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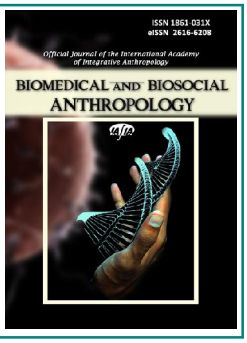

Features of t teleroentgenographic parameters of the upper and lower jaws in Ukrainian young men and young women with orthognathic occlusion and with different types and profiles of the face according to Schwarz A. M.

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Numerous studies have shown that teleroentgenographic indicators differ in people of different races, ethnicities, different populations, inhabitants of different geographical areas and often differ from the values of such indicators described by the authors of classical methods of cephalometric analysis. The aim of the study was to establish teleroentgenographic parameters that can be most often corrected during orthodontic and surgical interventions and to determine their features in Ukrainian young men and young women with orthognathic occlusion depending on profiles and facial types according to Schwarz A. M. The results of studies of lateral teleroentgenogram of the head of 49 young men aged 17 to 21 years and 76 young women aged 16 to 20 years with a physiological bite as close as possible to orthognathic using dental cone-beam tomography Veraviewepocs 3D Morita (Japan) are presented in this work. The morphometric teleroentgenographic parameters of the upper and lower jaws and inter-jaw parameters, which can most often change during surgical, orthodontic, cosmetic interventions in groups of persons with different profiles or types of faces according to Schwarz A. M., were determined. All significant differences between groups of young men with different facial profiles and between groups of young women with different facial profiles are of the same type: in both young men and young women with the first type of face profile - angle B is greater than in representatives with the third profile type, and angle MM is greater than in representatives with the third and second profile types; both in young men and young women with a second face type profile - distance R.asc. larger than the representatives with the first profile type; in both young men and young women with the third face profile type, the angle F is larger than in the representatives with the first profile type, the angle I is larger than in the representatives with the first and second profiles type, and the distances L-Mand and R.asc. larger than the representatives with the first profile type; the angle T have greater values in young men or young women with the first profile type of the face than with the second and third profiles type and have greater values in the representatives with the second profile type than with the first type profile of the face. Another picture is observed in the analysis of indicators in young men and young women with different face types. Thus, in persons with the third type of face the distance Max is greater than in persons with the first type and with the second type of face; the angle F in young men or young women with the third type of face is greater than in representatives with the second and first types, and in representatives with the second type - greater than in young men or young women with the first type of face. Young men with the first type of face have higher values of angles G, B and T than young men with the third type and angle B than young men with the second type of face; in young men with the second type of face - greater values of angle I than in young men with the first type and angle B than in young men with the third type of face; young men with the third type of face have larger values of angle I and distance R.asc. than young men with the first type of face. In young women, only tendencies to

higher values of I and T angles were recorded in persons with the third type of face than with the first type. The obtained results indicate the need to divide young men and young women into separate groups according to the profile and type of person for an individualized approach to the definition and analysis of teleroentgenographic indicators in the population of Ukraine.

Keywords: *young men, young women, orthognathic occlusion, lateral head teleroentgenography, cephalometric parameters, types and profiles of the face according to Schwarz A. M.*

Introduction

X-ray cephalometric analysis using lateral teleroentgenography plays a leading role in understanding the anatomy of the human dental system, establishing its individual anatomical features [27] and is one of the most informative methods of diagnosing and clarifying congenital or acquired pathological anomalies of the dental system, determining the various clinical forms of such anomalies [20].

Numerous author's methods of cephalometric radiological researches and the analysis of the received radiographs offered in the last century remain actual, both for practical use, and for scientific researches. However, further research has shown that teleroentgenographic indicators have their own characteristics, differences in people of different races [1, 12, 16, 19, 24], ethnic groups [18, 23, 30], different populations [11, 21], residents of different geographical areas [22, 25], different countries [10, 15, 17] and often differ from the values of such indicators described by the authors of the methods.

This necessitates the determination of teleroentgenographic indicators typical for the inhabitants of Ukraine. In recent years, research has been conducted in this direction and cephalometric parameters for Ukrainian adolescents have been determined and analyzed by the methods of Steiner C. C. [3], Schmuth G. [4], McNamara J. [14], Downs [5], Tweed [13]. According to the research of Chernysh A. V. et al., Dmitriev M. O. et al., not only cephalometric parameters in Ukrainian young men and young women were determined by the methods of Ricketts R. M., Harvold E. P. and Burstone C. J., but also differences in these indicators compared to the author's methods of cephalometric analysis [2, 6, 7].

All this became the basis for us to choose the direction of research and determine a specific method of cephalometric research to provide an even more individualized approach to the establishment and analysis of teleroentgenographic indicators in young Ukrainians.

The aim of the work is to establish teleroentgenographic indicators, which can most often be corrected during orthodontic and surgical interventions and to determine their features in Ukrainian young men and young women with orthognathic occlusion depending on profiles and face types according to Schwarz A. M.

Materials and methods

Lateral teleroentgenograms of the head were obtained in 49 young men aged 17 to 21 years and 76 young women aged 16 to 20 years with a physiological occlusion as close as possible to orthognathic (hereinafter orthognathic occlusion) using a dental cone-beam tomograph Veraviewepocs 3D Morita (Japan). Part of the primary teleroentgenographic indicators was obtained from the database of lateral teleroentgenograms of the research center of National Pirogov Memorial Medical University, Vinnytsya. Young men and young women were divided into separate groups with different profiles and different types of faces according to the recommendations of Schwarz A. M. [29] (Table 1).

