functions were, however, developed from populations dated from the 5th to the 13th century and could not therefore be used to classify the second burial phase in Đakovo. Craniometric data from the two burial phases was therefore further subjected to discriminant function analysis to see if statistically significant functions could be derived that would separate the two phases. If such functions could, indeed, be developed than this would be strong evidence for population movement or migration. As the discriminant functions developed by Šlaus were calculated only for male crania, craniometric relationships and the interpretation of these relationships are limited to males.

Mean values for the selected male cranial variables from the two burial phases in Đakovo are presented in Table 2.

Site	Datation
Stari Jankovci-Gatina	7 th to 8 th century
Privlaka-Gole Njive	8 th to 9 th century
Nin-Ždrijac	8 th to 10 th century
Mravinci	9 th to 10 th century
Bribir	9 th to 11 th century
Vukovar-Lijeva Bara	10 th to 11 th century
Bijelo Brdo	10 th to 11 th century
Gomjenica-Baltine Bare	10 th to 11 th century
Danilo-Šematorij	10 th to 16 th century
Bugojno-Čipulići	10 th to 16 th century

Table 3. The datation of other Croatian and Bosnian sites included in the discriminant function analysis.

Results

Craniometric analysis

Classification coefficients for determining the affiliation of new cases based on discriminant function analysis are presented in Šlaus (1998, 102). The multidimensional positions of the two burial phases, calculated from the unstandardized discriminant function coefficients (Šlaus 1998: 100), in relationship to the multidimensional positions of other Croatian and Bosnian sites, are shown in Figure 1.

The following sites have also been included in the analysis: Vukovar-Lijeva Bara, Bijelo Brdo, Privlaka-Gole Njive, Stari Jankovci-Gatina, Bribir, Mravinci, Nin-Ždrijac, Danilo-Šematorij, Bugojno-Čipulići and Gomjenica-Baltine Bare. The datation of these sites is shown in Table 3. Group centroids are marked with numbers. Number "1" corresponds to the group centroid for Avaro-Slav populations West of the Danube, "2" for Avaro-Slav populations east of the Danube, "3" to Bijelo Brdo populations, and "4" to Early Medieval Croatian populations.

The multidimensional positions and relationships of these sites are discussed in Šlaus (Šlaus 1998: 103). In very brief overview, the calculated discriminant functions showed a remarkably high accuracy in classifying the analyzed sites. Only one of the ten sites (Bribir) was wrongly classified, but the multidimensional position of Bribir on the two discriminant functions, considerably closer to the group centroid for Early Medieval Croat populations than to the centroid for Bijelo Brdo populations into which it was classified, clearly shows that this site belonged to the group of Early Medieval Croatian populations. All of the remaining sites were classified in accordance with their cultural affiliation and geographical position: Privlaka and Stari Jankovci into the group of Avaro-Slav populations west of the Danube, Bijelo Brdo and Vukovar-Lijeva Bara into the group of Bijelo Brdo culture populations, and Mravinci, Danilo and Nin-Ždrijac into the group of Early Medieval Croat populations. Of interest is the position of the two Bosnian sites: Bugojno-Čipulići and Gomjenica-Baltine Bare, both of which were classified into the group of Early Medieval Croatian populations.

In the context of this analysis, the multidimensional positions of the two burial phases from Đakovo (Figure 1) show two things. Firstly, the first burial phase clearly belongs to the group of Early Medieval Croat populations. The multidimensional position of this phase is close to that of Mravinci and Danilo, and closer to the group centroid for Early Medieval Croat populations than to any other group centroids. Secondly, burial phase 2 clearly represents a different population from the one that inhabited Đakovo during the first burial phase. The ethnic affiliation of this group is, at present, impossible to determine, but its multidimensional position, in the lower left hand corner of the picture, and clearly separated from all of the other sites, shows that it has little in common with the other populations.

