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DETERMINATION OF NORMATIVE CEPHALOMETRIC PARAMETERS ACCORDING TO THE RICKETTS METHOD FOR UKRAINIAN YOUNG MEN AND YOUNG WOMEN WITH DIFFERENT FACE TYPES

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Annotation. Due to the fact that orthodontic treatment is primarily aimed at young people, first of all, cephalometric standards for its proper use should be obtained for this age group by conducting a study taking into account the sex and nationality of the subjects. The aim of the study was to establish the features of cephalometric parameters by the Ricketts method in Ukrainian young men and young women with orthognathic occlusion depending on the type of face and to determine the sex differences of these parameters. 49 young men and 76 young women with orthognathic occlusion in $OnyxCeph^{3TM}$, 3DPro version, Image Instruments GmbH, Germany (license $\mathbb{N} URSQ-1799$) underwent a cephalometric study using the Ricketts method. The division into facial types was performed using the Garson index. As in previous studies, cephalometric parameters were divided into three groups. The analysis of the second (characteristics of jaws by the Ricketts method) and the third (indicators by the Ricketts method that characterize the position of the teeth) groups was performed. Statistical processing of the survey results was performed in the licensed statistical package "Statistica 6.0" using non-parameteric evaluation methods. As a result of the conducted researches at young men or young women between different types of face numerous reliable and tendencies of both similar differences, and the corresponding differences of differences of cephalometric parameters according to the Ricketts method concerning the second (higher number) or third groups are established. The pronounced manifestations of sexual dimorphism of cephalometric parameters between young men and young women with the corresponding facial types are established only for the indicators of the second group. The obtained results will improve the existing methods of treatment of dental patients and minimize the likelihood of diagnostic errors and complications.

Keywords: Ricketts cephalometry, facial types, sex differences, young men and young women with orthognathic occlusion.

Introduction

Among the diseases of the dental-jaw system, the pathology of occlusion is one of the most complex and common. Orthodontic examination is especially necessary at a young age, as early diagnosis and initiation of treatment of orthodontic pathology facilitates not only treatment planning but also the achievement of successful results [19].

Thus, a survey of 532 students from different schools in the city of Chennai (India) revealed bite pathology in 337 of the subjects. The age of children ranged from 7 to 13 years [19].

An odontological examination of 721 people seeking dental care revealed anterior cross-bite in 26.7 % of them. 11.4 % of the subjects had anterior and posterior transverse occlusion. Class I skeletal pattern was found in 53.37 % of people, class II - in 17.1 % and class III - in 29.53 % of people [23].

The COVID-19 pandemic has further complicated both the detection and treatment of odontological diseases. A survey of Brazilian orthodontists (395 people took part in the survey) on the methods of their work during the pandemic showed that most of them did their work only in emergencies and emergencies, such as breakage of arcs, wire wires, and so on. Most consultations were conducted online using messengers from mobile phones [5].

Thus, orthodontics now requires more reliable methods than ever to plan the treatment of orthodontic patients. To

achieve the best results, the leading tool used by orthodontists is the cephalometric analysis of lateral radiographs. Research data confidently state that the ideal treatment result can be approximated only with the use of this instrumental method of research and analysis. However, as noted by the results of these studies - this is possible only if you take into account all the parameters that may affect the proportions, ie the final results of treatment [21].

Data from international and domestic studies suggest that such parameters are sex, age, ethnicity [9] and regional affiliation [13, 22].

Studies on the adaptation of various methods of cephalometric analysis for the population of Ukraine have already taken place [8], but during their implementation another important parameter was not taken into account, namely - the type of human face.

The aim of the study was to establish the features of cephalometric parameters according to the Ricketts method in Ukrainian young men and young women with orthognathic occlusion depending on the type of face and to determine the sex differences of these parameters.

