

Hand Clasping and Arm Folding in Bulgarians from South Bulgaria

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The incidence of the hand clasping and arm folding types has been studied in 1524 Bulgarians (711 males and 813 females) aged 30-39 from the three parts of South Bulgaria — South-West, South Central and South-East. In both sexes the L-type of hand clasping and arm folding is prevalent with its percentage dropping from the West to the East. The intersexual differences are statistically significant only with respect to the arm folding. The observed territorial varieties of the hand clasping and arm folding frequencies are statistically insignificant in both sexes. The relationship between both asymmetries is statistically insignificant.

Key words: functional asymmetry, hand clasping, arm folding, intersexual differences, territorial differences.

Introduction

Hand clasping (interlocking of the fingers of the hands) and arm folding (crossing over of the fore-arms in front of the chest) represent manifestations of the functional asymmetry of the upper limbs in the man. L u t z [17] was the first to describe both ways of crossing the fingers of the hands. In the first case the right thumb is situated over and is defined as the R-type whereas the other with the left thumb is placed over the thumb and is defined as the L-type. Analogous are the cases in the crossing of the fore-arms over the chest described by W i e n e r [25]. A number of authors show an interest in that problem starting from the beginning of the 20-th century and up till our day. The interest is directed mainly to the factors accounting for the development of these asymmetries, the relationship between them and the impact of sex, age and race. Even now there is no unified opinion about their character. Both L u t z [17] himself and a variety of other authors support the thesis of a genetic control over them [7, 8, 18, 19, 20, 26]. Other investigators assume that there is no adequate evidence for such a control [5, 25]. According to L o u r i e [16] arm folding in contrast to hand clasping is an anthropological marker of a lesser importance and that genetic control is more evident in hand clasping. L a i and W a l s h [13] suggest that more probably the habit formed at an early age rather than the genetic factors determine the hand clasping types. L e g u e b e [14] marks the combined impact of the factors determining hand clasping. According to some authors sex and age do not exert an influence on the asymmetries under study [2, 9] and according to others they do affect them

though to a lesser degree [18]. A number of authors do not find a correlation between hand clasping and arm folding or if they record one it is very weak [2, 22, 23, 25] while according to others such a link exists [11, 12, 15, 21]. S a r n a et al. [24] based on literature data prove by statistical analysis that the manifestation of these asymmetries is not a random phenomenon. These asymmetries together with other features are used in anthropological studies on different populations [1, 15].

The studies on that problem in our country are comparatively very scanty. B o e v and T o d o r o v [3] have investigated 238 individuals of both sexes from three ethnic groups and have found a very high percentage of the R-type of hand clasping especially in the Bulgarians. M u t a f o v [27] has studied a control group of 1500 schoolchildren where the L-type of hand clasping was predominant. K a r e v [10] has studied 2100 schoolchildren and has also found a higher per cent of the L-type in both asymmetries. F i l c h e v a [6] has carried out a research on 1511 Bulgarians from North Bulgaria where the L-type is dominant among males in both asymmetries while in women it is prevalent only in the case of arm folding.

The aim of the present study is to trace the incidence of the hand clasping and arm folding types in Bulgarians from the three regions of South Bulgaria — South-West, South Central and South-East and to look for intersexual and territorial differences as well as for an association between both asymmetries.

Material and Methods

A total of 1524 Bulgarians of both sexes (711 males and 813 females) aged from 30 to 39 years living and descending from the three parts of South Bulgaria — South-West, South Central and South-East were investigated. The regions under study encompass four administrative areas — Sofia, Plovdiv, Haskovo and Bourgas (according to the administrative and territorial division of Bulgaria from 1987). The persons under study were living and originate from these regions. The study was carried out parallel to the National programme “Anthropological characteristics of the Bulgarian people” (1989-1993) realized by the department of Anthropology of IEMAM at the BAS. It was performed by the help of the conventional methods (4, 14) and the χ^2 -test has been used in the comparative analysis.

Results and Discussion

Hand clasping

The L-type is prevalent in both sexes for the whole of South Bulgaria whose percentages are of close values (Table 1). This confirms the opinion of other authors that the L-type is prevailing in Europe [22]. The intersexual differences are statistically insignificant ($P>0.05$). In both sexes in the three regions of South Bulgaria the L-type is prevalent with a highest percentage in South-West Bulgaria especially in women and beginning to drop down from the West to the East (Table 2). The territorial differences observed are statistically insignificant ($P>0.05$).