Discriminant function	Eigenvalue	Cannonical correlation	Wilks λ	χ^2	DF	Significance level
1	99.657184	0.99502	0.00993	41.5	8	0.0001

Table 4. Eigenvalue, canonical correlation, Wilks λ , and significance level for the derived discriminant function.

This assumption is further confirmed by the results of a discriminant function analysis between crania from the two burial phases. Because no missing values can be present in a data base when calculating discriminant functions, the analyzed sample was greatly reduced. Only 25 completely preserved male crania (15 from the first burial phase, and 10 from the second burial phase) were available for analysis. However, the discriminant function procedure from the Statgraphics 4.0 statistical software package (1989) was able to calculate one statistically significant discriminant function (Table 4). Standardized and unstandardized discriminant function coefficients are presented in Tables 5 and 6. Values for group centroids are presented in Table 7. The cut-off point for the two burial phases is -3.285. All crania with scores higher than this belong to the first burial phase, while crania with lower scores belong to the second burial phase. The accuracy of the discriminant function is apparently very high. All of the 25 completely preserved crania were accurately classified.

Demography

Mortality distribution by age and sex for the two burial phases in Đakovo is presented in Tables 8 and 9. A total of 160 skeletons (111 skeletons from burial phase 1, and 49 skeletons from burial phase 2) were available for analysis. Both series show an adult bias with an under-representation of subadults, who compose only 18.9 % of the burials in the first phase, and even less, 4 % in the second phase.

No significant differences in adult age distributions for males and females was noticed in the first burial phase. Peak adult male mortality is between the ages of 31 to 40 years during which slightly less than 37 % of all males died. Peak female mortality is between 36 to 45 years of age accounting for 22.7 % of all female deaths. Females in the first burial phase suffered more deaths during young adulthood than males. In the analyzed series, 40 % of adult females died before their 31. year, compared to 32 % of males. The mean ages at death for adult males and females from the first burial phase are very similar. Males lived on average 35.4 years, while females lived only slightly shorter, 34.9 years.

Similar demographic profiles are present in the second burial phase. Peak adult male mortality is between 31 to 40 years, accounting for 33.3 % of all male deaths, while peak female mortality is between 21 to 30 years, accounting for 38 % of all female deaths.

Martin Saller variable	Standardized disc. function coefficients
1	0.42891
8	-4.61925
9	-0.21033
17	-2.26789
45	-5.54072
48	-2.03610
51	2.21913
52	0.11354

Table 5. Standardized discriminant function coefficients.

In this phase 42 % of all females, and 37 % of all males died before their 31. year. Mean ages at death are slight lower than those recorded in the first burial phase. Males lived on average 34.7 years, while females lived slightly shorter, 33.4 years.

The statistical significance of differences in ages at death between the two burial phases, as well as between males and females, was evaluated using analysis of variance statistics. A two-factor analysis of variance was used to assess the effects of sex, and burial phase, on mortality (Table 10). No statistically significant differences were found either between mortality in the two burial phases, or between the mortality of males and females.

Discussion

The results of our investigation highlight, once again, some of the complexities associated with the determination of cultural or ethnic affiliation based on material remains, and underline the necessity of a multidisciplinary approach. In this respect, the multicomponent nature of the Đakovo cemetery is confirmed by both archaeological and biological analy-

Martin Saller variable	Unstandardized disc. function coefficients
1	0.06176
8	-1.81001
9	-0.05062
17	-0.45058
45	-1.65903
48	-0.86118
51	1.81340
52	0.10941
Constant	526.124

Table 6. Unstandardized discriminant function coefficients.

sis. From the archaeological point of view clear differences between the two burial phases are seen in the distribution of material remains, primarily jewelry, and in the stratigraphical relationships between the graves. From the anthropological point of view, marked differences in cranial morphology, quantified through the use of multivariate statistical procedures, indicate that the two burial phases from Đakovo are characterized by the presence of two different populations.

