

**"VICTOR BABEȘ" UNIVERSITY OF
MEDICINE AND PHARMACY TIMIȘOARA
DOCTORAL SCHOOL
MEDICINE**



**ADVANCED MEDICAL RESEARCH, EXPERIMENTAL
STUDIES AND INNOVATIVE APPROACHES IN
PEDIATRIC SURGERY AND ORTOPEDICS**

ABSTRACT

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SUMMARY OF THE THESIS

My research career began in 1999, simultaneously with my residency in Pediatric Surgery and Orthopedics in Timișoara's "Louis Urceanu" Emergency Clinical Hospital for Children. In 2002, I enrolled as a PhD student at Timișoara's "Victor Babeș" University of Medicine and Pharmacy, intending to focus on a topic of major importance in the field of urological pathology, notably relevant to both pediatric and adult situations - undescended testis and its surgical management.

Thus, the skill thesis entitled *Advanced Medical Research, Experimental Studies and Innovative Approaches in Pediatric Surgery and Orthopedics* presents the most relevant scientific achievements of my entire research career, starting with the doctoral years.

The first part of this habilitation thesis summarizes the main publications and research achievements that I carried out in the postdoctoral period, while the second chapter presents the most important academic achievements so far. The third section of this thesis presents, in short, my professional experience in the field of pediatric surgery and orthopedics, while the last part addresses the development plan of the academic career in the future.

An important part of my research focused on the management of **Pediatric vascular anomalies**. The majority of the time, the diagnosis occurs during the newborn period or the first few years of life. Even if most of them are harmless, some of them may have serious implications for the subjects, especially given their stage of development. Early detection and treatment of both the cause and subsequent changes is critical and should be initiated as soon as possible to avoid potentially significant and irreversible consequences.

Thus, pediatric surgical management and our involvement in a multidisciplinary team for the treatment of these vascular abnormalities, materialized through a series of publications, such as *Maria-Corina Stanciulesc, Florica Ramona Dorobantu, Eugen Sorin Boia, Marius-Calin Popoiu, Simona Cerbu, Rodica Heredea, Emil Radu Iacob, Anca Maria Cimpean, Borislav Dusan Caplar, Anca Voichita Popoiu - "Face(s)" of a PHACE(S) Syndrome Patient before and after Therapy: Particular Case Report and Review of Literature. Children (Basel). 2022 Dec 15;9(12):1970. doi:10.3390/children9121970. eISSN 2227-9067 IF 2,4.*

Another important research topic in which I was involved is represented by **Tumoral pathology in the pediatric population**. When it comes to solid tumors, both benign and malignant, the pediatric surgeon's role is critical. First, it plays an essential part in diagnosis, determining tumor type (benign or malignant), as well as a therapeutic role, determining partial/complete excision/tumor resection based on the specifics of each case. Many research

papers on this issue have been published by me and my team, including: *Oana Belei, Diana-Georgiana Basaca, Elena Rodica Heredea, Emil Radu Iacob, Laura Olariu, Roxana Folescu, Andrei Gheorghe Marius Motoc, Anda-Maria Nanu, Otilia Mărginean – Chronic Diarrhea Caused by Vasoactive Intestinal Peptide-Secreting Tumor. Life (Basel). 2023 Sep 27;13(10):1974. doi: 10.3390/life13101974. eISSN 2075-1729, IF 3,2.*

Another key aspect of pediatric surgery that has always concerned me is represented by **Minimally invasive and robotically assisted surgery**. Due to the small size of both the patient and the operational area, the field of pediatric surgery requires a high level of precision and delicacy regardless of the individual pathological state. With the implementation of minimally invasive surgical procedures, the goal of decreasing the impact of surgical trauma on young patients became attainable. Most surgical operations involving the chest, abdomen, and pelvis can now be performed using minimally invasive techniques. An example of research published on this topic is *RE Iacob, MC Popoiu, VL David, DV Vasilie, Corina Stanciulescu, Lavinia Stretcu, Alexandra Nyiredi, ES Boia - „Laparoscopic cholecystectomy in children - preliminary experience”, Jurnalul Pediatrului - Year XVIII, Vol. XVIII, Nr. 71-72, july-december 2015, pg 38-40.*

