PHYSICAL ANTHROPOLOGY

UDC 572
DOI: 10.33876/2311-0546/2026-2/344-359
Original Article

BILATERAL VARIABILITY OF PLANTAR DERMATOGLYPHICS IN MORDVA-MOKSHA

Bilateral variability in feet papillary patterns is not sufficiently studied. More detailed and comprehensive research is necessary, along with the accumulation of data from different populations. This article presents the results of a study on the bilateral symmetry of plantar dermatoglyphics in 240 Moksha people of southwestern Mordovia. We examined the pattern types in each sole region, triradii, directions of the main palmar lines, and heel ridges. An analysis of the overall feature symmetry showed weak bilateral differences in plantar dermatoglyphics. The only exception is the course of the papillary lines in the heel area, although symmetrical variants predominate for this feature as well. While the level of bilateral symmetry is high overall, it varies in different areas of the foot and depends partly on the variability of dermatoglyphic characteristics. The degree of asymmetry increases from the proximal to the distal areas of the sole and from the fibular to the tibial pads. There are no significant sex differences in the symmetry of the foot's papillary patterns, although this may be due to the small sample size. Trends in feature distribution on the right and left feet of the Moksha people correspond to the data from other groups. Statistically significant bilateral differences are found in the endings of the main plantar lines and the ridges of the heel area.

Keywords: *physical anthropology, plantar dermatoglyphics, bilateral variability, symmetry index, Mordva-Moksha people*

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For citation: Slavolyubova, I. A., and I. A. Filkin. 2026. Bilateral Variability of Plantar Dermatoglyphics in Mordva-Moksha. *Herald of Anthropology (Vestnik Antropologii)* 2: 344–359.

Funding: The study was conducted under the state assignment of Lomonosov Moscow State University "Formation of Some Morpho-functional Features of the Human in Philo- and Ontogenesis" (number CITIS: 121031600200-2).

References

Antoniuk, S. A. 1976. Kozhnye uzory stop zapadnykh belorusov [Skin Patterns of the Feet of Western Belarusians]. *Voprosy antropologii* 53: 71–83.

Benes, J. 1966. Untersuchung über das Tastleistensystem der Fussflachen von Zigeunern aus der Slowakei (Tschechoslowakie) [Study of the Soles' Tactile System of the Roma People from Slovakia (Czechoslovakia)]. *Anthropologie* 4(3): 49–59.

Bevza, A. L. 2011. Dermatoglificheskaya konstitutsiya stop zhitelei iuga Tiumenskoi oblasti **[**Dermatoglyphic Constitution of the Feet of Residents of the Southern Regions Tyumen Inhabitants]. Ph.D. diss. abstract. Tyumen State Medical Academy. 18 p.

Bozhchenko, A. P., A. A. Gomon, and M. T. Ismailov. 2018. Rasovo-diagnosticheskie osobennosti dermatoglifiki stop **[**Racial and Diagnostic Features of Sole Dermatoglyphics]. *Zdorov'e i obrazovanie v XXI veke* 20(1): 181–185.

Bozhchenko, A. P., and E. V. Kapustin. 2020a. Bilateral'naia simmetriya plantoglificheskikh priznakov kak kriterii prinadlezhnosti podoshv (sledov bosykh nog) odnomu cheloveku [Bilateral Symmetry of the Plantoglyphych Characteristics as a Criterion of the Affiliation Soles (Bare Footprint) for One Person]. *Sudebnaia ekspertiza* 1(61): 44–58.

Bozhchenko, A. P., and E. V. Kapustin. 2020b. Ispol'zovanie metoda dermatoglificheskogo issledovaniia dlia sudebno-meditsinskoi rekonstruktsii tel pogibshikh ot vzryvnoi travmy [Forensic Reconstruction of the Bodies of Victims of Explosive Injuries Based on Dermatoglyphic Studies]. *Voenno-meditsinskii zhurnal* 63(1): 21–25.

Buchwald, W. 1988. Listewki skorne streiy podpalcowej stop u ludnosci Polski pdlnocnej [Dermatoglyphic Traits of the Sub-toe Area of Soles in the Population of Northern Poland]. *Przegląd Antropologiczny* 54(1–2): 107–111.

Cummins, H., and C. Midlo. 1961. *Finger Prints, Palms and Soles*. *An Introduction to Dermatoglyphics.* Philadelphia, New York: Dover Publications. 319 p.

Datta, P. K. 1965. The Occurrence of Symmetry in the Individual Plantar Main Lines and Modal Types. *Zeitschrift für Morphologie und Anthropologie* 56(3): 255–262.