The analysis of teleroentgenographic parameters was performed using licensed medical software for the diagnosis and treatment of dental patients. Measurements were performed according to the recommendations of Schwarz A. M. [28, 29]. Cephalometric points were determined according to the recommendations of Phulari B. S. [26] and Doroshenko S. I. and Kulginsky E. A. [9].

Cephalometric points were determined for measurements: A (subspinale) - the most posterior point of the anterior contour of the upper jaw; Ar (articulare) - the intersection of the anterior surface of the main part of the occipital bone with the posterior surface of the neck of the mandible; ANS (spina nazalis anterior) - the top of the anterior nasal bone; forms the anterior point of the palatal plane (SpP); apMax - projection of point A on the line ANS-PNS (palatal plane SpP); PNS (spina nazalis posterior) - posterior nasal spine (posterior point of the palatal plane SpP); Pn (nasal perpendicular) - perpendicular line from the point N' (skin nasion) to the line Se-N; Pog (pogonion) - the most anterior point of the chin protrusion, also determined by the tangent dropped from point N; Go (gonion) - the posterior point on the lower contour of the body of the lower jaw; MT2 - point of contact of the tangent line (Mt2 according to Schwarz) to the branch of the mandible ramus

Table 1. Quantitative distribution of young men and young women groups with different profiles and face types.

Research groups	By Schwarz A. M.	Young women	Young men
1 face profile	back face profile	37	23
2 face profile	straight face profile	15	9
3 face profile	front face profile	24	17
1 face type	back face type	23	13
2 face type	average face type	24	18
3 face type	front face type	29	18

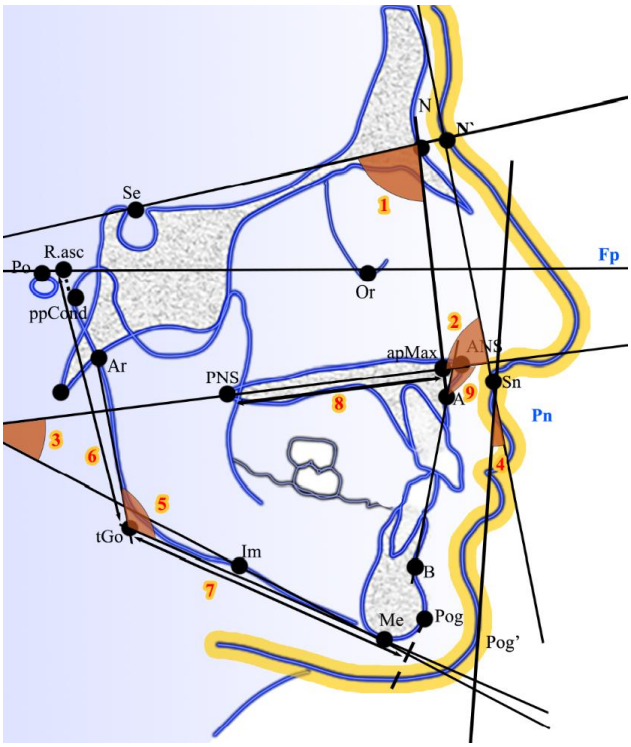

Fig. 1. Morphometric teleroentgenographic parameters of the upper and lower jaws, which most often change during surgery and orthodontic interventions. 1 - front angle F; 2 - inclination angle I; 3 - basal angle B; 4 - profile angle T; 5 - gonial angle G; 6 - distance R.asc.; 7 - distance L_Mand; 8 - distance Max; 9 - angle MM.

from the point ppCond; N (nasion) - the most anterior point of the fronto-nasal suture (connection of the frontal bone and nasal bone in the mid-sagittal plane); tGoS (gonion according to Schwarz) - projection point of the angle of the mandible, which is formed at the intersection of the lines ppCond-MT2 (line Mt2) and Me-T2; R.asc - constructive point, which is formed at the intersection of lines ppCond-MT2 and Po-Or; Po (porion) - is located on the upper edge of the external auditory canal; Se (sellia turcica entru) - a constructive point in the middle of the distance between the posterior and anterior inclined processes of the cuneiform bone; Or (orbitale) - the lowest part of the infraorbital margin, located on the orbital margin of the chin bone.

In this study, the indicators of the upper and lower jaws were determined by Schwarz A. M., which can most often change during orthodontic, surgical, cosmetic interventions, etc. (Fig. 1): distance Max - length of the upper jaw, distance from the design point apMax to the PNS point; angle F - facial angle, formed by lines Se-N and N-A and determines the location of the anterior contour of the upper jaw in the sagittal plane to the base of the skull; angle I - inclination angle, determines the angle of inclination of the upper jaw (spinal plane) to the nasal perpendicular, the angle formed by the line ANS-PNS and Pn (nasal perpendicular, perpendicular line from the point N' to the line Se-N; distance (L_Mand length) - length of the mandible, the distance from the projection of the point Pog on the line tGo-Me to the point tGo, angle G - gonial angle, the angle of the mandible, formed by lines ppCond-MT2 and T2-Me, which intersect at the point tGoS, distance R.asc. - length of the mandibular branch, distance from the structural point R.asc to the structural point tGoS, angle B - basal angle, indicating the angle between the upper and lower jaws, formed by the lines ANS-PNS (palatal plane SpP) and Im-Me (mandibular plane MPS according to Schwarz); angle MM - maxillary-mandibular angle, determines the angle at which the upper jaw is located relative to the lower jaw in the sagittal plane, formed by lines A-B and ANS-PNS, angle T - profile angle T, formed by lines Sn-Pog' and Pn (nose perpendicular).