A robotic assisted surgery program was launched at the hospital's surgery and orthopedics clinic during the 2018-2019 timeframe. This application made use of the da Vinci Xi system, which was kindly donated by the Botnar foundation in Switzerland. This culminated in the publication of numerous valuable scientific articles, some of which being: *Boia ES, Popoiu MC, Iacob RE, David VL. Robot surgery in children: where we stand and where we aim. Jurnalul Pediatrului. 2018 January-June; XXI (81-82):3-7.*

The fifth research topic considered in this thesis refers to **Pediatric orthopedics**. The major issues discussed are bone changes such as pectus excavatum, scoliosis, the impact of obesity on static, and a particularly significant subject - femoral fractures. These numerous conditions must be recognized and treated as soon as possible in order to avoid the impact that growth and pathological development can have on the patients' quality of adult life. Our team published a series of research papers on this vast topic, including: *Catan, L.; Amaricai, E.; Onofrei, R.R.; Popoiu, C.M.; Iacob, E.R.; Stanciulescu, C.M.; Cerbu, S.; Horhat, D.I.; Suci, O. The Impact of Overweight and Obesity on Plantar Pressure in Children and Adolescents: A Systematic Review. Int. J. Environ. Res. Public Health 2020, 17, 6600. ISSN 1660-4601, IF 2,468 (12 ISI citations).*

The sixth research topic, with an important impact on the field of pediatric and orthopedic surgery, is represented by **Ultrasound application in pediatric surgical and**

orthopedic pathologies. Ultrasound is an important imaging tool in pediatric disease diagnosis and management. The main conditions for which ultrasonography is utilized in pediatric surgery are abdomino-pelvic pathologies. Another major application of ultrasonography is pediatric hip ultrasound, which is mostly used to diagnose hip dysplasia in infants. Musculoskeletal ultrasound has also been established in the pediatric orthopedic field to be an accurate method of diagnosis and surveillance of long bone fractures in infants and children, when compared to traditional radiology. Research papers such as *Iacob Roxana, Stoicescu Emil Robert, Cerbu Simona, Iacob Daniela, Amaricai Elena, Catan Liliana, Belei Oana, Iacob Emil Radu - Could Ultrasound Be Used as a Triage Tool in Diagnosing Fractures in Children? A Literature Review. Healthcare, May 2022, 10(5), 823; doi:10.3390/healthcare10050823; eISSN 2227-9032, IF 2,8 (2 ISI citations) have been published on this topic.*

Pediatric surgical and orthopedic pathology encompasses a diverse range of disorders, some of which, while not commonly encountered, present significant diagnostic and therapeutic hurdles. In addition to these factors, there are instances of unique epidemiological circumstances, such as the current Coronavirus outbreak. This presents significant hurdles in terms of reevaluating healthcare services and managing patients affected by this particular disease. Our team contributed to this field of research with papers such as **RE Iacob, Daniela Iacob** – „Painful accessory navicular in children - case presentation”, *Jurnalul Pediatriei, Year XIII, vol. XIII, Nr.49-50, january-june 2010, pg. 74-76, ISSN 2360-4557.* Additionally, I have contributed to a series of investigations exploring the efficacy of ultrasound in the assessment and monitoring of neonates and infants afflicted with the coronavirus. On this topic, we have published 4 manuscripts, for example: *Emil Robert Stoicescu, Jovan Lovrenski, Roxana Iacob, Simona Cerbu, Daniela Iacob, Emil Radu Iacob, Septimiu Radu Susa, Ioana Mihaiela Ciuca, Laura Andreea Bolintineanu (Ghenciu), Andreea Ciornei-Hoffman, Cristian Oancea, Diana Luminita Manolescu. „COVID-19 in Infants and Children under 2 Years—Could Lung Ultrasound Score Be Correlated with Biomarkers and Symptoms?” Biomedicines. 2023 Sep 24;11(10):2620. doi: 10.3390/biomedicines11102620. ISSN 2227-9059 IF 4,7.*

