

**"VICTOR BABEȘ" UNIVERSITY OF  
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MEDICINE**



**THE ASSESSMENT OF HEALTH STATUS IN SPECIAL  
POPULATION COHORTS - FROM REHABILITATION  
MEDICINE TO INTERDISCIPLINARY RESEARCH**

**ABSTRACT**

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The habilitation thesis is focused on my main achievements in the scientific research domain, as well as in the academic and professional activity. The research and professional development have been closely related. I have started my professional specialization in the field of Physical medicine and Rehabilitation dealing mostly with adult and elderly patients. Starting from 2015 I am mainly involved in the paediatric rehabilitation due to the great opportunity to conduct a paediatric rehabilitation department in the largest children hospital of the Western part of the country.

The health assessment is a key point of my scientific activity. This can be divided into two main directions, namely health assessment of children and health assessment of adults and elderly. Throughout my research activity I have focused on the evaluation of patients addressed to rehabilitation. The assessment of healthy subjects is another point of interest in my research. My studies aimed the prevention of different musculoskeletal problems, as well as the establishment of recommendations related to posture improvement, increased physical activity and overall a healthy lifestyle.

The first part of my scientific activity has focused on assessment of adults and elderly suffering from the most common pathologies addressed to rehabilitation (neurologic, posttraumatic and rheumatologic pathologies). Patients after stroke or fractures, as well as patients suffering from ankylosing spondylitis develop impairments that can have important consequences on functioning and general health status.

Stroke is a leading cause of disability, while the post-stroke depression can be associated with a higher risk of falls, increased disability, and worse rehabilitation outcomes. I have studied the impact of post-stroke depression on functioning in stroke patients included in rehabilitation programmes. Significant correlations were noticed between depressive symptoms and functional status.

Ankylosing spondylitis is a disease that also requires the involvement of the rehabilitation team. The increased cardiovascular risk is a significant determinant for increased morbidity and mortality in ankylosing spondylitis patients. The objective was to assess arterial stiffness in relation to the disease activity and functional limitation in these patients, thus bringing an interdisciplinary perspective of my research. The conclusion of the study was that arterial stiffness was associated with disease activity and functional impairment. Therefore, a better disease management could improve vascular risk in patients suffering from ankylosing spondylitis.

A topic of interest for my research activity in patients with musculoskeletal conditions that affect the respiratory capacity was to quantify the effects of physical exercise on the

pulmonary function. The assessment of functional capacity was another key objective of the rehabilitation process. Functional capacity is influenced by both the musculoskeletal system and respiratory function. The aim of one of my studies was to analyse the influence of inspiratory muscle training on aerobic capacity and pulmonary function in patients suffering from ankylosing spondylitis. Patients who followed inspiratory muscle training altogether with conventional exercise training had higher chest expansion and aerobic capacity, resting pulmonary function and ventilator efficiency than those who performed only conventional exercise training.

Another objective of my research was to assess the respiratory function and functional capacity in children with pectus excavatum (without surgical correction) who followed a physical therapy programme. The conclusion was that in pectus excavatum children without surgical indications some of the respiratory parameters and functional capacity improved significantly after a 12-week supervised exercise programme. When compared to healthy controls, functional capacity still had lower values indicating the need for follow-up of the physical exercise. I also conducted a study that aimed to assess pulmonary function and functional capacity in school children and adolescents with mild or moderate idiopathic scoliosis who were included in a rehabilitation programme. These patients suffering from scoliosis (thoracic and thoraco-lumbar types), pulmonary parameters and functional capacity improved after a 12-week supervised physical therapy programme. In spite of this, all ventilatory parameters and functional capacity measures were still lower after rehabilitation in patients compared with controls. The findings of our study have important implications for schools and school-based health professionals involved in prevention and early diagnosis of postural changes of the spine.

Assessment of plantar pressure in patients with different musculoskeletal conditions and the importance for public health represents an essential part of my research. I aimed to assess the plantar pressure distribution in children with different musculoskeletal conditions (fractures of the lower limbs and spinal deviations). In addition to this, we performed a review targeted to the main findings in the field of plantar pressure in overweight and obese children and adolescents. Stabilometry was another topic of interest of my research activity. Although the terms, calculations and interpretations were new for me and my colleagues, being related to a more bioengineering domain, we could analyse these data and draw conclusions regarding the postural balance. The assessment of stabilometry in healthy subjects undergoing different situations (for example, when using the phone) offer

information related to possible disbalance that can affect, when persistent for a long time, the stability and postural balance.

As the fractures of the femoral shaft represent common fractures of the lower limb in the paediatric population, the objectives of my research were to analyse the static plantar pressure and functional capacity in children with surgically treated unilateral femoral shaft fractures one month after the removal of the metallic implant. The conclusion was that when compared to healthy controls children with surgically treated unilateral femoral shaft fractures, although assessed after 7 months, had a different weight distribution on the feet and a decreased functional capacity. Thus, an exercise-based programme should be included in the management of children with femoral shaft fractures for regaining their functional level.

Scoliosis is a major issue in the paediatric rehabilitation medicine. The objectives of our research were to compare the static plantar pressure and stabilometric parameters between female adolescents with idiopathic scoliosis and healthy subjects. We concluded that in female adolescents diagnosed with idiopathic S shaped moderate scoliosis, the static plantar pressure and stabilometric parameters were influenced by the main scoliotic curve. Important differences in weight distribution and stability were recorded in comparison to healthy controls.

Moreover, the assessment process can be applied to healthy subjects having in view the detection of early dysfunctions and the possibility to correct them in due time. The prevention has an important role in the modern rehabilitation medicine. With the progress of technology, the assessment tools have become more precise and easier to use both for researchers and clinicians.

I have focused on plantar pressure and stabilometry assessment in healthy young adults. The objective of one of my studies was to analyse the distribution of static plantar pressure and stabilometric parameters in relation to different dental conditions in healthy young adults. We concluded that in right-handed young adults the static plantar pressure is influenced by the maximum mouth opening. Regarding the stabilometry, an improved postural stability was recorded in maximum intercuspation in comparison to mandibular postural position. In contrast, a decreased postural stability was recorded when the examination was performed with maximum mouth opening.

Another part of my research concentrated on the effects of talking and texting on the smartphone upon the postural stability and plantar pressure. Our conclusion was that postural stability was significantly affected by talking and texting on the smartphone in

healthy young adults. They had more difficulty to maintain standing postural balance while talking on the phone in comparison to texting. Talking on the phone also influenced the weight distribution on the left foot first metatarsal head and heel as compared with message texting.

Regarding the published articles in the domain of the habilitation thesis I point out the fact that 5 were include in the red zone and 2 were included in the yellow zone of the Journal Citation Reports for Science Citation Index Expanded & Social Sciences Citation Index.

Considering further scientific perspectives, I intend to continue developing on the following research directions: assessment of plantar pressure and stabilometry in paediatric patients, in healthy children and adolescents, and in adults; stabilometry, postural and plantar pressure analysis in relation with dentistry domain; assessment of functional capacity in paediatric and adult subjects; assessment of musculoskeletal complaints in musicians; assessment of paediatric and adult subjects by questionnaires and surveys. Further professional and educational perspectives are also envisaged, as altogether with the research activity must constitute the premise of my career path towards the position of conducting PhD theses.