Materials and methods

The Ricketts cephalometric study was performed on 49 young men and 76 young women with orthognathic occlusion in OnyxCeph^{3™} software, 3DPro version, Image



Fig. 1. The main cephalometric points and measurements according to the Ricketts in the second group of indicators: 1 - distance A-NPog (mm); 2 - angle ANS-Xi-Pm (°); 3 - angle NPog-POr (°); 4 angle NBa-PtG (°); 5 - angle MeGo-NPog (°); 6 - angle MeGo-POr (°); 7 - angle POr-NA (°); 8 - angle N-CF-A (°); 9 - angle POr-ANSPNS (°); 10 - distance Go-CF (mm); 11 - angle POr-CFXi (°); 12 - angle DC-Xi-Pm (°); 13 - distance Xi-Pm (mm).



Fig. 2. The main cephalometric points and measurements according to the Ricketts in the third group of indicators: 1 - distance 6u-6l(OcP) (mm); 2 - Ovrjet (mm); 3 - Overbite (mm); 4 - distance 1I-OcP (mm); 5 - distance 3u-3l(OcP) (mm); 6 - angle Max1-Mand1 (°); 7 - distance 6u-PTV (mm); 8 - distance 1I-APog (mm); 9 distance 1u-APog (mm); 10 - angle Mand1-APog (°); 11 - angle Max1-APog (°); 12 - distance Xi-OcP (mm); 13 - distance Li-NsPog' (mm); 14 - distance ANS-sto (mm); 15 - distance sto-Ocp (mm).

Instruments GmbH, Germany (license № URSQ-1799). Cephalometric points were determined by B. S. Phulari [18] and S. I. Doroshenko and E. A. Kulginsky [10].

Division of young men (5 - with a very wide face, 22 - with a wide face, 11 - with a medium face, 8 - with a narrow face) and young women (25 - with a very wide face, 25 - with a wide face, 10 - with a medium face, 12 - with a narrow face) into types of faces were performed using the Garson index [20].

All cephalometric parameters were divided into three groups [7]. The first group includes indicators that usually do not change during surgical and orthodontic treatment, used in modern cephalometric analyzes of Schwartz, Ricketts, Steiner, Roth-Jarabak, Burstone and Bjork [12].

Indicators of the upper and lower jaws belonging to the second group according to the Ricketts method are shown in Figure 1.

Indicators that characterize the position of each individual tooth relative to each other, cranial structures and facial soft tissue profile (included in the third group) according to the Ricketts method are shown in Figure 2.

Statistical processing of the study results was performed in the licensed statistical package "Statistica 6.0" using non-parametric evaluation methods. The reliability of the difference between the values between the independent quantitative values was determined using the Mann-Whitney U-test.

Results. Discussion

When comparing the value of the distance **A-NPog**, which characterizes the position/distance of the anterior contour of the upper jaw to the N-Pog line, between young women with different face types, it was found that the value of this indicator in young women with a very wide face type $(-0.560\pm2.062 \text{ mm})$ significantly (p<0.05-0.01) is smaller than in young women with wide ($1.168\pm2.697 \text{ mm}$), medium ($0.990\pm1.498 \text{ mm}$) and narrow ($1.775\pm1.630 \text{ mm}$) facial types. When comparing the value of the distance **A-NPog** between young men and young women with a very wide ($1.260\pm2.339 \text{ mm}$) face type, the value of this indicator tends (p=0.079) to higher values, and in young women with narrow face - significantly (p<0.05) greater value (in young men - $0.650\pm2.004 \text{ mm}$).

When comparing the value of the angle **ANS-Xi-PM**, which characterizes the height of the lower part of the face, between young men with different face types, it was found that the value of this indicator in representatives with a very wide face type $(38.22\pm3.04^{\circ})$ significantly (p<0.05) is smaller, and in young men with a narrow face (39.10±3.72°) significantly (p<0.05) is smaller or tends to lower values (p=0.058) than in young men with a wide face (42.76±4.95°) and average (42.28±3.33°) facial types; between young women with different face types, it was found that the value of this indicator in women with a very wide face type (40.07±2.74°) is significantly (p<0.01-0.001) lover than in

young women with a wide $(43.57\pm3.48^{\circ})$, medium $(45.55\pm4.65^{\circ})$ and narrow $(43.94\pm3.14^{\circ})$ facial types. When comparing the value of the **ANS-Xi-PM** angle between young men and young women with the appropriate facial types, it was found that young women with medium and narrow facial types, the value of this indicator is significantly (p<0.05) greater.

