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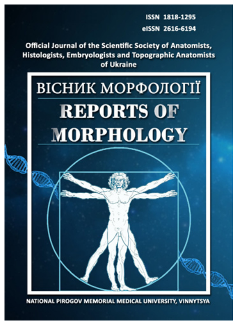

Modelling of the linear dimensions of dental arches in Ukrainian young men and young women with physiological occlusion and a wide facial type depending on the characteristics of Burstone cephalometric indicators and computed tomography tooth dimensions

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CONFLICT OF INTEREST

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Data are available upon reasonable request to corresponding author.

The variability of the linear parameters of dental arches may be determined by craniofacial characteristics and tooth sizes. Conducting a study that will allow a more accurate description of the interaction, i.e., the relationships of these three structures within a specific population, will make it possible to increase the validity of orthodontic diagnosis and treatment. The selection of Burstone cephalometric parameters is the most appropriate, given the limited number of studies using this analysis in the Ukrainian population. The aim of the study – development and analysis of regression models of the linear dimensions of dental arches in Ukrainian young men and young women with physiological occlusion and a wide facial type depending on the characteristics of Burstone cephalometric indicators and computed tomography tooth dimensions. On primary computed tomography scans and cephalograms of 25 Ukrainian young men and 25 young women with physiological occlusion and a wide facial type, obtained from the databank of the Research Center and the Department of Pediatric Dentistry of the National Pirogov Memorial Medical University, Vinnytsia, measurements of linear and angular indicators by the Burstone method and the dimensions of teeth and dental arches were performed. Regression models of dental arch dimensions depending on cephalometric indicators and computed tomography tooth dimensions were built using the licensed package "Statistica 6.0". It was established that in young men and young women with physiological occlusion and a wide facial type, all 18 possible significant models of linear parameters necessary for constructing the correct shape of dental arches were built depending on the characteristics of Burstone cephalometric indicators and computed tomography tooth dimensions, with a coefficient of determination (R^2) greater than 0.6 (in young men R^2= from 0.829 to 0.980, $p<0.001$ in all cases; in young women R^2= from 0.680 to 0.962, $p<0.001$ in all cases). Analysis of the frequency of inclusion of computed tomography tooth dimensions and Burstone cephalometric indicators in the models showed: in young men, cephalometric indicators were included most often (23.70 %), the width of the crown part of the corresponding teeth in the mesiodistal plane (20.74 %), and the width of the crown part of the corresponding teeth in the vestibulo-oral plane (17.04 %); in young women, cephalometric indicators were included most often (27.21 %), the width of the crown part of the corresponding teeth in the mesiodistal plane (13.24 %), the width of the crown part of the corresponding teeth in the vestibulo-oral plane (11.03 %), and the width of the cervical part of the corresponding teeth in the vestibulo-oral plane (10.29 %). Analysis of the frequency of inclusion of the corresponding teeth in the models showed: in young men, maxillary lateral incisors and canines were included most often (13.59 % each), maxillary central incisors (11.65 %), and mandibular canines (10.68 %); in young women, maxillary central incisors were included most often (23.23 %), mandibular canines (14.14 %), mandibular lateral

incisors (13.13 %), maxillary lateral incisors (12.12 %), mandibular central incisors (11.11 %), and maxillary canines (10.10 %).
Keywords: *dentistry, Burstone cephalometry, computed tomography dimensions of teeth and dental arches, young men and young women, facial type, physiological occlusion, regression analysis.*

Introduction

Malocclusion is the third most common pathology of the oral cavity, after caries and periodontal diseases. The global prevalence of malocclusion is 54.83 %, with the highest rates in Asia at 61.81 % and Europe at 61.50 %, and the lowest in Africa at 32.50 %. Regional differences were also noted in the prevalence of anterior open bite – in Africa the prevalence is 18.60 %, whereas in Europe it is 4.46 %. Deep bite, conversely, was most frequent in Europe – 33.08 % and the rarest in Africa – 6.30 % [8]. A meta-analysis of 11 studies including a total of more than 13 thousand individuals showed that the prevalence of Class I malocclusion was 56 %, Class II – 31 %, Class III – 11 %, with the most frequently detected traits being crowding (41%), increased overjet (34 %), negative overjet (13 %), crossbite (11 %), anterior open bite (7 %), and diastemas (4 %) [18].

Data from a survey of 1144 schoolchildren in Turkey showed that normal occlusion was observed in only 2.6 % of children. Most frequently, the examined individuals had Class I malocclusion – 53.3 %, Class II – 20.8 %, and Class III – 7.4 %. In addition, anterior crossbite was found in 6.5 %, posterior crossbite in 10 % – deep bite in 22.6 %, and open bite in 2.3 %. It is important to note that onychophagia was recorded in 41% of children, which is considered one of the causes of malocclusion development [3]. In Saudi Arabia, the prevalence of malocclusion is 72 %, with the prevalence of each class at the following levels: Class I – 66.51 %, Class II – 17.70 %, Class III – 15.79 % [10].

Examination of 1960 children aged 3-5 years in North-Eastern Italy revealed that 3.7 % of them had crossbite. Specifically, anterior crossbite was present in 3.3 %, posterior right crossbite in 3.7 %, posterior left crossbite in 2.9 %, and bilateral crossbite in 0.6 %. No statistically significant differences in prevalence distribution by age or sex were found by the researchers [12].

A review of 721 children in India revealed that the prevalence of anterior crossbite was 26.7 %. In particular, in 11.4 % of patients with anterior crossbite it was combined with posterior crossbite. 62 % of patients had unilateral involvement and 38% had bilateral involvement. Mandibular shift was also noted in 48.19 % of cases, gingival recession in 22.3 %, and mobility of the lower incisors in 6.2 % [26].

In Vietnam, the prevalence of malocclusion is 60.7 %, specifically Class I was present in 19 %, Class II in 31 %, and Class III in 10.7 %. An analysis of various harmful habits found that finger sucking was associated with Class I (OR 3.28) and Class II (OR 3.22), lip biting – with Class II (OR 4.37) and Class III (OR 6.83), tongue thrusting increased the likelihood of Class I (OR 5.25) and Class II (OR 6.42), and mouth breathing was associated with a higher likelihood of Class II (OR 2.71) [28].

In China, among children aged 3-5 years (a total of 2335 children examined), the prevalence of malocclusion was 83.9 %. The most frequently detected traits were deep bite (63.7 %), increased overjet (33.9 %), midline deviation (26.6 %), anterior crossbite (8.0 %), and anterior crowding (6.5 %). No statistically significant differences by gender were found [30].

A long-term study was conducted by Finnish scientists. A total of 1964 individuals born in 1966 participated, who at the end of the study were 46 years old. During the examination, 39.5 % had signs of malocclusion. The most frequently detected traits were crossbite (17.9 %), deep bite ≥6 mm (11.7 %), and increased overjet ≥6 mm (9.7 %). These results show that orthodontic disorders are a frequent phenomenon, even in a cohort of individuals who had been treated in childhood [16].

