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Topographical approach to kinship assessment within population according to discrete cranial traits: the 5th–6th cc. Plinkaigalis cemetery

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Background. Discrete cranial traits are used in anthropology for estimating the genetic divergence of palaeopopulations and for assessing the kinship of individuals within a population. The goal of the present research was to test the effectiveness of the topographical method in kinship assessment.

Materials and methods. The 5th–6th cc. burial ground in Plinkaigalis (Central Lithuania) was investigated. The spatial distribution of 45 discrete cranial traits in 360 individuals was examined, their local increasing in density (clusters) was estimated, and the concordance of their clustering areas was checked up by superposing the grave localization maps. The dispersion of some archaeological finds was analysed in the same way.

Results. Nine discrete characters demonstrated a significant clustering on the situation plan of the cemetery; in seven places their density focuses coincided and in two they were rather doubtful. The trait concentration areas differ from those of interments. The characters are of different nature: sutural bones, varieties of openings, even *cribra orbitalia*, a pathological manifestation. In respect of the occurrence in the Plinkaigalis population, some traits were comparative rare, and some of them were frequent. No relations to inter-group variability and trait taxonomic value in inter-population comparisons were detected. Several kinds of adornments and tools used in the research demonstrated a clustering independent of those of discrete cranial traits, nevertheless, in some rare cases, they can help kinship determination in palaeopopulations.

Conclusions. Using the topographical method, groups of genetically related individuals were detected. The discriminative value of significant clustering traits is connected neither with their occurrence in the population nor with inter-population variability. Archaeological artifacts may help in specific cases of kinship assessment.

Key words: discrete cranial traits, intra-population variability, kinship assessment, palaeopopulation genetics

INTRODUCTION

Discrete cranial traits known from the middle of the 19th century comprise the anthropological system employed continuously in palaeobiological reconstructions of ancient populations. In the middle of the 20th century, A. C. Berry and R. J. Berry formed the methodical basis for investigations of the system (1). The majority of them were devoted to the classification, biological essence, inheritance, side preference (asymmetry), gender and age dependence of the traits. The same questions were being solved very intensively in the turn of the century (2–9).

In their essence, discrete cranial traits are considered to be phenes, i. e. rather extensive markers of a genotype. Presence of an appropriate phene testifies presence not of a certain allele of a lonely gene, but of one allele in several possible genes (9). In spite of a long history of investigations, knowledge of discrete traits of the human skeleton is rather meager (3), therefore, their further examinations are needed.

Taking into consideration that phenes reflect the structure of the genome, the traits are usually used for estimation of genetic divergence (inter-population variability) of ancient inhabitants (1). On the other hand, the idea that biologically related individuals have in common a number of phenotypical characters that are typical of their family is the key premise for establishing kinship

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in the population as part of intra-group analysis (10). The pioneer paper on this topic was published by H. Ulrich (11). Indeed, the genetic variability of past populations is possible to estimate most exactly on the basis of ancient DNA analysis (12). Unfortunately, such investigations are rather expensive and therefore rare. Among the skeletal characters, teeth are the best to meet the requirements for such examinations (13). Nevertheless, discrete cranial variants are being used in familial studies (14–16), in examination of multiple burials (17–19) as well as in estimation of trait concentrations in ancient cemeteries (20–22). According to F. W. Roesing (3), osteological kinship analysis is highly innovative, the kinship being treated as an individual family relation, i. e. the common genomic parts in skeletal individuals due to close family ancestry.

There are three approaches to the validation of kinship in skeletal remains (13): (1) a comparison of trait frequencies, which is useful for the analysis of small groups (multiple graves), (2) a comparison of individuals in pairs, which is the most promising if specific subgroups of population are investigated, and (3) a search for conspicuous sub-blocks on the data matrix. Usually, rather sophisticated statistical procedures are needed in the three approaches, that is why it is necessary to look for more simple methods. We have not found any attempts to analyze the topographical dispersion of discrete traits on the situation map of a burial site, moreover, archaeological data suggesting relationships among individuals are used quite rarely (10).

The goal of the present work was to probe a simple topographical method for kinship assessment according to discrete cranial traits in the 5th–6th cc. Plinkaigalis population. To this end, the following tasks were set: to check the relation of grave distribution to age and gender, to fix the possible clusters in the dispersion of separate traits, to verify the coherence of the possible areas of clustering characters, to estimate the discriminative value of the traits in kinship assessment, and to define the role of archaeological finds.

