“TITU MAIORESCU” UNIVERSITY OF BUCHAREST

DOCTORAL SCHOOL

FIELD OF STUDY: MEDICINE

ABSTRACT OF THE HABILITATION THESIS

ADVANCED CONTRIBUTIONS TO THE DEVELOPMENT OF INTEGRATED MEDICAL REHABILITATION IN THE CONTEXT OF DISABILITY, NEUROREHABILITATION, TELEMEDICINE, AND EMERGING INFORMATIONAL THERAPIES

CANDIDATE:

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My habilitation thesis, entitled *Advanced Contributions to the Development of Integrated Medical Rehabilitation in the Context of Disability, Neurorehabilitation, Telemedicine, and Emerging Informational Therapies*, represents an integrated overview of my professional, academic, and scientific trajectory in the field of Physical and Rehabilitation Medicine and Balneology, a discipline to which I have devoted my entire professional career and which, over time, has become for me more than a medical specialty, evolving into a profound understanding of the relationship between disease, disability, adaptation, and the restoration of human autonomy.

Over more than three decades of activity in clinical practice, research, and academia, I have had the opportunity to witness the profound evolution of rehabilitation medicine and to actively contribute to the development of a modern, interdisciplinary, and personalized perspective on this specialty. Throughout these years, I have sought to build a professional career in which clinical experience, scientific research, and academic activity complement one another, while consistently placing the patient and the need to restore functional independence and biopsychosocial balance at the center of this endeavor.

My scientific activity has progressively evolved from clinical experience and from the desire to better understand the biological and functional mechanisms involved in rehabilitation processes. To date, I have published 18 papers in ISI Web of Science-indexed journals as first author and/or co-author, with an H-index of 8, as well as 8 papers indexed in international databases and 10 specialized books. In addition, I have authored more than 50 scientific papers published in the proceedings of national and international scientific events, for which I received 10 awards. Furthermore, since 2013, I have coordinated six research and development projects as project manager and/or project director, with a total value of EUR 3,400,000.

Throughout my scientific career, I have received 11 awards and distinctions, among which I would particularly mention the title of *Emeritus Ambassador of Romanian Spirituality* (Bucharest, 2021) and *Ambassador of the Specialty of Physical and Rehabilitation Medicine and Balneology* (Galați, 2019).

In recognition of my contributions to medical research and clinical practice, my involvement in improving public health, as well as for the professionalism, care, and dedication demonstrated in my activity within the Ilfov Public Health Directorate, I was awarded, on the occasion of Romania's National Day in 2004, the distinction **Order of *Sanitary Merit*, Officer Rank, Civil Division**, conferred by the President of Romania, Ion Iliescu, through Decree No.

1102/10.12.2004. Furthermore, in recognition of my involvement and contribution to the events of the Romanian Revolution of December 1989, I was awarded the **Order *"Victory of the Romanian Revolution of 1989"***, conferred through Decree No. 1168/22.12.2004, as well as the title of **Fighter for the Victory of the Romanian Revolution of December 1989**, granted through Decree No. 226/22.12.1992, both distinctions being conferred by the President of Romania, Ion Iliescu, in recognition of the commitment and spirit of sacrifice demonstrated during the events of December 1989.

From the very beginning of my professional career, I understood that medical rehabilitation involves far more than the treatment of a disease or the alleviation of symptoms. Rehabilitation represents the reconstruction of a life affected by illness, pain, or disability. It means restoring an individual's freedom of movement, autonomy, dignity, and the possibility of returning to their familial, social, and professional roles.

It is precisely this profoundly human dimension of rehabilitation medicine that has continuously motivated me to pursue modern therapeutic methods, innovative research directions, and multidisciplinary approaches capable of optimizing functional outcomes and improving patients' quality of life. My direct interaction with neurological patients, individuals suffering from chronic conditions, and people facing severe disabilities has strengthened my conviction that the medicine of the future must be integrative, personalized, and deeply centered on the real needs of the patient.

My clinical activity carried out within the Ilfov County Emergency Clinical Hospital, where I coordinate the Department of Physical Medicine, Rehabilitation, and Balneoclimatologie, has represented one of the most important sources of my professional and scientific development. Within this framework, I had the opportunity to work with patients presenting complex neurological disorders, severe degenerative conditions, and significant functional impairments, situations that required not only medical expertise but also the ability to build interdisciplinary teams and develop therapeutic strategies tailored to each individual patient.

In my clinical practice, I have consistently pursued the integration of conventional rehabilitation therapies with modern methods of assessment and treatment, including neuromodulation techniques, advanced physical therapies, and emerging technologies applied in functional rehabilitation. For me, rehabilitation medicine has never represented a

standardized approach, but rather a continuous adaptation to the biological, functional, and emotional particularities of each individual.

A defining component of my professional activity has been my involvement in disability management and in the assessment of people with disabilities. My position as President of the Ilfov County Commission for the Evaluation of Persons with Disabilities provided me with a profound perspective on the impact that disease and disability have on the lives of individuals and their families. Over time, I came to understand that disability cannot be reduced to an administrative or medical classification. Behind every diagnosis lies a complex human experience, marked by functional limitations, emotional imbalance, and social challenges.

This experience has continuously motivated me to promote a person-centered approach, in which assessment is conducted with professional rigor, while also being guided by empathy and human responsibility. I have always considered that the role of the physician is not limited to establishing a diagnosis or determining a degree of disability but also includes identifying the most appropriate solutions for rehabilitation, social integration, and the preservation of patient autonomy.

