

## REVIEW

**From Prof. Dr Vera Borisova Krumova, PhD**

**Member of the Scientific Jury Under Order of the Rector of Mu-Varna No  
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Author of the dissertation: **Dr. Iliyana Georgieva Atanasova**

**Topic of the dissertation: "Evaluation of individual indicators for orthodontic  
treatment of children with mixed and permanent dentition"**

Subject: the dissertation for awarding the scientific-educational degree

"Doctor", scientific specialty: "Orthopedic dentistry "

### **I. Biographical notes**

Dr. Iliyana Georgieva Atanasova was born in 1979 in Varna. In 1996 she completed her secondary education in high school "Sveti Kliment Ohridski" -city of Varna in profiled program with English and Russian. In 1999, she graduated with excellent grade from Medical College - Varna specialty Pharmacy with professional qualification -assistant pharmacist. In 2011 she graduated from Faculty of Dental Medicine at Medical University of Varna and acquired master degree in Dentistry. As the first of "Class 2011" she has been awarded with a "GOLDEN HIPPOCRATES" and Diploma "STUDENS OPTIMUS" – Prof. Dr. Slavcho Davidov for excellent accomplishments and high student achievement in the academic, scientific and creative activities of the class of 2011. After graduating since 2011 to 2013, she was part of the academic staff of the Department of Orthodontics. After a short break since 2016 Dr Atanasova is a full-time employed assistant-professor at the Department of Orthodontics, FDM at MU-Varna. In 2020, Dr. Atanasova acquired a specialty in Orthodontics. In 2019 she was assigned a full-time PhD student in the Department of Orthodontics and was elected as administrative assistant of the Department of Orthodontics.

Fluent in English and Russian. Regular member of the Bulgarian Dental Association , Bulgarian Orthodontic Society, Australian Dental Association, European Orthodontic Society. Dr Atanasova has 20 publications and participated 22 national and international conferences and symposiums.

## **II. Relevance of the problem**

In her dissertation, Dr. Iliyana Atanasova discusses a contemporary topic in the field of Orthodontics. There is a growing need to comply with individual indicators of growth and development of the patient, when treatment plan and prognosis should be prepared. During the pubertal period of growth when the children are in mixed or permanent dentition, a great variability in biometrical and radiographic parameters have been observed. Therefore, a précised assessment is essential for treatment outcome. Dr. Atanasova uses various innovative approaches, presented in formulation of the tasks in the dissertation.

## **III. Structure of the dissertation**

The dissertation "Evaluation of individual indicators for orthodontic treatment of children with mixed and permanent dentition" with author Dr. Iliyana Georgieva Atanasova is topical with its scientifically and practically applied nature. The dissertation contains 138 pages, 39 tables, 55 figures, 5 schemes and 16 application, 161 literary sources were cited, including 7 in Cyrillic and 154 in Latin. The literature review was presented on 40 pages. Chapters: - Purpose and tasks -1 page, Materials and methods -19 pages, Results and discussion 41 pages. Conclusions and affiliations -4 pages.

The literature review clearly shows that the dissertation has thoroughly studied the stages of ontogenetic development, the concepts of growth. A comprehensive survey of methods for evaluation of dental and skeletal age was performed. Based on literature review the author concluded that prompt orthodontic treatment of skeletal malocclusions with orthopedic effect is contemporary problem of medical and social significance. The author emphasizes insufficient data in our country on studying individual indicators of growth and development to provide guidance for the initiation of orthodontic treatment. Insufficient survey on accuracy of methods for dental age evaluation among Bulgarian subjects has been pointed as well.

## **IV. Purpose and tasks**

Purpose:

The purpose of the dissertation is by examining individual indicators of the pubertal growth period to create a prognostic model on orthopanthogram for the initiation of orthodontic treatment. The purpose of dissertation is clearly formulated.

To fulfill the goal the author formulated the following tasks:

#### Task 1

To conduct a study to assess the dental age of children in mixed and permanent dentition aged 7-16 years by using the methods of Demirjian and Willems .To determine the accuracy of each method (up to 0.5 years) relative to the chronological age and between them.

