

Current Issues in Pharmacy and Medical Sciences

Formerly ANNALES UNIVERSITATIS MARIAE CURIE-SKLODOWSKA, SECTIO DDD, PHARMACIA

journal homepage: <http://www.curipms.umlub.pl/>



Local administrative-territorial specificity dermatoglyphics of men in Ukraine affected by caries at various levels of intensity

MARIA SHINKARUK-DYKOVIYTSKA^{1*}, ANATOLY BORISENKO²

¹The Pirogov Department of Pediatric Dentistry, Vinnitsa National Medical University, Pirogov 56, Vinnitsa, Ukraine

²The Bogomolets Department of Therapeutic Stomatology, Kiev National Medical University, Kiev, Ukraine

ARTICLE INFO

Received 23 January 2015

Accepted 24 March 2015

Keywords:

caries,
the average level intensity of infestation, dermatoglyphics, somatically healthy men, administrative-territorial regions of Ukraine.

ABSTRACT

We found differences in administrative-territorial distributions of dermatoglyphics with regard to somatic healthy men of I adulthood with low and moderate levels intensity of caries. However, separate dermatoglyphics complexes of men with *low* levels intensity of caries, typical for any region of Ukraine, were not found. The data obtained from the western and southern regions of the country is particularly interesting. This, we believe, is a manifestation of population-regional particularities of the gene pool of Ukrainian men that corresponds to markers of greater physical health than to markers of the progression of the course of caries that is of low intensity. The greatest number of differences by indicator dermatoglyphics is evidenced in men with a *medium* level intensity of caries. This is concentrated in territorial segments: west↔center↔south and north↔center↔south. Moreover, a great amount of differences are seen in territorial segments: center west↔center↔north and south↔center↔east, while the least difference, albeit still numerous, is noticeable in territorial segments: north↔center↔east. The obtained data are interpreted by us as a manifestation of predisposition to the course of caries of a medium level of affection which is based on differences in the structure of the gene pool of the Ukrainian male population.

INTRODUCTION

Genetic markers of predisposition to diseases of a multifactorial nature can be used in data dermatoglyphics [4], which, by the definition of Hyt G. et al. [6], is a capacious information system and independent source of genetic information. However, controversy exists in considering caries as being a multifactorial disease that is the result of a combined influence of genetic and environmental factors [7].

Currently, convincing information about genetic markers of susceptibility to caries, as well as the forecast of its course, are not present in scientific literature [8], making it difficult to diagnose early, and as a result, proffer adequate, timely treatment.

In previous work, we found that the resulting population typology dermatoglyphics of somatically healthy men in Ukraine aged from 19 to 35 years, who are affected by caries, is formed mainly by the genetic contributions of persons with *low*- and *medium*-intensity affection by tooth

decay. We also identified the marking possibilities of dermatoglyphics on possible options regarding the development of caries by the intensity level of affection: average↔low [1,14]. Subsequently, the obtained results enabled us to target the dermatoglyphics of men with medium level caries intensity affection (CFR3), and ascertain whether there is an interdependence of this issue with their place of residence in any administrative-territorial region of Ukraine. This was the *goal* of this current study.

MATERIALS AND METHODS

The Pirogov Department of Pediatric Dentistry and Scientific Research Center, of the Vinnitsa National Medical University, carried out a survey of more than 3,500 men, aged from 19 to 35 years, from different regions of Ukraine, to establish a study group of somatically healthy persons. This was done by way of employing a special screening questionnaire [3]. As a result, 410 somatically healthy men were selected. These were all third generation residents of respective regions of Ukraine: 72 – from the north,

