

Index Digitalis in Bulgarians from North Bulgaria

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The frequency of the index digitalis types of 763 males and 737 females, aged 30-39, from three regions of North Bulgaria – North West, North Central and North East Bulgaria have been studied. The symmetrical types of index digitalis are prevalent in both sexes their percentage being higher in the males. Generally the asymmetrical types are more common among the women. Sex differences are statistically significant with regard to the symmetrical and asymmetrical types of index digitalis. The males from North West Bulgaria differ statistically significantly from the males in other regions with regard to the symmetrical and asymmetrical types of index digitalis while in the women of the same region these differences are significant only for the symmetrical types.

Key words: index digitalis, symmetrical types, asymmetrical types, sex differences, territorial differences.

Introduction

Morphological characteristics of the human hand are to a great extent defined by the finger length ratio. The study of the ratio between the length of the second and the fourth fingers of both hands presents a special interest. E c k e r [6] was the first to note that in certain individuals the length of the second finger of the hand is greater – and in others it is the one of the fourth finger. The ratio between the lengths of the second and fourth fingers of both hands is known in literature by the term “index digitalis”. This notion was introduced by Sergent in 1944 who also created a method of investigation [2]. According to the accepted classification the types of index digitalis are as follows: type “A” or ulnaris when $\Pi < IV$; type “I” or radial when $\Pi > IV$; type “=” or intermediary when $\Pi = IV$. In an identical ratio between the lengths of the second and fourth fingers of both hands symmetrical types of index digitalis are defined and in the case of a different ratio the types are asymmetrical. In the asymmetrical types six combinations are possible. Depending on the radial growth tendency the asymmetrical types of index digitalis can be either with a left or a right accent. The combinations AI, A= and I= represent asymmetrical types with an accent to the left and the IA, =A, =I combinations are the asymmetrical types accentuated to the right. A p r o s i o et al. [2] being based on family investigations have established that index digitalis is inherited. The same thesis is supported by B o e v and T o d o r o v [4]. Some authors think that the finger length is labile and depends on different factors, occupation being one of them [10, 12]. Gavrilović has investigated the index digitalis types in populations from different regions of Yugoslavia [7] and in collaboration with Radojević – samples of musicians

[8] and pupils [11]. Some authors have investigated this feature together with the parameters of functional asymmetry in anthropological studies on different populations [1, 9]. B o e v et al. [5] have concluded an extensive study on index digitalis in our country, recording the frequencies of the index digitalis types in 11 789 individuals of different descent and both sexes.

The aim of the present study is to trace the frequencies of the index digitalis types in Bulgarians of both sexes, coming from the three parts of North Bulgaria – North West, North Central and North East Bulgaria and to look for sex and territorial differences.

Material and Methods

A total of 1500 Bulgarians of both sexes (763 males and 737 females) aged 30-39 inhabiting and coming from North West, North Central and North East Bulgaria were investigated. Four administrative districts – Montana, Lovech, Rousse and Varna (according to the administrative territorial division of Bulgaria from 1987) comprise the regions under study. The investigation was carried out alongside the National programme “Anthropological Characteristics of the Bulgarian People” (1989-1993) undertaken and fulfilled by the Department of Anthropology at the IEMA – BAS. The investigation was

Table 1. Per cent distribution of index digitalis types in a population of North Bulgaria

Index digitalis	Males		Females		Both sexes	
	n	%	n	%	n	%
A	441	57.80	272	36.91	713	47.53
I	24	3.15	74	10.04	98	6.54
(=)	175	22.94	244	33.11	419	27.93
Total symmetrical	640	83.89	590	80.06	1230	82.00
AI	4	0.52	8	1.09	12	0.80
(A=)	67	8.78	37	5.02	104	6.93
(I=)	4	0.52	18	2.44	22	1.47
Total left asymmetrical	75	9.82	63	8.55	138	9.20
IA	6	0.79	11	1.49	17	1.13
(=A)	23	3.01	43	5.83	66	4.40
(=I)	19	2.49	30	4.07	49	3.27
Total right asymmetrical	48	6.29	84	11.39	132	8.80
Total asymmetrical	123	16.11	147	19.94	270	18.00
Total	763	100	737	100	1500	100

symmetrical types:

$$\chi^2 = 75.03 > 13.82, \quad k = 2, \quad P < 0.001$$

asymmetrical types:

$$\chi^2 = 29.96 > 20.52, \quad k = 5, \quad P < 0.001$$

performed after the conventional methods [2, 3] and the χ^2 -test was used for comparing the populations under study.

Results and Discussion

The symmetrical types of index digitalis are prevalent in both sexes from North Bulgaria their percentage being higher in the males (Table 1). Generally the asymmetrical types are more common among the women. The "A" type is predominant of the symmetrical types in both sexes, especially in the males. Second in its frequency is the "=" type whose per cent is higher in women. Type "I" whose spreading is thrice higher in women ranks third. The sex differences found with regard to the symmetrical types of index digitalis are statistically significant ($P < 0.001$). All asymmetrical types of index digitalis, with the exception of type "A=", are more common among the women. Generally the asymmetrical types with an accent to the left are prevalent in the males and in the females – with an accent to the right. The observed sex differences with regard to the asymmetrical types of index digitalis are statistically significant ($P < 0.001$). The "A" type is prevailing in the males of all three regions under study, especially in North West Bulgaria (Table 2). This per cent gradually diminishes starting from the West to the East i.e. it is lowest in North East Bulgaria. The type "=" ranks second in frequency whose trend of spreading is opposite to the one of the "A" type i.d. it grows from West to the East and is at its highest in North East Bulgaria. Type "I" is found in lower frequencies and is decreased from the West to the East. A similar tendency of distribution is established also for the women with the "=" and "I" types being more frequent and the "A" type less than the values recorded for men. The observed territorial differences in the index digitalis symmetrical type frequencies are statistically significant in both sexes when comparing only North West Bulgaria with the other regions under study. In the