One of the central directions of my research has focused on modern medical rehabilitation strategies and physical therapies applied in musculoskeletal and respiratory disorders. My interest in this field originated from observing the significant impact that chronic pain and degenerative conditions have on patients' autonomy and quality of life. In this context, I developed research concerning the use of superinductive magnetic field therapy in chronic low back pain, driven by the interest in exploring non-invasive therapeutic approaches capable of reducing pain and improving functional outcomes without the adverse effects associated with long-term pharmacological treatments.

The results obtained demonstrated significant improvements in pain relief and mobility and supported the integration of modern electromagnetic therapies into multimodal rehabilitation protocols. These studies further strengthened my interest in medical biophysics and in the application of technologies capable of influencing the neurophysiological and inflammatory mechanisms involved in chronic pain and functional recovery.

Within the same research direction, I investigated extracorporeal shock wave therapy in shoulder periarthritis, with a particular interest in understanding how biophysical stimuli

may influence tissue regeneration processes and neuromuscular reorganization (Section 1.1.1.1). The studies conducted highlighted the importance of individualizing therapeutic protocols and the role of energy parameters in achieving optimal functional outcomes.

These investigations provided me with the opportunity to further explore the relationship between pathophysiological mechanisms and modern therapeutic interventions and strengthened my conviction that the future of rehabilitation medicine lies in therapies capable of influencing the deep biological processes involved in adaptation and healing.

Another important area of my scientific activity has focused on functional rehabilitation in degenerative osteoarticular disorders and on the integration of balneology into modern rehabilitation medicine (Section 1.1.1.2). Research concerning the use of sapropelic mud and saline water from Techirghiol in the rehabilitation of patients with hip osteoarthritis aimed to evaluate their effects on pain, mobility, and functional independence.

Through these studies, I sought to demonstrate that Romanian balneology may represent a valuable therapeutic resource when integrated into evidence-based medicine and a multidisciplinary therapeutic model. I consider that natural therapies have significant potential in the management of chronic degenerative disorders and may contribute substantially to improving patients' quality of life.

A major direction of my research has been represented by neurorehabilitation and the study of the molecular mechanisms involved in neuroplasticity and neurological recovery processes (Section 1.1.1.3). My clinical activity in the rehabilitation of patients with stroke and severe neurological disorders led me to further investigate the neurobiological mechanisms underlying functional brain reorganization.

My research interests focused on the role of redox homeostasis, inflammatory processes, and modern neuromodulation techniques in neurological rehabilitation, while pursuing the integration of contemporary neuroscience concepts into rehabilitation medicine practice. This research direction holds particular significance for me, as I consider neurorehabilitation to be one of the most complex and fascinating adaptive processes of the human organism.

In parallel, I have been actively involved in the development of pulmonary rehabilitation and in the integration of kinesiotherapy and therapeutic exercise into the management of chronic respiratory diseases. Research conducted in patients with COPD and

bronchial asthma highlighted the major impact that therapeutic exercise may have on exercise tolerance, cardiorespiratory performance, and quality of life.

These studies supported the development of modern and personalized pulmonary rehabilitation programs and emphasized the need for a multidimensional approach in the management of patients with chronic respiratory diseases (Section 1.1.1.4).

My interest in integrative medicine and acupuncture developed from the desire to understand the human organism beyond the limits of a strictly conventional approach (Section 1.1.1.5). My professional training in acupuncture, completed in France, provided me with the opportunity to study this discipline within a rigorous academic framework and to explore the correlations between traditional medicine and modern neuroscience.

Over time, I came to consider that the medicine of the future must be profoundly interdisciplinary, capable of integrating technology, fundamental research, and clinically validated complementary therapies into a personalized and patient-centered therapeutic model.

Looking toward the future, I consider that my research directions should evolve in accordance with the profound transformations of contemporary medicine and the new challenges generated by the increasing prevalence of chronic diseases, population ageing, and the accelerated development of medical technologies. I intend to continue the development of integrated medical rehabilitation models based on personalized medicine, neuroscience, and advanced digital technologies.

I am particularly interested in further advancing research in the fields of advanced neurorehabilitation, neuromodulation, and the use of artificial intelligence in the assessment and functional monitoring of patients with neurological and locomotor disabilities. I believe that the integration of artificial intelligence, intelligent functional assessment systems, and virtual reality into rehabilitation medicine will profoundly transform the way functional disabilities are evaluated and treated in the coming decades.

At the same time, I intend to develop projects focused on telemedicine and remote medical rehabilitation, fields that I believe will become essential for ensuring therapeutic continuity and improving the accessibility of rehabilitation services. I aim to contribute to the development of digital platforms and intelligent systems capable of monitoring patients' functional progress and personalizing therapeutic interventions in real time.

I believe that the future of rehabilitation medicine will depend on our ability to integrate technology without losing the human dimension of the physician–patient relationship. Furthermore, I intend to continue research focused on integrative medical rehabilitation and on the role of complementary therapies in optimizing neuroplasticity processes and functional recovery. I am particularly interested in further investigating the neurophysiological and molecular mechanisms involved in acupuncture and biophysical therapies, as well as in integrating these approaches into modern and multidisciplinary therapeutic models.

I believe that the medicine of the future will need to transcend the rigid boundaries between specialties and develop complex therapeutic approaches capable of stimulating the natural mechanisms of self-regulation and adaptation of the human organism.

At the academic and institutional levels, I aim to contribute to the consolidation of a modern school of rehabilitation medicine and to the development of interdisciplinary and international collaborations that will facilitate the integration of Romanian research into the international scientific community. I intend to continue training a new generation of specialists capable of combining scientific rigor, clinical expertise, and the human dimension of medical practice.

In essence, the direction in which I wish my entire professional and scientific activity to evolve is that of a profoundly human, personalized, and interdisciplinary rehabilitation medicine, capable of restoring to patients not only physical functioning, but also hope, autonomy, and the possibility of rebuilding their own lives.