When comparing the value of the angle **NPog-POR**, which characterizes the horizontal position of the mandible relative to the Frankfurt plane, between young men with different face types, it was found that the value of this indicator in representatives with a very wide face type (91.62±1.26°) significantly (p<0.05) is greater than in young men with medium (88.82±2.68°) and narrow (88.69±2.17°) facial types; between young women with different face types it was found that the value of this indicator in young women with a very wide face type (89.95±2.49°) is significantly (p<0.05) greater than in young women with a wide (88.18±3.45°), medium (87.88±2.02°) and narrow (88.15±2.22°) face types.

When comparing the value of the angle NBa-PtG, which characterizes the horizontal and vertical position of the mandible relative to the N-Ba line, determines the direction of growth of the mandible retrospectively, also expresses the relationship between facial depth and height, between young men with different face types, found that in representatives with a very wide face type (99.54±3.11°) significantly (p<0.05-0.01) is greater than in young people with a wide (93.43±4.83°), medium (92.53±4.26°) and narrow (92.89±3.99°) types of face; between young women with different face types it was found that the value of this indicator in young women with a very wide face type (95.54±2.97°) is also significantly (p<0.001) greater than in young women with a wide (91.27±3.67°), medium (89.43±3.21°) and narrow (90.17±2.64°) facial types. When comparing the value of the NBa-PtG angle between young men and young women with the corresponding face types, it was found that in young men with a very wide face the value of this indicator is significantly (p<0.05) greater.

When comparing the value of the angle MeGo-NPog, which characterizes the position of the mandibular plane relative to the facial plane, between young men with different face types, it was found that the value of this indicator in representatives with a very wide face type (75.90±5.21°) significantly (p<0.05) is greater than in young men with an average face type (70.25±3.41°); between young women with different face types, it was found that the value of this indicator in women with a very wide face type (71.47±3.68°) is significantly (p<0.05) greater than in young women with medium (68.31±2.25°) and narrow (67.65±4.16°) face types, and in young women with a wide face type (70.58±3.22°) significantly larger (p<0.05) or tends to larger values (p=0.055) than in young women with medium and narrow facial types. When comparing the value of the MeGo-NPog angle between young men and young women with the appropriate face types, it was found that in young men with a narrow face (72.85±3.12°) the value of this indicator is significantly (p<0.05) greater.

When comparing the value of the angle MeGo-POr, which characterizes the angle of the mandibular plane relative to the Frankfurt plane, allows to determine the presence of skeletal deep or open bite, between young men with different face types found that the value of this indicator in very wide face type (12.50±5.32°) significantly (p<0.05) lover than in young men with wide (18.68±5.84°), medium (20.93±3.73°) and narrow (18.45±3.22°) types of faces; between young women with different face types, it was found that the value of this indicator in young women with a very wide face type (18.57±3.77°) is also significantly (p<0.05-0.001) lover than in young women with a wide (21.24±4.32°), medium (23.80±3.65°) and narrow (24.19±4.40°) facial types, and in young women with a wide face type - tends (p=0.074-0.080) to lower values than in young women with medium and narrow facial types. When comparing the value of the angle MeGo-POr between young men and young women with the appropriate face types, it was found that young women with very wide and narrow face types, the value of this indicator is significantly (p<0.05-0.01) greater.

When comparing the value of the angle **POr-NA**, which characterizes the position of the anterior contour of the upper jaw in the sagittal plane, between young men with different face types, it was found that the value of this indicator in representatives with a very wide face type $(93.06\pm3.67^{\circ})$ significantly (p<0.05) is greater than in young men with a narrow face type $(88.04\pm3.17^{\circ})$. When comparing the value of the angle **POr-NA** between young men and young women with the appropriate face types, it was found that in young men with a very wide face type the value of this indicator is significantly (p<0.05) greater (in young women 89.40±3.17^{\circ}).