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

Results

The limits of the percentile range of the distance Max for groups of young men and young women with different profiles and with different types of faces are established: young men - the first profile (47-50) mm, the second profile (47-50) mm, the third profile (48-53) mm; the first type (46-50) mm, the second type (46-50) mm, the third type (48-53) mm; young women - the first profile (44-47) mm, the second profile (45-47) mm, the third profile (44.5-48) mm; the first type (44-46) mm, the second type (44-46) mm, the third type (46-48) mm.

When comparing the distance Max between young men of different facial profiles or between young women of different facial profiles, no significant differences or tendencies to differences were found. On the other hand, both young men with the third type of face and young women with the third type of face have significantly higher values of this indicator, compared with young men or young women with the first type of face and compared with young men or young women with the second type of face (Table 2).

The limits of the percentile range of the values of the angle F in the groups of young men: the first profile (83-86)°, the second profile (84-88)°, the third profile (86-90)°; first type (81-83)°, second type (84-86)°, third type (88-90)° and in groups of young women: first profile (82-87)°, second profile (83-88)°, third profile (84-90)°; the first type (79-83)°, the second type (84-85)°, the third type (87-90)° face.

The values of the angle F in both young men and young women with the third facial profile are significantly higher than in the groups of young men or young women with the first facial profile. The angle F in both young men and young women with the third type of face is significantly greater than in members of the opposite sex with the first type and the second type of face, and in young men or young women

Table 2. Teleroentgenographic morphometric parameters of the maxilla Max, F and I in young men and young women with different profiles or with different face types.

Groups	Young men			Young women		
	(M±s)	p		(M±s)	p	
Max (mm)						
Profile 1	48.00±2.71	p_{1-2}	>0.05	45.73±4.27	p_{1-2}	>0.05
Profile 2	49.11±2.67	p_{1-3}	>0.05	46.20±2.27	p_{1-3}	>0.05
Profile 3	52.12±10.53	p_{2-3}	>0.05	46.29±4.07	p_{2-3}	>0.05
Type 1	47.38±2.53	p_{1-2}	>0.05	44.61±2.37	p_{1-2}	>0.05
Type 2	49.94±10.31	p_{1-3}	**<0.01**	45.75±5.08	p_{1-3}	**<0.001**
Type 3	50.94±3.26	p_{2-3}	**<0.05**	47.31±3.30	p_{2-3}	**<0.01**
F (°)						
Profile 1	84.43±2.89	p_{1-2}	>0.05	84.38±3.38	p_{1-2}	>0.05
Profile 2	86.11±3.55	p_{1-3}	**<0.01**	85.53±3.18	p_{1-3}	**<0.05**
Profile 3	87.59±3.37	p_{2-3}	>0.05	86.88±4.61	p_{2-3}	>0.05
Type 1	81.77±1.42	p_{1-2}	**<0.001**	81.17±1.99	p_{1-2}	**<0.001**
Type 2	85.11±0.90	p_{1-3}	**<0.001**	84.88±0.74	p_{1-3}	**<0.001**
Type 3	89.50±1.89	p_{2-3}	**<0.001**	89.17±2.69	p_{2-3}	**<0.001**
I (°)						
Profile 1	84.52±2.11	p_{1-2}	>0.05	84.86±3.81	p_{1-2}	>0.05
Profile 2	84.89±2.98	p_{1-3}	**<0.001**	85.67±1.23	p_{1-3}	**<0.001**
Profile 3	87.65±2.78	p_{2-3}	**<0.05**	88.88±3.03	p_{2-3}	**<0.001**
Type 1	83.77±1.96	p_{1-2}	**<0.01**	84.74±4.18	p_{1-2}	>0.05
Type 2	86.00±2.22	p_{1-3}	**<0.01**	86.83±2.58	p_{1-3}	**=0.068**
Type 3	86.72±3.39	p_{2-3}	>0.05	87.07±3.67	p_{2-3}	>0.05

Note: here and in the following tables, p_{1-2}, p_{1-3}, p_{2-3} - the significance of differences in the relevant indicators between young men or young women with different profiles or face types.

with the second type of face - significantly greater than in young men, or in young women with the first type (see Table 2).

The limits of the percentile range of the values of angle I in the groups of young men: the first profile (83-86)°, the second profile (83-87)°, the third profile (86-89)°; first type (83-85)°, second type (84-88)°, third type (85-89)° and in groups of young women: first profile (82-88)°, second profile (85-87)°, third profile (87-90)°; the first type (82-87)°, the second type (85-89)°, the third type (85-90)° face.

Angle I in both young men and young women with the third facial profile is significantly greater than in young men or young women with the first facial profile and than in young men or young women with the second profile. This figure is significantly higher in young men with the third type of face than in young men with the first type of face, and in young men with the first type of face - significantly higher than in young men with the second type. In contrast, young women showed only a tendency to a greater value of angle I in persons with the third type of face than with the first type (see Table 2).