Gladkova, T. D. 1966. *Kozhnye uzory kisti i stopy obez'ian i cheloveka* [Skin Patterns of the Hand and Foot of Monkeys and Humans]. Moscow: Nauka. 149 p.

Guseva, I. S. 2010. *Pal'tsevye uzory cheloveka Morfologiia. Morfogenez. Genetika. Dermatoglifika kak marker v meditsinskoi i sportivnoi antropologii* [Human Finger Patterns. Morphology. Morphogenesis. Genetics. Dermatoglyphics as a marker in medical and sports anthropology]. Minsk: FUAinform. 336 p.

Jungwirth, J. 1964. Über das Hautleistensystem der Fußsohlen von Niederösterreichern [Skin Ridge System of the Soles of the Feet of Lower Austrians]. *Annalen des Naturhistorischen Museums in Wien* 67: 673–680.

Fandeeva, O. M. 2010. Strukturnaya organizatsiia papilliarnykh uzorov pal'tsev i ikh osobennostei v semeinykh gruppakh. Ph.D. diss. abstract. Saint Petersburg State Pediatric Medical Academy.

Filkin, I. A., and I. A. Slavolyubova2018. Bilateral'nye variatsii kozhnykh uzorov stop u russkikh i mokshan s raznymi vidami dvigatel'noi asimmetrii nog [Bilateral Variations of Sole Skin Patterns in Russians and Mokshas with Different Types of Leg Motor Asymmetry]. *Aktual'nye voprosy antropologii.* Minsk: Belaruskaya navuka 13: 386–396.

Kapustin, E. V. 2021.Ustanovlenie prinadlezhnosti chastei tela odnomu cheloveku na osnove dermatoglificheskogo metoda issledovaniya. Ph.D. diss. abstract. Saint Petersburg Military Medical Academy. 21 p.

Kaur, M. 1998. Plantar Dermatoglyphics: a Study of Intra and Inter Population Variations in Five Endogamous Groups of Punjab. Ph.D. diss. Punjab. 147 p.

Khit, G. L., I. A. Shirobokov, and I. A. Slavoliubova, 2013. *Dermatoglifika v antropologii* [Dermatoglyphics in Anthropology]. Saint Petersburg: Nestor-Istoriya, 376 p.

Kondik, V. M. 1982. Plantarnyi dermatoglificheskii polimorfizm narodonaseleniia i ego primenenie v etnicheskoi antropologii i rasovedenii. Ph.D. diss. abstract. Moscow State University. 184 p.

Loesch, D., and Z. Swiatkowska. 1978. Dermatoglyphic Total Patterns on Palms, Fingertips and Soles in Twins. *Annals of Human Biology* 5: 409–419. https://doi.org/10.1080/03014467800003061

Mala, L. 1961. Analysa palmarnich a plantarnich dermatoglyfu u Ĉechoslovaku [Analysis of Pal-

mar and Plantar Dermatoglyphs in Czechoslovakia]. *Acta Facultatis Rerum Naturalium Universitatis Comenianae Anthropology* 6(1–5): 125–135.

Penrose, L., and D. Loesch. 1969. Dermatoglyphics in Sole Patterns: A New Attempt at Classification. *Human Biology* 41: 427.

Rahman, M. A., A. A. Mahajan, and S. S. Porwal. 2014. Sexual Dimorphism in Plantar Dermatoglyphics. *Journal of Evidence Based Medicine and Healthcare* 1(8): 893–901.

Reuer-Fabrizii, S. 1983. Zur Kenntnis Des Hautleistensystems Der Zehenbeeren Und Fußsohlen Der Kalenjin Aus Kenia [On the Knowledge of the Dermal Ridge System of the Toes and Soles of the Feet of the Kalenjin People from Kenya]. *Anthropologischer Anzeiger* 41(4): 283–292.

Takeya, S. 1933. Über die Hautleistenfigur der Zehen der Chinesen [Skin Ridge Pattern of the Toes in Chinese]. *Journal of Oriental Medicine* 19: 36–38.

Taraskaev, S. A. 2009. O klassifikatsii papilliarnykh uzorov na pal'tsakh stop cheloveka [On the Classification of Papillary Patterns on Human Toes]. *Biznes v zakone* 1: 205–207.

Teplov, K. V., I. V. Gugnin, and A. P. Bozhchenko. 2014. Gruppovoi polimorfizm i izmenchivost' dermatoglificheskikh priznakov pal'tsev nog i ruk: sravnitel'naya kharakteristika [Group Polymorphism and Variability of Dermatoglyphic Characters of the Toes and Fingers: The Comparative Characteristic]. *Sudebno-meditsinskaya ekspertiza* 4: 34–39.