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FEATURES OF THE RELATIONSHIPS OF TELERONTHENOMETRIC INDICATORS ACCORDING TO THE STEINER METHOD WITH THE SIZES OF THE DENTAL ARCHES IN UKRAINIAN GIRLS WITH A PHYSIOLOGICAL BITE WITH A VERY WIDE FACIAL TYPE

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Introductions. According to a systematic review and meta-analysis [2, p. 115-122], the prevalence of orthodontic pathology in the world ranges from 39% to 93% depending on the stage of development of the dentofacial system, with the highest frequency being observed in mixed occlusion. The authors indicate that on average more than 56% of children have some form of malocclusion, which makes the problem globally relevant. In the study by Tariq et al. [6, p. 143] among adolescents in Karachi, the prevalence of malocclusion was 62.7%, which correlates with the data of international surveys. The most common in this sample were distal occlusions (31.4%) and crowding of teeth (28.1%). These results indicate that orthodontic pathology is a typical and widespread phenomenon both in countries with a high level of development of dental care and in developing countries. Thus, the problem has not only local, but also global significance, requiring the attention of health care systems in different regions of the world.

Aim. Establishing the features of correlations between teleradiometric indicators according to the Steiner method and the dimensions of dental arches in Ukrainian girls with physiological occlusion and a very wide facial type.

Materials and methods. Computed tomograms of 30 Ukrainian girls (aged 16 to 20 years) with physiological occlusion with a very wide face type according to Garson were obtained from the data bank of the Department of Pediatric Dentistry and the Research Center of the National Pirogov Memorial Medical University, Vinnytsya. All teleradiographic and computed tomography studies were performed

using the dental cone-beam tomograph Veraviewepocs 3D Morita (Japan) and Planmeca ProMax 3D Mid, manufactured by Planmeca OY (Finland) and were conducted on the basis of the principle of voluntary informed consent in the private dental clinic “Vinintermed” and in the “Planmeca 3D Maxillofacial Diagnostics Center”. Morphometric studies of the linear dimensions of the dental arches were performed using the software applications i-Dixel One Volume Viewer (Ver.1.5.0) J Morita Mfg. Cor, and Planmeca Romexis Viewer (ver. 3.8.3.R 15.12.14) Planmeca OY [4, p. 34-35]. To determine the morphometric characteristics of cephalometric images, measurements were performed in the OnyxCeph³™ application, version 3DPro, from Image Instruments GmbH, Germany. The analysis of lateral cephalometric images was performed according to the method of Steiner S. S. [5, p. 10-22, 4, p. 31].

Correlations were assessed in the licensed package "Statistica 6.0" using Spearman's nonparametric statistics.

Results and discussion. As a result of the analysis of reliable and medium-strength unreliable relationships between teleradiometric indicators according to the Steiner method with the sizes of dental arches in girls with a very wide face type, the following multiple correlations were found: medium-strength reliable and unreliable, mainly direct (r= from 0.30 to 0.50), and medium-strength unreliable inverse (r=from -0.32 to -0.35) correlations between the value of the Pog_NB distance and the value of the distances VestBM, 33_43Bugr, 33_43Apx, mapx_46, dapx_46 (direct), napx_6, DL_C and DL_S (inverse); medium-strength, reliable direct (r= from 0.39 to 0.50), and mostly medium-strength reliable and unreliable inverse (r= from -0.31 to-0.61) correlations between the value of the Hld_Rat distance and the value of the distances 13_23Apx, DL_C, DL_F, DL_S (direct), 13_23Bugr, VestBM, 33_43Apx, mapx_46, dapx_46 and GL_3 (inverse); medium-strength, mostly reliable, direct (r=from 0.43 to 0.59) and inverse (r= -0.30 and -0.49) correlations between the value of the angle II and the value of the distances mapx_46, dapx_46, GL_2 (direct), 13_23Apx and DL_S (inverse).

Quantitative analysis of reliable and medium-strength unreliable correlations

between teleradiometric indicators according to the Steiner method with the dimensions of dental arches in girls with a very wide face type revealed 50 relationships out of 288 possible (17.36%), of which 5.56% were reliable direct relationships of medium strength, 2.78% were unreliable direct relationships of medium strength, 0.35% were reliable inverse relationships of strong strength, 3.13% were reliable inverse relationships of medium strength, and 5.56% were unreliable inverse relationships of medium strength.

In the study by Imani et al. [1, p. 1-5] cephalometric norms were established using the Steiner method for the Iranian Kurdish population, where the mean SNA angle was 81.6°±3.2, which was close to the standards, but the SNB index was lower – 77.8°±2.9, which indicated a tendency towards a distal position of the mandible. Analysis of the ANB in this population showed a mean value of 3.8°±1.6, which indicated a higher prevalence of distal occlusion compared to the Steiner norms. In the study by Rathod et al. [3, p. 98-99] for the Uttarakhand population, the SNA value was 82.4°±3.1, the SNB – 79.6°±2.8, and the ANB – 2.8°±1.5, which generally reflected more harmonious jaw relationships. The authors also found that the lower incisor line to NB was 25.3°±5.1, which is slightly higher than international norms, indicating pronounced incisor prognathism. Comparison of the two studies demonstrates statistically significant differences in ANB values between Kurdish and Indian populations ($p<0.05$), reflecting ethnic differences in facial skeletal growth. These data confirm the need to use local cephalometric norms in the diagnosis and planning of orthodontic treatment. Thus, studies in different populations reveal variability in key Steiner indicators, which has important clinical significance.

Conclusions. In Ukrainian girls with a physiological bite and a very wide facial type, multiple reliable and unreliable, mostly medium-strength, direct (r= from 0.30 to 0.59 – 8.34% of the total number of relationships) and inverse (r= from -0.30 to -0.61 – 8.69% of the total number of relationships) correlations of teleradiometric indicators according to the Steiner method with linear dimensions necessary for constructing the correct shape of the dental arches (almost half with the value of the Pog_NB and Hld_Rat distances) were established.

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