

## SOLES DERMATOGLYPHICS IN THE PROGNOSIS OF SPORT ENDOWMENTS: FORMING OF SOLES DERMATOGLYPHICS IN THE UKRAINIAN POPULATION (information 1)

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**Annotation.** Comparative indexes are considered for determination of dermatoglyphic markers feet in relation to a sporting gift. In an experiment took part 209 youths and 198 girls in age 17-19 years. Studied conformities to the law of the phenotypical forming of dermatoglyphics of feet at the persons of Ukrainian population. Differential differences are found between the dermatoglyphics of feet for men and women. Distributing of dermatoglyphic phenotype is resulted on two feet for men and women which do not go in for sports. It is established that most often for men and for women phenotype of LW is formed. For men it can find out this phenotype more frequent (39,5%), than for women (26,8%). Phenotype of ALW for people does not meet of both sexes. Last phenotype is distributed mainly evenly: from 3,1 to 12,2% for men and from 5,3 to 14,9% for women. The population presence of dermatoglyphic phenotype of LA has some differences. For women phenotype meets more frequent (19,4%), than for men (13,9%).

**Keywords:** dermatoglyphics, population peculiarities, genetic markers, phenotype.

### Introduction

Dermatoglyphic of hands (fingers and palms) is one of the most informative genetic markers of susceptibility of person to certain diseases, forming signs or tendency of people to high specific manifestation (physical or mental) abilities [4]. Identification of genetic markers of certain ability is only possible in matching display features (such as dermatoglyphics) in different population groups. For example, in studies of dermatoglyphics markers of athletic talent might be match balance phenotypic manifestation of dermatoglyphics at healthy people who do not go in for sport and at athletes. Differential differences on certain attribute of dermatoglyphics can be considered a genetic marker. The presence of genetic markers in a child can be considered as a prerequisite to the prognosis of certain signs or professional inclinations. Hence the problem of determining the genetic markers of athletic talent is actual scientific problem.

The first step in its solving is an estimation of population characteristics of the formation of dermatoglyphics. Population characteristics of dermatoglyphics were studied only hands. Found differential differences of dermatoglyphics sign in people of different nationalities, countries and even different regions of the same country [6-10]. N.V. Bagatskaya et al. [3] compared dermatoglyphics of fingers and palms of the hands in the population of Kharkiv an ethnic Russian and Ukrainian. L.I. Tehako et al. [5] studied dermatoglyphics of men and women residents of different regions of Belarus, and N.A. Danilov et al. (L.P. Sergienko, 2012) – population in different regions of Russia. Significant are differences of dermatoglyphics signs in males and females of one population [1]. However, population characteristics of dermatoglyphics of feet is not until studied.

The work is done according to the plan of research of the Open International University of Human Development "Ukraine".

### Aim, tasks, material and methods.

*The aim of the study* is to determine the quantitative criteria of dermatoglyphics signs of feet of men and women population of Ukraine.

*Tasks of work* were the following:

1. Identify the features of formation of dermatoglyphics of feet in youth of southern part of Ukraine.
2. Compare quantitative signs of feet dermatoglyphics in men and women.

*Methods and materials of research.* Fingerprints and soles of the feet have been studied by the method proposed by T.D. Gladkova. We used fingerprinting method using water-soluble black ink. To do this, use a device that consisted of boards and roller-coasters [2]. Ink applied to the surface of the foot even layer. Prints patterns of soles obtained by rolling your feet on a piece of paper that is placed on the platen from the heel to the toes. Thumb filmed separately.