The limits of the percentile range of the values of the distance L-Mand in groups of young men: the first profile (73-78) mm, the second profile (76-84) mm, the third profile (78-86) mm; first type (74-81) mm, second type (72-83) mm, third type (78-83) mm and in groups of young women: first profile (69-74) mm, second profile (71-75) mm, third profile (71-78.5) mm; the first type (72-75) mm, the second type (70.5-75) mm, the third type (69-76) mm of the face.

The L-Mand distances for both young men and young women with the third facial profile are significantly greater than for young men or young women with the first facial profile. When comparing this indicator between groups of young men or young women with different face types, only its value was recorded higher in young men with the third type of face than in young men with the first type of face (Table 3).

The limits of the percentile range of the values of the distance R.asc. in groups of young men: the first profile (60-66) mm, the second profile (66-69) mm, the third profile (65-72) mm; first type (58-66) mm, second type (62-69) mm, third type (65-72) mm and in groups of young women: first profile (55-61) mm, second profile (56-65) mm, third profile (58-63.5) mm; the first type (55-64) mm, the second type (56-61.5) mm, the third type (57-62) mm of the face.

Distance R.asc. both in young men and young women

Table 3. Teleroentgenographic morphometric parameters of the mandible L-Mand, R.asc. and G indicators in young men and young women with different profiles, or with different face types.

Groups	Young men			Young women		
	(M±s)	p		(M±s)	p	
Length of Mandible (L-Mand) (mm)						
Profile 1	75.61±3.99	p_{1-2}	>0.05	72.70±7.75	p_{1-2}	>0.05
Profile 2	79.78±5.72	p_{1-3}	**<0.01**	73.33±2.82	p_{1-3}	**<0.05**
Profile 3	84.71±17.05	p_{2-3}	>0.05	75.71±7.28	p_{2-3}	>0.05
Type 1	77.23±4.34	p_{1-2}	>0.05	73.57±3.29	p_{1-2}	>0.05
Type 2	80.67±17.77	p_{1-3}	**=0.089**	73.92±9.37	p_{1-3}	>0.05
Type 3	80.06±4.72	p_{2-3}	>0,05	73.83±6.99	p_{2-3}	>0.05
R.asc. (mm)						
Profile 1	63.57±4.55	p_{1-2}	**<0.05**	58.95±6.98	p_{1-2}	**<0.05**
Profile 2	67.44±3.54	p_{1-3}	**<0.01**	61.00±4.47	p_{1-3}	**<0.05**
Profile 3	71.53±15.55	p_{2-3}	>0.05	61.71±7.09	p_{2-3}	>0.05
Type 1	62.77±4.66	p_{1-2}	>0.05	59.52±4.19	p_{1-2}	>0.05
Type 2	68.89±15.54	p_{1-3}	**<0.05**	59.88±8.11	p_{1-3}	>0.05
Type 3	68.28±4.56	p_{2-3}	>0.05	61.07±7.01	p_{2-3}	>0.05
G (°)						
Profile 1	120.7±6.6	p_{1-2}	>0.05	121.7±6.2	p_{1-2}	>0.05
Profile 2	118.1±5.6	p_{1-3}	**=0.063**	120.9±6.0	p_{1-3}	>0.05
Profile 3	117.6±4.5	p_{2-3}	>0.05	119.5±7.3	p_{2-3}	>0.05
Type 1	121.7±5.1	p_{1-2}	>0.05	120.1±6.7	p_{1-2}	>0.05
Type 2	119.4±7.3	p_{1-3}	**<0.05**	122.1±6.7	p_{1-3}	>0.05
Type 3	117.1±4.0	p_{2-3}	>0.05	120.3±6.3	p_{2-3}	>0.05

Table 4. Teleroentgenographic morphometric inter-jaw indices B, MM and T in young men and young women with different profiles or with different face types.

Groups	Young men			Young women		
	(M±s)	p		(M±s)	p	
B (°)						
Profile 1	22.57±5.67	p_{1-2}	>0.05	23.38±7.08	p_{1-2}	>0.05
Profile 2	19.44±5.05	p_{1-3}	**<0.01**	21.93±4.83	p_{1-3}	**<0.05**
Profile 3	17.35±3.20	p_{2-3}	>0.05	21.17±4.10	p_{2-3}	>0.05
Type 1	24.77±4.38	p_{1-2}	**<0.05**	21.91±8.08	p_{1-2}	>0.05
Type 2	20.11±5.17	p_{1-3}	**<0.001**	23.71±4.85	p_{1-3}	>0.05
Type 3	16.94±3.44	p_{2-3}	**<0.05**	21.69±4.44	p_{2-3}	>0.05
MM (°)						
Profile 1	98.52±4.15	p_{1-2}	**<0.05**	97.46±3.72	p_{1-2}	**<0.01**
Profile 2	93.89±3.62	p_{1-3}	**<0.001**	94.47±3.18	p_{1-3}	**<0.001**
Profile 3	93.12±3.69	p_{2-3}	>0.05	93.38±4.00	p_{2-3}	>0.05
Type 1	96.85±4.67	p_{1-2}	>0.05	95.09±2.95	p_{1-2}	>0.05
Type 2	96.39±5.61	p_{1-3}	>0.05	95.33±4.99	p_{1-3}	>0.05
Type 3	94.44±3.24	p_{2-3}	>0.05	96.17±4.18	p_{2-3}	>0.05
T (°)						
Profile 1	16.52±3.55	p_{1-2}	**<0.001**	14.41±2.30	p_{1-2}	**<0.001**
Profile 2	10.56±0.53	p_{1-3}	**<0.001**	10.00±0.85	p_{1-3}	**<0.001**
Profile 3	4.941±2.926	p_{2-3}	**<0.001**	4.333±3.266	p_{2-3}	**<0.001**
Type 1	15.15±5.54	p_{1-2}	>0.05	12.22±3.94	p_{1-2}	>0.05
Type 2	11.94±5.50	p_{1-3}	**<0.01**	9.583±5.437	p_{1-3}	**=0.074**
Type 3	8.167±5.294	p_{2-3}	**=0.084**	9.517±5.309	p_{2-3}	>0.05