MATERIALS AND METHODS

The 5th–6th cc, population in Plinkaigalis (Kedainiai district, Central Lithuania) excavated by V. Kazakevičius in 1977–1984 was examined (23). 360 inhumations were unearthed, and 334 of them were suitable for anthropological analysis. The burial ground was entirely unearthed, and palaeodemographical characteristics were possible. There, newborns made 24.2% and adolescents (up to 20 years of age) made 46.7% of the entire population. The masculinization index 1.1 shows a slight preponderance of males, therefore their slight immigration can be suspected. During 200 years of the functioning (23) of the burial site, 40–60 people (5–8 families) might have lived in the community, their

Table 1. **The frequency of discrete cranial traits**

No	Trait	Plinkaigalis									The Baltic and adjacent territories
		Males		Females		Children		Total			
		m	n	m	n	m	n	m	n	% ± m %	
1.	*Os lambdae*	8	64	15	69	10	41	33	174	18.96 ± 2.90	17.84
2.	*Os bregmae*	1	75	1	67	4	43	6	185	3.24 ± 1.30	0.86
3.	*Os pterii totum*	6	54	5	41	6	26	17	121	14.05 ± 3.16	11.96
4.	*Os pterii partiale*	12	54	12	41	9	26	33	121	27.27 ± 4.05	21.78
5.	*Os pterii* (No. 3+4)	17	54	16	41	14	26	47	121	38.84 ± 4.43	31.68
6.	*Os asterii*	6	69	9	61	4	27	19	157	12.10 ± 2.60	17.32
7.	*Os interparietale totum*	2	64	1	69	0	41	3	174	1.72 ± 0.99	1.27
8.	*Os interparietale partiale*	2	64	4	69	0	41	6	174	3.45 ± 1.38	4.13
9.	*Os interparietale* (No. 7+8)	4	64	5	69	0	41	9	174	5.17 ± 1.68	5.40
10.	*Ossa suturae coronalis*	12	69	5	63	8	39	25	171	14.62 ± 2.70	5.41
11.	*Ossa suturae sagittalis*	1	42	1	56	3	45	5	143	3.50 ± 0.78	7.45
12.	*Ossa suturae lambdoideae*	44	60	55	69	32	39	131	168	77.98 ± 3.20	65.07
13.	*Ossa suturae squamosae*	1	63	4	50	0	26	5	139	3.60 ± 1.58	4.37

Table 1 (continued)

No	Trait	Plinkaigalis									The Baltic and adjacent territories
		Males		Females		Children		Total			
		m	n	m	n	m	n	m	n	% ± m %	
14.	*Os incisurae parietalis*	21	69	16	64	5	29	42	162	25.93 ± 3.44	20.73
15.	*Sutura frontalis*	3	84	7	76	4	50	14	210	6.67 ± 1.72	8.33
16.	*Sutura frontotemporalis*	6	54	1	41	1	26	8	121	6.61 ± 2.25	6.55
17.	*Sutura zygomatica*	1	69	0	64	0	45	1	178	0.56 ± 0.56	0.40
18.	*Sutura parietalis*	0	81	0	63	0	53	0	197	0.00 ± 0.00	0.10
19.	*Sutura palatina transversa scalaris*	26	65	28	48	6	34	60	147	40.82 ± 4.05	38.14
20.	*Foramen parietale*	56	81	46	63	23	53	125	197	63.45 ± 3.43	64.24
21.	*Foramen mastoideum*	68	70	38	46	31	34	137	150	91.33 ± 2.30	86.96
22.	*Canalis condylaris*	55	63	51	56	40	43	146	162	90.12 ± 2.34	90.35
23.	*Foramen supraorbitale*	22	79	16	67	8	67	46	213	21.60 ± 2.82	25.09
24.	*Foramen frontale*	20	79	18	69	7	69	45	217	20.74 ± 2.75	20.82
25.	*Foramen zygomaticofaciale*	67	75	52	55	36	45	155	175	88.57 ± 2.40	87.97
26.	*Foramen ethmoidale posterius*	44	45	30	33	13	16	87	94	92.55 ± 2.71	92.40
27.	*Foramen tympanicum*	6	76	8	71	26	66	40	213	18.78 ± 2.68	14.99
28.	*Foramen infraorbitale accessorium*	10	56	12	50	13	47	35	153	22.88 ± 3.40	21.34
29.	*Foramen palatinum minus accessorium*	44	58	32	41	15	25	91	124	73.39 ± 3.97	71.85
30.	*Foramen mentale accessorium*	9	82	5	65	4	57	18	204	8.82 ± 1.98	6.94
31.	*Foramen ovale incompletum*	7	68	2	45	4	30	13	143	9.09 ± 2.40	8.01
32.	*Foramen spinosum incompletum*	13	59	15	50	11	21	39	130	30.00 ± 4.02	25.32
33.	*Foramen mastoideum extrasuturale*	52	69	39	55	23	31	114	155	73.55 ± 3.54	61.54
34.	*Foramen ethmoidale anterius extrasuturale*	21	36	18	31	15	23	54	90	60.00 ± 5.16	49.93
35.	*Canalis hypoglossalis septus*	16	62	14	59	4	42	34	163	20.86 ± 3.18	30.61
36.	*Torus palatinus* (1^0–3^0)	31	78	24	65	13	61	68	204	33.33 ± 3.30	54.21
37.	*Torus palatinus* (2^0–3^0)	14	78	9	65	7	61	30	204	14.71 ± 2.48	30.86
38.	*Torus mandibularis*	3	87	2	79	0	68	5	234	2.14 ± 0.95	1.57
39.	*Torus acusticus*	3	71	4	74	1	63	8	208	3.85 ± 1.33	2.19
40.	*Tuberculum precondylare*	2	66	4	61	1	34	7	161	4.35 ± 1.61	6.04
41.	*Arcus mylohyoideus*	5	74	4	54	0	41	9	169	5.32 ± 1.73	8.61
42.	*Arcus pterygospinosus*	6	55	0	44	1	17	7	116	6.03 ± 2.21	9.28
43.	*Occipitalisatio atlantis*	1	64	0	58	–	–	1	122	0.82 ± 0.82	0.31
44.	*Facies articularis condylaris bipartita*	2	54	0	43	–	–	3	97	3.09 ± 1.00	8.46
45.	*Cribla orbitalia*	13	81	9	69	22	70	44	220	20.00 ± 3.90	16.17