Also, one of my main focuses regarding research is **Experimental research on laboratory animals – malformations.** Congenital malformations can be induced by a combination of genetic and environmental factors, as well as their interaction in a multifactorial process. As a result, understanding the deciding elements and their interactions is critical, which is why experimental investigations on laboratory animals are so crucial. Our

team published a series of research papers on this topic, including: *Daniela Iacob, Marius Pentea, Radu E Iacob – „The effect of alcohol consumption during embryogenesis on the product of pregnancy: Experimental study”, Journal of Food, Agriculture & Environment, vol 10, nr. 2, Aprilie 2012, pg. 147-150, ISSN 1459-0255.*

Last but not least, I focused my research work on **Innovative research**. Research in the context of the development of innovative medical devices, which help to detect the parameters and discomfort of newborns, infants and young children, is of real use, given their inability to communicate important symptoms such as pain. One of the research papers published on this subject is represented by *NYIREDI Alexandra, IACOB Emil Radu, IACOB Daniela, LIHU Andrei, MOZA Andreea, ILIE Constantin – When is the Neonate in Pain? – Edited by: Elvira Brătîlă, Monica Cîrstoiu, Proceedings of The 14th National Congress of Urogynecology (7-9 September 2017). The National Conference of the Romanian Association for the Study of Pain (26-27 October 2017), Pages: 511-514, Published: December 2017; ISBN 978-88-95922-98-0.*

Regarding **Research and development projects**, I have actively participated as a member and consultant in a total of **six** projects. In 2009, I had the opportunity to contribute as a member of a research team for the NATO Science for Peace and Security Program Reintegration Grant. The specific focus of our research was on the developmental skeletal abnormalities observed in fetuses that were induced by the administration of uranyl acetate dehydrate. My most recent accomplishment involved being appointed as a Specialist Consultant in the Unit for Implementation and Monitoring of the Project (UIP) for the development of the infrastructure of the Children's Emergency Clinical Hospital "Louis Țurcanu" in Timisoara. The primary objective of this proposal is to mitigate the risk of nosocomial infections within the hospital. *The main purpose of the project is to purchase a system of Senhance robotic surgery designed to facilitate the minimally invasive treatment of surgical conditions in children.*

Regarding **Scientific results and recognition**, I have actively participated in numerous national and international conferences throughout my broad and distinguished professional, medical, scientific, and academic trajectory. actively participated in the dissemination of study findings by delivering scholarly papers, which comprised both oral and poster presentations. My research findings have been meticulously documented and disseminated in major international publications with high impact factors. Throughout my academic career, I have made significant contributions to the growth of pedagogical materials in the fields of pediatric surgery and orthopaedics. It is well known that high-quality educational tools play an

important role in influencing students' learning experiences and facilitating their grasp of complex topics. One example of the instructional materials that I have conducted or contributed to is: *Radu Emil Iacob, Daniela Iacob – „Studii terapeutice în testiculul necoborât”, Editura Solness, 214 pg., 2010; ISBN 978-973-729-195-0.*

I have made significant contributions to the field of scholarly research articles, having authored or co-authored 91 comprehensive studies that have been published. These works were either written entirely by me or developed in collaboration with notable people. The academic acknowledgement of my writings in many internationally recognized journals indexed by the ISI Web of Science system is highlighted by an impressive count of 198 citations. The citation count for my work has reached a significant level, resulting in an H-index of 8, which serves as evidence of the impact and importance of my contributions in the area.

Furthermore, my scholarly endeavors have included active participation in both international and national conferences, which have earned extensive global praise. The aforementioned congresses have consistently drawn attendees from numerous nations, promoting important relationships and global information dissemination.