Orthodontic pathologies (such as malocclusion), unlike other oral diseases, require long-term and costly treatment. In England, NHS expenditure on primary orthodontic services is approximately £250 million per year. 7.6 % of treatments ended in early termination, corresponding to approximately £2.3 million in expenditure, 5.2 % of cases ended with "residual need" according to IOTN (expenditure about £1.6 million), and due to missing data another £13.2 million. Thus, in total 44 % of expenditure is potentially inefficient [22]. This, in particular, encourages initiating orthodontic treatment as early as possible, which will subsequently reduce its cost [24], and will satisfy the patient's aesthetic outcome [29]. Therefore, there is a need for a more thorough assessment of data concerning individuals of young age.

The aim of the study – development and analysis of regression models of the linear dimensions of dental arches in Ukrainian young men and young women with physiological occlusion and a wide facial type depending on the characteristics of Burstone cephalometric indicators and computed tomography tooth dimensions.

Materials and methods

Primary computed tomography scans and cephalograms of 25 Ukrainian young men (aged 17 to 21 years) and 25 Ukrainian young women (aged 16 to 20 years) with physiological occlusion and a wide facial type were obtained from the databank of the Research Center and the Department of Pediatric Dentistry of the National Pirogov Memorial Medical University, Vinnytsya. Computed tomography (using the dental cone-beam computed tomography scanner Planmeca ProMax 3D Mid, Finland) and cephalometric radiographic (using the dental cone-beam computed tomography scanner Veraviewepocs 3D Morita, Japan) examinations were performed on the basis of the principle of voluntary informed consent at the private dental clinic "Vinintermed" and at the "Planmeca 3D Maxillofacial Diagnostic Center". The Bioethics Committee of the National Pirogov Memorial Medical University, Vinnytsya (Protocol No. 6 dated 07.05.2025) established that the conducted studies do not contradict the basic bioethical standards of the Declaration of Helsinki, the Council of Europe Convention on Human Rights and Biomedicine (1977), relevant WHO provisions, and the laws of Ukraine.

Measurements of cephalometric parameters were performed according to the method of Burstone C. J. [7] in the OnyxCeph³™ application, version 3DPro (Image Instruments GmbH, Germany), on cephalograms obtained in a standard manner and created in the 3D Slicer v5.4.0 software with points marked on 3D objects.

According to this methodology, the following were determined: cranial base indicators and horizontal skeletal indicators (Fig. 1); vertical skeletal and dental indicators (Fig. 2); intermaxillary indicators (Fig. 3); dentoalveolar indicators (Fig. 4).

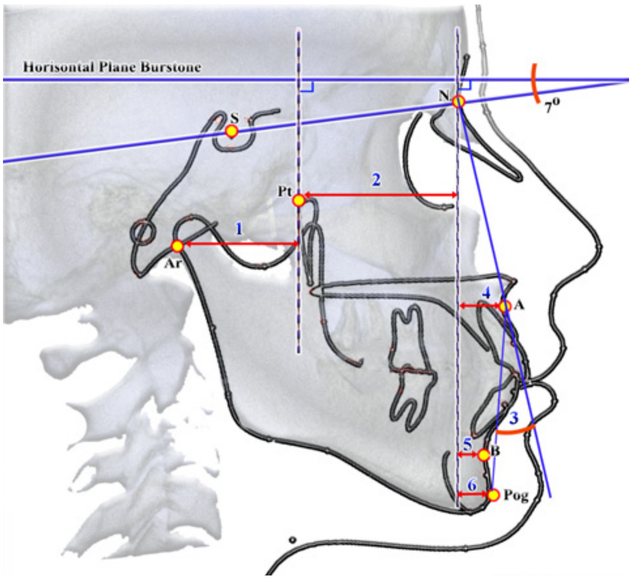

Fig. 1. Cranial base indicators and horizontal skeletal indicators according to the Burstone method. 1 – distance Ar-Pt (mm); 2 – distance Pt-N (mm); 3 – angle N-A-Pog (°); 4 – distance N-A (mm); 5 – distance N-B (mm); 6 – distance N-Pog (mm).

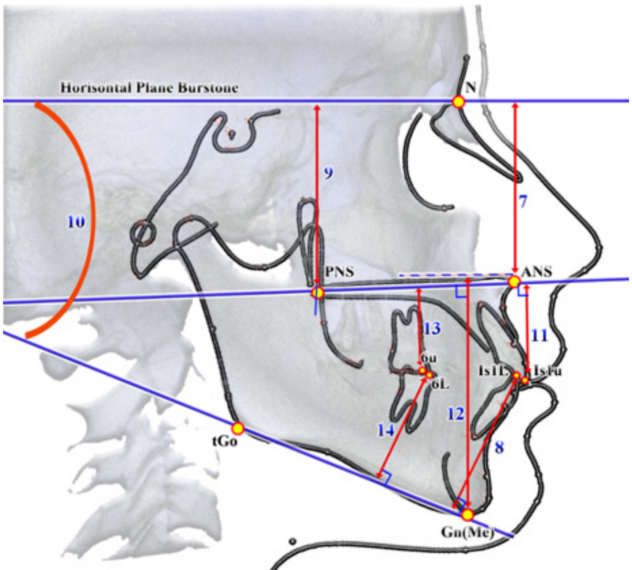

Fig. 2. Vertical skeletal and dental indicators according to the Burstone method. 7 – distance N-ANS (mm); 8 – distance ANS-Gn (mm); 9 – distance PNS-N (mm); 10 – angle MP-HP (°); 11 – distance 1u-NF (mm); 12 – distance 1l-MP (mm); 13 – distance 6u-NF (mm); 14 – distance 6l-MP (mm).

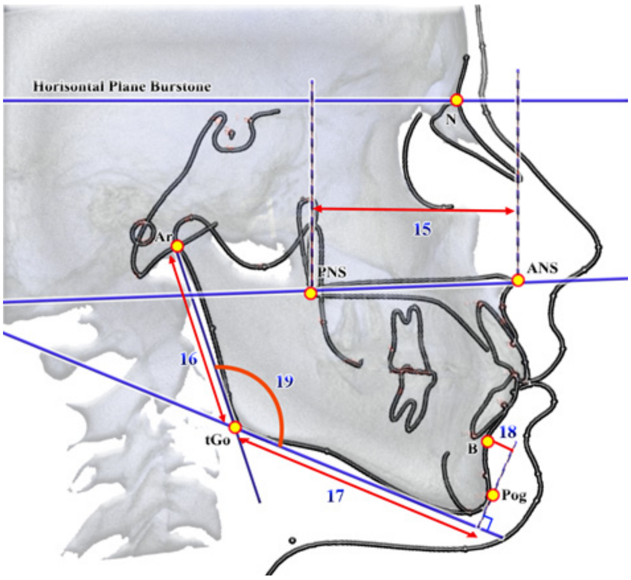

Fig. 3. Intermaxillary indicators according to the method. 15 – distance ANS-PNS (mm); 16 – distance Ar-Go (mm); 17 – distance Go-Pog (mm); 18 – distance B-Pog (mm); 19 – angle arGoMe/ArGoGn (Ar-Go_Gn) (°).