* Corresponding author

e-mail: m.dykoviyska@gmail.com

tel.: 097-8780008

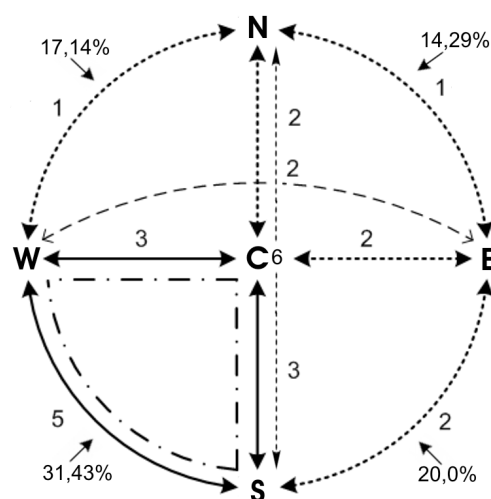
47 – from the south, 165 – from the central, 71 – from the west, 45 residents of the eastern regions. The central administrative-territorial region includes Vinnytsia, Cherkasy, Kirovohrad, Poltava and Dnipropetrovsk region; south – Odessa, Mykolaiv, Kherson, Zaporizhia region and Crimea; east – Kharkiv, Luhansk, Donetsk region; west – Volyn, Rivne, Lviv, Chernivtsi, Ternopil, Khmelnytskyi, Zakarpattia and Ivano-Frankivsk region; north – Zhytomyr, Kiev, Chernihiv, Sumy region.

The individuals of the study group then completed a special questionnaire regarding medical and social factors conditions of life, as well as indicators of their use of oral care products. A subjective assessment of periodontal tissues was subsequently undertaken. The results of this work brought about a relatively high homogeneity of samples of somatically healthy men from different regions of Ukraine [11,12,13]. Next, selected somatically healthy men undertook a complete dental examination. The intensity of teeth caries lesions with permanent occlusion was determined by the CFR index, where C – number of teeth affected by caries and its complications; F – number of dental fillings; R – number of teeth removed. The assessment of the level of caries, was performed on the basis of the criteria of caries intensity as found within the dental data of the WHO Global Bank [15] for the adult population. Therein: 0.2-1.5 – very low; 1.6-6.2 – low; 6.3-12.7 – average; 12.8-16.2 – high; 16.3 and above – a very high rate of dental caries intensity. The dermatoglyphic study itself, followed the methodology of H. Cummins and Ch. Midlo [2]. All members of the study were fingerprinted using brush printing ink on a sheet of paper [5]. This served as the basis of identity. Statistical analysis of the results was conducted by way of the package «STATISTICA 6.1» (the property of Pirogov SRC VNMU, license № BXXR901E246022FA).

The Committee of Bioethics of the Vinnitsa National Medical University found that this study is not contrary to the fundamental bioethical standards of the Helsinki Declaration, the European Convention on Human Rights and Biomedicine (1977), the relevant provisions of the WHO and the laws of Ukraine (protocol number 8, 10/09/2013).

RESULTS AND DISCUSSION

Based on the analysis of dermatoglyphic indicators, regarding the co-relation of somatically healthy men with low intensity of infestation by caries (CFR2) and administrative-territorial regions of Ukraine, the largest number of dermatoglyphic differences is concentrated in the territorial segment: west↔center↔south (11 features, 31.43%); and to almost the same degree, in territorial segments: north↔center↔east (5 signs, 14.29%), north↔center↔west (6 signs, 17.14%), north↔center↔south (6 signs, 17.14%), but slightly more – in the segment east↔center↔south (7 signs, 20.0%) (Fig. 1).



Note: hereinafter: S – south, N – north, W – west, E – east, C – center. Figures indicate the number of features on which significant differences were found

Figure 1. Zoning differences in administrative and territorial regions of Ukraine based on dermatoglyphics features in somatically healthy men affected by low level of caries infestation.

