

**"VICTOR BABES" UNIVERSITY OF MEDICINE  
AND PHARMACY TIMISOARA  
DOCTORAL SCHOOL  
DENTAL MEDICINE DOMAIN**



# **HABILITATION THESIS**

## **THREE DECADES OF RESEARCH IN IMPLANT DENTISTRY**

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## ABSTRACT

The habilitation thesis represents the area of the research directions that I followed after the PhD thesis, with title "Aspecte clinice și experimentale privind conexiunile dento-implantare", Scientific Coordinator- Prof. Univ. Dr. Dorin Bratu, Doctor's Diploma series A no. 0000433 according to the Order of the Minister of Education, Research and Youth no. 3467 of 16.03.2001, with distinction „Magna Cum Laude”.

My research activity is reflected in a Hirsch index with the value of HI 7 (IWS-Web of Science) and HIndex 10 (IGS-Google Scholar).

Graduate of the Faculty of Dentistry within the University of Medicine and Pharmacy "Victor Babeș" Timișoara (UMFT), general dentist, doctor of medical sciences and professor at UMFT, I started my teaching and research activity in 1995 at the Oral and Maxillofacial Surgery Clinic of the U.M.F. Timișoara.

In 1997 I transferred through competition to the Discipline of Oral Implantology. I present scientific and managerial experience by participating in 8 research grants, one of which is international.

I am a member of the research group of FP7 COST Action MP 1005.

I am the author for 3 OSIM patents, I have published 79 manuscripts in ISI journals and in conference proceedings.

Member of the D.G.Z.I. (German Society of Oral Implantology) since 1999 Vice President of the S.R.I.O.B. (Romanian Society of Oral Implantology and Biomaterials).

Since 2004 I am a member of ICOI (International Congress of Oral Implantologists) with the title of Fellow.

In 1999 I became the head of the Oral Implantology Discipline, Faculty of Dentistry "Vasile Goldiș" University of Arad. Since 2004 I am the head of the Oral Implantology Discipline, Faculty of Dentistry, University of Medicine and Pharmacy, UMF "Victor Babeș" Timișoara.

Part of research activity materialized by publishing a number of 9 books and treatises published in CNCSIS accredited publishing houses, more than 50 papers published in extenso, over 60 in volumes of international abstracts and 25 in volumes of national abstracts.

The achievements of a good coordinator and teamwork are supported by the 2 grants in which I participated as project manager and the 5 research projects in which I participated as a member/coordinator of the partner institution.

The thesis is structured in the form of four chapters:

The first chapter includes my scientific achievements, materialized in the creation and development of the following directions and sub-directions of research structured in the form of 3 chapters, corresponding to the three major research directions to which I turned in the period following the defense of my doctoral thesis:

- a. *Implant-bone peri-implant tissue remodeling*
- b. *Anatomical changes and advanced treatments*
- c. *Implant biomechanics, surface treatments and study of materials.*

For each of these research directions, I highlighted the most important publications from the high-level international scientific flow, articles published in the ISI and BDI journals, some of which were cited by more than 30 authors and research grants in which I participated as a project manager, coordinator from one of the partners or member of the research team.

Obviously, the collaborations I have had over time have made my scientific activity so rich.

My research career is interrelated with clinical aspects. The topics of the studies start from the more than a thousand implants inserted by me in the clinical activity so far, and their results return to the clinic, bringing every day an added value to the quality of life of the patients carrying implants.

The study of the implant-bone interface, with special emphasis on peri-implant tissue remodeling, we described in detail in subchapter 1.1. Having in the center, an important aspect - bone loss (Marginal Bone Loss) and remodeling at the implant-bone interface in various aspects.

One of these is the research of the short drilling protocol compared to the standard protocol and the influence of temperature in both situations.

As a result, there were no statistically significant differences between the two protocols.

Another aspect is related to the influence of the materials from which the superstructure is made, whether it is composites reinforced with nanoceramic particles or Lava Ultimate nanoceramic.

I have also highlighted the effects of implant diameter inserted on marginal bone loss, one of the most cited studies with over 30 citations in the international scientific flow, which attests to the quality of results and novelty in the field, but also the impact of implant height on therapeutic success.

Another concept we have considered is the association of complications in the case of implants with internal hexagonal connection (IH) and those with conical internal connections (IC).

Among of my results from an *in vitro* study based on twenty-five bovine and porcine ribs and mandibles were used, one hundred drilling osteotomies were performed to compare 2 types of drilling protocols by assessing the associated temperature changes and the extent of drill torque. There were no statistically significant differences in temperature increase between the conventional protocol and the short protocol at either of the 2 implant diameters tested (3.75 and 4.20 mm).

If tissue remodeling at the bone-implant level is a controversial and frequently addressed topic in research in the field of dentistry, studies in the field of advanced treatments are a challenge in terms of the fact that the subjects have an extraordinary dynamic.

Regarding of implant biomechanics, surface treatments and the study of materials, these fields are an opportunity for interdisciplinary research.

The most cited study (139 citations) in my research list is the one that refers to the impact of the rough surface of the implant neck on reducing marginal bone loss.

Forty-six patients completed the study, making 46 pairs of implants available for statistical analysis. None of the implants failed to integrate. All the implants displayed some extent of bone loss throughout the follow-up period. Apart from the type of implant, no correlation was found between marginal bone loss (MBL) and implant stability values (PerioTest), dimensions, place of insertion or any of the other variables collected. Implants with a rough neck surface and microfilament wires are more resistant to MBL in the early stages of healing, compared to implants with a polished neck.

My participation in research projects, which had as themes the study of bone level around osseointegrated implants, promotion of Romanian research in the European context in the field of cell biology and biocompatibility, research and infrastructure in the field of innovative implant-prosthetic therapies using bone extraction and regeneration direct, demonstrates my involvement as a researcher in the most interesting fields of dentistry.

As author of patents since 1999, a period in which this field of research was still in its infancy in Romania and difficult to access for many researchers, I contributed to the foundation of a new implant, (Endo-osteal implant for oral prosthetic rehabilitation RO114295B1), which has materialized into a new product on the market. I also contributed to the patenting of the inventions of an electroerosion device (RO114569B1) and a device for processing threads (RO114568B1).

Through these patents, I anticipated the current trend of global research to materialize scientific themes and fields and the openness of the research to the economic and production segment.

The chapters two, three and four aspects related to the evolution and development of my professional, scientific and academic career come together under one major goal: the establishment and consolidation of the Timisoara School of Implantology, in one with European and global recognition.

My international visibility as a researcher, clinician and opinion trainer in the field of Implantology is based on courses taught abroad, which I highlighted with photographic images to, some examples being: MIS Global Conference 2011, Second MIS Global Conference, 2013 Cannes, National Congress on Oral Maxillofacial Surgery, 2015-Indonesia.

At the national level, as coordinator of the Competence in Implantology program, organizer of a series of courses, the most recent of which are Dental Education la OSM Dentis 2019, Implantology course 2020, Implantology Course - Current concepts of surgery and implant prosthetics, Implantology course Timisoara, Digital Implantology by Dental Education course and main organizer of the Congress Implants Connected to Nature, I contributed to the integration of Romanian research in the international context.

All this, puts Timisoara, ones again on the world map in Implant Dentistry. Without the existence of multidisciplinary team and without the interconnection of researchers from different fields research cannot go further, we cannot talk about studies and research with major impact. This is the main concept in the reseach field.