When comparing the value of the angle N-CF-A, which characterizes the height of the upper jaw, between young men with different face types, it was found that the value of this indicator in representatives with a very wide face type (50.00±5.31°) is significant (p<0.05) smaller than in young men with wide (56.05±3.01°), medium (56.76±3.00°) and narrow (58.01±3.08°) facial types; between young women with different face types, it was found that the value of this indicator in women with a very wide face type (55.42±2.92°) is significantly (p<0.05-0.001) lover than in young women with average (58.70±3.85°) and narrow (59.69±3.33°) face types, and in young women with a narrow face type significantly (p<0.05) greater than in young women with a wide face type (56.81±3.29°). When comparing the value of the angle **N-CF-A** between young men and young women with the appropriate face types, it was found that young women with a very wide face type, the value of this indicator is significantly (p<0.05) greater.

When comparing the value of the angle **POr-ANSPNS**, which characterizes the inclination of the upper jaw relative to the Frankfurt plane, between young women with different face types, it was found that the value of this indicator in young women with a narrow face type $(1.692\pm2.499^{\circ})$ is significant (p<0.05-0.01) larger than in young women with very wide (-0.704±2.383°) and wide (-1.008±3.312°) facial types and tends to be larger (p=0.070) than in young women with a medium face (-1.000±3.635°).

When comparing the value of the distance **Go-CF**, which characterizes the posterior height of the face, between young men with different face types, it was found that the value of this indicator in representatives with a narrow face (71.69 \pm 3.55 mm) tends to higher values (p=0.079) than in young men with a wide face (68.70 \pm 4.33 mm). When comparing the value of the distance **Go-CF** between young men and young women with the appropriate face types, it was found that young men with very wide (71.54 \pm 5.38 mm), wide, medium (68.75 \pm 5.19 mm) and narrow types facial value of this indicator is significantly (p<0.05-0.001) greater (respectively, young women 63.91 \pm 8.21 mm, 64.12 \pm 7.70 mm, 62.44 \pm 4.08 mm and 62.67 \pm 3.67 mm).

When comparing the value of the angle **PO-CFXi**, which characterizes the position of the branch of the mandible, between young men with different face types, it was found that the value of this indicator in representatives with a very wide face type ($76.52\pm2.53^{\circ}$) is significant (p<0.05) greater than in young men with an average face ($73.82\pm2.47^{\circ}$).

When comparing the value of the angle **DC-Xi-PM**, which characterizes the angle formed by the longitudinal axes of the body and the condylar process of the mandible, between young women with different face types, it was found that the value of this indicator in young women with a very wide face type $(40.22\pm5.87^{\circ})$ is significantly (p<0.05) higher than in young women with a narrow face $(34.88\pm5.18^{\circ})$ and tends to higher values (p=0.058) than in young women with a medium face $(36.07\pm4.42^{\circ})$. When comparing the value of the angle **DC-Xi-PM** between young men and young women with the appropriate face types, it was found that young men with a narrow face type $(41.54\pm3.03^{\circ})$ the value of this indicator is significantly (p<0.01) greater.

When comparing the value of the distance **Xi-PM**, which characterizes the length of the body of the mandible, between young men and young women with appropriate facial types, it was found that young men with very wide $(73.02\pm4.50 \text{ mm})$, wide $(71.46\pm3, 86 \text{ mm})$, medium $(70.23\pm3.73 \text{ mm})$ and narrow $(69.65\pm4.54 \text{ mm})$ face types, the value of this indicator is significantly (p<0.01-0.001) greater, or tends to greater value (p=0.054) (respectively, young women $67.70\pm7.26 \text{ mm}$, $65.90\pm5.34 \text{ mm}$, $64.33\pm3.35 \text{ mm}$ and $65.70\pm3.37 \text{ mm}$).

When comparing the value of the distance **6u-6l(OcP)**, which characterizes the position of the first molars relative to each other along the closing plane, between young women with different face types found that the value of this indicator in young women with a very wide face type (- 2.164 ± 2.306 mm) is significantly (p<0.05) smaller than in young women with wide (- 1.232 ± 0.965 mm) and medium (- 0.900 ± 1.055 mm) facial types. When comparing the value of the distance **6u-6l(OcP)** between young men and young women with appropriate facial types, it was found that in young women with average facial type the value of this indicator is significantly (p<0.05) greater (in young men - 2.009 ± 0.926 mm).