Analysis of dermatoglyphics signs performed by the method of H. Cummins, C. Midlo (Y.S. Guseva, 1986). Dermatoglyphic signs were studied on the thumb (Fig. 1) and feet (Fig. 2, 3). Dermatoglyphic patterns on the big toe are similar to pattern of fingers. In our study is studied types of dermatoglyphics patterns of the thumb (A, L, W) of right, left foot and two feet in total, the number of deltas and scallops separately on each and two legs, scallops in patterns of cranial determined by the total count of the right and left sides (Fig. 4). As sole dermatoglyphics patterns were determined following indicators: number of patterns, deltas and scallops on the right, the left leg and two legs. Were evaluated following phenotypes of dermatoglyphics of feet (pattern thumb is not considered):

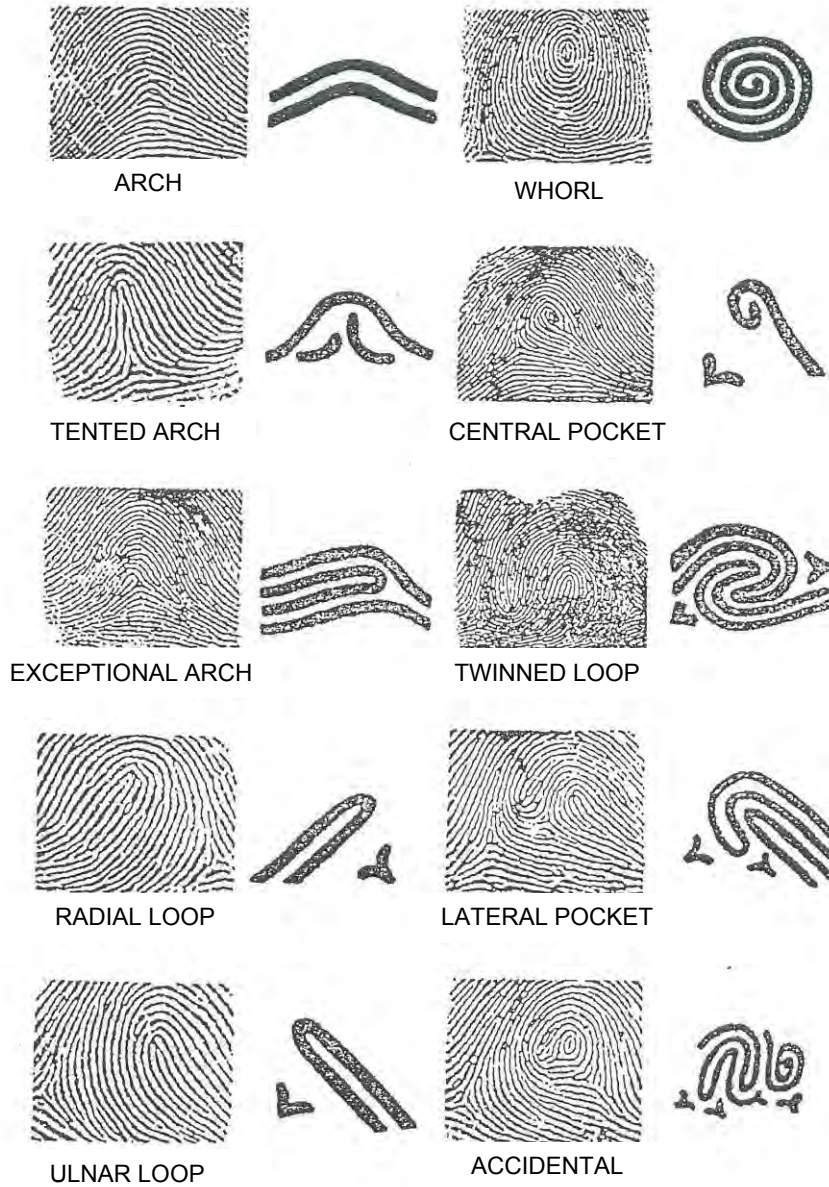


Fig. 1. Main types of dermatoglyphics patterns of fingers and sole

Without delta patterns – whorls (A, At, Ae), one-delta patterns – tibial (Lt) or radial (R) and fibular (Lf) or ulnar (U), two-delta patterns – whorls (W) and composite whorls (WL); central pocket (CP), double loop (TL), lateral pocket (LPL), three-delta patterns (ACC) – combination A, W, WL.

