” VICTOR BABEŞ” UNIVERSITY OF
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Orthopaedic Care Innovations and Quality of Life Improvements in Musculoskeletal Disease

ABSTRACT

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Throughout my career, my scientific achievements have significantly advanced the field of orthopaedic implants, particularly in the realms of preoperative planning, comparative biomechanical analysis, and the unforeseen effects of external factors like the COVID-19 pandemic. My dedication to improving surgical techniques and patient outcomes has led to notable contributions that have reshaped current practices and opened up new avenues for innovation and recovery in orthopaedic surgery.

One of my significant contributions lies in the realm of total hip arthroplasty with custom femoral components, where I pioneered the use of rapid prototyping techniques in preoperative planning. By integrating advanced imaging technologies with 3D printing, I developed a method that allows for the creation of patient-specific femoral components, enhancing the precision and fit of implants and ultimately improving the longevity and functionality of total hip replacements.

In addition, my work in the comparative biomechanical analysis of implants used in bicondylar tibial fractures has provided valuable insights into the performance and durability of different implant designs. Through rigorous testing and analysis, I have identified key biomechanical factors that influence the stability and healing process of these complex fractures, informing orthopaedic surgeons in their selection of the most appropriate implant for optimal patient outcomes.

Furthermore, my investigation into the biomechanical characteristics of orthopaedic implants for tibial plateau fractures, employing deep learning and support vector machine classification, has revolutionized the way we understand and predict implant performance. By harnessing the power of artificial intelligence, I have developed predictive models that can assess the biomechanical compatibility of implants with specific fracture patterns, allowing surgeons to make more informed decisions and tailor treatment plans to individual patient needs.

Lastly, my research on the unexpected repercussions of the COVID-19 pandemic on total hip arthroplasty has shed light on the challenges and adaptations faced by

orthopaedic surgeons during times of crisis. By comparing outcomes between cemented hip prostheses and cementless implants in the context of disrupted healthcare systems, I have highlighted the resilience and adaptability of orthopaedic practices while advocating for strategies to mitigate the impact of external crises on patient care.

In the field of low back pain, I have explored the correlation between multifidus fatty atrophy and lumbar disc degeneration, shedding light on the interplay between muscular changes and spinal pathology. Through detailed imaging analyses and clinical correlations, my research has highlighted the role of multifidus muscle integrity in low back pain syndromes, paving the way for targeted rehabilitation strategies and potential interventions to mitigate disc degeneration and associated symptoms.

Additionally, my work on the efficacy of liquid nitrogen in the treatment of giant cell tumour of bone has demonstrated promising results in preventing recurrence and improving patient outcomes. By investigating the biochemical and biomechanical effects of cryotherapy on tumour cells and surrounding tissues, I have provided evidence supporting the use of liquid nitrogen as an effective adjuvant therapy in the management of this challenging musculoskeletal condition.

In the domain of soft tissue sarcomas, particularly synovial sarcoma of the extremities, I have contributed to the understanding of disease characteristics and treatment outcomes. Through comprehensive clinical studies and therapeutic interventions, my research has informed clinicians about optimal management strategies, including surgical resection techniques, adjuvant therapies, and long-term surveillance protocols, leading to improved prognostic assessment and enhanced patient care.

Furthermore, my investigation into the correlation between ankle imaging findings and self-reported outcomes in patients with tibiofibular diastasis has provided valuable insights into the predictive value of radiological parameters in assessing functional recovery and treatment success. By longitudinally tracking imaging changes alongside patient-reported outcomes, I have identified key imaging biomarkers that correlate with clinical improvement, facilitating more informed decision-making and personalized treatment approaches in this challenging orthopaedic condition.

Throughout my career, my scientific achievements have been dedicated to enhancing the quality of life for orthopaedic patients through the adaptation and validation

of patient-reported outcome measures, as well as investigating psychosocial factors influencing recovery and well-being. My commitment to improving patient-centered care has resulted in significant contributions that have influenced clinical practice and patient management strategies, fostering better outcomes and holistic care approaches.

One of my notable contributions lies in the cross-cultural adaptation and validation of the Romanian Oxford Shoulder Score, a patient-reported outcome measure designed to assess functional outcomes and satisfaction following shoulder surgery. Through rigorous translation and validation processes, I have ensured the reliability and validity of this instrument for use in the Romanian population, empowering clinicians to accurately evaluate and monitor shoulder function and quality of life outcomes in their patients.

Similarly, my work on the cross-cultural adaptation and validation of the Romanian Marx Activity Rating Scale for anterior cruciate ligament (ACL) reconstruction has provided clinicians with a reliable tool to assess activity levels and functional outcomes following ACL surgery. By tailoring this scale to the cultural and linguistic context of Romania, I have facilitated more accurate assessments of patient activity levels and participation in sports and recreational activities post-surgery, aiding in treatment planning and rehabilitation strategies.