While these results are, by themselves, of interest and noteworthy, the full value of a multidisciplinary, bioarchaeological approach to the analysis of the Đakovo cemetery, lies in our ability to correctly identify, on the basis of cranial morphology, individuals from the first burial phase as belonging to the Early Medieval Croat population. Based only on archaeological analysis, this would not be possible as the recovered material in-

Burial phase	Group centroid
1	6.571
2	-13.143

Table 7. Group centroids for the two burial phases

Age	Subadults	Males	Females
Birth-5	5		
6-10	8		
11-15	8		
16-20		5	4
21-25		4	8
26-30		6	6
31-35		11	3
36-40		6	7
41-45		7	11
46-50		1	2
51-55		3	1
56-60		1	1
61-65		0	0
66-70		2	1
		mean=35.4 sd 12.8	mean=34.9 sd 11.6

Table 8. Mortality distribution by age and sex for burial phase 1.

cludes both typical Bijelo Brdo artifacts, as well as Early Medieval Croat artifacts. The Gomjenica site in northern Bosnia, dated from the 10th to the 11th century, displays a similar distribution of material remains. In this medieval cemetery, Bijelo Brdo culture artifacts represented the majority of finds and Early Medieval Croat artifacts a minority (Miletić 1967). Yet, based on cranial morphology, the inhabitants of Gomjenica unequivocally belonged to the Early Medieval Croat population. Indeed, both Gomjenica, and the first burial phase from the Đakovo cemetery, are biologically considerably closer to the Dalmatian sites Danilo, Mravinci, Bribir and Nin-Ždrijac, than they are to either Bijelo Brdo, or to Vukovar-Lijeva Bara (see Figure 1). Our use of archaeological artifacts such as jewelry, for the determination of ethnic or cultural affiliation, clearly needs to be reevaluated.

The datation and geographical location of some of the sites inhabited by Early Medieval Croat populations is also of considerable interest. Use of the Nin-Ždrijac cemetery, located on the Eastern Dalmatian coast, is dated from the 8th to the 10th century (Belošević 1980). The Gomjenica cemetery in northern Bosnia is dated from the 10th to the 11th century (Miletić 1967), while the first Burial phase from Đakovo is dated from the 11th to the first half of the 13th century (Filipec 1996; 1997).

Age	Subadults	Males	Females
Birth-5	0		
6-10	0		
11-15	2		
16-20		2	1
21-25		4	6
26-30		3	2
31-35		5	5
36-40		4	0
41-45		3	4
46-50		1	2
51-55		2	0
56-60		2	0
61-65		0	0
66-70		0	1
		mean=34.7 sd 12.3	mean=33.4 sd 12.5

Table 9. Mortality distribution by age and sex for burial phase 2.

What became of the early Medieval Croat population that inhabited Đakovo from the 11th to the first half of the 13th century is, at present, not known. Historical sources show that the Mongols, in their unsuccessful attempt to capture the Croat-Hungarian king Bela IV, passed through this area in 1242. The ferocity of the Mongols is well attested to and therefore, in view of the marked difference in cranial morphology which argues for the presence of a different population in Đakovo in the second half of the 13th century, two possibilities present themselves. Either the Early Medieval Croat population from Đakovo made a timely evacuation, or it was destroyed by the Mongols. Both these hypothesis are, however, almost impossible to prove. If the Croat population was, indeed, massacred and dispersed by the Mongols, the deceased would not necessarily have to be buried in the Đakovo cemetery. Never the less, we are currently analyzing the osteological material from the first burial phase in Đakovo with the aim of recording the presence of peri-mortem traumas (traumas which occur at the time of death). The presence of peri-mortem trauma is evidence for a violent death and can, therefore, be related to the Mongol invasion. The poor preservation of the osteological material from Đakovo makes this, however, a time consuming endeavor. So far, we have found no evidence of peri-mortem trauma in approximately half of the recovered sample.

