



**OVIDIUS UNIVERSITY OF CONSTANȚA
DOCTORAL SCHOOL**

DOCTORAL FIELD: DENTAL MEDICINE

**ABSTRACT OF THE HABILITATION
THESIS**

USE OF STATISTICAL PROCEDURES FOR
CONCEPTUALIZATION, ANALYSIS AND VALIDATION OF
MEDICINE AND DENTAL MEDICINE STUDIES

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ABSTRACT OF THE HABILITATION THESIS

Use of statistical procedures for conceptualization, analysis and validation of Medicine and Dental Medicine studies

This habilitation thesis is an overview of the professional achievements obtained starting with my debut in higher education until now, both in the field of scientific research and in the field of teaching, activities carried out in the Laboratory of Biophysics, Medical Informatics and Biostatistics of the Faculty of Dentistry, but also in collaboration with the Research Centers of the "Ovidius" University of Constanța.

The habilitation thesis was drafted respecting the provisions of the Order of the Ministry of Education and Scientific Research, 3121/21.01.2015; Regulation of the "Ovidius" University of Constanța, 141/16.05.2016 regarding the organization and development of the process of obtaining the habilitation certificate and consists of three parts.

I have presented in the first part my personal scientific, professional and academic achievements.

The scientific research activity started in my last year of college when I received through a contest a training internship (Tempus grant) at the Huygens Laboratory, Leiden University, The Netherlands, a grant that represented the basis for writing the Diploma Thesis, with the title "*Study of the absorption of aggregate species of chlorophyll-A at room temperature and at low temperatures*" (1994).

In 2004 I defended my doctoral thesis entitled "*Study of human hemoglobin and its derivatives by biophysical methods*" (O.M. No. 3876/19.05.04). The research activity continued with drafting and defending in 2013 of the master's thesis in the field of Applied Mathematics and Biostatistics, entitled "*Statistical methods used in the exploratory study of enamel and dentin hardness*", as well as papers that were presented in national and international events, respectively published in specialized journals: 16 books published in national publishing houses, 1 book chapter in national publishing houses, 3 book chapters in international publishing houses, 9 practical workbooks, 90 articles published in specialized journals: (46 in ISI listed journals, 27 in BDI indexed journals, 17 in national journals), 64 papers communicated at international conferences and congresses whose abstracts appeared in "volumes of abstracts" of the congress/conference, 10 papers communicated at conferences and national congresses.

During this period, I have actively participated in several research teams as a member (22) but also as director (2) of national (22) and international (2) projects. I am currently carrying out my research activity at the *Center for research and development of the morphological and genetic studies of malignant pathology* (CEDMOG) of Ovidius Constanța University, *Electron Microscopy Laboratory*, both on electron microscopy as well as on consulting in statistical analysis of experimental data.

Publications from various International Journals and Journals with scientific impact have accumulated a Hirsch index of 6 in the Web of Science database, 5 in the Scopus database, 7 in the Google Scholar.

The main research directions that I focused and that I presented in this thesis were represented by the hardness analysis of dentin, tooth enamel and photocomposite filling materials for dentin/frontal restorations, the influence of general risk factors and local in the occurrence of periodontal disease, but also the impact of exposure to environmental factors on infectious pathology. The entire research activity so far has involved the use of statistical procedures in order to conceptualize, analyze and validate studies in the medical field and especially in the field of dentistry.

The second part of the thesis presents the main plans for professional, scientific and academic career development, as well as future research perspectives and directions.

Starting from the experience gained from studies on risk factors in the occurrence of periodontal disease, I want to deepen this issue in the future research in other respects.

It is already known that the risk of developing periodontal disease varies greatly from person to person and, over time, many factors have been identified that have been associated with an increased risk of developing marginal periodontitis.

The application of the prevention model in periodontal health requires an accurate and valid risk assessment, which makes the prevention, diagnosis and management of periodontal disease to require special attention from dentists.

In this respect, I want to develop an application based on mathematical algorithms that assigns relative weights to known risk factors in the development of marginal periodontitis, to generate the risk profile of the examined patient, and with the help of periodontists to develop interventional and monitoring therapeutic alternatives.

Another research direction I want to develop is based on the activity carried out within the *Center for research and development of the morphological and genetic studies of malignant pathology* (CEDMOG) from the "Ovidius" University of Constanța, *Electron Microscopy Laboratory*. In Romania, there is not much research on the genetic factors

involved in the occurrence and development of oral cancer. Considerable progress has been made in recent years in understanding the genetic basis of the development of oral squamous cell carcinoma. Cancer progression is due to gene modification with a role in regulating proliferation, apoptosis, genome stability, angiogenesis, invasion and metastasis. Future research efforts should focus on identifying the genetic changes that are responsible for the evolution to invasive carcinoma. Genetic markers with predictive value were identified that allowed the initiation of personalized chemoprevention therapies. Based on genetic studies and integrating biostatistical methods, I want to propose a progression model for the development of oral squamous cell carcinoma.

I aim that the coordination activity of doctoral students to be based on the approach of a current and interdisciplinary research topic. I want, in the current context of the pandemic generated by SARS-CoV-2 virus infection, to use statistical methods to quantify oropharyngeal clinical manifestations in patients in the Dobrogea area, following to compare the results obtained with other groups of patients from different regions of Romania and other states, in order to understand the peculiarities of the infectious disease Covid-19.

In the last part of the thesis are listed all the cited bibliographical references.

This thesis is the result, on the one hand, of professional experience and, on the other hand, of the results of research work, which was achieved through transparency, adaptability, collegial and team spirit and, last but not least, through a lot of dedication and perseverance.