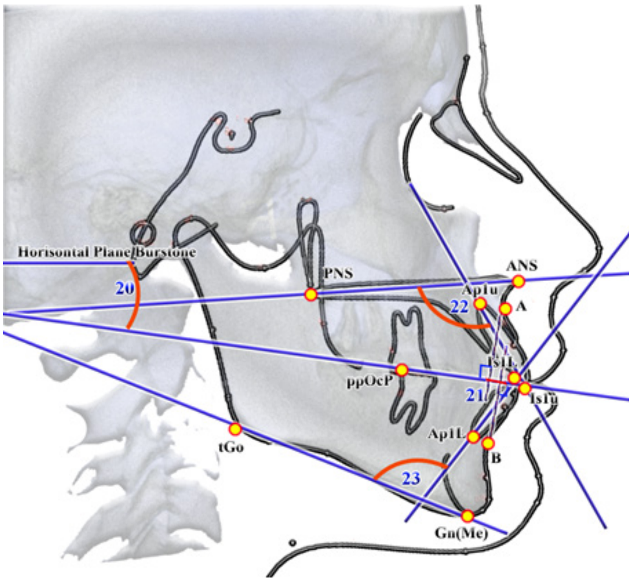

Fig. 4. Dentoalveolar indicators according to the method. 20 – angle OP-HP **(°)**; 21 – distance A-B (mm); 22 – angle Max1-SpP/Max1-NF (Max1-NF) (°); 23 – angle Mand1-MeGo/Mand1-Mp (Mand1-MP) (°).

Morphometric assessment of teeth and dental arches was 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.

Tooth morphometry included determination of the following distances (mm) [23]: the width and length of the crown part of the corresponding teeth in the mesiodistal (MdK and MdLK, respectively) and vestibulo-oral (VoK and VoLK, respectively) planes; the width of the cervical part of the corresponding teeth in the mesiodistal (MdC) and vestibulo-oral (VoC) planes; the length of the root part of the corresponding teeth in the mesiodistal (MdLR) and vestibulo-oral (VoLR) planes; and the length of the corresponding teeth (MdLD).

Since previous studies did not reveal significant differences or trends when comparing computed tomography dimensions of homonymous teeth on the right and left sides of the maxilla and mandible [19], we used mean values for the corresponding teeth: 11 or 41 – maxillary or mandibular central incisors, 12 or 42 – maxillary or mandibular lateral incisors, 13 or 43 – maxillary or mandibular canines, 14 or 44 – maxillary or mandibular first premolars, 15 or 45 – maxillary or mandibular second premolars, 16 or 46 – maxillary or mandibular first molars.

Dental arch morphometry included determination of the following distances (mm) [23]: in the transverse plane – PonM, PonPr, VestBM, 13_23Bugr, 13_23Apx, 33_43Bugr, 33_43Apx, mapex_6, napx_6, dapx_6, dapx_46, and mapx_46; in the sagittal plane – DL_C, DL_F, and DL_S; in the vertical plane – GL_1, GL_2, and GL_3.

Using the licensed statistical package “Statistica 6.0”, stepwise regression analysis was applied to model the linear dimensions of dental arches depending on the characteristics of Burstone cephalometric indicators and computed tomography tooth dimensions.

Results

In *young men* with physiological occlusion and a wide facial type, regression models (with a coefficient of determination R^2>0.60) of the linear dimensions required to construct the correct shape of dental arches depending on the characteristics of Burstone cephalometric indicators and computed tomography tooth dimensions take the form of the following linear equations:

distance PonPr= 8.495 + 2.199×MdK12 + 0.661×MdLK43 + 2.573×VoK11 - 0.989×MdLK11 - 1.932×VoK42 + 1.400×VoK44 - 0.763×VoK14 + 0.167×1l-MP (R^2=0.947, $F_{(8.16)}$=35.73, p<0.001, Std.Error of estimate=0.588);

distance PonM= 27.81 + 2.165×VoK15 + 0.172×ANS-Gn - 0.197×Ar-Pt + 0.255×Go-Pog - 0.221×Mand1-MP - 0.667×B-Pog + 0.426×VoLK13 (R^2=0.922, $F_{(7.17)}$=28.89, p<0.001, Std.Error of estimate=0.807);

distance 13_23Bugr= -15.00 + 1.717×MdK12 + 0.420×MdLD15 + 0.941×VoLK41 + 1.895×VoK11 - 0.532×MdLD45 + 1.290×VoK16 + 0.446×VoLR11 + 0.332×B-Pog - 0.136×1u-NF (R^2=0.978, $F_{(9.15)}$=74.56, p<0.001, Std.Error of estimate=0.400);

distance 13_23Apx= 15.98 + 0.529×N-ANS - 2.975×MdC42 + 2.918×MdK15 - 0.860×MdLR42 - 1.145×MdLK13 + 0.467×MdLD14 - 0.597×VoK14 (R^2=0.913, $F_{(7.16)}$=24.01, p<0.001, Std.Error of estimate=0.830);

distance VestBM= 68.74 + 2.209×VoK15 - 0.305×Ar-Go_Gn - 0.213×Mand1-MP + 1.603×MdK15 + 0.458×1l-MP - 0.331×VoLR11 (R^2=0.938, $F_{(6.18)}$=45.06, p<0.001, Std.Error of estimate=0.786);

distance napx_6= -20.79 + 0.871×PNS-N + 3.620×VoC43 - 8.172×MdK42 + 0.175×Max1-NF - 1.072×VoLR41 + 0.925×VoLR43 + 3.046×VoC11 - 0.651×MdLR11 (R^2=0.942, $F_{(8.16)}$=32.36, p<0.001, Std.Error of estimate=0.951);

distance dapx_6= 0.156 + 4.432×VoC13 + 2.283×MdK46 - 0.539×MdLD42 + 0.582×MdLD13 - 2.408×VoK12 + 0.436×N-A + 2.931×VoK44 - 3.047×VoC41 (R^2=0.928, $F_{(8.16)}$=25.83, p<0.001, Std.Error of estimate=1.447);

distance mapex_6= -30.13 + 3.863×MdK45 + 1.863×MdK12 + 5.909×MdK15 + 3.338×MdC41 + 0.179×Go-Pog - 1.066×VoLK41 - 1.787×MdK14 (R^2=0.946, $F_{(7.17)}$=42.33, p<0.001, Std.Error of estimate=0.969);