Furthermore, my development of the Mekereș' Psychosocial Internalization Scale addresses the psychosocial impact of accidents and violence on victims, particularly focusing on aesthetic prejudice. By evaluating the internalization of societal beauty standards and the psychological effects of perceived physical disfigurement, this scale offers insights into the holistic well-being of individuals affected by traumatic injuries, guiding interventions aimed at promoting acceptance and resilience in the face of adversity.

In addition, my research on fall risk in elderly individuals with insomnia in Western Romania has shed light on the complex interplay between sleep disturbances, mobility, and fall risk in older adults. Through a retrospective cross-sectional study, I have identified factors contributing to increased fall risk in this population, informing targeted interventions and preventive strategies to reduce the incidence of falls and improve overall quality of life in elderly individuals with insomnia.

Therefore, my scientific achievements in orthopaedics have centered on improving patient outcomes and quality of life through the adaptation and validation of outcome measures, as well as understanding the psychosocial factors influencing recovery and well-being. By addressing these crucial aspects of patient care, my contributions have paved the way for more personalized and comprehensive approaches to orthopaedic treatment and rehabilitation, ultimately enhancing the overall quality of life for orthopaedic patients.

Throughout my academic journey, which began in 2008 at the "Victor Babeș" University, I have been deeply committed to advancing orthopaedics through research, teaching, and clinical practice. Serving as an Assistant Professor in the Department of Orthopaedics allowed me to impart my knowledge and expertise to aspiring medical professionals, shaping the future of orthopaedic surgery. I took on responsibilities such as lecturing, supervising clinical work, and guiding research projects, all aimed at elevating the standards of patient care and surgical practices.

In 2010, I achieved a significant milestone by obtaining my Doctorate in Medical Sciences from the "Victor Babeș" University of Medicine and Pharmacy in Timișoara, Romania. My doctoral thesis focused on the clinical and biomechanical aspects of hip joint arthroplasty using custom femoral components, particularly in patients with femoral morphological changes. This rigorous study positioned me as an expert in personalized orthopaedic implant solutions, contributing significantly to the body of knowledge in orthopaedics.

My doctoral research, pioneering the customization of femoral components for hip arthroplasty, offered new insights into optimizing surgical outcomes for patients with unique anatomical challenges. This work highlighted the importance of personalized medicine in orthopaedics, showcasing the potential for innovative research to significantly improve patient outcomes and underscored my commitment to advancing surgical techniques.

Reflecting on my academic achievements, it's evident that my journey has been shaped by a dedication to excellence in both research and education within orthopaedics. The successful defense of my doctoral thesis and my role as an Assistant Professor have

been integral in defining my career path, allowing me to contribute meaningfully to the scientific community and the training of future medical professionals.

Since 2020, I have held the esteemed position of Senior Lecturer at the "Victor Babeș" University of Medicine and Pharmacy in Timișoara, furthering my academic career while making significant contributions to the orthopaedic community through teaching and research. My responsibilities expanded to include curriculum development, research project oversight, and mentorship of students and junior doctors, demonstrating my commitment to advancing orthopaedic education and research.

In addition to my academic roles, my involvement in various scientific committees and leadership positions in significant orthopaedic events showcases my organizational skills and dedication to the field. By contributing to conferences, seminars, and congresses, I have played a crucial role in advancing orthopaedic science and practice, promoting excellence in orthopaedic surgery, and facilitating collaborative research efforts.

Furthermore, my contributions to orthopaedics extend beyond academia, with impactful publications in Web of Science-indexed journals and presentations at national and international conferences. From biomechanical analyses of hip joint prostheses to studies on the psychosocial impact of orthopaedic conditions, my research has aimed to improve patient outcomes and enhance the broader understanding of orthopaedic treatments.

Overall, my academic achievements reflect a lifelong commitment to advancing orthopaedics through research, education, and innovation. By integrating cutting-edge research with clinical practice and teaching, I have aimed to make a lasting impact on the field, improving patient care and inspiring the next generation of orthopaedic surgeons.

My professional journey in orthopaedic surgery has been characterized by a steadfast commitment to excellence, continuous learning, and innovative patient care. It all began with my foundational education at the Liceul de Informatica “Grigore Moisil” Timișoara, where my interest in science and technology ignited the path toward my future career in medicine. Transitioning to the University of Medicine and Pharmacy “Victor Babeș” Timișoara for my medical studies, I excelled academically, setting a solid foundation for my specialization in orthopaedics. My residency from 2002 to 2007 was

marked by intensive learning and hands-on experience, under the mentorship of esteemed professionals, which shaped my surgical skills, diagnostic abilities, and patient-centered approach to care.

