

REVIEW

by Prof. Dr. Dimitar Stefanov Kadiysky, Doctor of Medical Sciences

Institute of Experimental Morphology, Pathology and Anthropology with Museum (IEMPAM) –
Bulgarian Academy of Sciences

Regarding the dissertation for awarding the Doctor scientific degree in the field of higher education: 4. Natural Sciences, Mathematics and Informatics, Professional Field: 4.3 Biological Sciences, Scientific Specialty "Anthropology", code 01.06.01

Author: Dr. Boyan Valentinov Kirilov

Topic: *"Main anthropological signs and eruption of permanent teeth in 5-12-year-old children and adolescents"*

Scientific supervisor: Assoc. Prof. Dr. Ivaila Ivanova-Pandurska

Scientific consultant: Senior Assistant Prof. Dr. Yanitsa Zhecheva

Procedure for defending a dissertation.

Order NO-05-05-6 / 02.10.2025 of the Director of the Institute of Experimental Morphology, Pathology and Anthropology with a Museum (IEMPAM) - BAS, appoints me as a member of the Scientific Jury in connection with the procedure for the defense of a dissertation on the topic "Basic anthropological signs and eruption of permanent teeth in 5–12-year-old children and adolescents" for the acquisition of the educational and scientific degree "Doctor" - field of higher education: 4. Natural Sciences, Mathematics and Informatics, Professional Direction: 4.3 Biological Sciences, Specialty "Anthropology", code 01.06.01. The author of the dissertation is Dr. Boyan Valentinov Kirilov, a full-time doctoral student (enrolled with order No. RD-15 – 7/29.01.2020) at the "Anthropology and Anatomy" Section of the Institute of Experimental Morphology, Pathology and Anthropology with a Museum, (IEMPAM) BAS. To prepare the review, I received in electronic form the materials required by the Regulations for the Development of the Academic Staff of IEMPAM and in accordance with the rules for the application of the Law on Academic Staff Development (LASD) in the Republic of Bulgaria and BAS.

The doctoral student is studying in the period 15.09.2013– 08.07.2019 at the Medical University – Sofia for a Master of Dental Medicine. His professional growth subsequently includes official commitments from 01.10.2019 to 01.08.2024 at "SiD" Denti OOD as a dental doctor, and from 01.01.2024 to the present he is a manager - dental doctor at AIPDP - "Dentalntsa" EOOD. In parallel with his commitments in the field of healthcare, Dr. Kirilov is a full-time doctoral student at IEMPAM - BAS from 01.01.2020 to 01.01.2024. The main competencies resulting from his medical education and practice contribute to conducting research in the scientific field of contemporary anthropological research. Almost the entire scientific career of the doctoral student is related to the research and educational activities conducted at IEMPAM - BAS, specifically in the Section of Anthropology and Anatomy. To date, he has been dismissed from doctoral studies with the right to defend after successfully passing internal approval - the dissertation work was discussed and directed for defense at an extended meeting of the Section - seminar on 24.09.2025 at IEMPAM - BAS.

Biomedical significance of the study.

The dissertation topic is directly and indirectly related to the important anthropological screening of the modern living population from a medical and biological point of view. Scientific research of this type is the subject of study of modern physical anthropology. A similar type of anthropological research of the population of a given country provides information about the physical development and health status of children, adolescents and adults, body composition, body fitness and somatotype; they allow for the assessment of the influence of genetic factors and environmental factors on the morphofunctional characteristics of a person. The goal set for the development of this dissertation - through anthropological methods to study and characterize the specifics of physical development in parallel with the eruption of permanent teeth in children and adolescents from 5 to 12 years of age - falls completely within the field of modern physical anthropology. The topic of the dissertation allows for the application of a comprehensive methodological approach to a sufficient research contingent (709 children aged between 5 and 12 years, of which 361 boys and 348 girls, with the age groups formed according to one-year age periods).

The Introduction and the **Literature review**, resulting from the review of 164 literature sources, convince us that scientific studies in Bulgaria on growth and development, including the eruption of permanent teeth in children and adolescents, are relatively few. On the other hand, studies analyzing the relationship between the eruption of permanent teeth, cephalo- and somatometric signs and physical fitness in children and adolescents are practically not many either. The dissertation shows good knowledge of the state of the problem and the a priori assessment of the significance of the work for medical practice is clearly positive.

Evaluation of the work.

The dissertation work is structured according to generally accepted requirements - introduction, literature review, aim and objectives, material and methods, results and discussion, conclusions, contributions and literature. It is written on 134 pages and includes 25 tables and 28 figures, graphs and diagrams. The included literature covers 164 sources (40 in Cyrillic and 124 in Latin). In the overall literary interpretation of the problem based on the review of the aforementioned 164 literary sources, the author establishes that there are relatively few scientific studies in Bulgaria, the purpose of which is an anthropological analysis of physical development, including the eruption of permanent teeth in children and adolescents, as well as an assessment of the relationships between tooth eruption and cephalometric signs, height, weight and body mass index.

The dissertation focuses on the anthropological characteristics of children and adolescents and the development of the maxillofacial region during different age periods, which is associated with the specifics of physical development. It is noted that during the periods of growth and development of the organism, deviations from the norms of physical development for a given age also appear significant, as their detection and regulation can prevent the development of pathological deviations.

The lack of a large-scale study in Bulgaria after 1978 on the development of the maxillofacial region during different age periods, together with the specifics of the overall physical development of the individual, has contributed to the definition of the goals of the dissertation work: to study and characterize the specifics of the physical development and eruption of permanent teeth in 5–12-year-old children and adolescents using anthropological methods. The tasks to be solved arise directly from this goal:

1. Conduct a representative anthropological study according to a specially compiled program of children between the ages of 5 and 12.