In the territorial segment: west↔center↔south, 45.46% of all differences are evident for the vector: west↔south, and 27.27% of all differences are seen for the vector: center↔west and vector: center↔south. Regarding the territorial segment: west↔center↔north, vector: center↔west holds 50% of all differences. Pertaining to territorial segment: south↔center↔east, vector: center↔south carries 42.86% of all differences. Finally, in territorial segment: north↔center↔east, dominant vectors of difference were not found. With regard to all identified significant differences of dermatoglyphic indicators in the somatic of healthy men with low intensity of caries infestation in Ukraine (35 indicators in total), the distribution of differences by region look as follows: in the direction west↔north, north↔east, north↔south – one (1) sign (at 2.86% of the total signs); center↔east, center↔north, east↔south, west↔east – two (2) signs (at 5.71% of the total signs); in areas center↔west and center↔south – three (3) signs (at 8.57% of the total signs); in the direction west↔south – five (5) signs (at 14.29% of the total signs). The data show that there were few differences in dermatoglyphic indicators in healthy men affected by caries of low level intensity, when compared by way of residence in different administrative-territorial regions of Ukraine. Hence, the possibility to isolate individual dermatoglyphics complexes did not exist. Thus, we put forward that in most regions, the local population is genetically homogeneous. At the same time, more pronounced differences can be seen in the characteristics of the dermatoglyphics vector laying through the central region of Ukraine towards the west and south of the country (this being most expressed, albeit, to a minor degree in the direction west↔south). This we see being a manifestation of population-regional characteristics of the gene pool of Ukrainian men who meet the criteria of complete physical health. This interpretation of our data finds its support in the findings of Pshenychnova A. [9], who studied the structure of the gene pool of the Ukrainian

population according to the polymorphism of mitochondrial DNA and the Y chromosome. A. Pshenychnova found that the most peculiar genetic for markers on the Y chromosome is in the western Ukrainian, and in regard to mtDNA, this is to be seen in the east. The population of the southern Ukrainian in regard to this kind of research, typically falls through the net, indicating that as a population, it was not long ago formed by the interaction of a genetic diversity of different peoples. Our research continued into the analysis of dermatoglyphic indicators in men with a medium level intensity of caries infestation (CFR3). Herein, we found that each of the regions is characterized by its own set of dermatoglyphic traits. The largest number of differences in dermatoglyphic indicators is seen in the territorial segment: west↔center↔south (28 features, 25.0%), and in the territorial segment: north↔center↔south (26 features, 23.2%). It is also evident to a lesser degree in territorial segment: west↔center↔north (21 character, 18.75%) and territorial segment: south↔center↔east (20 features, 17.86%). Moreover, it is seen to the lowest, albeit still significant degree, in the territorial segment: north↔center↔east (17 features, 15,18%) (Fig. 2).

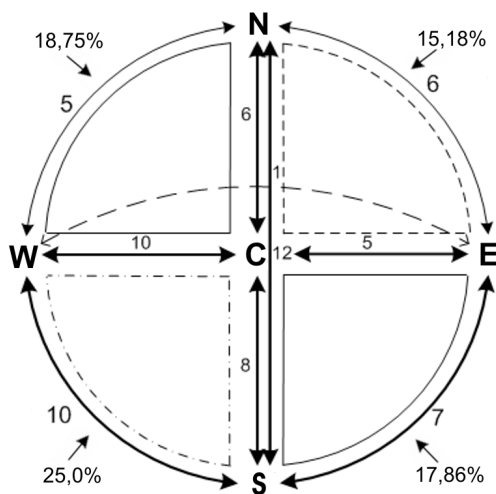


Figure 2. Zoning of differences in administrative and territorial regions of Ukraine based on dermatoglyphics features in somatically healthy men with a medium level of caries infestation

In the territorial segment: west↔center↔ north, 47.62% of differences are seen in the longitudinal vector: west↔center, whereas, in the territorial segment: north↔center↔south, 46,15% of all differences are evident in the latitudinal vector: south↔north. Regarding the territorial segment: south↔center↔east 40.0% of differences are displayed in the latitudinal vector: south↔center. Finally, in territorial segments: north↔center↔east and west↔center↔south, dominant vectors of differences were not found, the differences are distributed almost evenly.

