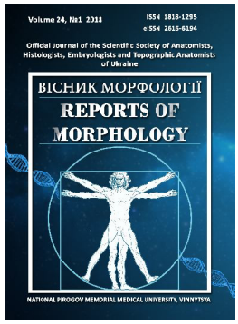
DOI: 10.31393/morphology-journal-2018-24(1)-09 Reports of Morphology, Vol. 24, №1, Pages 56-61

ISSN 1818-1295 eISSN 2616-6194

REPORTS OF MORPHOLOGY

Official Journal of the Scientific Society of Anatomists, Histologists, Embryologists and Topographic Anatomists of Ukraine

journal homepage: https://morphology-journal.com



Regression models of individual linear sizes of molars depending on the features of cephalometric indices in practically healthy men of the Western and Eastern regions of Ukraine

Kotsyura O.O.
National Pirogov Memorial Medical University, Vinnytsya, Ukraine

ARTICLE INFO
Received: 17 November, 2017
Accepted: 24 January, 2018

UDC: 611.314:616.714.1-071.3:79-055.1(477)

CORRESPONDING AUTHOR
e-mail: olyatkokotsyura@gmail.com
Kotsyura O.O.

Restoration of missing teeth should be done as close as possible to the natural anatomical features of the person's tooth-jaw apparatus. That is why the problem of aesthetics in dentistry has ceased to be only orthopedic and has shifted towards a constitutional and ethnic odontology. The purpose of the study is to construct and carry out analyzes obtained by regression analysis, models of computed-tomographic size of molars, depending on the features of cephalometric indices of practically healthy men of the Western and Eastern regions of Ukraine. A computed-tomographic study of molars with the following odontometry and cephalometry of 36 practically healthy men of the Western region of Ukraine - residents of Volyn, Rivne, Lviv, Chernivtsi, Ternopil, Khmelnytskyi, Transcarpathian and Ivano-Frankivsk regions and 35 men of the Eastern region of Ukraine - residents of Kharkiv, Donetsk and Luhansk regions was performed with the help of the Dental Cone-ray Tomography Veraviewepocs-3D (Morita, Japan). Regression models of linear sizes of molars, depending on cephalometric indices, were conducted using the statistical software package Statistica 6.1. As a result of the conducted research, reliable models of computed-tomographic size of the upper and lower jaws molars were constructed in practically healthy men of the Western [7 models of mesio-distal dimensions (R2 = 0.532-0.646), most of which include sagittal arc (12.5%), outer-eye width, nose depth, distance between nasion and inter-cutter point, body length of the lower jaw on the left, largest head circumference and maximum head length (by 7.5%); 6 models of vestibular-tongue dimensions (R^2 = 0.527-0.646), which most often include nasal depth (20.0%), body length of the lower jaw to the left (16.0%), physiological face length and morphological face length (by 12.0%); 1 model of crown height (R^2 = 0.579)] as well as Eastern [3 models of crown height (R^2 = 0.538-0.682), which most often include nose depth (15.0%), face type, physiological face length, morphological face length, smallest width head and sagittal arc (by 10.0%); 2 models of mesio-distal sizes (R^2 = 0.572 and 0.556), which most often include inter eye fossa width (15.4%)] regions of Ukraine. Thus, in practically healthy men from the Western and Eastern administrative-territorial regions of Ukraine, based on the specifics of cephalometric indicators and face type, reliable regression models (with determination coefficient R^2 greater than 0.5) of computed-tomographic size of molars of the upper and lower jaws (out of 40 possible 14 for the western and 5 for the eastern regions of Ukraine).

Keywords: *regression analysis, dimensions of molars, computed-tomography, cephalometry, practically healthy men, Western and Eastern regions of Ukraine.*

Introduction

One of the main issues of orthodontics is the prevention and correction of the wrong bite, as well as other tooth-jaw anomalies. The current level of orthodontic development allows to restore the form and function of the tooth-jaw system by various methods [9, 10, 21]. The progress of dentistry, the emergence of new technologies, materials, methods of treatment gradually formed a new direction - aesthetic dentistry. When working, you must strive not only to close the defect and deprive the patient of pain, but also to reproduce the natural beauty of the teeth [3, 7, 8, 26].

© 2018 National Pirogov Memorial Medical University, Vinnytsya

In order to achieve stable and guaranteed clinical success, a comprehensive approach is needed. That is, the problem of returning the natural form of teeth does not belong to the category of exclusively aesthetic. Restoration of missing teeth should be done as close as possible to the natural anatomical features of the person's tooth-jaw apparatus. That is why the problem of aesthetics in dentistry has ceased to be only orthopedic and has shifted towards the constitutional and ethnic odontology [13, 15, 17, 19, 22].