#### Task 2

To determine the mean chronological age of the onset of pubertal growth peak defined by the method of cervical vertebrae maturation.

#### Task 3

To determine the mineralization stages of mandibular canine (33), mandibular second premolar (35), mandibular second molar (37) and mandibular third molar (38) in the left lower quadrant, as well as maxillary left canine (23) relative to the stages of maturation of the cervical vertebrae .

#### Task 4

To determine the correlation between the stages of mineralization of the teeth examined in Task 3 and the stages of maturation of the cervical vertebrae CVM II, CVM III, CVM IV of Baccetti method, by specifying

The purpose and tasks are well targeted at the specific groups, enabling the author, through properly selected means, to implement the topic of dissertation.

### **V. Materials and methods**

For this study, the material was systematized clearly and accurately. The children examined were 320 outpatients in the Faculty of Dental Medicine. The results of each child's survey were evaluated according to 19 indicators recorded in a statistical card. All ortopantomograms (320 - OPG) and lateral cephalograms (320 - TRG) studied - total 640 in number were digital. The visualization of radiographs is carried out using ROMEXIS viewer software, allowing image enlargement if necessary for greater accuracy of the study and AudaxCeph-Cephalometric x-ray analysis software-for TRG analysis. The main measurements for this dissertation are 6129 in number, task 1 being 2065, task 2 is 960, the third task is 1552 and task 4 is 1552 respectively.

In the performance of the first task, 295 opanthomograms of children in mixed and permanent dentition aged 7.00-16.00 years were examined. The children studied were divided into four age groups based to the period of development of dentition, according to the classification of Van der Linden .The dental age was assessed with Demirjian и Willems methods.

In the performance of a second task, 320 telegengenograms were examined. The subjects aged 7-17 years were divided in 11 age groups with 12 months increment. The skeletal age is evaluated with the method of Baccetti and mean chonological age is determined for Bulgarian children in stage of skeletal maturation CVM II, CVM III и CVM IV.

In the performance of a third task, three target groups were assigned – in the first group 64 children with cervical vertebrae maturation stage CVM II were included, in the second group 74 subjects in stage CVM III were included and in the third group 56 children in the CVM IV stage were selected. On 194 OPG of the same children from the target groups the degree of mineralization of the dental germ by the Demirjian method of left mandibular canine (33), left maxillary (23) canine, left mandibular second premolar (35), second left mandibular molar (37) and left mandibular third molar (38) was determined.

In the performance of a fourth task, we examined the correlation between the degree of mineralization of the teeth defined in task 3 determined by the Demirjian method with the stages of maturation of the cervical vertebrae CVM II, CVM III, CVM IV of Baccetti method, on 194 TRG of the same children.

## **VI. Results and discussion**

### **Results by task 1**

The study carried out on this task showed a higher significance and accuracy of the Willems method, in which the differences between dental and chronological age are less than 12 months for all age groups. Contrary the significant difference demonstrated by the method of Demerjian gives the author reason to suggest the orthodontic practitioners to prefer Willems method as a more precise in treatment planning in all age groups.

### **Results by task 2**

In task 2, the author defined the mean chronological age outlining the pubertal growth period according to the skeletal age evaluated by maturation of cervical vertebrae method. The thorough analysis of the cervical vertebrae maturation stages in different age groups and different stages of development of the dentition of subjects studied was performed. The results are of great value demonstrating earlier pubertal onset in girls in age of 9 years compared with that in boys, which is significantly later. The results are based on complete analysis of subjects, divided according to the age and gender, which enable the author to state proper conclusions about the difference among studied children.

The data obtained by the research was precisely illustrated in tables in figures.

### **Results by task 3**

In this task, the author studied the degree of mineralization of teeth 33, 35, 37, 38 and 23 during the stages of skeletal maturation CVM II, CVM III, CVM IV. The prevalence of incomplete root development and opened apical foramina of examined teeth was defined in girls during this period of growth, including left mandibular third molar-38.