The biological identity of the population that inhabited Đakovo during the second burial phase is also, at present, a mystery. This population is characterized by mesocranic skulls (as opposed to the dolichocranic skulls of the first Burial phase) with very broad faces. It's isolated position in the lower left hand corner of Figure 1 indicates that it has little in common with the other analyzed populations. However, the 13th and 14th century are a period of population movement and migration, and the fertile Đakovo area, left uninhabited in the wake of the Mongol invasion, could have been occupied by any number of different, homogenous or heterogeneous populations.

Historical sources show that, following the arrival of the Bosnian bishop, Đakovo began to quickly develop from a small village, to a market center (Mažuran 1995). This market attracted people from different areas, which together with the bosnian population which accompanied the bishop made the second burial phase, in all likelihood, a very heterogeneous population.

That the area was fertile, and offered a variety of resources necessary for survival, is seen in the demographic profiles of the two burial phases, which are very similar, and which show a slightly longer mean average life span for adults, than in most other Croatian medieval sites. The biased exclusion of subadult remains from both burial phases, probably the result of underground waters and high soil acidity, precludes the construction of meaningful life tables and consideration of longevity, survivorship, and life expectancy from birth. The average age at death for adults over 15 (males=35.4, females=34.9 for the first burial phase, and males=34.7, females=33.4 for the second burial phase), is, however, higher than that recorded in two sites from the same area, Privlaka and Nova Rača. In Privlaka the average life span of adult males was 34.9 years and for adult females 31.8 years (Šlaus 1996), while in Nova Rača adult males lived on average 33.0 years while adult females lived 28.9 years (Šlaus et al. 1997). The very similar demographic profiles of the two burial phases from the Đakovo cemetery, attest to a similar lifestyle and, in all likelihood, the continuance of exploitation of the same resources necessary for survival.

Conclusion

The results of a multidisciplinary, bioarchaeological analysis of the medieval cemetery from Đakovo show that from the 11th to the 16th century, this site was inhabited by two different populations. The first population, which inhabited this site from the 11th to the first half of the 13th century, and which comprises the first burial phase in the Đakovo cemetery, can archaeologically be defined by shallower graves and the presence of Bijelo Brdo culture, and early Croatian jewelry. Discriminant function analysis of crania from this burial phase indicates that this population belongs to the group of Early Medieval Croat populations. Discrimi-

Source of variance	DF	Mean square	F-ratio	Sig. level
Total	144			
Within-groups	139	151.708		
Between-groups	3	12.955	0.08	0.967
Factors:				
Burial phase	2	19.411	0.12	0.880
Sex	1	0.514	0.003	0.954

Table 10. Two-factor analyses of variance by burial phase and sex for adults from the Đakovo cemetery.

nant function analysis also indicates that there is a clear difference between crania from this phase, and crania from the second burial phase. The second burial phase is archaeologically defined by deeper graves and a general paucity of material remains among which earrings made from simple open-ended wires and rings with a widened, decorated field were the most frequently recovered. Differences in cranial morphology

between the two phases are primarily present in cranial length and width, and in facial breadth. Crania from the second burial phase represent the presence of a different population which inhabited Đakovo from the second half of the 13th to the 16th century.

The presence of an Early Medieval Croat population in Đakovo, in the first half of the 13th century, may represent evidence for a trend of gradual expansion