Table 2. **Characterization of unevenly distributed cranial traits in the Plinkaigalis population**

Trait	Occurrence in the Plinkaigalis population	Variability in the area	
		Variation coefficient values	The group according to the rotated factor loadings
Os suturae coronalis	Rare	High	Paramount
Os incisurae parietalis	Moderate	Moderate	Little
Foramen parietale	Frequent	Low	Little
Foramen supraorbitale	Moderate	Moderate	Minor
Foramen frontale	Moderate	Moderate	Paramount
Foramen mentale accessorium	Rare	High	Little
Foramen spinosum incompletum	Frequent	Moderate	Paramount
Canalis hypoglossalis septus	Moderate	Moderate	Little
Cribra orbitalia	Moderate	Moderate	Paramount

longevity being typical of the Iron Age in Europe: $e_0^0 = 23.0$, $e_{20}^0 = 19.4$ years. Data of multivariate analysis (24) demonstrate the homogeneity of the population, especially of females who represented a hypermorphous, dolichocranial, narrow-faced craniological type characteristic of the Žemaičiai (Samogitians, or western Lithuanians). Male crania had a slight admixture of a wide-faced component common for the Aukštaičiai (eastern Lithuanians).

Fourty five discrete cranial traits were estimated using typical methods (5, 9, 25) and the Latin terminology (Tables 1 and 2) proposed earlier by one of the authors (26). For evaluation the Plinkaigalis findings, data on variability of the traits in the East Baltic area and adjacent territories, based on examination by the author of 61 diachroneous craniological samples from this part of Europe, were used (1). In order to elicit the taxonomic value of the traits in the area from the multivariate point of view, the method of principal components with varimax rotation was used (1, 2).

The spatial distribution of the traits in the population was examined with the help of mapping a separate trait on the situation plan of the graves, checking on it their possible local increase in density (clusterization). In case of the manifestation of the same characters in more than three neighbouring graves, a cluster, or a concentration focus, was stated, and then the coherence of trait clusters was searched for superposing the distribution maps of all characters. The regularities of dispersion of some cerements in the graves were analyzed in the same way.

RESULTS

The graves distribute unevenly in the burial ground (Fig. 1), their density is increased evidently in the west-southern part of the site (I and II, Fig. 3). The next area of interment (III, Fig. 3) is situated in its northern part, and two more areas may be noted in its eastern part, stripes of solitary inhumations separating one area from another. Localization of male and female graves is mixed, while non-adult graves are concentrated in several places, especially in the stripes between interment areas of adults.

In general, the percentage of 45 discrete cranial traits in the Plinkaigalis population differs considerably from that in the Baltics and adjacent territories (Table 1). There, *os asterii, os suturae sagittalis, canalis hypoglossalis septus, torus palatinus* (Trait No. 6, 11, 35, 36, 37) occur rather rarely, and *os bregmae, os pterii partiale, os suturae coronalis, os suturae lambdoideae, foramen mastoideum, foramen mastoideum extrasuturale, foramen ethmoidale anterius extrasuturale* (No. 2, 4, 10, 12, 21, 33, 34) appear more often.

The majority of discrete characters investigated distribute homogeneously on the grave situation map, nevertheless, nine of them form increasings in density, or trait foci (Fig. 2): *os suturae coronalis* (trait No. 10, Table 1), *os incisurae parietalis* (14), *foramen parietale* (20), *foramen supraorbitale* (23), *foramen frontale* (24), *foramen mentale accessorium* (30), *foramen spinosum incompletum* (32), *canalis hypoglossalis septus* (35), and *cribra orbitalia* (No. 45). In some places, the density foci of several traits spatially coincide. The largest of such areas (*a* in Figs. 2–4), embracing foci of eight traits (Fig. 2), is situated in the southern part of the graveyard. Two smaller areas, containing foci of three traits, were revealed in the south-western and north-eastern sides (*b* and *c*, Figs. 2–4). In the other cases, areas of trait clusters do not cover each other entirely. Two places of that kind emerge in the northern and the eastern parts of the cemetery (*d* and *e*). Two more places (*f* and *g*) can be traced in the eastern side of it, but they are questionable because the foci of characters do not cover themselves but are situated in the neighbourhood.