with the third facial profile are significantly larger than in the sex-relevant groups of persons with the first profile, and young men or young women with the second facial profile are significantly larger than young men or young women with the first profile. There is only one significant difference between young men and young women with different face types in this indicator - young men with the third type of face have higher values than young men with the first type (see Table 3).

Limits of percentile range of values of angle G in groups: young men - the first profile (116-125)°, the second profile (115-121)°, the third profile (115-120)°; the first type (117-125)°, the second type (115-124)°, the third type (114-120)° and in groups of young women - the first profile (117-126.5)°, the second profile (117-126)°, the third profile (113-125)°; the first type (115-126)°, the second type (117.5-127)°, the third type (117-125)° of face.

The values of the angle G show only a tendency to greater value in young men with the first facial profile than in young men with the third profile and significantly higher value in young men with the first type of face than in young men with the third type (see Table 3).

Limits of the percentile range of values of angle B in groups: young men - the first profile (18-28)°, the second profile (17-23)°, the third profile (15-20)°; first type (22-28)°, second type (17-23)°, third type (15-18)° and in groups of young women - first profile (20-27)°, second profile (17-26)°, third profile (18.5-24)°; the first type (17-27)°, the second type (20.5-26.5)°, the third type (19-25)° of face.

The angle B in both young men and young women with the first facial profile is significantly greater than in the sex-relevant groups of persons with the third facial profile. Significantly higher values of this indicator are also in young men with the first type of face than in young men with the second and third face types and in young men with the second type of face than in young men with the third type (Table 4).

The limits of the percentile range of the values of the angle MM in the groups of young men: the first profile (95-102)°, the second profile (91-97)°, the third profile (90-96)°; first type (94-99)°, second type (90-99)°, third type (92-97)° and in groups of young women: first profile (95-100)°, second profile (92-96)°, third profile (91-96)°; the first type (93-98)°, the second type (92-98.5)°, the third type (94-99)° of face.

The MM angle in both young men and young women with the first facial profile is significantly greater than in the sex-appropriate groups of individuals with the second or third facial profile. Significant differences in this indicator both between groups of young men and between groups of youngwo men with different face types were not found (see Table 4).

Limits of percentile range of values of angle T in groups: young men - the first profile (13-19)°, the second profile (10-11)°, the third profile (4-7)°; first type (10-18)°, second type (7-17)°, third type (5-12)° and in groups of young women - first profile (12-16)°, second profile (9-11)°, third profile (3-6.5)°; the first type (9-15)°, the second type (5.5-13)°, the third type (6-14)° of face.

The angle T in both young men and young women with the first facial profile is significantly greater than in members of the opposite sex with the second and third facial profiles, and in young men or young women with the second facial profile - significantly greater than in young men or young women with the third profile. In young men with the first type of face, this figure is significantly higher than in young men with the third type; there is a greater value of the angle T in young men with the second type of face than in young men with the third type, as well as in young women with the first type of face than in young women with the third type (see Table 4).

Discussion

One of the most popular in Ukraine is the method of cephalometry by Schwarz A. M. [29], who tried to get rid of certain shortcomings of other methods. Thus, Schwarz A. M. proposed for analysis certain anatomical structures of the head, located on the sagittal plane, or close to it, to obtain more stable indicators and level the influence of asymmetries between the right and left halves and layers

of images of structures on X-ray. He proposed the use for the construction of the corresponding basal plane, in relation to which the main analysis is performed, namely the points of the center of entry into the sella turcica and so on. M. O. Dmitriev et al. [8] determined craniometric and gnatometric parameters according to the method of Schwarz A. M. for Ukrainian young men and young women, established differences in these indicators between different sex groups and proved the existence of differences in a number of indicators compared with data from studies of Schwarz A. M.

We determined the percentile scales (25-75 percentile) of teleroentgenographic indicators of the upper and lower jaws and inter-jaw indicators in Ukrainian young men and young women with orthognathic occlusion with different types and profiles of the face according to Schwarz A. M.

Differences of the investigated indicators depending on profiles and types of the person are defined. It should be noted that all significant differences between groups of young men with different facial profiles and between groups of young women with different facial profiles are the same.