The process of competent modeling of anatomical forms leads to the fact that newly created designs from restoration materials are harmoniously combined with craniofacial structures. The work on predicting the size of the teeth - this is a daily task facing the dentist, but it was solved earlier, as a rule, intuitive [5, 14, 27, 28, 30].

Previously, methods for modeling the teeth parameters were based mainly on simplified models with numerous assumptions, but now it is important to simulate the size of the teeth, which requires deep knowledge of anatomy and, in particular, the consideration of individual dimensional features of the tooth-jaw and craniofacial system [2, 4, 6, 11, 12].

The purpose of the study is to construct and carry out analyzes obtained by regression analysis, models of computed-tomographic size of molars, depending on the features of cephalometric indices of practically healthy men of the Western and Eastern regions of Ukraine.

Materials and methods

On the basis of the medical center "WinIntermed LTD", for 200 somatologically healthy men aged from 19 to 35 years from different administrative regions of the regions of Ukraine done a cone-ray computer tomography using the Veraviewepocs-3D Dental Cone-ray Tomography (Morita, Japan). Among them: the western region - 36 inhabitants of Volyn, Rivne, Lviv, Chernivtsi, Ternopil, Khmelnytsky, Transcarpathian and Ivano-Frankivsk regions; Eastern region - 35 inhabitants of Kharkiv, Donetsk and Luhansk regions. Bioethics Committee of National Pirogov Memorial Medical University, Vinnytsya found that the studies fully met ethical and moral-legal requirements in accordance with the order of the Ministry of Health of Ukraine No. 281 of November 1, 2000 and do not contradict the basic bioethical norms of the Helsinki Declaration, the Council of Europe Convention Human Rights and Biomedicine (1977).

On cone-ray computed-tomograms of molars of the upper and lower jaws, measurements were made: height of the crown of the corresponding tooth; vestibular-tongue dimensions of the crown and neck of the tooth; mesio-distal dimensions of the crown and neck of the corresponding tooth [20].

A cephalometric study was conducted taking into account the generally accepted recommendations and anatomical points [1] with the help of a large sliding compass with a scale of the real size of the Martin system and a soft centimeter ribbon. The shape of the head was determined according to the following formula [30]: EU_EU / G_OP x 100. Up to 75.9, men belonged to dolichocephals; 76.0-80.9 - to mesocephals; 81.0-85.4 - for brachycephals; 85.5 and more - to hyperbrachycephals. The value of the face index (Garson morphological index) was obtained by the corresponding formula [18]: N_GN / ZY_ZY x 100. Up to 78.9 men belonged to the group with a very wide face; 79.0-83.9 - with a wide face; 84.0-87.9 - with middle face; 88.0-92.9 - with a narrow face; 93.0 and more - with a very narrow face.

For the determination of computed-tomographic linear dimensions of molars, according to the features of cephalometric indices, craniotype and the type of the face of practically healthy men from the Western and Eastern regions of Ukraine, a direct stepwise regression analysis was conducted using the licensed statistical software package "Statistica 6.1". For the analysis of the obtained results, only models in which the determination coefficient (R^2) was not less than 0.50 and the value of the F-criterion was not less than 2.5 were taken into account.

Results

As a result of the regression analysis, the following reliable models of computed-tomographic size of molars were constructed, depending on the features of cephalometric indices, craniotype and the face type of practically healthy men from the Western and Eastern regions of Ukraine:

mesio-distal size of the crown of the upper right second molar (western region) = 4.492 + 0.368 x FMT_FMT + 0.909 x N_PRN - 0.197 x DUGS_GOP + 0.603 x EK_EK - 0.137 x TIP_LICA - 0.800 x N_SN (R^2=0.646; $F_{(6,29)}$=8.82; p<0.001; Error of estimate=0.468);

height of the crown of the upper right first molar (western region) = -0.540 + 2.101 x N_STO + 0.317 x DUG_AUAU - 1.628 x AL_AL + 1.233 x CHI_CHI - 0.455 x EU_EU - 0.082 x N_PRN (R^2=0.579; $F_{(6,29)}$=6.65; p<0.001; Error of estimate=0.874);

mesio-distal size of the crown of the upper left second molar (western region) = 2.934 + 0.308 x RGO_GN + 0.930 x SN_PRN - 0.254 x DUGS_GOP + 0.216 x TR_GN + 0.093 x N_SN + 0.485 x EK_EK (R^2=0.615; $F_{(6,29)}$=7.72; p<0.001; Error of estimate=0.479);