The heterogeneously distributed characters may be called discriminatively valued. They are of different nature: two of them belong to sutural bones (*ossa suturarum*), six represent varieties of openings, and one (*cribra orbitalia*) is treated by some authors as a manifestation of pathology. In their turn, openings are anatomical variants of different origin: some of them (*foramen supraorbitale, foramen frontale*) develop as

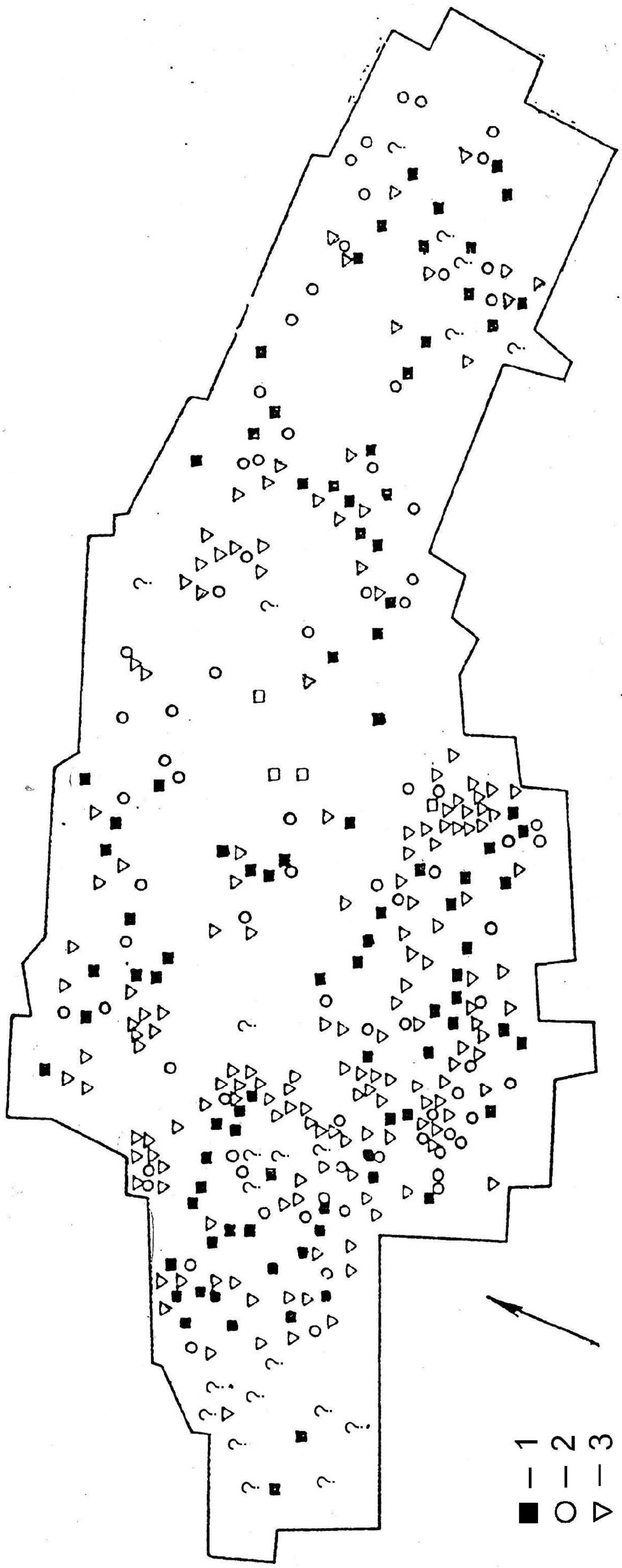

Fig. 1. The distribution of male (1), female (2) and non-adult (3) graves in Plinkaigalis cemetery