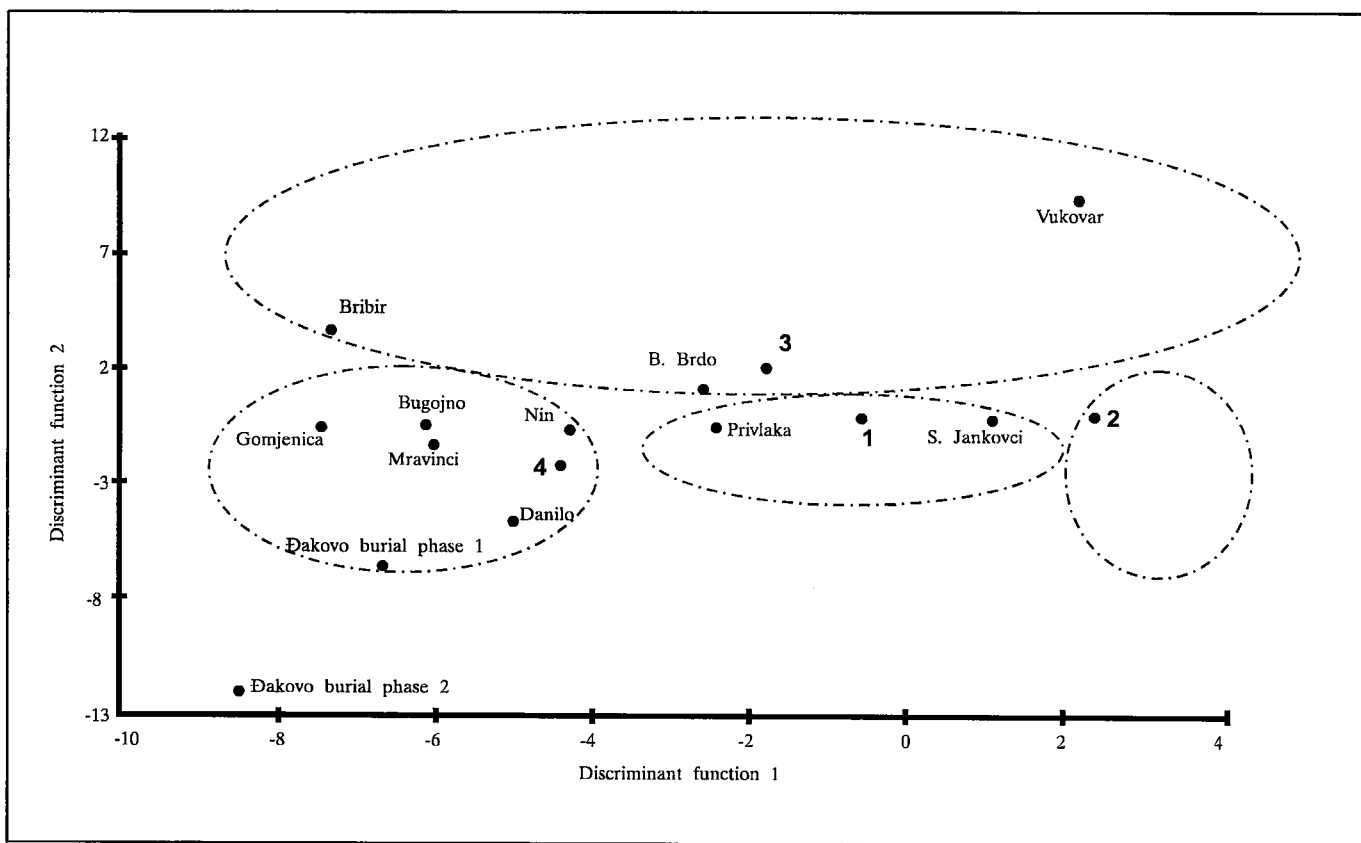


Figure 1. The multidimensional positions of the first and second burial phases from the Đakovo cemetery on the two discriminant functions calculated for classifying early medieval populations from Central Europe

of Croat populations from their centers on the eastern Dalmatian coast and the immediate hinterland, in a north-eastern direction.

The demographic profiles of the two burial phases are very similar, reflecting a similar lifestyle, and in all probability, a continuance of exploitation of the same resources necessary for survival.