- ALW – phenotype that has whorls, arch and loops;
- LW – phenotype that has loops and whorls with great amount of loops;
- WL – phenotype that has whorls and loops with great amount of whorls;

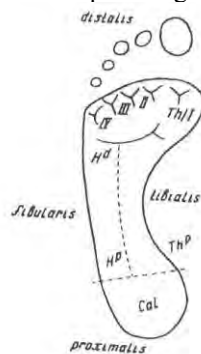


Fig. 2. Toe-pads

II, III, IV – interfinger pads; Th/I (Th<sup>d</sup>) – pad of great toe or distal tenar; Th<sup>p</sup> – tenar proximalis; Cal – calcar area; H<sup>d</sup> i H<sup>p</sup> – distalis and proximalis areas of hypotenar

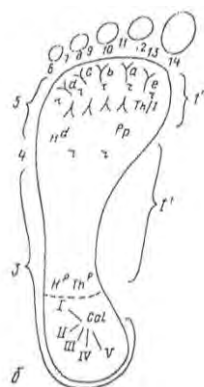


Fig. 3. Fields, three-radius and lines of sole

1–14 – sole fields; a, b, c, d, e – toe three-radiuses; P<sub>p</sub> – low extra three-radiuses; I–V – direction of papillary lines in calcar (heel) area

- SLSW – phenotype that has same number of dermatoglyphics loops and whorls;
- L – phenotype that has only loops patterns;
- W – phenotype that has only whorl patterns;
- LA – phenotype that has loops and arch patterns with great amount of loops;
- AL – phenotype that has arch and loops patterns with great amount of dermatoglyphics arches.



Fig. 4. Ridge account between delta and center in the whorl pattern

In research took part 407 persons of population of South region of Ukraine (Kherson) aged 17-19 years old (among them 209 men and 198 women).

**Results.**

*Dermatoglyphics of big toe.* The distribution of the main types of dermatoglyphics patterns on the first finger of the right and left leg and total on two legs are given in Table 1. Analyzing the data we note that most often the first toes have loop patterns (L = 81,6% men and 73.5% in women). This is somewhat higher percentage in comparison with the general trend of distribution dermatoglyphics types on the fingers. In the men's division arc (A) and cranial (W) patterns almost similar (respectively 9.1 and 9.3%). For women, there is a greater availability of arc (16.9%) than cranial (9.6%) patterns. Differences between the types of patterns fingers are essential. On arcs on the fingers of Ukrainian population occurs 3-8% of people, and cranial pattern - 20-37% (L.P. Sergienko, 2012). That arc patterns on the first toe seen in people of both sexes more than the fingers. For cranial patterns trend is the opposite. Note also that women almost twice as likely to occur arc patterns than men.

Table 1

*Distribution of major dermatoglyphics patterns on the first toes in male and female*

Sex	Types of dermatoglyphics patterns on the first toe							
	A		U		R		W	
	Quantity	%	Quantity	%	Quantity	%	Quantity	%
Right leg								
Men	20	9,6	166	79,4	7	3,3	16	7,7
Women	31	15,7	148	74,7	3	1,5	16	8,1
Left leg								
Men	18	8,6	8	3,8	160	76,6	23	11,0
Women	36	18,2	8	4,0	132	66,7	22	11,1
Total on two legs								
Men	38	9,1	174	41,6	167	40,0	39	9,3
Women	67	16,9	156	39,4	135	34,1	38	9,6

Quantitative indicators of the presence of large deltas on the toes are shown in Table 2. Quantitative deltas on the right and left leg in men and women are almost similar. There is a similar trend of deltas presence on the big toes in men and women.

Table 2

Quantitative indicators ( $\bar{X} \pm m$ ) of dermatoglyphics deltas on the first toe of men and women of Ukrainian population

Sex	Legs		
	Right	Left	Total on two legs
Men	0,96 ± 0,027	0,98 ± 0,026	1,94 ± 0,043
Women	0,91 ± 0,033	0,92 ± 0,037	1,83 ± 0,062

Trend of quantitative display of dermatoglyphics scallops on the first toes presented in Table 3. Note the presence of more scallops on the thumb of right and left legs of men than women. Somewhat more significant, although not significantly, quantitative scallops on the right than on the left leg.