When comparing the value of the angle **Max1-Mand1**, which characterizes the slope of the upper and lower medial incisors relative to each other, between young men with different face types, it was found that the value of this indicator in representatives with a narrow face type $(137.3\pm5.5^{\circ})$ reliably (p<0.05) is greater than in young men with a wide face $(131.0\pm6.1^{\circ})$.

When comparing the value of the distance 6u-PTV, which characterizes the position of the upper first molar in the sagittal plane, between young men with different face types found that the value of this indicator in representatives with a very wide face (23.04±4.04 mm) significantly higher (p<0.05) and tends to higher values (p=0.062) than in young men with narrow (18.25±2.00 mm) and medium (19.05±2.68 mm) facial types; among young women with different face types, it was found that the value of this indicator in young women with a very wide face type (18.72±3.75 mm) tends to higher values (p=0.080) than in young women with a narrow face (15.99±4.02 mm). When comparing the value of the distance 6u-PTV between young men and young women with the appropriate face types, it was found that young men with very wide, wide (20.09±4.29 mm) and medium face types, the value of this indicator is significant (p<0.05) greater, or tends to larger values (p=0.067) (in young women with a wide face 17.22±3.69 mm, in young women with a medium face 16.92±3.53 mm).

When comparing the distance **1I-APog**, which characterizes the position of the cutting edge of the medial incisors of the mandible in the sagittal plane relative to the line A-Pog, between young men with different face types found that the value of this indicator in representatives with a wide face (1.768±1.371 mm) is significantly greater (p<0.05) than in young men with a narrow face (0.425±1.441 mm).

When comparing the distance **1u-APog**, which characterizes the position of the cutting edge of the medial incisors of the upper jaw in the sagittal plane relative to the line A-Pog, between young men with different face types found that the value of this indicator in representatives with a wide face (4.641±1.491 mm) significantly greater (p<0.05) than in young men with a narrow face (3.050±1.310 mm).

When comparing the value of the angle **Max1-APog**, which characterizes the slope of the upper medial incisor to the A-Pog line, between young men with different face types, it was found that the value of this indicator in representatives with a wide face type $(23.92\pm3.26^{\circ})$ reliably (p<0.05) is larger and tends to greater values (p=0.079) than in young men with narrow $(18.78\pm2.90^{\circ})$ average $(19.97\pm6.45^{\circ})$ facial types, in young men with a very wide face type $(24.00\pm6.70^{\circ})$ - tends to be higher (p=0.079) than in young men with a narrow face. When comparing the value of the **Max1-APog** angle between young men and young women with the corresponding face types, it was found that in young women with a narrow face $(23.16\pm5.52^{\circ})$ the value of this indicator tends to higher values (p=0.076).

When comparing the value of the distance **Xi-OcP**, which characterizes the position of the closing plane relative to the point Xi, between young women with different face types, it was found that the value of this indicator in young women with a narrow face (-0.458 ± 1.866 mm) is significantly smaller (p<0.05-0.01) than in young women with very wide (0.860 ± 2.840 mm), wide (1.152 ± 3.335 mm) and medium (3.320 ± 2.632 mm) facial types.

When comparing the value of the distance **Li-NsPog'**, which characterizes the position of the lower lip in the sagittal plane relative to the line Ns-Pog', between young women with different face types found that the value of this indicator in young women with a very wide face (- 4.312 ± 3.047 mm) tends to lower values (p=0.052-0.077) than in young women with narrow (- 2.258 ± 1.793 mm) and medium (- 2.300 ± 1.782 mm) facial types.

When comparing the value of the distance ANS-sto, which characterizes the height/length of the upper lip, between young men with different types of faces, it was found that the value of this indicator in representatives with a wide face (26.09±2.43 mm) is significantly greater (p<0.05) and tends to have higher values (p=0.079) than in young men with very wide (23.85±1.10 mm) and narrow (24.70±1.71 mm) facial types; between young women with different face types it was found that the value of this indicator in young women with a wide face type (24.96±2.69 mm) is significantly higher (p<0.05) than in young women with a very wide face (23.33±2.56 mm). When comparing the value of the ANS-sto distance between young men and young women with the corresponding face types, it was found that in young men with a wide face the value of this indicator is significantly (p<0.05) greater.