distance 33_43Bugr= -4.076 + 3.659×MdK42 - 0.085×N-A-Pog + 1.417×MdK12 - 1.190×MdK14 + 0.419×MdLD43 - 0.434×MdLD13 + 1.488×VoK41 (R^2=0.829, $F_{(7.17)}$=11.78, p<0.001, Std.Error of estimate=0.784);

distance 33_43Apx= 4.671 - 0.565×A-B + 1.296×MdLK43 - 0.678×MdLK42 - 0.723×MdLD44 + 2.910×VoC12 + 2.225×MdC41 + 0.425×MdLD14 - 0.437×VoLR43 (R^2=0.859, $F_{(8.16)}$=12.18, p<0.001, Std.Error of estimate=1.036);

distance mapx_46= -12.98 + 4.249×MdK16 + 1.009×MdLD43 + 1.573×VoK16 - 0.265×Pt-N - 1.271×VoLR12 + 1.879×VoC43 - 0.911×VoLK13 + 0.096×Ar-Go (R^2=0.955, $F_{(8.15)}$=39.58, p<0.001, Std.Error of estimate=0.751);

distance dapx_46= 14.29 - 0.211×Mand1-MP + 2.306×VoK16 + 2.572×MdC12 + 3.420×MdK16 + 0.211×N-A - 1.874×MdK46 + 0.335×MdLD13 (R^2=0.926, $F_{(7.16)}$=28.51, p<0.001, Std.Error of estimate=0.970);

distance DL_C= -16.35 + 1.882×MdK11 + 0.434×VoLK13 + 0.161×1l-MP - 0.522×VoK46 + 0.083×Pt-N - 0.200×VoLK41 + 0.389×VoK12 (R^2=0.950, $F_{(7.17)}$=46.24, p<0.001, Std.Error of estimate=0.337);

distance DL_F= -23.88 + 2.616×MdK11 + 1.881×VoK12 + 0.513×VoLK13 + 0.817×MdK44 - 0.195×MdLR13 + 1.095×MdK15 - 0.704×VoK45 + 0.427×VoK14 - 1.075×VoC41 + 0.026×MP-HP (R^2=0.980, $F_{(10.14)}$=67.98, p<0.001, Std.Error of estimate=0.281);

distance DL_S= -7.963 + 3.007×MdK11 - 0.358×MdLR12 + 0.255×VoLK11 + 0.903×VoK12 + 0.562×MdLK13 + 0.537×VoK14 + 0.043×N-A-Pog (R^2=0.964, $F_{(7.17)}$=65.23, p<0.001, Std.Error of estimate=0.417);

distance GL_1= -17.53 + 0.366×N-A-Pog - 2.153×VoLR12 + 3.097×MdK13 + 1.129×VoLR43 - 1.729×MdK43 + 0.156×Max1-NF + 0.276×1l-MP (R^2=0.889, $F_{(7.17)}$=19.51, p<0.001, Std.Error of estimate=1.023);

distance GL_2= 32.80 + 1.817×MdK13 - 0.386×Ar-Go - 3.960×VoK46 + 2.526×MdK43 - 1.029×MdLR12 +

0.886×MdLD15 + 1.489×VoK45 (R^2=0.870, $F_{(7.17)}$=16.30, p<0.001, Std.Error of estimate=1.219);

distance GL_3= 17.92 + 0.679×6u-NF - 0.329×Ar-Pt + 1.444×MdK13 - 3.542×MdK16 + 1.117×MdLK11 + 2.318×MdK14 - 0.386×MdLK41 (R^2=0.900, $F_{(7.17)}$=21.87, p<0.001, Std.Error of estimate=0.792);

where, here and in the following equations, R^2 – coefficient of determination; $F_{(!)}$=! – critical $_{(!)}$ and obtained (!) Fisher's test value; p – confidence level; Std.Error of estimate – standard error of estimate.

In *young women* with physiological occlusion and a wide facial type, regression models (with a coefficient of determination R^2>0.60) of the linear dimensions required to construct the correct shape of dental arches depending on the characteristics of Burstone cephalometric indicators and computed tomography tooth dimensions take the form of the following linear equations:

distance PonPr= 3.131 + 2.881×MdK11 + 2.410×VoK11 - 2.941×VoK41 - 0.336×A-B + 1.006×MdC11 (R^2=0.693, $F_{(5.19)}$=8.60, p<0.001, Std.Error of estimate=1.349);

distance PonM= 9.226 + 2.564×MdK11 + 0.144×1u-NF + 1.071×MdLD11 - 0.725×MdLD41 - 2.732×VoC41 + 5.039×VoC42 - 2.530×VoK13 + 0.141×Ar-Go (R^2=0.852, $F_{(8.16)}$=11.55, p<0.001, Std.Error of estimate=1.163);

distance 13_23Bugr= 10.88 + 2.428×MdK11 + 2.690×VoC12 - 0.221×A-B - 0.616×VoLK42 + 0.320×B-Pog - 0.099×Max1-NF - 0.021×MdC43 (R^2=0.955, $F_{(7.17)}$=51.10, p<0.001, Std.Error of estimate=0.496);

distance 13_23Apx= 16.87 + 4.673×MdK12 + 0.053×MdC43 + 5.397×MdK11 - 6.750×MdK43 - 0.635×VoLR41 + 1.045×VoC43 - 2.323×MdC11 + 0.434×B-Pog - 1.788×MdC13 (R^2=0.962, $F_{(9.15)}$=42.74, p<0.001, Std.Error of estimate=0.682);

distance VestBM= -11.36 + 0.903×MdLD11 - 3.687×VoC41 + 5.056×MdK42 + 1.998×VoLK43 + 7.303×VoC43 - 7.480×VoK43 + 0.888×MdLK43 + 1.853×MdK16 - 0.971×VoLK11 + 0.173×Ar-Pt (R^2=0.945, $F_{(10.14)}$=24.27, p<0.001, Std.Error of estimate=0.804);

distance napx_6= 3.182 + 0.664×1u-NF - 0.246×Go-Pog - 1.448×MdLR12 + 0.594×MdLD14 + 1.312×MdLK42 + 0.324×Ar-Pt - 1.040×MdK46+ 1.640×VoLK13+ 0.754×MdLD44 (R^2=0.944, $F_{(9.15)}$=27.90, p<0.001, Std.Error of estimate=1.092);

distance dapx_6= -41.46 + 5.752×VoC12 + 1.143×Ar-Pt + 0.895×MdLD15 - 1.132×MdLR13 + 2.581×MdLD42 - 1.668×MdLD41 + 0.832×B-Pog (R^2=0.854, $F_{(7.17)}$=14.16, p<0.001, Std.Error of estimate=2.121);

distance mapex_6= 12.84 + 2.773×MdLK11 + 1.443×MdLD12 + 0.411×ANS-PNS - 3.963×MdK44 - 1.224×VoLR41 + 0.900×MdLD45 - 0.759×MdLD11 (R^2=0.900, $F_{(7.17)}$=21.86, p<0.001, Std.Error of estimate=1.326);

