

**"VICTOR BABEȘ" UNIVERSITY OF
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DOCTORAL SCHOOL
MEDICINE DOMAIN**



**INTEGRATING MODERN ASSESSMENTS IN CLINICAL
PRACTICE – FROM PREVENTION TO OUTCOMES
MEASUREMENT IN REHABILITATION MEDICINE**

ABSTRACT

Associate Professor ONOFREI ROXANA – RAMONA

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The habilitation thesis, entitled „*Integrating modern assessments in clinical practice – from prevention to outcomes measurement in rehabilitation medicine*” provides an overview and a synthesis of my main scientific, academic and professional achievements.

Throughout my research activity, I have focused on assessments, aiming to identify different risk factors or situations that could impair functions, and thus to prevent future impairments and disabilities, and to evaluate therapies outcomes in different pathologies. These two complex research directions are in a close interrelation with my professional medical career.

A significant part of my scientific activity has focused on balance and posture assessments. Balance refers to the ability of maintaining the center of gravity within the limits of stability, over the base of support, in both static and dynamic conditions. The ability to control posture and balance is a dynamic process across the lifespan, balance impairments being identified in children due to the maturational deficits, and in elderly, due to aging process. Balance deficits are associated with an increased risk of falling or sport-related injuries. Knowing the specific components and strategies used in balance control, as well the interrelations between neural, mechanical and environmental factors allows a better understanding of balance and balance impairments, with practical implications in balance assessment and training.

I have focused my researches on assessing static balance in healthy young adults, in relation with different factors considered to have an impact on maintaining proper balance. In my studies, I have assessed the influence of physical activity, as well as the impact of gender and vision, on postural balance performance in healthy young adults, or the influence of different dental conditions on static balance. Taken into account the increasing of the time spent by talking and texting on the smartphone nowadays, I also studied the impact of smartphone conversation and message texting on static balance and static plantar pressure in healthy young adults. In relation with this study, I was also involved in another study, aiming to investigate the influence of „text neck” posture on static occlusion in healthy young subjects.

Working in a sports medicine clinic, I understand the importance of identifying athletes at risk for injuries. I conducted a study aiming to evaluate the preseason

dynamic balance performance in healthy male elite soccer players and to identify potential side-to-side asymmetries, using the modified Star Excursion Balance Test. I have also studied the reliability of an easier to use protocol for this test, using a single practice trial protocol in healthy elite athletes familiar to the test from previous assessments, reducing the examination time and also the burden on athletes and tester in the pre-season screening.

Musculoskeletal disorders represent an important public health problem, and also an important cause of disability. As the prevalence of musculoskeletal disorders and chronic pain is increasing, I considered that a thorough patients' assessment is important not only to provide the right treatment, but also to identify those at risk to disability. Part of my research was oriented in identifying factors that could predispose patients with musculoskeletal pain to disability and a worse prognosis.

Osteoporosis and sarcopenia, two musculoskeletal conditions that negatively affect the functionality and the quality of life in elderly. Identifying in time osteoporotic postmenopausal women at risk to develop sarcopenia, since older osteoporotic postmenopausal women with previous falls and confirmed sarcopenia diagnosed in the EWGSOP2 criteria (low muscle mass and low muscle strength) are more likely to have a lower quality of life, as sustained by another study I was part of.

Work-related musculoskeletal disorders and complaints are an important cause of workplace disability, with a negative impact on activity for long periods of time, leading to absenteeism, reduced productivity, increased healthcare needs and costs. Healthcare professionals are at risk to develop work-related musculoskeletal complaints. I conducted two studies together with my colleagues, to have a clear view about the burden of these complaints and also about the incriminated risk factors in these healthcare practitioners, mainly in massage practitioners and surgeons; a significant need for education strategies to increase the awareness and knowledge of proper working posture and ergonomic strategies emerged from these studies.