Based on the identified significant differences of dermatoglyphic indicators across the country (in total, 112 indicators), the distribution of differences by region looks as follows: in the direction: south↔north – 12 signs (10.71% of the total); south↔west – 10 signs (8.93% of the total); and center↔west – 10 signs (8.93% of the total). Of note, significant differences were found in the areas: center↔south – 8

signs (7.14% of the total); south↔east – 7 signs (6.25% of the total). In addition, less significant differences were found in the areas center↔north – 6 signs (5.36% of the total); north↔east – 6 signs (5.36% of the total); center↔east and north↔west – 5 signs (4.46% of the total), while practically no difference was seen in the direction: west↔east – 1 sign (0.89% of the total).

The comparison of territorial spread, therefore, displays the three dermatoglyphic options – southern, central and northern – as detected by Segeda S. [10], who studied the differentiation of the population of Ukraine according to dermatoglyphics. However, our studied results, built upon the location of administrative territorial regions, did not reveal significant analogies. Hence we opine that the obtained data can be interpreted as a manifestation of susceptibility to caries current with a medium level of infestation which is based on differences in the structure of the gene pool of Ukrainian males.

CONCLUSIONS

Based on the analysis of complex dermatoglyphic indicators, we identified local specificity of dermatoglyphics for each of the 5 studied administrative and territorial regions of Ukraine, and thus indicate that genetic factors are involved in the course of caries with a moderate level of intensity of infestation. However, dermatoglyphic markers in the course of caries with low intensity of infestation are not found. Yet minor differences exist, particularly in the direction west↔south. This trend, we regard as being an additional manifestation of population-regional characteristics of the gene pool of Ukrainian males who meet the criteria of complete physical health.

REFERENCES

1. Borisenko A.V., Shinkaruk-Dykovytska M.M.: On the issue of the genetic component in lesions of tooth by caries of varying intensity. *The world of medicine and biology*, 4, 47, 2014.
2. Cummins H., Midlo Ch.: Finger Prints, Palms and Soles. An Introduction to Dermatoglyphics. Philadelphia, 300, 1961.
3. Danilenko G.M. et al. Hygienic screening-assessment of the implementation health forming innovations in secondary schools. Kharkiv, 76, 2006.
4. Delaunay N.L., Solonichenko V.G.: Adaptive phenotypes of human in physiology and medicine. *The successes of Physiological Sciences*, 30, 2, 1999.
5. Gladkova T.D.: Skin patterns of hand and foot in monkeys and humans. Moscow, *Science*, 151, 1966.
6. Khit G.L., Shirobokov I.G., Slavolyubova I.A. Dermatoglyphics in anthropology. St. Petersburg, 376, 2013.
7. Okushko V.R.: Genetic and ectogenetic factors forming dental rows. *Biomedical and biosocial anthropology*, 2, 2004.
8. Pochtarenko V.A., Yakushevich O.O.: Genetics and periodontics. The difficulties of a long journey. *Dentistry for all*, 4, 2008.
9. Pshenichnov A.S.: The structure of the gene pool of Ukrainians from data on polymorphism of mitochondrial DNA and Y chromosome. Moscow, 191, 2007.
10. Segeda S.P.: Anthropological composition of the Ukrainian people: ethnogenetic aspects. Kyiv, 28, 2002.
11. Shinkaruk-Dykovytska M.M.: Indicators of subjective estimation of the state periodontal tissues in somatically healthy men from different regions of Ukraine. *Ukrainian medical almanac*. 15, 6, 2012.

12. Shinkaruk-Dykovytska M.M.: Indicators of use of oral care products in somatically healthy men from different regions of Ukraine. *Ukrainian medical almanac*. 15, 5, 2012.
13. Shinkaruk-Dykovytska M.M. Medical and social factors living conditions of somatically healthy men from different environmental and administrative regions of Ukraine. *Biomedical and biosocial anthropology*. 19, 2012.
14. Shinkaruk-Dykovytska M.M. Prognostic value of palmar dermatoglyphics signs concerning possible variants of caries by the level of its intensity lesion. *Ukrainian morphological almanac*, 12, 3, 2014.
15. Volkov E.A., Yanushevich O.O. Therapeutic dentistry: a tutorial. *GEOTAR – Media*, 168, 2013.