mesio-distal crown size of the lower left second molar (western region) = 7.787 + 0.445 x N_STO + 0.607 x SN_PRN + 0.341 x TIP_LICA - 0.297 x ZM_ZM + 0.466 x TR_N + 0.604 x N_I + 0.819 x AL_AL - 0.125 x DUG_GOP (R^2=0.646; $F_{(6,17)}$=8.27; p<0.001; Error of estimate=0.413);

mesio-distal size of the neck of the lower left second molar (western region) = 5.612 + 1.466 x N_I + 0.789 x LGO_GN - 0.257 x DUG_GOP - 0.474 x N_GN + 0.162 x DUGS_GOP (R^2=0.581; $F_{(5,30)}$=8.31; p<0.001; Error of estimate=0.387);

vestibular-tongue size of the neck of the lower left first molar (western region) = -0.859 + 1.641 x SN_PRN + 0.504 x LGO_GN + 0.444 x TR_GN - 0.371 x N_GN - 0.278 x TR_N (R^2=0.646; $F_{(5,30)}$=10.95; p<0.001; Error of estimate=0.441);

vestibular-tongue crown size of the lower left first molar (western region) = -4.197 + 1.752 x SN_PRN + 0.176 x DUG_AUAU + 0.489 x LGO_GN + 0.442 x N_STO (R^2=0.614;

$F_{(4,31)}$=12.34; p<0.001; Error of estimate=0,566);

mesio-distal crown size of the lower left first molar (western region) = -9.286 + 0.443 x EU_EU - 1.010 x MF_MF + 0.418 x G_OP + 0.527 x LGO_GN + 0.856 x SN_PRN + 0.146 x ZM_ZM (R^2=0.575; $F_{(6,29)}$=6.54; p<0.001; Error of estimate=0.585);

vestibular-tongue size of the neck of the lower right first molar (western region) = -0.399 + 1.567 x SN_PRN + 0.473 x LGO_GN + 0.252 x TR_GN - 0.228 x N_GN (R^2=0.582; $F_{(4,31)}$=10.80; p<0.001; Error of estimate=0.463);

vestibular-tongue crown size of the lower right first molar (western region) = -5.950 + 1.570 x SN_PRN + 0.282 x TR_GN + 0.326 x RGO_GN + 0.377 x EK_EK (R^2=0.571; $F_{(4,31)}$=10.32; p<0.001; Error of estimate=0.560);

mesio-distal cervical size of the lower right first molar (western region) = -0.053 + 0.105 x DUGS_GOP - 0.261 x DUG_AUAU + 0.434 x EU_EU + 0.343 x EK_EK + 0.239 x G_OP (R^2=0.544; $F_{(5,30)}$=7.16; p<0.001; Error of estimate=0.484);

vestibular-tongue dimension of the cervix of the lower right second molar (western region) = -7.589 + 1.019 x LGO_GN + 1.129 x N_I + 0.710 x SN_PRN - 0.318 x N_GN (R^2=0.527; $F_{(4,31)}$=8.62; p<0.001; Error of estimate=0.570);

vestibular-tongue crown size of the lower right second molar (western region) = -8.965 + 0.437 x N_STO + 0.919 x AL_AL + 0.970 x N_I + 0.757 x RGO_GN (R^2=0.539; $F_{(4,31)}$=9.05; p<0.001; Error of estimate=0.570);

mesio-distal size of the neck of the lower right second molar (western region) = 6.668 + 1.897 x N_I - 0.209 x DUG_GOP + 0.251 x DUGS_GOP + 0.626 x LGO_GN - 0.603 x N_GN - 0.374 x G_OP (R^2=0.532; $F_{(5,50)}$=6.29; p<0.001; Error of estimate=0.487);

height of the crown of the upper right second molar (eastern region) = 14.12 + 0.740 x N_GN - 0.205 x DUGS_GOP - 1.216 x SN_PRN - 0.146 x FMT_FMT - 0.583 x EK_EK + 0.668 x MF_MF - 0.466 x CHI_CHI (R^2=0.682; $F_{(7,27)}$=8.27; p<0.001; Error of estimate=0.442);

height of the crown of the upper right first molar (eastern region) = 12.21 - 0.382 x TIP_LICA - 1.096 x SN_PRN + 0.264 x TR_GN - 0.619 x N_I - 0.428 x FMT_FMT - 0.102 x N_PRN + 0.456 x LGO_GN (R^2=0.538; $F_{(6,49)}$=7.27; p<0.01; Error of estimate=0.862);