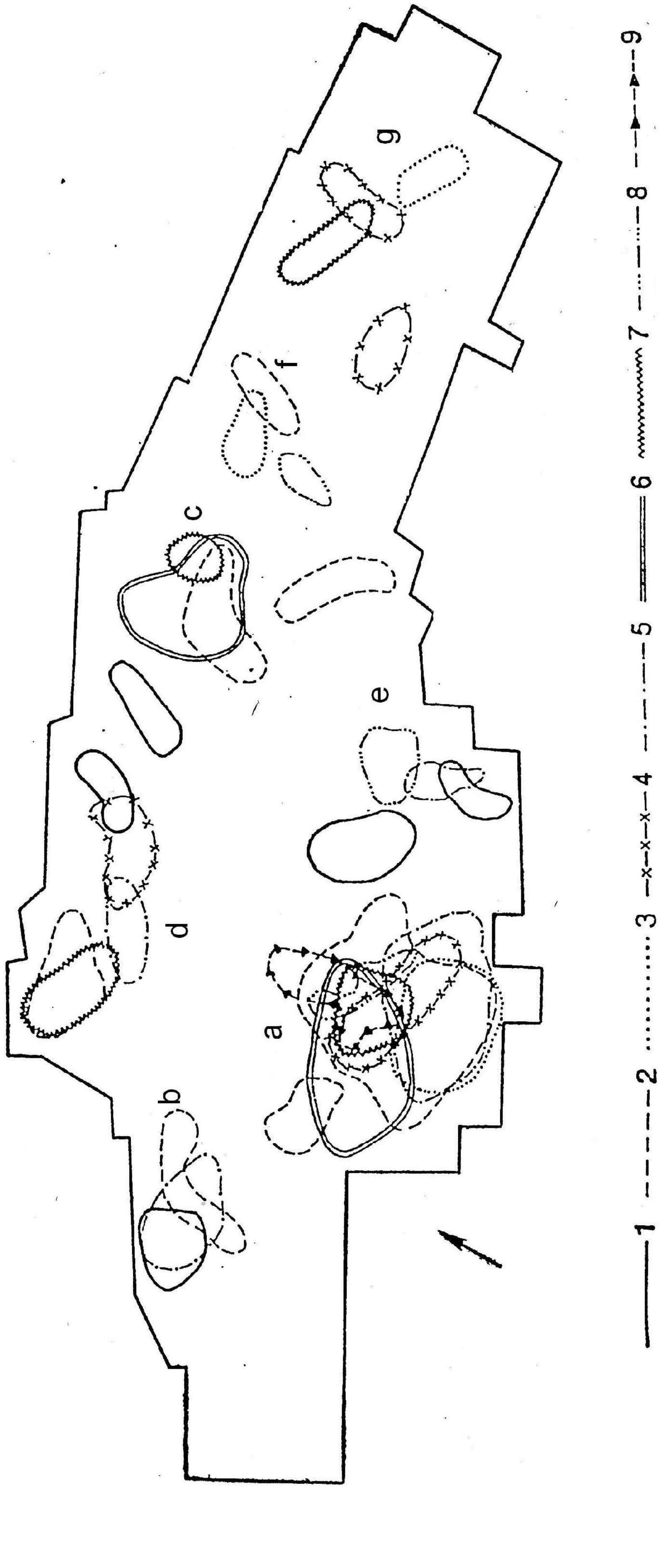

Fig. 2. Accumulations of the main discrete traits: 1 – *os incisurae parietalis*, 2 – *foramen parietale*, 3 – *foramen spinosum incompletum*, 4 – *foramen frontale*, 5 – *foramen supraorbitale*, 6 – *canalis hypoglossalis septus*, 7 – *cribra orbitalia*, 8 – *os suturae coronalis*, 9 – *foramen mentale accessorium* (*a–g* are explained in the text)

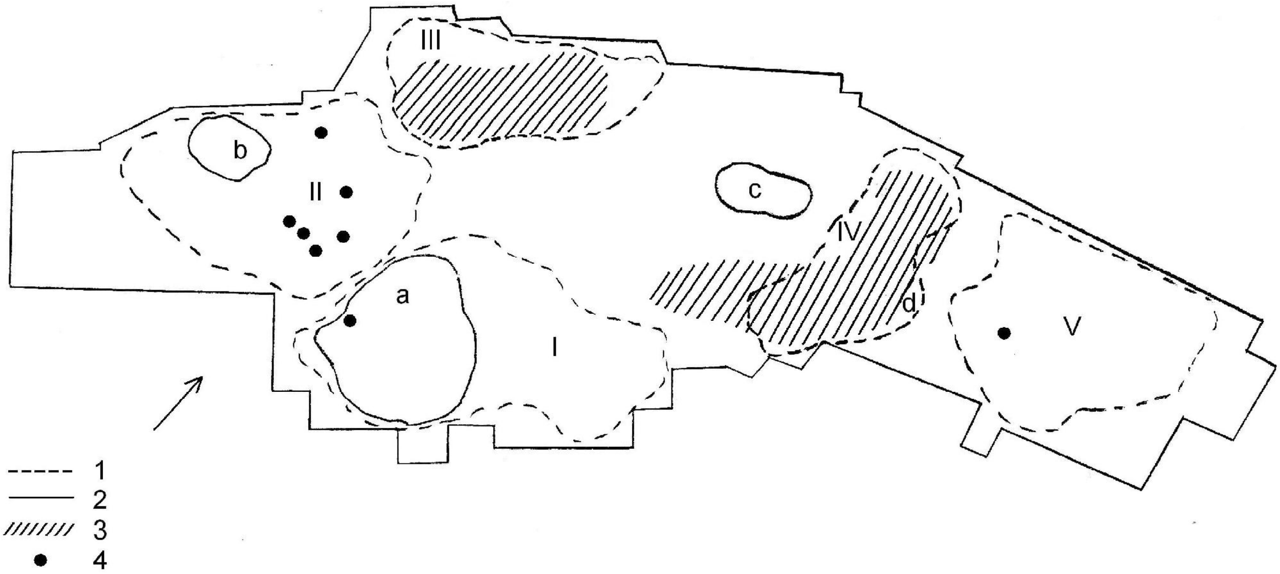

Fig. 3. Areas of interment (1), discrete traits accumulation areas (2), location of socketed axes (3), and of drinking horns (4) in the cemetery (*a*, *b*, *c* are explained in the text)