Both in young men and young women with the first facial profile: angle B is significantly larger than in young men or young women with the third facial profile (respectively, by 30.1 %, $p<0.01$ and by 10.4 %, $p<0.05$); MM angle is significantly higher than in young men or young women with the third profile (respectively, by 5.8 %, $p<0.001$ and by 4.4 %, $p<0.001$) and with the second profile (respectively, by 4.9 %, $p<0.05$ and by 3.2 %, $p<0.01$) of face.

Both in young men and young women with a second facial profile: distance R.asc. significantly higher than in young men or young women with the first profile (by 6.1 % and 3.5 %, respectively, $p<0.05$ in both cases).

Both in young men and young women with the third facial profile: the angle F is significantly larger than in the groups of young men or young women with the first facial profile (respectively, by 3.7 %, $p<0.01$ and 3.0 %, $p<0.05$); angle I is significantly higher than in young men or young women with the first profile (respectively, by 3.7 % and 4.7 %, $p <0.001$ in both cases) and than among young men or young women with the second profile (respectively, by 3.3 %, $p<0.05$ and 3.7 %, $p<0.001$); the distance of L-Mand is significantly greater than that of young men or young women with the first facial profile (respectively, by 12.0 % and 4.1 %, $p<0.001$ in both cases); distance R.asc. significantly higher than in young men or young women with the first facial profile (respectively, by 12.5 %, $p<0.01$ and by 4.7 %, $p<0.05$).

The profile angle T was expected to differ significantly in all study groups with different facial profiles, both in young men and young women, given that this indicator was the basis for the division into groups by facial profiles according to Schwarz A. M.: higher values in young men or in young women with the first profile of the face than with the second (respectively, by 56.4 %, $p<0.001$ and by 44.1 %, $p<0.001$) and with the third profiles (respectively, 3.34 times, $p<0.001$ and 3.32 times, $p<0.001$) and higher values in young men or young women with the second face profile than with the first profile (respectively, 2.14 times, $p<0.001$ and 2.31 times, $p<0.001$).

It should be noted that the index of the length of the upper jaw (Max) had no difference in the comparison groups, both young men and young women, and relative to the angle G recorded only a tendency to higher values in young men with the first facial profile, compared with young men with the third profile (by 2.6 %, $p=0.063$).

In total, 24 significant differences in the studied teleroentgenographic indicators were recorded between groups of young men or between groups of young women with different facial profiles. The largest number of differences was found between young men or young women with the first and third facial profiles in terms of F, I, L-Mand, R.asc., B, MM and T (58.3 % of the total). There were 25 % differences between the groups of young men or young women with the first and second facial profiles (according to R.asc., MM and T), and between the groups with the second and third profiles - 16.7 % (actually, except for the profile angle T, which differed significantly in all comparison groups, the differences between the groups with the second and third facial profiles, both in young men and young women were only in terms of angle I).

Summarizing and analyzing the features of the values of the studied teleroentgenographic indicators, between groups of young men and young women with different face types according to Schwarz A. M., the following similar differences were established.

In both young men and young women - in persons with the third type of face, the value of the distance Max is significantly greater than in persons with the first type of face (respectively, by 7.5 %, $p<0.01$ and 6.1 %, $p<0.001$) and than in persons with the second type of face (respectively, by 2.0 %, $p<0.05$ and by 3.4 %, $p<0.01$); the facial angle F was expected to be significantly different in all study groups with different facial types, both young men and young women, given that this indicator was the basis for the division into groups by facial types according to Schwarz A. M. - higher values in young men or in young women with the third type of face than with the second (respectively, by 5.2 %, $p<0.001$ and by 5.1 %, $p <0.001$) and with the first type (respectively, by 9.5 %, $p<0.001$ and by 9.1 %, $p<0.001$) and higher values in young men or young women with the second type of face than with the first type (respectively, by 4.1 %, $p<0.001$ and 4.6 %, $p<0.001$).

Only in young men with the first type of face significantly higher values of the angles G (by 3.9 %, $p<0.05$), B (by 46.2 %, $p<0.001$) and T (by 85.5 %, $p<0.01$) than in young men with the third face type and angle B (by 23.2 %, $p<0.05$) than in young men with the second type; with the second type of face significantly higher values of angle I (by 2.7 %, $p<0.01$) than among young men with the first type of face and angle B (by 18.7 %, $p<0.05$) than among young men

with the third type of face; with the third type of face significantly higher values of angle I (by 3.5 %, p<0.01) and distance R.asc. (by 8.8 %, p<0.05) than in young men with the first type of face.

In young women, only tendencies to higher values of angles I (by 2.7 %, p=0.068) and T (by 28.4 %, p=0.074) were recorded in persons with the third type of face than with the first type.

It should be noted that the indicators of the length of the mandible (L-Mand) and maxillary-mandibular angle (MM) had no differences in the comparison groups, both in young men and young women with different face types; young women with different face types also did not significantly differ in the distance R.asc. and angles G and B. Young women with the third type of face tend to have a greater value of angle I than young women with the first (by 2.4 %, p=0.068), and young women with the first type of face - a tendency to a greater value of the angle T than with the third type (by 28.4 %, p=0.074).

Thus, young men with different facial types found more pronounced variability of the studied indicators than in young women, both in terms of the number of differences (15 between groups of young men vs. 7 between groups of young women) and the number of indicators that were different - 7 indicators from 9 subjects in young men (Max, F, I, R.asc., G, B and T) against 4 in young women (Max, F, I and T).