distance 33_43Bugr= 2.621 - 1.873×VoK45 + 2.840×VoC12 + 1.733×MdK16 - 1.467×MdK46 + 0.119×Max1-NF + 1.114×VoC43 (R^2=0.680, $F_{(6.18)}$=6.38, p<0.001, Std.Error of estimate=1.514);

distance 33_43Apx= -19.93 - 1.830×MdLK42 + 3.774×MdC42 + 0.552×Ar-Pt + 1.212×MdLK13 + 1.513×VoK11 - 0.136×N-A-Pog + 0.169×MP-HP (R^2=0.878, $F_{(7.17)}$=17.41, p<0.001, Std.Error of estimate=1.164);

distance mapx_46= 34.20 + 3.075×MdK11 - 0.050×MdC43 + 0.198×N-Pog + 0.830×B-Pog - 2.164×VoLK42 + 1.421×VoK45 - 0.213×1I-MP (R^2=0.885, $F_{(7.16)}$=17.59, p<0.001, Std.Error of estimate=1.304);

distance dapx_46= 35.68 + 0.683×N-Pog + 1.017×VoLR11 + 2.790×MdC12 - 0.568×N-A - 0.807×MdLR43 + 0.581×MdLR41 (R^2=0.938, $F_{(6.17)}$=43.02, p<0.001, Std.Error of estimate=1.210);

distance DL_C= -7.984 + 0.102×Max1-NF + 0.855×VoK12 + 0.588×MdK46 - 0.037×Ar-Go_Gn - 0.199×6u-NF + 0.079×Pt-N - 0.072× OP-HP (R^2=0.898, $F_{(7.17)}$=21.47, p<0.001, Std.Error of estimate=0.451);

distance DL_F= -11.70 + 3.009×VoC12 + 1.101×MdK16 - 0.465×B-Pog + 0.184×Pt-N - 0.724×MdLK42 + 0.473×MdLK11 - 0.080×N-B - 0.707×VoK11 + 1.396×MdC13 - 0.139×N-ANS (R^2=0.936, $F_{(10.14)}$=20.45, p<0.001, Std.Error of estimate=0.544);

distance DL_S= -18.19 + 3.162×VoC12 + 1.807×MdK16 + 1.819×VoK41 - 1.456×MdC12 + 0.067×Mand1-MP + 0.880×VoK15 - 0.601×VoK45 (R^2=0.931, $F_{(7.17)}$=32.70, p<0.001, Std.Error of estimate=0.576);

distance GL_1= 23.17 - 0.382×OP-HP - 0.907×VoLR11 + 0.485×VoLR13 - 1.714×MdC42 + 1.652×MdK11 - 2.020×MdK13 + 0.399×VoLK11 (R^2=0.871, $F_{(7.17)}$=16.45, p<0.001, Std.Error of estimate=0.778);

distance GL_2= 10.70 - 1.244×VoLK43 + 0.398×6u-NF + 1.690×VoC43 - 2.783×VoK41 + 1.318×VoLK42 - 0.815×MdLD11 + 0.422×VoLR13 + 0.422×VoK11 (R^2=0.827, $F_{(8.16)}$=9.58, p<0.001, Std.Error of estimate=1.342);

distance GL_3= 0.688 + 0.559×VoLR43 + 5.103×VoC42 - 3.367×VoK41 + 0.335×6u-NF + 1.085×MdLK12 + 1.105×MdC11 - 0.735×MdLK42 - 2.400×VoC13 + 0.158×N-A-Pog (R^2=0.929, $F_{(9.15)}$=21.87, p<0.001, Std.Error of estimate=0.752).

Discussion

Thus, in *young men* with physiological occlusion and a wide facial type, all 18 possible significant (p<0.001 in all cases) models of linear parameters required to construct the correct shape of dental arches were built depending on the characteristics of *Burstone* cephalometric indicators and computed tomography tooth dimensions, with a coefficient of determination greater than 0.6 (respectively R^2= from 0.829 to 0.980).

When analyzing the frequency of inclusion of *Burstone* cephalometric indicators and computed tomography tooth dimensions in the regression equations in *young men* with physiological occlusion and a wide facial type, the following percentages of inclusion of these indicators into the models were established: cephalometric indicators (23.70 %), width of the crown part of the corresponding teeth in the mesiodistal plane (20.74 %), width of the crown part of the corresponding teeth in the vestibulo-oral plane (17.04 %), length of the corresponding teeth (8.89 %), length of the crown part of the corresponding teeth in the mesiodistal and vestibulo-oral planes and length of the root part of the corresponding teeth in the vestibulo-oral plane (5.93 % each), width of the cervical part of the corresponding teeth in the vestibulo-oral plane (5.19 %), length of the root part of the corresponding teeth in the mesiodistal plane (3.70 %), width of the cervical part of the corresponding teeth in the mesiodistal plane (2.96 %).

When analyzing the frequency of inclusion of the corresponding teeth in the regression equations in *young men* with physiological occlusion and a wide facial type, the following percentages of inclusion of these indicators into the models were established: maxillary incisors (25.25 % of all variables, including 11.65 % central incisors and 13.59 % lateral incisors), mandibular incisors (16.51 % of all variables, including 9.71 % central incisors and 6.80 % lateral incisors), maxillary canines (13.59 %), mandibular canines (10.68 %), maxillary premolars (16.51 % of all variables, including 8.74 % first and 7.77 % second), mandibular premolars (7.76 % of all variables, including 3.88 % first and 3.88 % second), maxillary first molars (5.83 %), mandibular first molars (3.88 %).

In *young women* with physiological occlusion and a wide facial type, all 18 possible significant ($p<0.001$ in all cases) models of linear parameters required to construct the correct shape of dental arches were also built depending on the characteristics of *Burstone* cephalometric indicators and computed tomography tooth dimensions, with a coefficient of determination greater than 0.6 (respectively R^2= from 0.680 to 0.962).

When analyzing the frequency of inclusion of *Burstone* cephalometric indicators and computed tomography tooth dimensions in the regression equations in *young women* with physiological occlusion and a wide facial type, the following percentages of inclusion of these indicators into the models were established: cephalometric indicators (27.21 %), width of the crown part of the corresponding teeth in the mesiodistal plane (13.24 %), width of the crown part of the corresponding teeth in the vestibulo-oral plane (11.03 %), width of the cervical part of the corresponding teeth in the vestibulo-oral plane (10.29 %), length of the corresponding teeth and width of the cervical part of the corresponding teeth in the mesiodistal plane (8.82 % each), length of the crown part of the corresponding teeth in the mesiodistal plane (6.62 %), length of the crown part of the corresponding teeth in the vestibulo-oral plane (5.88 %), length of the root part of the corresponding teeth in the vestibulo-oral plane (5.15 %), length of the root part of the corresponding teeth in the mesiodistal plane (2.94 %).