mesio-distal crown size of the upper left first molar (eastern region) = 11.90 - 0.276 x DUGS_GOP + 0.235 x N_SN + 1.046 x AL_AL - 0.592 x MF_MF + 0.312 x EU_EU - 0.153 x N_PRN - 0.147 x TIP_LICA (R^2=0.572; $F_{(6,15)}$=7.27; p<0.001; Error of estimate=0.498);

height of the crown of the upper left second molar (eastern region) = 7.681 + 0.635 x N_GN - 1.088 x SN_PRN - 0.208 x DUGS_GOP - 0.638 x N_STO - 0.262 x TIP_LICA + 0.105 x TR_GN (R^2=0.639; $F_{(6,28)}$=8.27; p<0.001; Error of estimate=0.520);

mesio-distal size of the neck of the lower left first molar (eastern region) = 15.56 - 0.415 x N_GN + 0.763 x EK_EK - 0.371 x ZM_ZM - 0.277 x ZY_ZY - 0.333 x TR_N + 0.578 x MF_MF (R^2=0.556; $F_{(5,84)}$=6.28; p<0.001; Error of estimate=0.519);

where, R^2 - coefficient of determination; $F_{(!,!!)}$=!!,!! - critical $_{(!,!!)}$ and got (!!,!!) value of Fisher's criterion; St. Error of estimate - standard error of the standardized regression coefficient; FMT_FMT - the smallest width of the head (sm); N_PRN - nose length (sm); DUGS_GOP - sagittal arc (sm); EK_EK - exterior eye width (sm); TIP_LICA - face type (1 - wide, 2 - medium, 3 - narrow, 4 - very narrow); N_SN - nose height (sm); N_STO - height of the upper face part (sm); DUG_AUAU - transverse arc (sm); AL_AL - width of the base of the nose (sm); CHI_CHI - mouth width (sm); EU_EU - maximum head width (sm); RGO_GN - the length of the body of the mandible on the right (sm); SN_PRN - depth of the nose (sm); TR_GN - physiological length of the face (sm); ZM_ZM - average width of the face (sm); TR_N - height of the forehead (sm); N_I - the distance between the nasion and the inter-cutter point (sm); DUG_GOP - the largest girth of the head (sm); LGO_GN - the length of the body of the mandible on the left (sm); N_GN - morphological length of the face (sm); MF_MF - inter-orbital width (sm); G_OP - the largest length of the head (sm); ZY_ZY - face width (sm).

Models of all other linear dimensions of molars in practically healthy men of the Western and Eastern regions of Ukraine have a determination coefficient less than 0.5 and therefore have no significance for practical dentistry.

Discussion

Knowledge of odontology of different groups of the population allows to develop an individual approach in the course of activities aimed at the treatment and restoration of teeth and dental-jaw system in general, extends the importance of other specialties, including forensic medicine and anthropology [12, 20, 23, 29]. Specialists engaged in this branch of odontology, seek to identify general patterns of structure and development of the dental system, individual and sexual variability of teeth, the laws of their morphogenesis, the relationship between different elements of the system, the correlation of the size and structure of individual teeth between themselves and the skull. As a result, with a number of known morphometric parameters of the patient's teeth, by calculating on the basis of regression equations, we obtain the individual parameters of missing teeth and their tissues [11, 16, 24, 25].

Using regression analysis, based on the characteristics of cephalometric indices, craniotype and face type, reliable models (with determination coefficient R^2 greater than 0.5) of linear computed-tomographic sizes of molars of the upper and lower jaws in practically healthy men of the Western (4 models of mesio-distal sizes of the crown of the teeth of the upper and lower jaws, R^2 = 0.575-0.646; 3 models of mesio-distal dimensions of the neck of the teeth of the mandible, R^2 = 0.532-0.581; 3 models of vestibular-tongue crowns of the lower teeth R^2 = 0.527-0.646; 1 model of the height of the crown of the tooth of the upper jaw, R^2 = 0.579) and the Eastern (3 models of the height of crowns of the teeth of the upper jaw, R^2 = 0.538-0.682; 1 model of mesio-distal size of crown of tooth of upper jaw, R^2 = 0.572; 1 model of

mesio-distal size of the neck of the mandible tooth, R^2 = 0.556) of the regions of Ukraine.