ABBREVIATIONS

AJPA	- American Journal of Physical Anthropology	GZM	- Glasnik Zemaljskog Muzeja Bosne i Hercegovine u Sarajevu
Amer. Antiq.	- American Antiquity	Opusc. Archaeol.	- Opuscula Archaeologica
Coll. Antropol.	- Collegium Antropologicum	SHP	- Starohrvatska prosvjeta

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SAŽETAK

BIOARHEOLOŠKA ANALIZA SREDNJOVJEKOVNOG GROBLJA U ĐAKOVU; ARHEOLOŠKI I ANTROPOLOŠKI DOKAZI O ETNIČKOJ PRIPADNOSTI I MIGRACIJI STANOVNIŠTVA

Ključne riječi: biološka udaljenost, kranijalna varijacija, multivarijantna statistika, srednjovjekovno Đakovo

U radu su prikazani rezultati multidisciplinarnih, arheoloških i antropoloških istraživanja srednjovjekovnog groblja u Đakovu. Arheološka istraživanja, započeta kao zaštitna istraživanja na prostoru budućeg poslovnog centra, otkrila su prisutnost većeg srednjovjekovnog groblja. Ukupno je ustanovljeno 486 grobova, složenih u više manje pravilne redove. Pokojnici su ukopani u proste rake bez grobne arhitekture, orijentirani zapad-istok uz manja ili veća odstupanja. Na temelju stratigrafskih odnosa i materijalnih ostataka (gotovo isključivo nakita), na groblju su ustanovljene dvije faze ukopavanja. U starijem sloju grobova, koji datira u razdoblje od 11. do 13. stoljeća, otkrivena je prisutnost dviju vrsta nakita. Prva skupina nakita pripada bjelobrdskoj kulturi i to vremenu njezine kasne faze. U toj grupi nalaze se s-karičice i pojedini prsteni koji su tipični za kasnu fazu bjelobrdske kulture. U drugoj skupini nakita javlja se filigranski nakit, naušnice s koljencima, naroskane naušnice i trojagodne naušnice, odnosno nakit koji bi po svome izgledu spadao u standardne oblike nakita koji se pojavljuje na središnjem prostoru srednjovjekovne hrvatske države..

U mlađem sloju grobova, koji se datira u razdoblje od druge polovice 13. do sredine 16. stoljeća, materijalni nalazi bili su rijetki. Najčešće su nalažene naušnice načinjene od obične otvorene karičice i prsteni s proširenom, ukrašenom pločicom.

Nedavno objavljene različite funkcije omogućuju svrstavanje nepoznatih srednjovjekovnih arheoloških populacija u jednu od četiri velike skupine populacija: avaroslavenske populacije istočno od Dunava, avaroslavenske populacije zapadno od Dunava, bjelobrdske populacije i dalmatinsko-hrvatske populacije. Funkcije su izračunate na temelju kranijalnih varijabli i imaju veliku točnost; na uzorku od 29 srednjovjekovnih lokaliteta iz središnje Europe, različite funkcije ispravno su svrstale 28 (96,5%).

Cilj naših istraživanja bio je ustanoviti: 1) kojoj skupini populacija pripadaju lubanje iz prve faze ukopavanja

na Đakovačkom groblju, i 2) je li u drugoj fazi ukopavanja na Đakovačkom groblju, koje vjerojatno započinje nakon provale Tatara 1242. godine, prisutna ista populacija ili je došlo do moguće promjene stanovništva ?

U tu su svrhu na ušćivanom osteološkom materijalu, razdvojenom na temelju arheoloških analiza na dvije faze ukopavanja (tablica 1), prikupljeni kranimetrijski i paleodemografski podaci. Kranimetrijski podaci izmjereni su standardnim antropometrijskim instrumentarijem, a za analizu su izabrane sljedeće varijable: a) najveća duljina lubanje (Martin Saller varijabla broj 1), b) najveća širina lubanje (Martin Saller varijabla broj 8), c) najmanja širina čela (Martin Saller varijabla broj 9), d) visina lubanje (Martin Saller varijabla broj 17), e) širina među jabučicama (Martin Saller varijabla broj 45), f) visina gornjeg dijela lica (Martin Saller varijabla broj 48), g) širina očnice (Martin Saller varijabla broj 51) i h) visina očnice (Martin Saller varijabla broj 52).

