



TITU MAIORESCU UNIVERSITY

BUCHAREST

DOCTORAL SCHOOL

MEDICINE

HABILITATION THESIS ABSTRACT

Modern Approaches in Orthopedic Surgery. Biomaterials and Musculoskeletal Reconstruction

CANDIDATE:

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The habilitation thesis entitled “Modern Approaches in Orthopaedic Surgery. Biomaterials and Musculoskeletal Reconstruction” is structured in accordance with the recommendations of the National Council for the Attestation of University Degrees, Diplomas and Certificates (CNATDCU), as well as with the provisions of the national legislation in force, being organised into three main sections.

The first section is dedicated to the presentation of the academic, scientific and research activity, highlighting, in chronological order, the main stages of professional development in the medical, teaching and scientific fields. Accordingly, I have summarised the relevant contributions to research activity and academic practice, including representative publications, articles published in national and international specialist journals, as well as the academic distinctions and awards obtained throughout my professional career. Affiliations to scientific societies and professional organisations in the field are likewise mentioned, aspects that reflect a constant involvement in clinical and teaching activity and in the specialist scientific community.

I am a graduate of the Faculty of General Medicine of the “George Emil Palade” University of Medicine, Pharmacy, Science and Technology of Târgu Mureș, class of 2003. Following the National Residency Examination held in the same year, I obtained a position in the specialty of Orthopaedics and Traumatology within the Bucharest University Centre, completing my training at the Orthopaedics and Traumatology Clinic of the Elias Emergency University Hospital. In 2010 I obtained the title of specialist physician in Orthopaedics and Traumatology, and since 2014 I have held the title of senior consultant physician (medic primar) in the same specialty.

My teaching activity began in 2017, as an associate member of the teaching staff at Titu Maiorescu University. Subsequently, I held the position of Lecturer (Șef de Lucrări) between 2018 and 2023, and since 2023 I have been Associate Professor.

Within my academic activity, I have participated in the delivery of practical classes for students, in particular within the module “Medical Emergencies and Medical First Aid. First Aid Measures”. I have also been constantly involved in the clinical research carried out within the Orthopaedics and Traumatology Department, contributing to the preparation of scientific articles and publications. From the perspective of clinical activity, I have been practising within the Orthopaedics and Traumatology Department of the Elias Emergency University Hospital since 2004. Between 2020 and 2023 I coordinated the Orthopaedics

Department of the Monza Oncology Hospital in Bucharest, and from 2023 to the present I have been the coordinator of the Orthopaedics Department of Memorial Healthcare Hospital.

The doctoral thesis, entitled “The Use of New Biodegradable Materials (Mg-Ca Alloys) in Orthopaedic Surgery. Biocompatibility”, was prepared under the supervision of Professor Adrian Gheorghe Barbilian, MD, PhD, and publicly defended in 2017 within the Doctoral School of the “Carol Davila” University of Medicine and Pharmacy. The completion of my doctoral studies represented an important moment in my professional and academic development, contributing to the consolidation of my scientific activity and to shaping the subsequent research directions in the field of orthopaedic surgery and of the biomaterials used in musculoskeletal reconstruction.

My research activity has materialised in the publication of 15 full-text articles indexed in Clarivate Web of Science, 15 articles indexed in international databases (BDI), as well as in the publication of a specialist book. I am also the author of the invention patent “Multi-material Rod for External Fixator” (OSIM 131543), awarded gold medals at the EUROINVENT, PROINVENT, Inventica and “Traian Vuia” salons of 2017, as well as the Diploma of Honour of the Academy of Sciences of Moldova. I have taken part in four research grants, in the capacity of project director, advisory member or member of the research team. My scientific activity may also be consulted through the Web of Science ResearcherID profile: HMW-0401-2023.

The second section of the thesis presents the current directions and the development prospects of the academic and research activity, founded on the experience gained through the studies carried out, the completed projects and those currently ongoing. It highlights the objectives of professional development, the research directions and the potential contributions in the field of modern orthopaedics, with an emphasis on the use of biomaterials and on innovative strategies for musculoskeletal reconstruction.

Pedagogical training was completed through the graduation of the Psycho-pedagogical Training Programme, levels I and II (2020), and managerial training through the completion, in 2026, of the master’s programme “Health Services Management” of the “George Emil Palade” UMFST of Târgu Mureș.

It should be noted that the entire research activity was built upon a stable interdisciplinary structure, bringing together orthopaedic surgeons, specialists in materials science and bioengineering, pathologists, radiologists and laboratory physicians — a collaboration

reflected in the composition of the author teams of the published papers. This working framework enabled the transfer of the results of fundamental research into clinical practice and ensured thematic continuity between in vitro studies, in vivo studies and the analysis of clinical cases.

I consider that the development of a solid academic and professional path in the medical field requires the consolidation of an environment based on collaboration, integrity and the promotion of performance. The relationships between teaching staff, students, resident physicians and specialists play an essential role in the formation of a professional community oriented towards knowledge, responsibility and progress. In this context, supporting professional excellence, recognising merit and promoting mutual respect represent fundamental principles for maintaining the quality of the educational and medical act.

On the basis of the experience accumulated, I intend to further develop my research activity in directions with practical applicability and scientific relevance. The specific objectives include:

1. Development and implementation of biodegradable and biocompatible biomaterials in bone reconstruction and modern orthopaedic surgery
2. Optimisation of the management of severe musculoskeletal trauma and development of modern intervention strategies in orthopaedic and trauma emergencies
3. Research and development of modern strategies in arthroplasty and personalised musculoskeletal reconstruction

The third section comprises the relevant bibliographic references that formed the basis of the theoretical and methodological grounding of the topics addressed, reflecting both the current relevance of the field and the interdisciplinary character of the research presented.

In conclusion, the professional path pursued over more than two decades has consistently sought the integration of the three components of the academic mission — therapeutic practice, university activity and scientific research. The directions addressed to date, from the characterisation of biodegradable alloys to the analysis of the mechanisms of limb prosthetic replacement and reconstruction, have had clinical applicability and interdisciplinary collaboration as their common denominator. Obtaining the habilitation certificate represents both a recognition of the activity carried out and the assumption of a long-term commitment to the development of medical research and to the training of future generations of specialists.