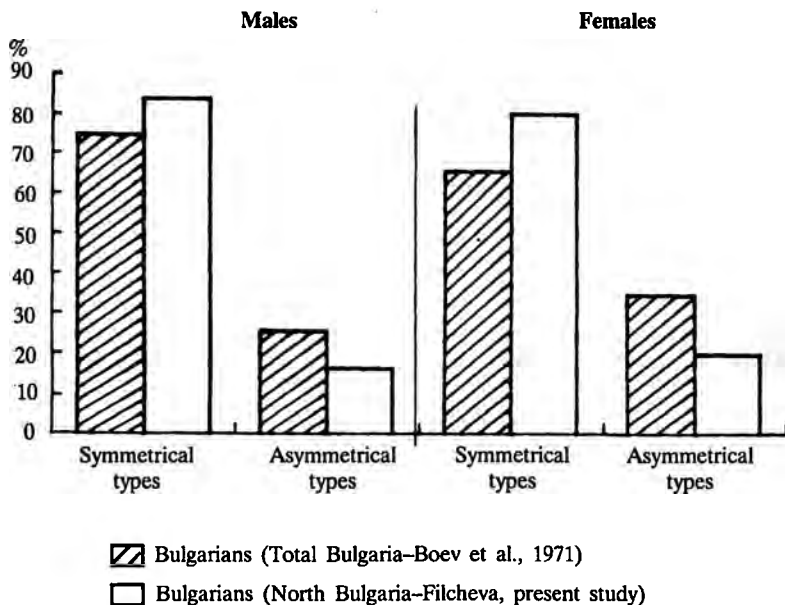


Fig. 1. Comparative data about the frequency of index digitalis

Table 2. Comparison of the frequencies of index digitalis types between populations from three regions of North Bulgaria

Index digitalis	Sex	North West Bulgaria (1)		North Central Bulgaria (2)		North East Bulgaria (3)		Comparison groups	χ^2
		n	%	n	%	n	%		
A	Males	208	68.87	112	54.11	121	47.64	Males	k=2
	Females	135	47.87	78	40.00	59	22.69	1-2	13.17*
I	Males	12	3.97	8	3.86	4	1.58	1-3	34.91*
	Females	28	9.93	21	10.77	25	9.62	2-3	5.20
(=)	Males	41	13.58	52	25.12	82	32.28	Females	k=2
	Females	49	17.38	73	37.44	122	46.92	1-2	16.99*
Total symmetrical	Males	261	86.42	172	83.09	207	81.50	1-3	61.04*
	Females	212	75.18	172	88.21	206	79.23	2-3	12.33
AI	Males	3	0.99	1	0.49	-	-		
	Females	4	1.42	1	0.51	3	1.15	Males	k=5
(A=)	Males	16	5.30	22	10.63	29	11.42	1-2	10.59**
	Females	13	4.60	4	2.05	20	7.69	1-3	15.09*
(I=)	Males	3	0.99	-	-	1	0.39	2-3	4.84
	Females	11	3.90	1	0.51	6	2.31		
Total left asymmetrical	Males	22	7.28	23	11.12	30	11.81		
	Females	28	9.92	60	3.07	29	11.15		
IA	Males	6	1.99	-	-	-	-		
	Females	8	2.84	2	1.03	1	0.39		
(=A)	Males	9	2.98	8	3.86	6	2.36		
	Females	23	8.16	10	5.13	10	3.85	Females	k=5
(=I)	Males	4	1.33	4	1.93	11	4.33	1-2	2.86**
	Females	11	3.90	5	2.56	14	5.38	1-3	12.05*
Total right asymmetrical	Males	19	6.30	12	5.79	17	6.69	2-3	8.87**
	Females	42	14.90	17	8.72	25	9.62		
Total asymmetrical	Males	41	13.58	35	16.91	47	18.50		
	Females	70	24.82	23	11.79	54	20.77		
Total	Males	302	100	207	100	254	100		
	Females	282	100	195	100	260	100		

* P < 0.001

** P < 0.05

asymmetrical types of index digitalis variable territorial differences are observed. In the male section it is more clearly discernible that the "A=" and "=I" types grows in value from the West to the East. In women a tendency for a decrease of frequency from West to East is only registered for the "=A" type. The territorial differences found in the asymmetrical types of index digitalis are statistically significant only for the males exclusively for the comparison between North West Bulgaria and the other regions ($P < 0.05$).

The population from North Bulgaria studied is distinct with its higher per cent of symmetrical rather than asymmetrical index digitalis types when compared to the data of Boev et al. [5] for the whole country (Fig. 1).

Conclusion

Men from North Bulgaria differ from women by the significantly higher per cent of index digitalis by contrast to the asymmetrical ones, which are not so common. The "A" or ulnaris type is most widely spread in both sexes, with a highest per cent, in North West Bulgaria. The males from North West Bulgaria differ to a significant extent from the males of the other regions with respect to both the symmetrical and asymmetrical types while in the women of the same region these differences are significant only for the symmetrical types. The significance of index digitalis for anthropology is in the population-genetics field and can be used as a genetic marker for determining the degree of proximity between the populations of interest. Its investigation contributes to the elucidation of the anthropological typing of a certain population.

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