When comparing the value of the distance **sto-OcP**, which characterizes the position of the closing plane relative to the point of closing the lips, between young men with different face types found that the value of this indicator in representatives with a very wide face (-0.600±0.876 mm) is significantly greater (p<0.05) than in young men with an average face (-2.800±1.561 mm); among young women with different face types, it was found that the value of this indicator in young women with a medium face (-4.220±1.297 mm) is significantly lower (p<0.01) and tends to lower values (p=0.070) than in young women with very wide (-2.720±1.647 mm), wide (-2.300±1.673 mm) and narrow (-2.833±1.533 mm) facial types. When comparing the value of the **sto-OcP** distance between young men and young women with the appropriate facial types, it was found that in young men with very wide and medium facial types, the value of this indicator is significantly (p<0.05-0.01) greater.

When comparing the distance **Ovrjet** (characterizes the position of the medial incisors of the upper and lower jaws relative to each other, along the closing plane), **Overbite**

(characterizes the position of the medial incisors of the upper and lower jaws relative to each other, along the vertical plane), **1I-OcP** medial incisors of the mandible relative to the closing plane), **3u-3I (OcP)** (characterizes the position of the canines of the upper and lower jaws relative to each other in the sagittal plane) and the angle **Mand1-APog** (characterizes the inclination of the inferior medial incisor to the A-Pog line) between young men or/and young women no significant or trend differences were found.

Thus, when comparing the cephalometric parameters by the Ricketts method, belonging to the second group, between young men or young women with orthognathic occlusion with different facial types found both similar differences and corresponding differences: both young men and young women with a very wide face - larger (p<0.05-0.001) values of NBa-PtG and MeGo-POr angles than in representatives with other types of faces; greater (p<0.05) values of the angle NPog-POR than in representatives with medium and narrow face types; smaller (p<0.05-0.001) values of the angle ANS-Xi-PM than in representatives with wide and medium facial types; smaller (p<0.05-0.001) values of the angle N-CF-A than in the representatives with medium and narrow face types and smaller (p<0.05) values of the angle MeGo-NPog than in the representatives with the average face; only in young men with a very wide face - greater (p<0.05) values of the angle POr-CFXi than in representatives with a medium face and smaller (p<0.05) values of the angle N-CF-A than in representatives with a wide face; only in young men with a narrow face - smaller (p<0.05, p=0.058) values of the angle ANS-Xi-PM than in representatives with wide and medium face types; smaller (p<0.05) values of the angle POr-NA than in representatives with a very wide face and larger (p=0.079) values of the distance Go-CF than in representatives with a wide face; only in young women with a very wide face - smaller (p<0.05-0.01) values of the distance A-NPog than in young women with other types of faces; greater (p<0.05) value of the angle NPog-POr than in young women with a wide face and higher (p<0.05, p =0.058) value of the angle DC-Xi-PM than in young women with medium and narrow face types; only in young women with a wide face - lover (p=0.074, p=0.080) the value of the angle MeGo-POr and higher (p<0.05, p=0.055) the value of the angle **MeGo-NPog** than in young women with medium and narrow face types; lover (p<0.05) value of the angle N-CF-A than in representatives with a narrow face; only in young women with a narrow face - higher (p<0.05-0.01, p=0.070) the value of the angle **POR-ANSPNS** than in young women with other facial types and lover (p<0.05) the value of the angle MeGo-NPog, than at representatives with a wide face.

When comparing cephalometric parameters by the Ricketts method, belonging to the *third group*, between young men or young women with orthognathic occlusion with different face types also found both similar differences and corresponding differences: *both young men and young*