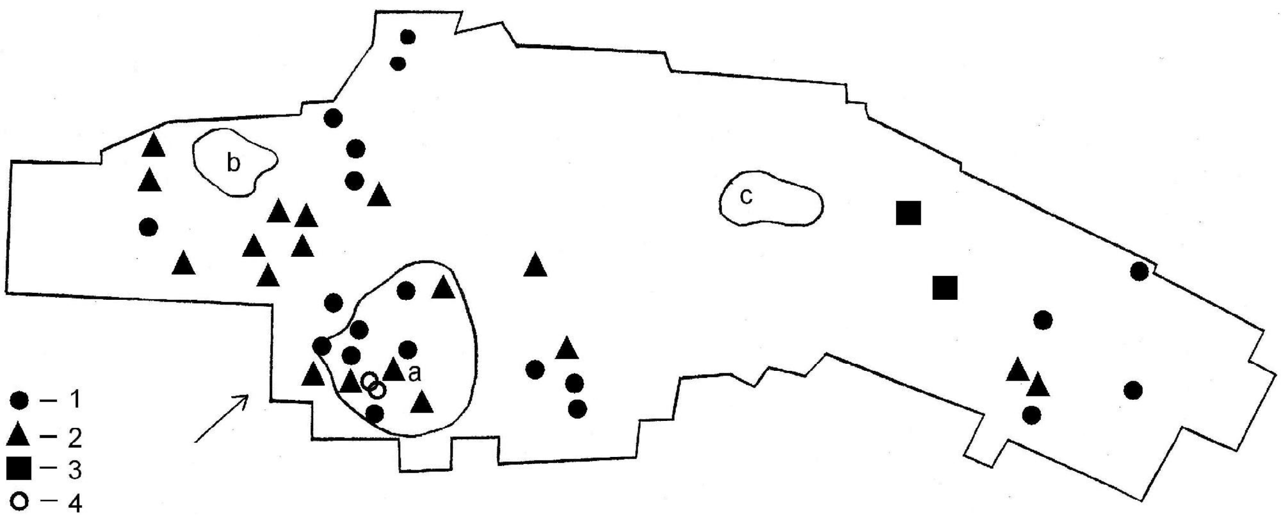

Fig. 4. Distribution of cross-bow brooches (1), amber beads (2), head dress garlands of the same construction (3), and two parts of the same bracelet (4) against the background of the main concentration areas of discriminative discrete cranial traits (*a*, *b*, *c* are explained in the text)

the result of hyperostotic processes, while *foramen spinosum incompletum*, on the contrary, appears due to insufficient osteogenesis of the sphenoid spine. Lastly, *foramen parietale* and *canalis hypoglossalis septus* are closely connected with the venous system and peripheral nerves, therefore their embryogenesis must be intricate.

In respect of occurrence in the Plinkaigalis population, the nine characters are also different (Table 2). In the percentage span from 0.0 to 92.5% (correspondingly *sutura parietalis* and *foramen ethmoidal posterius*), mean frequency of 45 traits being 26.30%, the occurrence of the majority of the nine discriminative traits is moderate: two of them (*foramen mentale accessorium* and *os suturae coronalis*) are significantly rare, and the same number of them (*foramen spinosum incompletum* and *foramen parietale*) are frequent in the Plinkaigalis population.

Concerning the inter-population variability of the characters in 61 samples from the Baltic area and adjacent territories (1), the majority of discriminative traits (Table 2) distinguish themselves by moderate values of the variation coefficients (27.4–40.3%); two of them (*os suturae coronalis* and *foramen mentale accessorium*) demonstrate a high inter-group variety

(V = 68.1 and V = 73.3, respectively), and only one trait (*foramen parietale*) is notable for a low inter-population diversity (V = 13.5) in the area. In general, smaller coefficients of inter-population variation (4.0–7.0%) are characteristic only of four traits (*foramen mastoideum, canalis condylaris, foramen zygomaticofaciale* and *foramen ethmoidale posterius*) out of the whole set of 45 characters.

From the data of factor analysis (1), four groups of discrete traits were noted according to the loadings of three main factors of variance in the Baltics and adjacent territories: the group of a paramount taxonomic importance in the area, traits of minor importance, the ones of little importance, and unimportant characters. The traits that demonstrated an uneven spatial distribution on the grave situation map of the Plinkaigalis cemetery seem to be quite different from the viewpoint of their significance in inter-population comparisons (Table 2). There, almost half of them (*os suturae coronalis, foramen frontale, foramen spinosum incompletum* and *cribra orbitalia*) belong to the group of paramount importance, and the rest (*os incisurae parietalis, foramen parietale, foramen supraorbitale, foramen mentale accessorium* and *canalis hypoglossalis septus*) can be treated as the ones of minor and little taxonomic importance (the 2nd and the 3rd groups) in the area. It is necessary to emphasize that absolutely unimportant traits (group 4) are absent.

In order to compare anthropological and archaeological data, the distribution of several grave gift types was examined. Two kinds of axes were unearthed in the cemetery. Most (67 units) of them were narrow-edged with a butt, and the rest (36 units) were socketed ones (23 units), latter axes being older. Two clusters of socketed axes, in the northern and eastern parts of the cemetery, may be traced on the map (Fig. 3). Drinking horns with bronze and silver binding are very particular Baltic articles, and they happened in 8 male graves concentrated in the western section of the burial ground (Fig. 3). The distribution in the graves of several adornments, i. e. the cross-bow brooches with rings on the shaft, as well as amber beads and the head dress garlands of the same construction, was mapped (Fig. 4). The brooches and beads make several small clusters, two head garlands of the same construction were unearthed in a close vicinity of one another, and two parts of the same bracelet were found in adjacent female graves.