When analyzing the frequency of inclusion of the corresponding teeth in the regression equations in *young women* with physiological occlusion and a wide facial type, the following percentages of inclusion of these indicators into the models were established: maxillary incisors (35.35 % of all variables, including 23.23 % central incisors and 12.12 % lateral incisors), mandibular incisors (24.24 % of all variables, including 11.11 % central incisors and 13.13 % lateral incisors), maxillary canines (10.10 %), mandibular canines (14.14 %), maxillary premolars (3.03 % of all independent variables, including 1.01 % first and 2.02 % second), mandibular premolars (6.06 % of all variables, including 2.02 % first and 4.04 % second), maxillary first molars (4.04 %), mandibular first molars (3.03 %).

The studies most closely related in topic to our research are the works performed by Brotskyi N. O. and co-authors, which, in addition, were also conducted in a Ukrainian population corresponding to our age category. However, in his studies a cephalometric analysis method according to Ricketts was used. In one of the studies, the correlation between cephalometric indicators and the dimensions of teeth and dental arches was assessed. Without taking facial type into account, the proportion of associations with maxillary tooth dimensions was 7.76 % in young men and 9.39 % in young women, with mandibular tooth dimensions – 9.39 % in young men and 8.98% in young women, with dental arch dimensions 24.60 % in young men and 10.32% in young women [4]. In another study, regression models of linear dimensions required to construct the correct shape of dental arches were built. For young men and young women, all 18 possible significant models ($p<0,001$) with a coefficient of determination >0,6 were constructed. The variables most frequently included in the models were, in young men, teleradiometric indicators (27.35 %), the width of the crown part in the mesio-distal direction (20.51 %) and in the vestibulo-oral direction (17.09 %), the distance from the incisal edge to the root apex (11.11 %); in young women, teleradiometric indicators (37.50 %), crown width in the mesio-distal direction (18.75 %), the width of the enamel-dentin junction and the distance from the incisal edge to the root apex (8.04 % each) [5]. In the most recent work, correlations between teleradiometric indicators according to Ricketts and CT dimensions of teeth and dental arches were analyzed. Correlations between teleradiometric indicators and tooth dimensions were of moderate strength and amounted to r from 0.32 to 0.50 [6].

Assessment of cephalometric and dento-maxillary indicators in a sample of 113 individuals with Class III malocclusion did not reveal any statistically significant associations between the magnitude of anterior Bolton discrepancy and cephalometric indicators, such as SNA ($r=-0,046$; $p=0,629$), ANB ($r=-0,089$; $p=0,348$) and others [1]. The results of another similar study showed manifestations of sexual dimorphism, in particular, in men most linear arch dimensions were statistically significantly larger than in women ($p<0.05$), although no such differences were found for the Bolton ratio [21].

Assessment of 100 plaster models (50 men and 50 women) showed the presence of moderately strong associations between crown diameters and dental arch length, with coefficients up to 0.60-0.62 for mandibular arch length and up to 0,68 between maxillary arch length and individual crown diameters [2].

When analyzing plaster models of mixed dentition

(100 models of boys and girls aged 7-10 years), low but significant inverse associations were found between the mesio-distal diameters of certain teeth and the magnitude of the arch "space deficiency". In girls, for the maxilla r=-0.383 (p=0.001) for 11 and r=-0.383 (p=0.001) for 21 were found, for the mandible r=-0.341 (p=0.004) for 42, and in boys for the mandible r=-0.369 (p=0.038) for 46 [9].

In an Egyptian sample of children aged 11-16 years, in the mandible a significant direct association was found between AP and AL (r=0.641; p=0.006) and between CMWT and AL (r=0.618; p=0.008). At the same time, for the maxilla no significant associations were established [11]. In another study with a similar age sample, the TS-ALD index in the maxilla had moderate direct associations with arch length (r=0.241; p=0.031), anterior arch length (r=0.315; p=0.004), and intermolar width (r=0.325; p=0.003), and in the mandible inverse correlations with the mandibular plane angle (r=-0.287; p=0.048) [13].

F. A. Kareem and co-authors established that the upper arch perimeter is most strongly associated with arch length (r=0.769), intermolar width (r=0.670) and intercanine width (r=0.640), whereas in the mandible the perimeter correlates more strongly with intermolar width (r=0.708) and intercanine width (r=0.684), and the association with arch length was weaker (r=0.273) [14].

S. Singh and G. Shivaprakash [25], during statistical analysis, found a significant inverse association between mandibular crowding and effective mandibular length (r=-0.290; p=0.025), pronounced direct correlations between maxillary and mandibular crowding (r=0.640; p=0.001) and between effective maxillary and mandibular lengths (r=0.555; p=0.001).

The obtained data are of great interest for practical orthodontics, as indicated by the results of clinical cases in which knowledge obtained in research is successfully applied [15, 17, 20, 27].

Conclusion

1. In young men and young women with physiological occlusion and a wide facial type, all 18 possible significant (p<0.001) models of the linear dimensions of dental arches were built depending on the characteristics of Burstone cephalometric indicators and computed tomography tooth dimensions (in young men R^2= from 0.829 to 0.980; in young women R^2= from 0.680 to 0.962).

2. When analyzing the frequency of inclusion of Burstone cephalometric indicators and computed tomography tooth dimensions in the models, the most frequently included variables in young men were cephalometric indicators (23.70 %), the width of the crown part of the corresponding teeth in the mesiodistal plane (20.74 %), and the width of the crown part of the corresponding teeth in the vestibulo-oral plane (17.04 %); whereas in young women – cephalometric indicators (27.21 %), the width of the crown part of the corresponding teeth in the mesiodistal plane (13.24 %), the width of the crown part of the corresponding teeth in the vestibulo-oral plane (11.03 %), and the width of the cervical part of the corresponding teeth in the vestibulo-oral plane (10.29 %).

3. When analyzing the frequency of inclusion of the corresponding teeth in the models, the most frequently included in young men were maxillary lateral incisors and canines (13.59 % each), maxillary central incisors (11.65 %), and mandibular canines (10.68 %); whereas in young women – maxillary central incisors (23.23 %), mandibular canines (14.14 %), mandibular lateral incisors (13.13 %), maxillary lateral incisors (12.12 %), mandibular central incisors (11.11 %), and maxillary canines (10.10 %).