women with a very wide face have higher (p<0.05-0.01, p=0.080) values of distances 6u-PTV than in representatives with a narrow face and sto-OcP than in representatives with a medium face; both young men and young women with a wide face have a greater (p<0.05) value of the ANS-sto distance than those with a very wide face; only in young men with very wide and wide facial types greater (p<0.01, p=0.079) values of the angle Max1-APog than in those with medium and narrow facial types; only young men with a very wide face have larger (p=0.062) values of the 6u-PTV distance than those with a medium face; only in young men with a wide face greater (p<0.05, p=0.079) values of distances 1I-APog, 1u-APog and ANSsto and lover (p<0.05) values of the angle Max1-Mand1 than in representatives with narrow face; only young women with a very wide face have smaller (p<0.05) values of the distance **6u-6l(OcP)** than young women with a wide and medium type of face and smaller (p=0.052, p=0.077) values of the distance Li-NsPog', than in young women with medium and narrow facial types; only young women with an average face have higher (p<0.05-0.01) Xi-OcP distance than young women with other facial types and lover (p<0.01, p=0.070) sto-OcP distance, than in young women with wide and narrow facial types.

As a result of the conducted researches the expressed displays of sexual dimorphism of cephalometric parameters by the Ricketts method, only in for parameters of the upper and lower jaws (the second group) are established. Thus, young men have significantly higher, or tendencies to greater values than young women of the corresponding face types: for all face types - the distances of Go-CF and Xi-PM; with a very wide face - distances A-NPog and angles NBa-PtG and POR-NA; with a narrow face - angles MeGo-NPog and DC-Xi-PM; and in young women - with a very wide face - corners MeGo-POr and N-CF-A; with the average face - ANS-Xi-PM angle; with a narrow face - the distances of A-NPog and angles ANS-Xi-PM and MeGo-POr than in young men with the appropriate face types. For indicators that characterize the position of each tooth relative to each other, cranial structures and soft tissue profile of the face (third group) according to the Ricketts method in young men only significantly higher, or tendencies to greater values than in young women of the corresponding face types: distances 6u-PTV in representatives with very wide, wide and medium face types; ANS-sto distances in representatives with a wide face; sto-OcP distances in representatives with very wide and narrow face types; and in young women, the distances 6u-6l (OCP) in women with a medium face and the angle Max1-APog in young women with a narrow face than in young men with the appropriate face types.

Domestic scientists have conducted a number of studies related to the topic of our study. Thus, A. V. Chernysh [4] built regression models of individual cephalometric parameters used in the Ricketts method, but without taking into account the types of faces of the subjects. The author built reliable models for such indicators as distances Go-CF, Xi-Pm, 6u-6l, Overjet, Overbite, 6u-PTV, 1I-APog, 1u-APog, Xi-OcP, 1u-APog and Xi-OcP and values angle Max1-APog.

Regression models of individual teleradiographic indicators by the Ricketts method for Ukrainian youth with different facial types have been created. For young men, the models are built for such indicators as Ar-Go distance, POr-NBa angle, NS and SE distances and NS: S-Ar 'ratio, N-CF-A angle, Ar-Go distance, N-CC and A-NPog, angle ANS-Xi-Pm, POr-ANSPNS and DC-Xi-Pm; for young women, the models are built for indicators: distance Xi-Pm, P-PTV, angles MeGo-NPog and POr-CFXi, distance Ar-Go, angle POr-NBa and the ratio S-ar:ar-Go, distances A-NPog and Xi -Pm and the angle NBa-PtG [11].

Among the works where the shape of the face was taken into account, the study of A. V. Marchenko with coauthors is noteworthy [16], where to build the correct shape of dental arches, depending on odontometric and cephalometric indicators, 18 reliable size models with coefficient from 0.645 to 0.944 were developed. Among the odontometric indicators, the models most often included the distance from the middle of the cutting edge to the tip of the tooth root in the vestibulo-oral direction, the width of the tooth crowns in the mesio-distal and vestibulo-oral directions.

S. B. Assi et al. [1] evaluated the inclination of the incisors of the upper jaw, growth axis and facial axis in different types of face (according to the divergence of the lower jaw). In all groups of subjects, the indicators differed were FA/ nasion-basion (NBa) and GA/NBa (p<0.001).

It should be understood that the type of face and structure of the human skull significantly affects the work of the dental-jaw apparatus [6, 15]. The greatest force of a bite is observed at brachiocephalic persons. Moreover, it does not depend on age or body mass index of the person (p=0.3360 and p=0.7538, respectively) [2]. In addition, it was found that a greater inclination of the incisors is observed in persons of dolichocephalic type than brachiocephalic. At the same time, no statistically significant difference in the inclination of the incisors between dolichocephalus and mesocephalus was found [14].