Constructed models of computed-tomographic sizes of molars of the upper and lower jaws with a determination coefficient of more than 0,5 most often include:

in men of the Western region of Ukraine - parameters of the facial part of the head 72.6% (nose depth - 11.0%, the length of the body of the mandible on the left - 9.6%, the distance between the nasion and the inter-cutter point and the morphological length of the face - by 6.8%, exterior eye width, the height of the upper face and physiological face length - by 5.5%) and the parameters of the cerebral head were 24.7% (sagittal arc - 6.8%; transverse arc, greatest head width, largest head girth and largest head length - by 4.1%); individually for models of mesio-distal teeth size - sagittal arc (12.5%), exterior eye width, nasal depth, distance between nasion and inter-cutter point, length of the body of the mandible on the left, largest head circumference and maximum head length (by 7.5%); to the models of vestibular-tongue sized teeth - the depth of the nose (20.0%), the length of the body of the lower jaw to the left (16.0%), physiological face length and morphological face length (by 12.0%);

in men of the Eastern region of Ukraine - parameters of the facial part of the head 72.7% (nose depth, morphological length of the face and inter-orbital width - by 9.1%, nose length, exterior eye width and physiological facial length - by 6.1%), parameters of the cerebral head 18.2% (sagittal arc - 9.1%; lowest head width - 6.1%) and face type 9.1%; separate to the models of the height of crowns of teeth - nose depth (15.0%), face type, physiological face length, morphological length of face, smallest head width and sagittal arc (by 10.0%); to models of mesio-distal dimensions of teeth - inter-orbital width (15.4%).

When comparing our results with the results of modeling the linear dimensions of premolars in similar regions [16] it is necessary to note: for men of the Western region of Ukraine constructed 4 models of mesio-distal sizes of premolars (R^2 = 0.535-0.659), which most often include the largest girth the head and distance between the nasion and the inter-cutter point (by 14.8%), the transverse arc, the width of the mouth gap and the length of the body of the mandible on the right (by 11.1%); 1 model of the height of crowns of premolars (R^2 = 0.522); men of the Eastern region of Ukraine had 6 models of mesio-distal premolars sizes (R^2 = 0.505-0.641), most of which included sagittal arc, mouth width and forehead height (by 12.8%), average facial width (10.3%), and length of the body of the mandible on the left (7.7%); 2 models of the vestibular-tongue dimensions of premolars (R^2 = 0.519 and 0.559), which most often include the transverse arc, the width of the mouth, exterior eye width, the width of the mandible, and the length of the nose (by 14.3%); 1 model of height of crown of premolars (R^2 = 0.603).

Constructed regression models of linear dimensions of molars, depending on the features of cephalometric indices and the type of face of men of the Western and Eastern regions of Ukraine, will allow dentists to more correctly carry out treatment and diagnostic measures of various tooth-jaw anomalies.

Conclusion

In practically healthy men from the Western and Eastern administrative-territorial regions of Ukraine, based on the specifics of cephalometric indices and face type, reliable regression models (with determination coefficient R^2 greater than 0.5) of computed-tomographic size of molars of the upper and lower jaws (out of 40 possible 14 for the Western and 5 for the eastern regions of Ukraine) have been constructed.

References

[1] Alekseev, V. P., & Debets, G. F. (1964). *Craniometry: anthropological research methodology.* M.: Science.

[2] Allen, D., Rebellato, J., Sheats, R., Ceron, A. M. (2003). Skeletal and Dental Contributions to Posterior Cross-bites. *Angle Orthodontist.,* 5, 515-524. doi: 10.1043/0003-3219(2003)073<0515:SADCTP>2.0.CO;2

[3] Anari, S. (2017). Aesthetic dentistry Changing public perceptions. *British dental journal*, 223(6), 390. https://doi.org/10.1038/sj.bdj.2017.791

[4] Anderson, G., Fields, H. W., Beck, M., Chacon, G., Vig, K. W. (2006). Development of Cephalometric Norms Using a Uni?ed Facial and Dental Approach. *The Angle Orthodontist,* 76(4), 612-618. doi: 10.1043/0003-3219(2006)076[0612:DOCNUA]2.0.CO;2

[5] Bamber, M. A., Harris, M., Natcher, C. (2001). A validation of two orthognathic model surgery techniques. *J. Orthod.*, 28, 135-142. doi: 10.1093/ortho/28.2.135

[6] Bedoya, A., Osorio, J. C., Tamayo, J. A. (2015). Dental Arch Size, Biting Force, Bizygomatic Width and Face Height in Three Colombian Ethnic Groups. *International Journal of Morphology*, 33(1), 55-61. http://dx.doi.org/10.4067/S0717-95022015000100009

[7] Bennet, M. E., & Tulloch, J. F. C. (1999). Understanding orthodontic treatment satisfaction from the patient's perspective: a qualitative approach. *Clinical Orthod. and Research.*, 2(2), 53-61. PMID: 10534980

[8] Chernyak, V. V., Gasyuk, P. A., & Nikiforov, A. G. (2013). Method of determination of individual odontoglyphic status. *Bukovinsky Medical Bulletin*, 3, 181-182.