DISCUSSION

The five interment areas (Fig. 1) might have occurred for three reasons. First of all, they might belong to different family groups, and this is rather probable. Secondly, they might be dated from different time periods, but the cemetery functioned only for two hundred years, i. e. for a comparative short time period, and only a slight trend to earlier interments in the eastern part of the cemetery may be traced. Furthermore, several late cremations are situated on the western edge of the burial site. Thirdly, people migrations might be the reason, but archaeological and anthropological data contradict such a supposition. So, Plinkaigalis is situated between the Žemaičiai and the Aukštaičiai (correspondingly the western and the eastern tribe unions); material culture of its inhabitants represents both tribe unions (23), and the anthropological type of the population may be treated as transitional (24).

The fact that children graves are concentrated in several groups and located mostly on the stripes between adult grave foci may testify either to the existence of the custom to bury non-adults on the outskirts of the cemeteries (27), or to epidemics that were common at that time and used to kill a great number of inhabitants, especially children, in a short time (24).

One fifth (20%) of the discrete cranial traits studies are unevenly dispersed spatially (Fig. 2). According to the logic of facts, if inherited peculiarities are scattered in a burial ground evenly, people were being buried probably quite accidentally with no care for familial links, and on the contrary, if phenes are concentrated on separate places, it is possible to presume that biologically close individuals (relatives) were being buried in those places. Structures of the corresponding characteristics by no means give a proof that there had ever been an actual family group; they rather serve as a hypothesis for the existence of such groups (10). A serious restraint of the possibilities to analyze kinship on the phenetical ground is the difference between genetic relationship and the social concept of family: not all members of a family are genetically related to each other (for instance, husbands and wives). Families are not clearly delimited genetic entities, they overlap each other (10). With a certain reservation, it is possible to suppose the existence of approximately seven groups of related individuals. The largest southern group (*a*, Fig. 2) is the most real because its area contains density thickenings of eight discrete traits. Other groups unite either a smaller number of characters (*b* and *c*) or their areas do not cover each other completely (*d* and *e*). Two small groups in the eastern part of the cemetery (*f* and *g*) are doubtful, for their foci only approach but not overlap each other.

It is necessary to reject the presumption that discrete cranial traits are concentrated because of the uneven distribution of interments (Fig. 1). The concentration foci do not coincide with interment areas (Fig. 3). There, two main foci (*a* and *b*) occupy only part of the areas (I and II), while the third one (*c*) lays absolutely separately, and three interment areas (III, IV and V) contain no undoubted foci of trait concentration.

There is no unanimous opinion on the nature of physical characters used in the assessment of kinship or genetic relationship of individuals. The characters must meet the following requirements: to have a high heritability, to be not correlated, to be rare, the maximum possible number of them should be determined (3, 18). Alt and Vach (10) add to this list of requirements a low variability in respect to age and sex and an occurrence independent of each other. According to Roesing (3), we can only say that hyperostotic and dental traits probably are predominantly determined by genes, therefore their discriminative value is the highest. Nevertheless, it is not true for the Plinkaigalis population: only two of the nine discriminative characters (*foramen supraorbitale* and *foramen frontale*) can be explained by hyperostotic processes, while the majority of them (Table 2) are of quite different nature.

Concerning the occurrence of the nine discriminative discrete variants in Plinkaigalis, one (*canalis hypoglossalis septus*) is more rare, and one (*os suturae coronalis*) is more frequent in comparison with the Baltic area and adjacent territories (Table 1), the incidence of the other traits practically being the same. Within the Plinkaigalis population, only two characters (*os suturae coronalis* and *foramen mentale accessorium*) are rare, while other ones occur either moderately or even frequently. Our data contradict the opinion that only rare traits are of a great discriminative value in assessing the genetic relations of individuals in intra-population analysis.

It was important to evaluate the characters significant in our research against the background of inter-group variability in the area (Table 2). The same traits reviewed above (*os suturae coronalis* and *foramen mentale accessorium*) are notable for high values of the inter-group variation coefficient; the rest of them stand out for a moderate variability, therefore, the question remains open. The discriminative importance of the trait within the group is not connected with the data of factor analysis: it is impossible to reckon the nine characters to one of the four groups of traits separated according to their taxonomic value in inter-population analysis.

It is necessary to consider the archaeological evidence suggesting a relationship among individuals, to analyze rare articles of material culture in clustering graves in the same area of the cemetery (10). Regardless of the fact that several male and female archaeological finds (socketed axes, drinking horns, cross-bow brooches and amber beads) are somewhat concentrated in more or less evident clusters (Figs. 3 and 4), their areas do not coincide with the foci of discrete cranial traits.

Quite naturally, tools and adornments characteristic of the community were in use of all people regardless of their familial relationship. Thus, it is possible to suppose that archaeological artifacts are not very useful in intra-population analysis, except for some specific cases of kinship assessment.