Table 1. Per cent distribution of hand clasping types among a population of South Bulgaria

Sex	R – type		L – type		Total
	<i>n</i>	%	<i>n</i>	%	
Males	329	46.27	382	53.73	711
Females	384	47.23	429	52.77	813
Both sexes	713	46.78	811	53.22	1524

$\chi^2 = 0.14, k = 1, P > 0.05$

Table 2. Comparison of the frequencies of hand clasping types between populations from three regions of South Bulgaria

Region	Sex	R – type		L – type		Total	Comparison groups	χ^2 <i>k</i> = 1
		<i>n</i>	%	<i>n</i>	%			
1. South - West Bulgaria	Males	108	44.63	134	55.37	242	Males	0.24
	Females	126	42.86	168	57.14	294	1 – 2	
2. South Central Bulgaria	Males	125	46.82	142	53.18	267	1 – 3	0.37
	Females	146	49.83	147	50.17	293	2 – 3	0.02
3. South - East Bulgaria	Males	96	47.52	106	52.48	202	Females	2.87
	Females	112	49.56	114	50.44	226		
Total	Males	329	46.27	382	53.73	711	1 – 3	2.31
	Females	384	47.23	429	52.77	813	2 – 3	0.01

Arm folding

In both sexes for the entire South Bulgaria the L-type is predominant with a much higher percentage than that of the R-type especially in the males (Table 3). This fact is also in accord, as in the case of hand clasping, with the tendency for predomination of the L-type in Europe [19]. The intersexual differences are statistically significant ($P < 0.05$). In both sexes in the three regions of South Bulgaria the L-type is prevalent also in the men, being much more common than the R-type. By contrast to the hand clasping a clear-cut tendency

Table 3. Per cent distribution of arm folding types among a population of South Bulgaria

Sex	R – type		L – type		Total
	<i>n</i>	%	<i>n</i>	%	
Males	260	36.57	451	63.43	711
Females	347	42.68	466	57.32	813
Both sexes	607	39.83	917	60.17	1524

$\chi^2 = 5.92, k = 1, P > 0.05$

Table 4. Comparison of the frequencies of arm folding types between populations from three regions of South Bulgaria

Region	Sex	R – type		L – type		Total	Comparison groups	χ^2 <i>k</i> = 1
		<i>n</i>	%	<i>n</i>	%			
1. South - West Bulgaria	Males	89	36.78	153	63.22	242	Males	0.14
	Females	122	41.50	172	58.50	294	1 – 2	
2. South Central Bulgaria	Males	94	35.21	173	64.79	267	1 – 3	0.08
	Females	131	44.71	162	55.29	293	2 – 3	0.42
3. South - East Bulgaria	Males	77	38.12	125	61.88	202	Females	0.62
	Females	94	41.59	132	58.41	226		
Total	Males	260	36.57	451	63.43	711	1 – 3	0.00
	Females	347	42.68	466	57.32	813	2 – 3	0.50

in the percent distribution for the region is not observed in this type of asymmetry (Table 4). The found territorial differences are statistically insignificant ($P > 0.05$).

The per cent distribution of the combinations between the R-types and the L-types of hand clasping and arm folding was traced. In both sexes for South Bulgaria as a whole the per cent of the combination between the L-type of hand clasping and the L-type of arm folding is of highest values (LL). Ranking second is the combination between the R-type of hand clasping and the L-type of arm folding (RL). The per cent of the combination between the R-type hand clasping and R-type arm folding is of lowest values ((RR) (Table 5). The intersexual differences are statistically insignificant ($P > 0.05$). This tendency in the combination between both asymmetries is preserved with respect to their territorial distribution in both sexes where the differences are statistically insignificant (Table 6). The sought association between both asymmetries is statistically insignificant (Table 7). Compared with the data of Filcheva [6] about Bulgarians from North Bulgaria significant differences were established only with respect to arm folding and in the case of the males at that ($\chi^2 = 9.44$, $k = 1$, $P < 0.05$).

Table 5. Per cent distribution of hand clasping / arm folding combinations among a population of South Bulgaria

Sex	RR		RL		LR		LL		Total
	n	%	n	%	n	%	n	%	
Males	115	16.18	213	29.96	145	20.39	238	33.47	711
Females	171	21.03	213	26.20	174	21.40	255	31.37	813
Both sexes	286	18.77	426	27.95	319	20.93	493	32.35	1524

$$\chi^2 = 7.23, k = 3, P > 0.05$$

Table 7. Relationship between hand clasping and arm folding among a population of South Bulgaria

Hand clasping	Arm folding		
	Right	Left	Total
Right	286	426	712
Left	319	493	812
Total	605	919	1524

$$\chi^2 = 0.12, k = 1, P > 0.05$$

Conclusion

The incidence of the hand clasping and arm folding types in Bulgarians from South Bulgaria corresponds to the parameters typical of the Europoid race. The L-type prevails in both sexes and in both types of asymmetry, especially in arm folding. The intersexual differences are statistically significant only in the case of arm folding. The observed territorial variations in both types of asymmetry are statistically insignificant. The most common combination between than in both sexes is LL where the intersexual differences are also statistically insignificant. The study of these types of asymmetry adds to the morpho-functional characteristics of the individuals under study and they deserve their position in the complex anthropological characterization of modern Bulgarian population.

T a b l e 6. Comparison of the frequencies of hand clasping / arm folding combinations among the three regions

Region	Sex	RR		RL		LR	
		<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
1. South - West Bulgaria	Males	36	14.88	71	29.33	52	21.49
	Females	54	18.37	72	24.49	68	23.13
2. South Central Bulgaria	Males	43	16.10	82	30.71	52	19.48
	Females	68	23.21	78	26.62	61	20.82
3. South - East Bulgaria	Males	36	17.82	60	29.70	41	20.30
	Females	49	21.68	63	27.88	45	19.91
Total	Males	115	16.18	213	29.96	145	20.39
	Females	171	21.03	213	26.20	174	21.40

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