[9] Cracel-Nogueira, F., & Pinho, T. (2013). Assessment of the perception of smile esthetics by laypersons, dental students and dental practitioners. *Int. Orthod.*, 11(4), 432-444. PMID: 24427802

[10] Flis, P. S., Omelchuk, N. A., & Rashchenko, N. B. (2008). *Orthodontics.* Kiev: Medicine. ISBN 978-966-10-0026-0

[11] Gayvoronskiy, I. V., Gayvoronskiy, A. I., Gayvoronskaya, M. G., Dubovik, E. I., Kevorkova, S. A., Koltunov, A. V., ... Schanikova, A. S. (2008). Craniometric correlations of the dentoalveolar system, temporomandibular joint and facial skull in an adult. *Morphology*, 133(2), 29.

[12] Glushak, A. A. (2015). Vestibular-or al size of teeth in boys and girls with orthognathic bite depending on the shape of head and type of face. *Reports of Vinnytsia National Medical University,* 19(1), 37-43.

[13] Hieu, L. C., Zlatov, N., Vander Sloten, J., Bohez, E., Khanh, L., Binh, P. H., ... Toshev, Y. (2005). Medical rapid prototyping applications and methods. *Assembly Automation,* 25(4), 284-292. https://doi.org/10.1108/01445150510626415

[14] Mavili, M. E., Canter, H. I., Saglam-Aydinatay, B., Kamaci, S., & Kocadereli, I. (2007). Use of three-dimensional medical modeling methods for precise planning of orthognathic surgery. *The Journal of Craniofacial Surgery*, 18(4), 740-747. doi: 10.1097/scs.0b013e318069014f

[15] Muzurova, L. V., & Rezugin, A. M. (2008). Correlation relations of linear cranio-cephalometric parameters in persons with orthognathic occlusion. *Morphology,* 2, 92.

[16] Orlovskiy, V. O., Shinkaruk-Dykovytska, M. M., & Gunas, I. V. (2018). Modeling using regression analysis of individual linear dimensions of premolars depending on cephalometric indicators of practically healthy men from different regions of Ukraine. *Bulletin of scientific research*, 1, 90-95. doi: 10.11603/2415-8798.2018.1.8737

[17] Pacheco-Pereira, C., Canto, G. D. L., Major, P. W., & Flores-Mir, C. (2014). Variation of orthodontic treatment decision-making based on dental model type: A systematic review. *The Angle Orthodontist*, 85(3), 501-509. https://doi.org/10.2319/051214-343.1

[18] Proffit, U. R. (translation from English; Ed. L. S. Persina) (2015). *Modern orthodontics.* M.: Medpress-inform. ISBN: 978-5-00030-236-1

[19] Rasulov, I. M. (2011). Odontological features of the structure of the central incisors of the upper jaw (anthropological aspects). *Bulletin of the Dagestan Scientific Center. Makhachkala*, 3, 45-47.

[20] Samusev, R. P., Krayushkin , A. I., & Dmitrienko , S. V. (Ed. M. R. Sapin) (2002). *Basics of clinical morphology of teeth: a tutorial.* M.: OOO "Publishing House "ONIX 21 vek": OOO "World and Education". ISBN: 5-329-00426-8

[21] Santoroa, M., Jarjourab, K., & Cangialosic, T. J. (2006). Accuracy of digital and analogue cephalometric measurements assessed with the sandwich technique. *American J. of Orthodontics add Dentofacial Orthopedics,* 3, 345-351. doi: 10.1016/j.ajodo.2005.12.010

[22] Scherbakova, L. V. (2004). *Anthropometric parameters of cranio-facial complex of females and males 18-20 years old.* The theses are presented in the materials of the conference dedicated to the 65th anniversary of the Department of Operative Surgery and Topographic Anatomy of the Volgograd State Medical University. Volgograd, 60(3), 93-94.

[23] Slavicek, G. (2011). *Cephalometrie.* Berlin: Steinbeis-Ed. ISBN: 9783941417724

[24] Smerdina, L. N., & Smerdina, Yu. G. (2010). Biological norm of orthognathic occlusion (monograph). *The successes of modern natural science*, 2, 48-49.