The use of the Ricketts analysis method has a positive effect on the results of odontological treatment. It was found that when used for the treatment of occlusion pathology of class II by reducing the angle of the mandible and limiting the anterior displacement of the upper jaw, there is a significant improvement in the patient's profile [3].

Peculiarities of Ricketts cephalometric parameters for Nepal residents with class III occlusion pathology have been determined. Compared to class II patients, such individuals had significantly lower baseline N-S-Ar values (p<0.05). Also, persons of class III have a much shorter length of the upper jaw (p<0.01) [17].

Determination of normative cephalometric parameters by the Ricketts method for Ukrainian youth with different

facial types, achieved as a result of this study allows to improve the results of the orthodontist when working with this method of cephalometric analysis and confirms the prospects for further work in this area.

Conclusions and prospects for further development

1. Numerous reliable and tendencies of both similar differences and corresponding discrepancies of differences of cephalometric parameters according to the Ricketts method concerning the second (metric dental-jaw characteristics by which surgical methods can change the length, width, angles and positions of the upper and lower jaws) or the third (indicators that characterize the position

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of each individual tooth relative to each other, cranial structures and the profile of the soft tissues of the face) groups found between different types of faces in young men or young women with orthognathic occlusion.

2. Pronounced manifestations of sexual dimorphism of cephalometric parameters by the Ricketts method between young men and young women with appropriate facial types are established only for indicators belonging to the second group.

In further studies, it is planned to evaluate the features and sex differences of cephalometric parameters by the Steiner method in young men and young women with orthognathic occlusion depending on the type of face.

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ВИЗНАЧЕННЯ НОРМАТИВНИХ ЦЕФАЛОМЕТРИЧНИХ ПАРАМЕТРІВ ЗА МЕТОДОМ RICKETTS ДЛЯ УКРАЇНСЬКИХ ЮНАКІВ І ДІВЧАТ ІЗ РІЗНИМИ ТИПАМИ ОБЛИЧЧЯ

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Анотація. У зв'язку з тим, що ортодонтичне лікування в першу чергу направлене на осіб молодого віку, першочергово, цефалометричні норми для належного його застосування мають бути отримані для даної вікової категорії шляхом проведення дослідження з урахуванням окрім цього статі і національної належності обстежуваних. Мета дослідження - встановити особливості цефалометричних параметрів за методом Ricketts в українських юнаків і дівчат із ортогнатичним прикусом залежно від типу обличчя та визначити статеві розбіжності даних параметрів. 49 юнакам і 76 дівчатам із ортогнатичним прикусом у програмному забезпеченні ОпухСерh^{3 тм}, версії 3DPro, компанії Image Instruments GmbH, Німеччина (ліцензія № URSQ-1799) проведено цефалометричне дослідження за методикою Ricketts. Розподіл на типи обличчя проводили за допомогою індексу Гарсона. Як і в попередніх дослідженнях, цефалометричні показники були розділені на три групи. Проведено аналіз другої (характеристики щелеп за методом Ricketts) та третьої (показники за методом Ricketts, які характеризують положення зубів) груп. Статистична обробка результатів дослідження проведена в ліцензійному статистичному пакеті "Statistica 6,0" з використанням непараметричних методів оцінки. У результаті проведених досліджень у юнаків або дівчат між різними типами обличчя встановлені багаточисельні достовірні та тенденції як подібних відмінностей, так і відповідних розбіжностей відмінностей цефалометричних параметрів за методом Ricketts, що відносяться до другої (більша кількість) або третьої груп. Виражені прояви статевого диморфізму цефалометричних параметрів між юнаками та дівчатами з відповідними типами обличчя встановлені лише для показників другої групи. Отримані результати дозволять удосконалити існуючі методи лікування стоматологічних пацієнтів і мінімізувати ймовірність виникнення діагностичних помилок і ускладнень.

Ключові слова: цефалометрія за методом Ricketts, типи обличчя, статеві розбіжності, юнаки та дівчата з ортогнатичним прикусом.