2. To make an age-sex anthropological characteristic according to metric data for basic cephalometric signs and indices, height, body weight and to assess the type of physical protection of children and adolescents.
3. Analyze the peculiarities in the sequence and rates of eruption of permanent teeth in relation to age and gender.
4. To assess the relationships between the eruption of permanent teeth and the dimensions of the face, the main anthropometric features.
5. Assessment of the frequency of occurrence of dental caries of the first molars (M6) in the studied children.

The study material is sufficient in volume - a transversal anthropological study of children and adolescents in a total of 11 schools and 4 kindergartens - on the territory of Sofia 5 schools and 3 kindergartens and 6 schools and 1 kindergarten in Sofia region. The research material is properly structured, well documented and precisely registered, which guarantees the reliability of the results obtained.

The experimental research approach of the author of the dissertation includes methods sufficient in number, volume and representativeness with which an adequate answer to the tasks is obtained. From the five tasks directly related to the goal, a detailed structured methodology for solving them arises, including: Anthropological program, Cephalometric signs and indices, Somatometric signs and body security, Odontoscopic signs, etc. The applied methods can be summarized in general as: survey, anthropometric, anthroposcopic and mathematical-statistical methods, parametric, correlation, logistic regression and graphical analyses.

The **Results and Discussion** section occupies a total of 65 pages of the presentation (from 50 to 115 pages). An essential basis for the development of the study, which served to compile the dissertation, is the summarized assessment of the results of the study of height, body weight and body protection in the studied periods of development of the child's organism. The importance of this part of the dissertation stems from the fact that height and body weight are two of the main anthropometric indicators for assessing the physical development of a person during the various stages of postnatal ontogenesis. Without dwelling in detail on the data obtained, I will emphasize that the screening of these indicators carried out by the author of the dissertation makes it possible to characterize the intensity of growth of the child's organism and to assess whether its physical development is within the normal range. By conducting the study, clearly expressed chronological and gender differences were established. Conclusions were drawn that the beginning of the eruption of most teeth is earlier in girls than in boys.

An essential part of the development of the dissertation work is the establishment of a correlation between anthropometric characteristics and the eruption of permanent teeth.

The data on the studied anthropometric characteristics and the eruption of permanent teeth provide information on the growth of children and adolescents specifically during the age period 5-12 years. It has been documented and graphically presented that the development and eruption of teeth in this period are inextricably linked to the growth of maxillofacial dimensions. The established correlations between anthropometric characteristics (with the exception of the height of the entire upper lip) and erupted permanent teeth are positive and statistically reliable. The significant correlations between height and eruption of permanent teeth, as well as between weight and eruption, reveal the relationship between tooth formation, bone growth and maturation. The observed clear dependence and correlation of data is

reflected in detail in the Conclusions of the dissertation. The results of the research in connection with the dissertation work are summarized in 8 conclusions, concerning the entire range of the study.

In clearly formulated theoretical and scientific-applied Contributions, the author of the dissertation work summarizes the data and results of his experimental work. Along with the contributions of a theoretical nature - the established specificity of inter-sex and inter-age differences in anthropometric characteristics, the positive correlations between the main cephalometric and somatometric signs and the eruption of permanent teeth, the eruption of permanent teeth and the presence of caries of the first molars, data on the eruption of permanent teeth in children and adolescents with varying degrees of physical fitness, there are important conclusions of a scientific-applied nature - these are the updated anthropometric data on dental eruption, which can be used in the training of students with a medical and biological profile; in scientific and clinical practice for assessing the morphofunctional maturity of the child's organism and in comparative anthropological studies.

The main **results of the study have been published** in English in 5 scientific articles and have been promoted in 3 communications at scientific forums. The publications are co-authored, but my personal impressions of the work of the team under the leadership of the scientific supervisor and consultant give me reason not to doubt that Dr. Boyan Kirilov has made his main contribution to a large part of the results.

The abstract is sufficiently comprehensive in terms of including the main results and contributions of the dissertation work.

My recommendations are that in the further research activities of the doctoral student, work should be done both for the future expansion of the geographical territory of such studies, and in the direction of expanding studies on the relationships of certain nosological units of dental pathology and deviations in the physical development of the individual.

CONCLUSION

The dissertation work of Dr. Boyan Valentinov Kirilov represents a contemporary study of current problems of physical anthropology, enriching research approaches in the field. The practical usefulness of the results obtained from the conducted study consists in facilitating the scientific identification of some pathological changes in the physical development of adolescents and in optimizing therapeutic behavior. In this sense, the presented dissertation work represents a scientific development of importance for dental and orthodontic practices in the preparation of certain clinical-diagnostic and therapeutic plans. The doctoral student possesses knowledge and skills for successful scientific research work in the scientific specialty. The materials and documents of the procedure meet the requirements of the Act on the Development of Academic Staff in the Republic of Bulgaria, the Regulations for the Implementation of this Act and the Regulations for the Acquisition of the Doctor degree at IEMPAM - BAS.

Based on the above, I give a positive assessment of the conducted scientific research reflected in the dissertation work, and I propose to the esteemed Scientific Jury to award Dr. Boyan Valentinov Kirilov the educational and scientific degree "Doctor" in the field of higher education 4. Natural Sciences, Mathematics and Informatics, Professional field: 4.3 Biological Sciences, Scientific specialty Anthropology, code 01.06.01

Prof. Dr. Dimitar Kadiysky, MD, PhD, DSci

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