Playing-related musculoskeletal disorders are reported to be prevalent in pianists. Pianists playing mainly romantic repertoire could be predisposed to develop musculoskeletal complaints, as resulted from a study performed to evaluate elbow extensors' isometric muscle force after playing different piano sonatas.

Ultrasound imaging utility in clinical practice in Physical and Rehabilitation Medicine has increased in the last years, especially for the assessment of different musculoskeletal pathologies. One of the common pathologies encountered in athletes

are the anterior cruciate ligament tears, and our results highlighted the accuracy and reliability of the dynamic ultrasound assessment of anterior tibial translation used to diagnose unilateral ACL tears. Having in mind the importance of body composition assessment in athletes, and also the importance of a reliable and a time-efficient method of assessment, I have joined a study that aimed to determine the reliability of percent body fat, and thus the body composition using the A-mode ultrasound in elite soccer players, using different skinfold formulas.

Outcomes assessment is essential in both research and clinical practice to monitor the efficiency of a treatment or the quality of care. In physical and rehabilitation medicine, the treatment's efficacy is usually measured as changes in pain, patients' impairments, disability, activity limitations, participation restrictions, and quality of life, as well as functional improvements. Another research topic of interest for me was to assess the efficacy of different relatively novel treatments, like Multiwave Locked System laser therapy (MLS) and pulsed electromagnetic field therapy (PEMF) - in comparison with classical electrotherapy interventions in shoulder pathologies, or non-immersive virtual reality system in the rehabilitation of subacute and chronic stroke patients, focusing on upper limb functionality and motor function. Other pathologies for which I studied the efficacy of a sustained rehabilitation treatment are pectus excavatum in children with no surgical treatment indications and surgically treated ankle fractures.

The results of all these studies were published mainly in Web of Science indexed journals, part of them receiving awards at the national competition Human resources – Award of the research results, and also citations.

Since 2021, I am the coordinator of the *Research Centre for Assessment of Human Motion, Functionality and Disability*.

I taught lectures and practical courses for students enrolled in the Physiotherapy program, General Medicine, and also for master students enrolled in the „Rehabilitation in neurologic disorders” master program.

I consider that education and research complement and support each other. I encouraged students to participate in research activities, part of the volunteering program developed by the university (VADA), a program which I have coordinated in our department between 2016 and 2020, but also in the *Research Centre for Assessment of Human Motion, Functionality and Disability*. I have coordinated students from the Physiotherapy program that have presented their research results

at different congresses and communication meetings. For ten years now in addition to teaching responsibilities, I have supervised and coordinated 47 bachelor theses.

I am a member of the Victor Babeș” University of Medicine and Pharmacy Timișoara Senate. I participated as a member of the commission for the admission contest for the Physiotherapy program, as well as of the bachelor exams commissions. I am a member in three PhD supervisory committees for PhD students.

The international recognition of my activity is emphasized by my participation in the editorial board of international journals - *BMC Musculoskeletal Disorders* (impact factor 2.562), *Plos One* (impact factor 3.752). I was guest editor for a special issue of *Applied Sciences* journal, and now I am topic editor for the *Frontiers in Rehabilitation Sciences*. I was reviewer for 24 international Web of Science indexed journals with impact factors, reviewing a number of 97 manuscripts. I participated as an external expert for the European Commission, evaluating proposals submitted under the HORIZON topic.

Over the years, I have attended different courses, to deepen my knowledge in the field of Physical and Rehabilitation Medicine. I have also pass the musculoskeletal ultrasound specialization exam. I am an active member of national and international societies, also participating in networking groups in these societies.

Considering further scientific perspectives, I aim to continue the current research directions and will also approach new ones – assessments of static and dynamic balance in single and dual-task conditions, gait analysis in dual-task conditions, as well as in different pathologies, assessments of mechanical properties of muscles and tendons, injury risk assessments in athletes, posture analysis studies.

In relation to scientific future plans, are the perspectives for academic and professional career, all having a main goal – improving my skills and knowledge.