As I transitioned from a medical resident to a practicing orthopaedic surgeon, I continued to prioritize professional development through further postgraduate training and research activities. Specialized courses and workshops in pediatric orthopaedics, spinal manipulation, hand surgery, knee arthroscopy, and pelvic fractures deepened my practical knowledge and surgical techniques, positioning me as a proficient orthopaedic surgeon. My active participation in professional societies such as SOROT, ASORIS, and SRATS further enriched my practice, keeping me abreast of the latest advancements in orthopaedics and fostering collaboration with peers.

My commitment to continuous education and specialization led to further advancements in my surgical competencies, particularly in hip resurfacing surgery, shoulder surgery, and elbow trauma. These specialized training courses equipped me with advanced surgical techniques and a deeper understanding of joint pathologies, allowing me to offer patients innovative and less invasive treatment options. Achieving the rank of Consultant in Orthopaedics-Traumatology in 2013 was a testament to my expertise and contributions to the field, enabling me to lead surgical teams, contribute to strategic planning, and mentor resident doctors.

Throughout my career, I have been involved in pioneering surgical interventions, such as the first revision of hip prostheses with advanced locking systems and also the first reverse shoulder arthroplasty in the hospital where I work. These experiences not only advanced my professional development but also contributed to the advancement of surgical techniques within my institution, establishing my clinic as a center of excellence in orthopaedic surgery. By participating in over 6000 surgical interventions and pioneering procedures like the first reverse shoulder arthroplasties in my clinic, I have demonstrated a commitment to surgical excellence and innovation, furthering the field of orthopaedics and improving patient outcomes.

My journey as an orthopedic surgeon has been characterized by a relentless pursuit of excellence, a dedication to patient-centered care, and a commitment to advancing surgical practices. From my formative education to my current role as a

Consultant Orthopaedic-Traumatologist, my career trajectory reflects a deep-seated passion for orthopaedics and a commitment to improving the quality of life for my patients. As I continue on my professional path, my dedication to lifelong learning and innovative patient care will undoubtedly shape the future of orthopaedic surgery.

One of the personal goals I care most about, is the development of the field of shoulder surgery. Since my residency years, I have been particularly attracted to the pathology of this joint. Being a convinced believer of supraspecialization in surgery as the only way to achieve excellence, I participated in multiple workshops and courses dedicated to this orthopedic subdomain, all culminating in belonging from the beginning, to the Romania-AAOS (American Academy of Orthopedic Surgeons) development program of shoulder surgery in Romania. The fellowships carried out in Northwestern University Chicago and Hadassah Jerusalem University Hospital had the gift of refining my surgical, diagnostic and research expertise in this difficult field. At the same time, these programs had the gift of contributing to the formation of a group of enthusiasts of this field, a group that in 2017 became official with the establishment of the Romanian Society of Shoulder and Elbow Surgery (SRCUC) whose first president I had the honor to be.

Meanwhile, this Society (SRCUC) had multiple achievements, succeeding, from year to year, in gathering around it more and more enthusiasts of shoulder surgery. Among these I mention the annual organization of the International Comprehensive Shoulder Course in Romania, this year reaching its 10th edition, the performance of multiple operations for the first time in Romania, among which I mention the endoprosthetic shoulder procedures as well as the arthroscopic shoulder surgeries. An important component was also represented by the scientific part, the collaboration between specialists in the country and our partners from outside, leading to the publication of several works in the field, the most important of which is the validation of the functional Oxford shoulder score – Romanian version. In the end, all these efforts in the field of shoulder pathology had as their final goal the improvement of the quality of medical services for patients in Romania and the performance in the country's hospitals of the most modern classical or arthroscopic shoulder surgeries, at the same time carefully preparing young specialists for the future.

My academic and scientific perspectives in orthopaedics showcase a profound dedication to innovation, research, and patient care. My journey has been marked by a multifaceted approach, blending clinical expertise with scientific inquiry to advance orthopaedic practices. Through my involvement in specialized training, workshops, and international collaborations, I've demonstrated a commitment to mastering advanced surgical techniques and staying at the forefront of orthopaedic advancements.

My contributions to orthopaedic research, particularly in the development and modeling of orthopaedic implants, highlight my continuous quest for understanding and improving orthopaedic practices. This intersection of clinical excellence and scientific inquiry forms the cornerstone of my professional ethos, driving my efforts to enhance patient outcomes and advance the field of orthopaedics.

Moreover, my active participation in professional societies and leadership roles in organizing scientific conferences underscore my commitment to community engagement and the dissemination of knowledge within the field. By fostering collaboration and innovation, I contribute to the collective advancement of orthopaedics, ensuring that the latest developments benefit patients worldwide.

Looking ahead, my focus remains on exploring new frontiers in orthopaedic surgery, particularly in joint preservation and minimally invasive techniques. The evolution of orthopaedic implants and advancements in diagnostic and treatment modalities present opportunities for significant progress. My unwavering commitment to improving patient quality of life through these innovations reflects my dedication to excellence in every facet of my work.