CONCLUSIONS

1. The topographical method seems to be useful for kinship assessment according to discrete cranial traits in palaeopopulations.

2. Using this method, several areas of trait concentration stood out, testifying to the existence of 5–7 groups of genetically related individuals, possibly family groups, in the Plinkaigalis community.

3. The discriminative value of a trait is not evidently related to its occurrence within a specific population, to its inter-population variability and discriminative value for inter-population comparisons.

4. Archaeological findings do not correspond to anthropological data, nevertheless they may help in specific cases of kinship assessment.

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TOPOGRAFINIS GIMINYSTĖS TYRIMAS POPULIACIJOJE PAGAL DISKREČIUS KAUKOLĖS POŽYMIUS: V–VI AMŽIŲ PLINKAIGALIO KAPINYNAS

S a n t r a u k a

Įvadas. Diskretūs, arba nemetriniai, kaukolės požymiai nuo praėjusio amžiaus vidurio naudojami paleopopuliacinėje genetikoje atstumui tarp populiacijų nustatyti, o pastaraisiais dešimtmečiais ieškoma patikimų būdų giminystės laipsniui tarp tos pačios populiacijos individų apibrėžti. Dauguma tų būdų sudėtingi, todėl nedažnai naudojami. Šio darbo tikslas – išmėginti paprastą topografinį metodą, taip pat išskirti ir apibūdinti svarbius giminystei požymius.

Medžiaga ir metodai. Ištirta 360 griautinių kapų, iškastų V. Kazakevičiaus V–VI a. Plinkaigalio (Kėdainių rajonas) kapinyne, kaulinė medžiaga. 45 diskretūs kaukolės požymiai nustatyti įprastiniais metodais ir pavadinti lotyniškais terminais, pasiūlytais vieno iš autorių. Kapinyno situacijos plane kartografuoti atskiri požymiai, tikrintas jų pasiskirstymas. Siekiant išryškinti požymių sutirštėjimą, požymių žemėlapiai buvo užklojami vienas ant kito. Tokiu pačiu būdu buvo tiriamas ir kai kurių archeologinių radinių pasiskirstymas.

Rezultatai. Dauguma požymių išsibarstė difuziškai, tik devyni susispietė atskirais židiniais. Sugretinus žemėlapius (2 pav.), septyniais atvejais židinių plotai daugmaž sutapo, dviejuose plotuose sutapimas buvo sąlyginis – trijų požymių arealai tik lietėsi neužklodami vienas kito. Nustatyta, kad diskrečių požymių plotai nesusiję su palaidojimų tankumu (3 pav.). Netolygiai pasiskirsčiusių ir toliau vadinamų diskriminantiniais požymių prigimtis įvairi – tai ir siūlių kaulai, ir įvairios angos, ir net akiduobių akytumas (*cribra orbitalia*), laikomas patologijos ženklu. Pagal dažnumą kapinyne diskriminantiniai požymiai skiriasi (2 lentelė): pusė jų kaukolėse aptinkami vidutiniškai dažnai, du – labai dažnai ir du – labai retai. Palyginus jų dažnumą apskritai Rytų Baltijos regione ir kaimyninėse teritorijose, bendri dėsningumai neišryškėjo. Peržvelgus tarpgrupinės variacijos koeficientus (2 lentelė), daugumai diskriminantinių požymių būdingas vidutinis įvairavimas, du varijuoja labai, o vienas – menkai. Faktorinės analizės būdu pagal rotuotų faktorių krūvius anksčiau (1) buvo išskirtos keturios požymių grupės pagal jų taksonominę svarbą populiacijų genetiniam artimumui nustatyti. Diskriminantiniai požymiai neįeina į vieną kurią grupę: beveik pusė jų yra svarbūs, o kiti saikingai ar menkai svarbūs. Siekiant sugretinti antropologinius duomenis su archeologiniais, kai kurių įrankių ir papuošalų (įmovinių kirvių, geriamųjų ragų, lankinių žieduotųjų segių, gintaro karolių) topografija buvo tirta tuo pačiu būdu. Įkapių ir diskrečių požymių sutankėjimo plotai nesutapo (3 ir 4 pav.). Tik kaip išimtis gretimuose palaidojimuose aptikti vienodi apgalviai ir dvi tos pačios apyrankės dalys.

Išvados. Topografinis metodas tinka palaidotų asmenų giminystei nustatyti. Šiuo metodu Plinkaigalyje aptiktos 5–7 genetiškai artimų žmonių grupės, galimi šeimų nariai. Diskrečių požymių diskriminantinė vertė nustatant giminystę nėra susijusi nei su jų dažnumu pačiame kapinyne, nei su paplitimu visame regione, nei su jų taksonomine verte atstumams tarp populiacijų nustatyti. Nustatant giminystę bendruomenės viduje, archeologiniai radiniai gali būti naudingi tik retais atvejais.

Raktažodžiai: diskretūs kaukolės požymiai, įvairavimas populiacijoje, giminystės tyrimas, paleopopuliacinė genetika