U prvoj analizi korištene su srednje vrijednosti spomenutih varijabli izmjerene na muškim lubanjama (tablica 2). U ovoj analizi, na temelju već izračunatih razlučnih funkcija, lubanje iz prve faze ukopavanja svrstane su u jednu od četiri spomenute velike skupine populacija. Lubanje iz druge faze ukopavanja nije međutim imalo smisla podvrći istoj analizi, budući su datirane od 13. do 16. stoljeća odnosno u vremensko razdoblje koje izračunate različite funkcije ne pokrivaju. Stoga smo, kako bi ustanovili kontinuitet populacije na Đakovačkom groblju u obje faze ukopavanja, ili eventualni dolazak nove populacije u drugoj fazi, lubanje iz prve i druge faze podvrgli zasebnoj analizi u kojoj smo, na temelju istih kranijalnih varijabli, pokušali izračunati različite funkcije koje bi odvojile lubanje iz prve faze od onih iz druge. Statistički značajna funkcija, koja bi bila u stanju realtivno precizno razdvojiti lubanje iz dviju faza ukopavanja, bila bi jaki argument za dolazak nove populacije u Đakovo tijekom 13. stoljeća.

Na ušćivanom osteološkom materijalu prikupljeni su i osnovni paleodemografski podaci; podaci o spolu i doživljenoj starosti, s namjerom da se usporede demografski profili između dviju faza ukopavanja.

Dobili smo sljedeće rezultate. Kranimetrijska analiza srednjih vrijednosti kranijalnih varijabli iz dvije faze ukopavanja, provedena uz pomoć već izračunatih različitih funkcija, pokazala je kako lubanje iz prve faze ukopavanja pripadaju skupini dalmatinsko-hrvatskih populacija (slika 1). U istu skupinu populacija pripadaju lubanje s lokaliteta Nin-Ždrijac, Danilo, Mravinci, Gomjenica-Baltine Bare i Bugojno-Čipulčići. Lubanje iz ove faze jasno su odvojene od lubanja iz Bijelog Brda i Vukovara-Lijeve Bare, te lubanja iz avaroslavenskih nalazišta Privlake i Starih Jankovaca.

Lubanje iz druge faze ukopavanja odvojene su, u donjem lijevom kutu slike 1, od svih drugih nalazišta, i ne pokazuju biološku sličnost s bilo kojom od spomenutih populacija. Naglašena multidimenzionalna udaljenost između lubanja iz prve i druge faze ukopavanja upućuje na vjerojatni dolazak nove populacije u Đakovo tijekom 13. stoljeća. Ovu pretpostavku provjerili smo zasebnom analizom različitim funkcijama u kojoj smo, na temelju istih kranijalnih varijabli, pokušali rzdvojiti lubanje iz prve i druge faze ukopavanja. Dobili smo jednu (tablica 4), statistički značajnu funkciju ($p < 0,0001$), koja je uspješno rzdvojila sve potpuno ušćuvane lubanje iz obje faze ukopavanja.

Polučeni rezultati antropološke analize, pokazuju kako je, nakon provale Tatara 1242. godine, Đakovo naseljeno novim stanovništvom. Pri tome se nameću dva pitanja. Prvo, što se dogodilo sa starijom populacijom koja je naseljavala Đakovo od 11. do 13. stoljeća, i drugo, koja je to novopridošla populacija koje se naselila u Đakovo tijekom 13. stoljeća? Nažalost na oba pitanja, za sada, nemamo odgovore. Poznavajući okrutnost Tatara možemo pretpostaviti kako je starija populacija koja je naseljavala Đakovo do 1242. godine ili pobjegla pred Tatarima, ili uništena od njih. Obje je pretpostavke, međutim, vrlo teško provjeriti na arheološkom ili osteološkom materijalu. Arheološka analiza groblja nije pokazala prisutnost masovnih grobnica koji bi se mogli povezati uz prolazak Tatara, niti je dala neke druge naznake koje bi išle u prilog tvrdnji da je starija populacija potpuno uništena. Osteološka analiza također nije pokazala povećanu prisutnost peri-mortalnih ozljeda (ozljeda u trenutku smrti) koje bi upućivale na moguću obranu naselja. S druge strane, nema razloga zašto bi eventualne tatarske žrtve bile pokopane na Đakovačkom groblju.