### **Results by task 4**

In this task, the correlation between the degree of mineralization of the teeth determined in task 3 with the stages of maturation of the cervical vertebrae CVM II, CVM III, CVM IV of Baccetti method was examined. The indicators of the puberty development were specified on the orthopantomogram and guidance for the initiation of orthodontic treatment was provided.

Dr Atanasova established the correlation in girls of stages CVM II, CVM III and CVM IV with the degree of calcification of maxillary left canine as well. In boys, such a correlation was examined in significantly later age. This approach of studying simultaneously the degree of calcification of targeted teeth and maturation of cervical vertebrae enable determination of their correlation. A study of this nature is an innovative in our country.

Summarizing the results established in dissertation I conclude that the analysis of the data and précised illustration of it enables Dr. Atanasova and her research supervisor Assoc. prof. Dr. Arnautska, PhD to state clear and concrete affiliations in aid of the most accurate orthodontic treatment approach.

The schemes provided in the fourth task guided the practitioners précised in initiation of orthodontic treatment planning. I believe that this dissertation enrich the proper diagnostic process with more innovative approaches, which enables achieving the best results and accomplish our goals.

### **VII. Affiliations**

Based on results of the study Dr. Atanasova pointed 10 affiliations, summarizing all data of the survey conducted.

### **VIII. Contributions**

Thera are one contribution with an original character for the country. Contributions of a scientific and theoretical nature-6 and Contributions of a scientifically and practically applied nature-5. They accurately reflect the original and innovative nature of this valuable dissertation.

Contribution with an original character for the country :

For the first time in Bulgaria, a model is prepared for determining the puberty period of growth on orthopanthogram by assessing individual indicators of growth and development.

The most valuable contributions of a scientific and theoretical nature were :

The stages of mineralization of teeth 23, 33, 35, 37, 38 during the stages of skeletal age - CVM II, CVM III and CVM IV have been established.

The correlation relationships between the stages of mineralization of teeth 23, 33, 35, 37, 38 and the stages of bone age CVM II, CVM III and CVM IV have been studied.

Contributions of a scientifically and practically applied nature:

1. We recommend Willems method for assessing dental age in Bulgarian children aged 7-16 years.
2. We established the average chronological age of girls and boys until reaching it, the most effective treatment of Class III with maxillary expansion and upper jaw protraction can be done.
3. We established the mean chronological age of girls and boys at the time of reaching it the start of treatment of distal bite with retrognathic mandible should begin.

4. We determined the stages of mineralization of teeth 23, 33, 35, 37, 38 during the stages of skeletal age CVM II, CVM III and CVM IV and the relationship between them.

5. We have prepared a model for determining the puberty period of growth on orthopanthograpam, by assessing the degree of mineralization of different teeth in combination with chronological age and gender.

#### **IX. Recommendations**

Analyzing the current dissertation , which has undeniably vaue for acquiring an educational and scientific degree "Doctor", I recommend the author to issue this thesis as a monographic work in order to promote its innovative methods more. It is also necessary to include the results achieved in the teaching of students and graduates.

#### **X. Assessment of the publications and personal contribution of the dissertant.**

Dr. Atanasova has published the results of her study in 3 publications and two participations in scientific forums.

#### **XI. Conclusion**

In conclusion, I would like to emphasize that Dr. Atanasova professional growth, which I have witnessed since her student years, is only going upwards. As the first of class 2011 Dr Atanasova was awarded with "Golden Hippocrates" for excellent grades and with his current dissertation theme again proves his undeniable scientific qualities.

This gives me reason, as a reviewer and a member of the scientific jury, to vote confidently with "Yes" for the acquisition of the educational and scientific degree "Doctor" of Dr. Iliyana Georgieva Atanasova.

05.07.2022 г.

City of Varna

Reviewer



/Prof. Dr. Vera Krumova, PhD