[25] Swennen, G. R. J., Barth, E., Eulzer, C., & Schutyser, F. (2007). The use of a new 3D splint and double CT scan procedure to obtain an accurate anatomic virtual augmented model of the skull. *International Journal of Oral & Maxillofacial Surgery,* 36(2), 146-152. doi: 10.1016/j.ijom.2006.09.019

[26] Swennen, G. R. J., Mommaerts, M. Y., Abeloos, J., De Clercq, C., Lamoral, P., Neyt, N., ... Schutyser, F. (2009). A cone-beam CT based technique to augment the 3D virtual skull model with a detailed dental surface. *International Journal of Oral and Maxillofacial Surgery*, 38(1), 48-57. doi: 10.1016/j.ijom.2008.11.006

[27] Trezubov, V. N., Bulycheva, E. A., Chikunov, S. O., Trezubov, V. V., & Alpatyeva, U. V. (2015). The cephalometric study of the facial skeleton during the preparation to eliminating the occlusal surface deformations of dentition. Institute of *Stomatology*, 4(69), 102-104.

[28] Walker, F., Ayoub, A. F., Moos, K. F., & Barbenel, J. (2008). Face bow and articulator for planning orthognathic surgery: 1 face bow. *British Journal of Oral & Maxillofacial Surgery,* 46(7), 567-572. doi: 10.1016/j.bjoms.2008.02.015

[29] Yadav, A. O., Walia, C. S., Borle, R. M., Chaoji, K. H., Rajan, R, Datarkar, A. N. (2011). Cephalometric norms for Central Indian population using Burstone and Legan analysis. *Indian J. Dent. Res.*, 22(1), 28-33. doi: 10.4103/0970-9290.79970

[30] Zubov, A. A. (1968). Odontology. *Methodology of anthropological research.* M.: Science.

РЕГРЕСІЙНІ МОДЕЛІ ІНДИВІДУАЛЬНИХ ЛІНІЙНИХ РОЗМІРІВ ВЕЛИКИХ КУТНІХ ЗУБІВ В ЗАЛЕЖНОСТІ ВІД ОСОБЛИВОСТЕЙ ЦЕФАЛОМЕТРИЧНИХ ПОКАЗНИКІВ ПРАКТИЧНО ЗДОРОВИХ ЧОЛОВІКІВ ЗАХІДНОГО І СХІДНОГО РЕГІОНІВ УКРАЇНИ

Коцюра О. О.

Відновлення відсутніх зубів необхідно здійснювати максимально наближаючись до природних анатомічних особливостей зубощелепного апарату індивідуума. Саме тому проблема естетики в стоматології перестала бути лише ортопедичною і змістилась в напрямку конституціональної та етнічної одонтології. Мета дослідження - побудувати та провести аналіз, отриманих за допомогою регресійного аналізу, моделей комп'ютерно-томографічних розмірів великих кутніх зубів в залежності від особливостей цефалометричних показників практично здорових чоловіків Західного і Східного регіонів України. За допомогою дентального конусно-променевого томографа Veraviewepocs-3D (Morita, Японія) проведено комп'ютерно-томографічне дослідження великих кутніх зубів із наступними одонтометрією і цефалометрією 36 практично здорових чоловіків Західного регіону України - мешканці Волинської, Рівненської, Львівської, Чернівецької, Тернопільської, Хмельницької, Закарпатської та Івано-Франківської областей та 35 чоловіків Східного регіону України - мешканці Харківської, Донецької та Луганської областей. Регресійні моделей лінійних розмірів великих кутніх зубів залежно від цефалометричних показників, проводили за допомогою ліцензійного статистичного програмного пакета Statistica 6.1. В результаті проведених досліджень побудовані достовірні моделі комп'ютерно-томографічних розмірів великих кутніх зубів верхньої і нижньої щелеп у практично здорових чоловіків Західного [7 моделей мезіо-дистальних розмірів (R^2=0.532-0.646) до яких найчастіше входять сагітальна дуга (12.5%), зовнішньоочна ширина, глибина носа, відстань між назіон та міжрізцевою точкою, довжина тіла нижньої щелепи зліва, найбільший обхват голови та найбільша довжина голови (по 7.5%); 6 моделей присінково-язикових розмірів (R^2=0.527-0.646) до яких найчастіше входять глибина носа (20.0%), довжина тіла нижньої щелепи зліва (16.0%), фізіологічна довжина обличчя та морфологічна довжина обличчя (по 12,0%); 1 модель висоти коронки (R^2=0.579)], а також Східного [3 моделі висоти коронок (R^2=0.538-0.682) до яких найчастіше входять глибина носа (15.0%), тип обличчя, фізіологічна довжина обличчя, морфологічна довжина обличчя, найменша ширина голови та сагітальна дуга (по 10.0%); 2 моделі мезіо-дистальних