Dmitriev M. O. et.al. research [8] found that a number of craniometric and gnatometric indicators in Ukrainian young men and young women differ from the values of indicators established in the author's method of teleroentgenographic studies by Schwarz A. M., determined in the inhabitants of Germany. The results of our research also revealed a number of differences in the studied indicators (distances Max, L-Mand, R.asc. and angles F, I, B, MM, T) in young men and young women with different profiles and face types according to Schwarz A. M. compared with the results of the author of the method and the results obtained by Dmitriev M. O. et.al. [8] for Ukrainian young men and young women with orthognathic occlusion in general, without division into types or facial profiles.

The obtained results testify to the expediency and necessity of taking into account not only belonging to a certain sex, age group or ethnicity but also belonging to certain groups by profiles and face types when evaluating teleroentgenographic morphometric parameters of upper and lower jaws and inter-jaw indicators in young Ukrainians.

Conclusions

1. The values of the percentile range of morphometric teleroentgenographic parameters of the upper and lower jaws and inter-jaw parameters in Ukrainian young men and young women with orthognathic occlusion with different profiles and face types according to Schwarz A. M. were established.

2. There are differences in certain indicators between groups of young men or young women with different profiles or types of faces. All significant differences between groups of young men with different facial profiles and between groups of young women with different facial profiles are the same - both in terms of indicators that differed and in the number of established differences. Instead, a more pronounced variability of the studied indicators was clearly established in young men with different face types than in young women with different face types, both in terms of the number of differences and the number of indicators that were different.

References

[1] Behbehani, F., Hicks, E. P., Beeman, C., Kluemper, G. T., & Rayens, M. K. (2006). Racial variations in cephalometric analysis between Whites and Kuwaitis. *Angle Orthod.*, 76(3), 406-411. doi: 10.1043/0003-3219(2006)076[0406:RVICAB]2.0.CO;2

[2] Chernysh, A. V., Gavryluk, A. O., Dmytrenko, S. V., Serebrennikova, O. A., & Balynska, M. V. (2018). Cephalometric studies of Ukrainian boys and girls with orthognathic bite by the method of R. M. Ricketts. *Світ медицини та біології - World of Medicine and Biology,* 2(64), 88-93. doi: 10.26724/2079-8334-2018-2-64-88-93

[3] Dmitriev, M. O. (2016). Визначення нормативних цефалометричних параметрів за методом Стайнера для українських юнаків та дівчат [Determination of normative cephalometric parameters by the Steiner method for Ukrainian boys and girls]. *Світ медицини та біології - World of Medicine and Biology,* 3(57), 28-32.

[4] Dmitriev, M. O. (2017). Identification of normative cephalometric parameters based on G. Schmuth method for young male and female Ukrainians. *Вісник морфології - Reports of Morphology,* 23(2), 288-292.

[5] Dmitriev, M. O. (2018). Determination of standard cephalometric parameters using the Downs method for Ukrainian adolescents. *Вісник морфології - Reports of Morphology,* 24(2), 22-26. doi: 10.31393/morphology-journal-2018-24(2)-03

[6] Dmitriev, M. O., Chernysh, A. V., & Chugu, T. V. (2018). Cephalometric studies of Ukrainian boys and girls with physiological bite by the method of Charles J. Burstone. *Biomedical and biosocial anthropology*, (30), 62-67. doi: 10.31393/bba30-2018-09

[7] Dmitriev, M. O., Chernysh, A. V., & Gunas, I. V. (2019). Features of the Cephalometric Profile of Ukrainian youth by Methods of Ricketts R. M., Burstone C. J. and Harvold E. P. *World Science*, 3(6(46)), 4-10. doi: 10.31435/rsglobal_ws/30062019/6569

[8] Dmitriev, M. O., Chugu, T. V., Gerasymchuk, V. V., & Cherkasova, O. V. (2017). Визначення краніометричних та гнатометричних показників за методикою А. М. Шварца для українських юнаків та дівчат [Determination of craniometric and gnatometric parameters according to the method of A. M. Schwartz for Ukrainian boys and girls]. *Biomedical and Biosocial Anthropology,* (29), 53-58.

[9] Doroshenko, S. I., & Kulginskii, E. A. (2007). *Основы телерентгенографии [Fundamentals of teleroentgenography]*. К.: Здоров'я - К.: Health.

[10] Drevensek, M., Farcnik, F., & Vidmar, G. (2006). Cephalometric

standards for Slovenians in the mixed dentition period. *Eur. J. Orthod.*, 28(1), 51-57. doi: 10.1093/ejo/cji081

[11] Gonzalez, M. B., Caruso, J. M., Sugiyama, R. M., & Schlenker, W. L. (2013). Establishing cephalometric norms for a Mexican population using Ricketts, Steiner, Tweed and Arnett analyses. *APOS Trends Orthod.,* (3), 171-177. doi: 10.4103/2321-1407.121437

[12] Gueye, M., Dieng, L., Mbodj, E. B., Seck, A. K., Toure, A., Thioune, N., & Ngom, P. I. (2014). Relationship between bizygomatic width and the size of maxillary anterior teeth among young Senegalese black people recruited in army. Odontostomatol. *Trop.,* 37(148), 5-12. PMID: 25980092