Table 3

Quantitative indicators ( $\bar{X} \pm m$ ) of dermatoglyphics scallops on the first toe of men and women of Ukrainian population

Sex	Legs		
	Right	Left	Total on two legs
Men	13,00 ± 0,544	12,61 ± 0,523	25,60 ± 0,988
Women	10,91 ± 0,524	10,61 ± 0,567	21,52 ± 1,011

When comparing dermatoglyphics patterns (deltas and scallops) in the first toes obviously more complicated dermatoglyphic pattern in men than women.

*Dermatoglyphics of feet soles.* Number of sole dermatoglyphics patterns of various types was relatively low (Table 4). Although their distribution has a tendency: 1) on the right foot in both men and women there more patterns than in the left foot; 2) men have more dermatoglyphics patterns on two feet than women.

Table 4

Quantitative indicators ( $\bar{X} \pm m$ ) of dermatoglyphics of feet sole of men and women of Ukrainian population

Sex	Legs		
	Right	Left	Total on two legs
Men	1,88 ± 0,064	1,72 ± 0,060	3,60 ± 0,110
Women	1,60 ± 0,053	1,54 ± 0,051	3,13 ± 0,090

Phenotypic expression of dermatoglyphics deltas and scallops on sole of two feet of the surveyed boys and girls are given in Table 5. Under previous laws in men was more significant number of deltas and scallops on the right than on the left leg. Moreover, these figures were quantitatively greater in men than women.

Table 5

Quantitative indicators ( $\bar{X} \pm m$ ) of dermatoglyphics deltas and arch on the sole of feet of men and women of Ukrainian population

Sex	Legs		
	Right	Left	Total on two legs
Deltas			
Men	2,11 ± 0,087	1,94 ± 0,089	4,05 ± 0,162
Women	1,85 ± 0,080	1,68 ± 0,081	3,53 ± 0,143
Arches			
Men	44,40 ± 1,944	40,61 ± 1,927	85,01 ± 3,565
Women	37,26 ± 1,722	32,15 ± 1,543	69,41 ± 2,939

Distribution of dermatoglyphics phenotypes on two legs in men and women who are not involved in sports, are given in Table 6. Observe that most often both men and women formed phenotype LW. Although in men this phenotype can be detected more frequently (39.5%) than women (26.8%). Phenotype ALW at people of both sexes are not meeting. Recent phenotypes are distributed mostly evenly, from 3.1 to 12.2% in men and from 5.3 to 14.9% in women. Population presence is a little bit difference in dermatoglyphic phenotype LA. In women the phenotype is more common (19.4%) than men (13.9%).

Table 6

*The distribution of phenotypes of dermatoglyphics of the feet soles of men and women of Ukrainian population*

Sex	Phenotypes of dermatoglyphics of the feet															
	ALW		LW		WL		SLSW		L		W		LA		AL	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Men	0	0	165	39,5	13	3,1	47	11,2	47	11,2	37	8,9	58	13,9	51	12,2
Women	0	0	106	26,8	21	5,3	38	9,6	42	10,6	53	13,4	77	19,4	59	14,9

### Conclusion

1. At first studied patterns of phenotypic formation of legs dermatoglyphics of Ukrainian population persons.
2. Found differential differences between dermatoglyphics of feet in both men and women.
3. A more complex structure of dermatoglyphics of feet in men than in women.

*Prospects for further research* is to determine the differences of population structure dermatoglyphics legs with feet dermatoglyphics of people of different professional groups. This may provide future determination of dermatoglyphics feet bullets of different abilities. Such information will be useful in the technology and professional sports selection.

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**Cite this article as:** Serhiyenko L.P., Lyshevska V.M. Soles dermatoglyphics in the prognosis of sport endowments: forming of soles dermatoglyphics in the Ukrainian population (information 1). *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2013, vol.1, pp. 79-83. doi:10.6084/m9.figshare.106944

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Received: 12.01.2013

Published: 31.01.2013