Biološki identitet novopridošle populacije koja naseljava Đakovo tijekom 13. stoljeća također nam je, za sada, nepoznat. Razlučne funkcije korištene u prvoj analizi pokrivaju samo razdoblje od 7. do 13. stoljeća. Jedan od naših glavnih budućih ciljeva je povećati našu arheološku i kranimetrijsku bazu podataka što će nam omogućiti ispravnu identifikaciju kasnosrednjovjekovnih populacija kao što je ova. Do tada, jedino što možemo sa sigurnošću reći

o ovoj populaciji, je kako ne pokazuje biološke sličnosti s drugim populacijama uključenim u ovu analizu i kako je karakterizira mezokrana lubanja s vrlo širokim licem. Povijesni izvori jasno pokazuju kako se Đakovo, nakon dolaska bosanskog biskupa, ubrzano razvija. Vrlo brzo, mjesto prerasta u trgovište i grad. Po svome izgledu i privrednoj važnosti ono se gotovo ravnopravno nosilo s najvećim gradski naseljima u Slavoniji. Dio novog stanovništva sigurno je došao s područja koja je obuhvaćala vrhbosanska biskupija, a razvijeno trgovište moglo je privući i ljude iz različitih drugih krajeva. Vrlo je vjerojatno stoga, kako je stanovništvo koje je naseljavalo Đakovo tijekom druge faze ukopavanja bilo vrlo heterogena populacija.

Paleodemografske analize pokazale su kako su populacije koje su naseljavale Đakovo, premda različite, imale vrlo slične demografske profile. U oba uzorka ušćuvanost dječjih kostura bila je vrlo slaba, što je onemogućilo izračunavanje demografskih tablica. Mortalitet odraslih osoba (iznad 15 godina starosti) pokazao je međutim slična razdoblja najvećeg stresa kod obje populacije, i vrlo slične prosječne doživljene starosti kod muškaraca i žena iz obje populacije (tablice 8 i 9). Analiza varijance, provedena na dobivenim podacima, pokazala je kako niti spol, niti populacijska pripadnost, ne utječu na mortalitet u čitavom uzorku (tablica 10).

Rezultati naših analiza još jedanput ističu važnost multidisciplinarnih istraživanja. Naime, niti su arheološka istraživanja mogla, sama po sebi, utvrditi identitet populacija koje naseljavaju Đakovo od 11. do 16. stoljeća, niti su antropološka istraživanja, bez prethodne podjele na dvije faze ukopavanja, mogla ispravno identificirati osobe iz prve faze ukopavanja kao pripadnike dalmatinsko-hrvatske populacije. Pri tome su se pojavila i neka nova saznanja koja su važna za buduća istraživanja.

Pokazalo se kako je nakit donekle nepouzdan pokazatelj etničke pripadnosti. U prvoj fazi ukopavanja na Đakovačkom groblju nađen je i tipični bjelobrdski nakit i nakit koji se često nalazi na području središta srednjovjekovne hrvatske države, a ista situacija ustanovljena je i na srednjovjekovnom groblju Gomjenica-Baltine Bare gdje je bjelobrdski nakit i puno učestaliji od starohrvatskoga. Antropološka je analiza međutim jasno pokazala kako su oba lokaliteta bila naseljena pripadnicima dalmatinsko-hrvatske populacije.

Vrlo su zanimljive i datacije, te zemljopisni položaji lokaliteta na kojima su identificirane dalmatinsko-hrvatske populacije: lokalitet Nin-Ždrijac, datiran od 8. do 10. stoljeća, lokalitet Gomjenica-Baltine Bare u sjevernoj Bosni, datiran od 10. do 11. stoljeća, i prva faza ukopavanja na Đakovačkom groblju, datirana od 11. do 13. stoljeća.