розмірів (R^2=0.572 і 0.556) до яких найчастіше входить міжочноямкова ширина (15.4%)] регіонів України. Таким чином у практично здорових чоловіків із Західного та Східного адміністративно-територіальних регіонів України на основі особливостей цефалометричних показників і типу обличчя розроблені достовірні регресійні моделі (з коефіцієнтом детермінації R2 більшим ніж 0,5) комп'ютерно-томографічних розмірів великих кутніх зубів верхньої і нижньої щелеп (із 40 можливих 14 для Західного та 5 для Східного регіонів України).

Ключові слова: *регресійний аналіз, розміри великих кутніх зубів, комп'ютерна томографія, цефалометрія, практично здорові чоловіки, Західний і Східний регіони України.*

РЕГРЕССИОННЫЕ МОДЕЛИ ИНДИВИДУАЛЬНЫХ ЛИНЕЙНЫХ РАЗМЕРОВ БОЛЬШИХ КОРЕННЫХ ЗУБОВ В ЗАВИСИМОСТИ ОТ ОСОБЕННОСТЕЙ ЦЕФАЛОМЕТРИЧЕСКИХ ПОКАЗАТЕЛЕЙ ПРАКТИЧЕСКИ ЗДОРОВЫХ МУЖЧИН ЗАПАДНОГО И ВОСТОЧНОГО РЕГИОНОВ УКРАИНЫ

Коцюра О. А.

Восстановление отсутствующих зубов необходимо проводить максимально приближаясь к естественным анатомическим особенностям зубочелюстного аппарата индивидуума. Именно поэтому, проблема эстетики в стоматологии перестала быть только ортопедической и сместилась в направлении конституциональной и этнической одонтологии. Цель исследования - построить и провести анализ, полученных с помощью регрессионного анализа, моделей компьютерно-томографических размеров больших коренных зубов в зависимости от особенностей цефалометрических показателей практически здоровых мужчин Западного и Восточного регионов Украины. С помощью дентального конусно-лучевого томографа Veravieweрocs-3D (Morita, Япония) проведено компьютерно-томографическое исследование больших коренных зубов с последующей одонтометрией и цефалометрией 36 практически здоровых мужчин Западного региона Украины - жителей Волынской, Ровенской, Львовской, Черновицкой, Тернопольской, Хмельницкой, Закарпатской и Ивано-Франковской областей и 35 мужчин Восточного региона Украины - жителей Харьковской, Донецкой и Луганской областей. Регрессионные модели линейных размеров больших коренных зубов в зависимости от цефалометрических показателей, проводили с помощью лицензионного статистического программного пакета Statistica 6.1. В результате проведенных исследований построены достоверные модели компьютерно-томографических размеров больших коренных зубов верхней и нижней челюстей у практически здоровых мужчин Западного [7 моделей мезио-дистальных размеров (R^2 = 0.532-0.646) к которым чаще всего входят сагиттальная дуга (12.5%), внешнеглазная ширина, глубина носа, расстояние между назион и между-резцовой точкой, длина тела нижней челюсти слева, самый обхват головы и наибольшая длина головы (по 7.5%); 6 моделей преддверно-языковых размеров (R^2 = 0.527-0.646) к которым чаще всего входят глубина носа (20.0%), длина тела нижней челюсти слева (16.0%), физиологическая длина лица и морфологическая длина лица (по 12,0%); 1 модель высоты коронки (R^2 = 0.579)], а также Восточного [3 модели высоты коронок (R^2 = 0.538-0.682), к которым чаще всего входят глубина носа (15.0%), тип лица, физиологическая длина лица, морфологическая длина лица, наименьшая ширина головы и сагиттальная дуга (по 10.0%); 2 модели мезио-дистальных размеров (R^2 = 0.572 и 0.556), к которым чаще всего входит междуглазничная ширина (15.4%)] регионов Украины. Таким образом, у практически здоровых мужчин из Западного и Восточного административно-территориальных регионов Украины на основе особенностей цефалометрических показателей и типа лица разработаны достоверные регрессионные модели (с коэффициентом детерминации R^2 большим 0,5) компьютерно-томографических размеров больших коренных зубов верхней и нижней челюстей (с 40 возможных 14 для Западного и 5 для Восточного регионов Украины).

Ключевые слова: *регрессионный анализ, размеры больших коренных зубов, компьютерная томография, цефалометрия, практически здоровые мужчины, Западный и Восточный регионы Украины.*