References

[1] Aktürk, E. S., Müftüoğlu, Ö., & Memikoğlu, T. U. T. (2022). Anterior Tooth Size Discrepancy in Class III Surgical Patients. T*urkish Journal of Orthodontics, 35*(3), 186-191. doi: 10.5152/TurkJOrthod.2022.21202

[2] Alt, K. W., Honrath, N., Weykamp, M., Grönebaum, P., Nicklisch, N., & Vach, W. (2024). The correlation of tooth sizes and jaw dimensions with biological sex and stature in a contemporary central European population. *Biology, 13*(8), 569. doi: 10.3390/biology13080569

[3] Atasever İşler, A. A., Hezenci, Y., & Bulut, M. (2025). Prevalence of orthodontic malocclusion in children aged 10–12: an epidemiological study. *BMC Oral Health, 25*(1), 249. doi: 10.1186/s12903-025-05650-x

[4] Brotskyi, N. O. (2025). Correlations between Ricketts "internal structure" cephalometric parameters and tooth and dental arch dimensions in Ukrainian young men and women with physiological occlusion, with and without consideration of facial type. *Вісник Вінницького національного медичного університету=Reports of Vinnytsia National Medical University, 29*(4), 572-580. doi: 10.31393/reports-vnmedical-2025-29(4)-03

[5] Brotskyi, N. O., Dmitriev, M. O., Arshynnikov, R. S., Drachuk, N. V., Popova, O. I., Moskalenko, V. B., & Ruban, M. M. (2024). Models of linear dimensions necessary for constructing the correct shape of the dental arch in boys and girls with a wide face type depending on the characteristics of teleradiometric indicators. *Вісник Вінницького національного медичного університету=Reports of Vinnytsia National Medical University, 28*(4), 613-619. doi: 10.31393/reports-vnmedical-2024-28(4)-06

[6] Brotskyi, N. O., Dmitriev, M. O., Beliaiev, E. V., Piliponova, V. V., & Kyrychenko, I. M. (2025). Correlations of teleradiometric "dental" indicators according to the Ricketts method with the sizes of teeth and dental arches in Ukrainian young men and young women with physiological occlusion without and taking into account the type of face. *Вісник Вінницького національного медичного університету=Reports of Vinnytsia National Medical University, 29*(1), 19-28. doi: 10.31393/reports-vnmedical-2025-29(1)-03

[7] Burstone, C. J., James, R. B., Legan, H., Murphy, G. A., & Norton, L. A. (1979). Cephalometrics for orthognathic surgery. *J Oral Surg*, (36), 269-277. PMID: 273073

[8] Chen, H., Lin, L., Chen, J., & Huang, F. (2024, July). Prevalence of malocclusion traits in primary dentition, 2010-2024: a systematic review. In *Healthcare* (Vol. 12, No. 13, p. 1321). MDPI. doi: 10.3390/healthcare12131321

[9] Daoud, R., Bencze, M. A., Albu, C. C., Teodorescu, E., Dragomirescu, A. O., Vasilache, A., ... & Ionescu, E. (2021). Implications of permanent teeth dimensions and arch lengths on dental crowding during the mixed dentition period. *Applied Sciences, 11*(17), 8004. doi: 10.3390/app11178004

[10] Devanna, R., Felemban, N. H., Althomali, Y., Battepati, P. M., Alfawzan, A. A., & Gupta, P. (2021). Prevalence of malocclusion among children of the Kingdom of Saudi Arabia–A systematic review and meta-analysis. *The Saudi Dental Journal, 33*(8), 826-834. doi: 10.1016/j.sdentj.2021.09.005

[11] Elhiny, O. A., Sharaf, R. F., Abou Elyazied, M., Radwan, E., & Salem, G. A. (2021). The relationship between tooth size, arch length and arch perimeter in Egyptians. *Bali Medical Journal, 10*(3), 1056-1060. doi: 10.15562/bmj.v10i3.2618

[12] Ferro, R., Besostri, A., Olivieri, A., Quinzi, V., & Scibetta, D. (2016). Prevalence of cross-bite in a sample of Italian preschoolers. *Eur J Paediatr Dent, 17*(1), 307-309. PMID: 28045319

[13] García-Gil, M., Alarcón, J. A., Cacho, A., Yañez-Vico, R., Palma-Fernández, J. C., & Martin, C. (2023). Association between eruption sequence of posterior teeth, dental crowding, arch dimensions, incisor inclination, and skeletal growth pattern. *Children, 10*(4), 674. doi: 10.3390/children10040674

[14] Kareem, F. A., Rauf, A. M., Noori, A. J., & Ali Mahmood, T. M. (2020). Prediction of the dental arch perimeter in a Kurdish sample in Sulaimani City based on other linear dental arch measurements as a malocclusion preventive measure. *Computational and Mathematical Methods in Medicine, 2020*(1), 8869996. doi: 10.1155/2020/8869996

[15] Kochar, G. D. (2021). Management of Tooth Size Arch Perimeter Discrepancy: An Indian Board of Orthodontics Case Report. J*ournal of Indian Orthodontic Society, 55*(3), 310-314. doi: 10.1177/03015742211026217

[16] Krooks, L., Pirttiniemi, P., Kanavakis, G., & Lähdesmäki, R. (2016). Prevalence of malocclusion traits and orthodontic treatment in a Finnish adult population. *Acta Odontologica Scandinavica, 74*(5), 362-367. doi: 10.3109/00016357.2016.1151547

[17] Lim, H. J., Kim, Y., Park, J. H., Lee, N. K., Kim, K. B., & Kook, Y. A. (2022). Cephalometric and model evaluations after molar distalization using modified C-palatal plates in patients with severe arch length discrepancy. *American Journal of Orthodontics and Dentofacial Orthopedics, 162*(6), 870-880. doi: 10.1016/j.ajodo.2021.07.024

[18] Londono, J., Ghasemi, S., Moghaddasi, N., Baninajarian, H., Fahimipour, A., Hashemi, S., ... & Dashti, M. (2023). Prevalence of malocclusion in Turkish children and adolescents: A systematic review and meta-analysis. *Clinical and experimental dental research, 9*(4), 689-700. doi: 10.1002/cre2.771

[19] Marchenko, A. V., Gunas, I. V., Petrushanko, T. O., Serebrennikova, O. A., & Trofimenko, Yu. Yu. (2017). Computer-tomographic characteristics of root length incisors and canines of the upper and lower jaws in boys and girls with different craniotypes and physiological bite. *Wiadomosci Lekarskie (Warsaw, Poland: 1960), 70*(3 pt 1), 499-502. PMID: 28711896

[20] Nugraha, A. P., Putri, D. A., Salim, A., Narmada, I. B., Triwardhani, A., Ardani, I. G. A. W., ... & Pramusita, A. (2025). Arch Length Discrepancy Analysis Comparison with the Huckaba and Moyers Method in Angle Class I Malocclusion in Surabayan Children with Mixed Dentition during the Growth and Development Phase: A Retrospective Cross-Sectional Study in Universitas Airlangga Dental Hospital. *European Journal of Dentistry*. Online ahead of print. doi: 10.1055/s-0045-1807732

[21] Omar, H., Alhajrasi, M., Felemban, N., & Hassan, A. (2018). Dental arch dimensions, form and tooth size ratio among a Saudi sample. *Saudi medical journal, 39*(1), 86-91. doi: 10.15537/smj.2018.1.21035

[22] Price, J., Whittaker, W., Birch, S., Brocklehurst, P., & Tickle, M. (2017). Socioeconomic disparities in orthodontic treatment outcomes and expenditure on orthodontics in England's state-funded National Health Service: a retrospective observational study. *BMC Oral Health, 17*(1), 123. doi: 10.1186/s12903-017-0414-1