[13] Gunas, I. V., Dmitriev, M. O., Prokopenko, S. V., Shinkaruk-Dykovytska, M. M., & Yeroshenko, G. A. (2017). Determination regulatory cephalometric options by the method of Tweed international foundation for Ukrainian boys and girls. *Світ медицини та біології - World of Medicine and Biology,* 4(62), 27-31. doi: 10.26724/2079-8334-2017-4-62-27-31

[14] Gunas, I. V., Dmitriev, M. O., Tikholaz, V. O., Shinkaruk-Dykovytska, M. M., Pastukhova, V. A., Melnik, M. P., & Rudiy, Y. I. (2018). Determination of normal cephalometric parameters by J. McNamara method for Ukrainian boys and girls. *Світ медицини та біології - World of Medicine and Biology,* 1(63), 19-22. doi: 10.26724/2079-8334-2018-1-63-19-22

[15] Hsiao, T. H., Tsai, S. M., Chou, S. T., Pan, J. Y., Tseng, Y. C., Chang, H. P., & Chen, H. S. (2010). Sex determination using discriminant function analysis in children and adolescents: a lateral cephalometric study. *Int. J. Legal. Med.,* 124(2), 155-160. doi: 10.1007/s00414-009-0412-1

[16] Huang, W. J., Taylor, R. W., & Dasanayake, A. P. (1998). Determining cephalometric norms for Caucasians and African Americans in Birmingham. *Angle Orthod.,* 68(6), 503-511. doi: 10.1043/0003-3219(1998)068<0503:DCNFCA>2.3.CO;2

[17] Johannsdottir, B., Thordarson, A., & Magnusson, T. E. (2004). Craniofacial skeletal and soft tissue morphology in Icelandic adults. *European Journal of Orthodontics*, 26, 245-250. doi: 10.1093/ejo/26.3.245

[18] Kalha, A. S., Latif, A., & Govardhan, S. N. (2008). Soft-tissue cephalometric norms in a South Indian ethnic population. *Am. J. Orthod. Dentofacial. Orthop.,* 133(6), 876-881. doi: 10.1016/j.ajodo.2006.05.043

[19] Kilic, N., Catal, G., & Oktay, H. (2010). McNamara norms for Turkish adolescents with balanced faces and normal occlusion. *Aust. Orthod. J.,* 26(1), 33-37. PMID: 20575197

[20] Kovach, I. V., Bindiugin, A. Iu., & Verbitskaia, A. V. (2017). Роль цефалометрических характеристик в дифференциальной диагностике клинических форм прогенического прикуса [The role of cephalometric characteristics in the differential diagnosis of clinical forms of progenic occlusion]. *Современная стоматология - Modern dentistry,* (2), 62-65.

[21] Kumari, L., & Das, A. (2017). Determination of Tweed's cephalometric norms in Bengali population. *Eur. J. Dent.,* 11(3), 305-310. doi: 10.4103/ejd.ejd_274_16

[22] Liang, C., Liu, S., Liu, Q., Zhang, B., & Li, Z. (2014). Norms of McNamara's Cephalometric Analysis on Lateral View of 3D CT Imaging in Adults from Northeast China. *Journal of Hard Tissue Biology,* 23(2), 249-254. doi: 10.2485/jhtb.23.249

[23] Mohammad, H. A., Abu Hassan, M. I., & Hussain, S. F. (2011). Academic Journals Cephalometric evaluation for Malaysian Malay by Steiner analysis. *Scientific Research and Essays*, 6(3), 627-634. doi: 10.5897/SRE10.869

[24] Muzurova, L. V., Mikheeva, M. V., Konnov, V. V., & Sheludko, S. N. (2014). Изменчивость параметров зубной дуги нижней челюсти у женщин с различными формами лица [Variability of the parameters of the dental arch of the lower jaw in women with different facial shapes]. *Бюллетень медицинских интернет конференций - Bulletin of medical Internet conferences,* 4(6), 937.

[25] Naikmasur, V. G., Shrivastava, R., & Mutalik, S. (2010). Determination of sex in South Indians and immigrant Tibetans from cephalometric analysis and discriminant functions. *Forensic Sci. Int.,* 197(1), 122-128. doi: 10.1016/j.forsciint.2009.12.052

[26] Phulari, B. (2013). *An atlas on cephalometric landmarks*. JP Medical Ltd. doi: 10.5005/jp/books/11877

[27] Riakhovskii, A. N., Dedkov, D. N., Gvetadze, R. Sh., & Boitsova, E. A. (2017). Определение высоты прикуса по результатам цефалометрического анализа боковой телерентгенограммы [Determination of the bite height according to the results of the cephalometric analysis of the lateral teleroentgenogram]. *Стоматология - Dentistry,* 96(1), 63-71. doi: 10.17116/stomat201796163-71

[28] Schwarz, A. M. (1960). *Rontgenostatics; Practical Evaluation of the Tele-X-ray-photo (study-head-plate)* (Vol. 1). Leo L. Bruder.

[29] Schwarz, A. M. (1961). Roentgenostatics: a practical evaluation of the x-ray headplate. *American Journal of Orthodontics,* 47(8), 561-585. doi: 10.1016/0002-9416(61)90001-X

[30] Wu, J., Hogg, U., & Rabie, A. B. (2007). Chinese norms of McNamara's cephalometric analysis. *Angle Orthod.*, 77(1), 12-20. doi: 10.2319/021606-62R.1