[23] Ryabov, T. V., Shinkaruk-Dykovytska, M. M., Kotsyura, O. O., Koliadenko, S. V., Belik, N. V., Piliponova, V. V., & Gunas, I. V. (2024). Correlations of teleroentgenometric indicators according to the Steiner method with the dimensions of teeth and dental arches in young men and young women with a physiological bite without taking into account the type of face. *Вісник Вінницького національного медичного університету=Reports of Vinnytsia National Medical University, 28*(3), 410-419. doi: 10.31393/reports-vnmedical-2024-28(3)-07

[24] Schneider-Moser, U. E., & Moser, L. (2022). Very early orthodontic treatment: when, why and how?. *Dental press journal of orthodontics, 27*, e22spe2. doi: 10.1590/2177-6709.27.2.e22spe2

[25] Singh, S., & Shivaprakash, G. (2017). To evaluate the correlation between skeletal and dental parameters to the amount of crowding in class II div. 1 malocclusions. *Journal of clinical and diagnostic research: JCDR, 11*(9), ZC22-ZC27. doi: 10.7860/JCDR/2017/27675.10566

[26] Vithanaarachchi, S. N., & Nawarathna, L. S. (2017). Prevalence of anterior cross bite in preadolescent orthodontic patients attending an orthodontic clinic. *Ceylon Medical Journal, 62*(3), 189-192. doi: 10.4038/cmj.v62i3.8523

[27] Volovic, J., Badirli, S., Ahmad, S., Leavitt, L., Mason, T., Bhamidipalli, S. S., ... & Turkkahraman, H. (2023). A novel machine learning model for predicting orthodontic treatment duration. *Diagnostics, 13*(17), 2740. doi: 10.3390/diagnostics13172740

[28] Vu, D. A., Vu, H. M., Nguyen, Q. T., & Vu, H. M. (2024). Malocclusion among children in Vietnam: Prevalence and associations with different habits. *Journal of oral biology and craniofacial research, 14*(2), 112-115. doi: 10.1016/j.jobcr.2024.01.007

[29] Yao, J., Li, D. D., Yang, Y. Q., McGrath, C. P. J., & Mattheos, N. (2016). What are patients' expectations of orthodontic treatment: a systematic review. *BMC oral health, 16*(1), 19. doi: 10.1186/s12903-016-0182-3

[30] Zhou, X., Zhang, Y., Wang, Y., Zhang, H., Chen, L., & Liu, Y. (2017). Prevalence of malocclusion in 3-to 5-year-old children in Shanghai, China. *International journal of environmental research and public health, 14*(3), 328. doi: 10.3390/ijerph14030328

МОДЕЛЮВАННЯ ЛІНІЙНИХ РОЗМІРІВ ЗУБНИХ ДУГ В УКРАЇНСЬКИХ ЮНАКІВ І ДІВЧАТ ІЗ ФІЗІОЛОГІЧНИМ ПРИКУСОМ І ШИРОКИМ ТИПОМ ОБЛИЧЧЯ В ЗАЛЕЖНОСТІ ВІД ОСОБЛИВОСТЕЙ ТЕЛЕРЕНТГЕНОГРАФІЧНИХ ПОКАЗНИКІВ ЗА МЕТОДОМ BURSTONE ТА КОМП'ЮТЕРНО-ТОМОГРАФІЧНИХ РОЗМІРІВ ЗУБІВ

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Варіабельність лінійних параметрів зубних дуг може бути зумовлена краніофаціальними особливостями та розмірами зубів. Проведення дослідження, що дозволить точніше описати взаємодію, тобто, взаємозв'язки цих трьох структур у межах специфічної популяції, дозволить підвищити обґрунтованість ортодонтичної діагностики та лікування. Вибір телерентгенометричних показників за Burstone є найбільш доцільним, зважаючи на малочисельність досліджень з використанням цього аналізу на українській популяції. Мета дослідження – розробка та аналіз регресійних моделей лінійних розмірів зубних дуг в українських юнаків і дівчат із фізіологічним прикусом із широким типом обличчя в залежності від особливостей телерентгенографічних показників за методом Burstone та комп'ютерно-томографічних розмірів зубів. На первинних комп'ютерних томограмах та телерентгенограмах 25 українських юнаків і 25 дівчат із фізіологічним прикусом і широким типом обличчя, що були отримані з банку даних науково-дослідного центру та кафедри стоматології дитячого віку Вінницького національного медичного університету ім. М. І. Пирогова, проведено вимірювання лінійних і кутових показників за методом Burstone та розмірів зубів і зубних дуг. Регресійні моделі розмірів зубних дуг в залежності від телерентгенометричних показників і комп'ютерно-томографічних розмірів зубів побудовані за допомогою ліцензійного пакету «Statistica 6.0». Встановлено, що в юнаків і дівчат із фізіологічним прикусом і широким типом обличчя побудовані усі 18 можливих достовірних моделей лінійних параметрів необхідних для побудови коректної форми зубних дуг в залежності від особливостей телерентгенометричних показників за методом Burstone та комп'ютерно-томографічних розмірів зубів із коефіцієнтом детермінації (R^2) більшим 0,6 (в юнаків R^2= від 0,829 до 0,980, p<0,001 в усіх випадках; дівчат R^2= від 0,680 до 0,962, p<0,001 в усіх випадках). Аналіз частоти входження до моделей комп'ютерно-томографічних розмірів зубів і телерентгенометричних показників за методом Burstone показав: в юнаків найбільш часто входять телерентгенометричні показники (23,70 %), ширина коронкової частини відповідних зубів у мезіо-дистальній площині (20,74 %) та ширина коронкової частини відповідних зубів у вестибуло-оральній площині (17,04 %); у дівчат найбільш часто входять телерентгенометричні показники (27,21 %), ширина коронкової частини відповідних зубів у мезіо-дистальній площині (13,24 %), ширина коронкової частини відповідних зубів у вестибуло-оральній площині (11,03 %) та ширина пришийкової частини відповідних зубів у вестибуло-оральній площині (10,29 %). Аналіз частоти входження до моделей відповідних зубів показав: в юнаків найбільш часто входять верхні бічні різці й ікла (по 13.59 %), верхні присередні різці (11,65 %) та нижні ікла (10,68 %); у дівчат найбільш часто входять верхні присередні різці (23,23 %), нижні ікла (14,14 %), нижні бічні різці (13,13 %), верхні бічні різці (12,12 %), нижні присередні різці (11,11 %) та верхні ікла (10,10 %).

Ключові слова: *стоматологія, цефалометрія за методом Burstone, комп'ютерно-томографічні розміри зубів і зубних дуг, юнаки та дівчата, тип обличчя, фізіологічний прикус, регресійний аналіз.*

Author's contribution

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