Regarding Section 2 of this thesis – **Academic achievements**, I have made noteworthy contributions to the realm of paediatric surgery and orthopaedics by my active involvement in teaching and research activities. I have been fortunate to engage in several roles at the University of Medicine and Pharmacy 'Victor Babes' Timisoara, notably within the Department XI, especially on the Discipline of Paediatric Surgery and Orthopaedics. The academic trajectory commenced with the publication of my doctoral thesis named "Therapeutic Investigations in the Unrestrained Testis" in the year 2008. Then in 2013, I started my academic career as an Assistant Professor at the Discipline of Paediatric Surgery and Orthopaedics, affiliated with the University of Medicine and Pharmacy 'Victor Babes'. Throughout this time frame, I actively engaged in teaching and research, thereby refining my knowledge in the respective domain. Subsequently, during the period spanning from 2017 to 2021, I obtained the role of Lecturer, so augmenting my instructional and scholarly obligations. In acknowledgment of my unwavering commitment and extensive knowledge, I was elevated to the rank of Associate Professor within the Discipline of Paediatric Surgery and Orthopaedics at the esteemed University of Medicine and Pharmacy 'Victor Babes' in the year 2021.

Through our academic endeavors, we have created two educational resources aimed at facilitating the training and education of students and residents, such as *ES Boia, Șt Lazea*,

ER Iacob - „Chirurgie și ortopedie pediatrică - îndreptar de abilități practice”, Editura Victor Babeș Timișoara, 2014, pagini 120. ISBN 978-606-8456-28-.

During my Lecturer frame, I held the position of coordinator for 11 graduate students who were in the process of completing their studies with license theses. During my period of Associate Professor carrer, I have successfully supervised an additional 2 bachelor's theses.

In my role as a mentor, I have been afforded the opportunity to oversee students in their research projects, offering direction and nurturing their development as emerging scholars. During my involvement, I successfully organized and facilitated five courses in Timisoara, for example *Central & Eastern European Pediatric Minimal Access Surgery Advanced Skills Lab - European Paediatric Surgeons Association (EUPSA) approved Course – 6-7 March 2020, Timișoara, secretary of the course and course coordinator.*

On the third part of the thesis, entitled **Professional experience**, I have explained my professional trajectory in the field of pediatric and orthopedic surgery, from a trainee – starting in 1998 at the ‘Pius Brinzeu’ Clinic Emergency County Hospital in Timisoara, to specializing as a pediatric and orthopedic surgeon resident, at the ‘Louis Turcanu’ Children's Emergency Clinical Hospital, specifically in the Pediatric Surgery Clinic, during the period spanning from April 1999 to April 2004, until becoming a primary surgery and paediatric orthopaedic doctor in 2013. The achievement of the completion of a Master's degree in ‘Management of perinatal healthcare’ in 2010 is an additional accomplishment in the chapter of personal experience.

The main important competences and aptitudes include Competence in General Ultrasound (2005), Certificate in Health Services Management (2009), certificate in Musculoskeletal Ultrasound (2011), Certificate of Laparoscopic Paediatric Surgery Level I (2015), Certificate of Laparoscopic Paediatric Surgery Level II (2015). The most recent competence acquired is certified by the International Certification in Robotic Assisted Surgery – DaVinci Xi System obtained in 2019.

Chapter 4 of this habilitation thesis focuses on the **Academic career development plan**.

Higher education necessitates the development of characteristics such as tenacity, intelligence, patience, outstanding memory, and persistent passion. These characteristics must be continually maintained in order to overcome the inherent hurdles and setbacks of this profession. The development of a SWOT analysis is a valuable tool for my academic career, helping me assess my current position, make informed decisions, and develop strategies to succeed in my future pursuits.

Regarding my future objectives, they were categorized into four main domains: general objectives, research objectives, educational/teaching objectives, and medical activity goals.

The most important perspective of the future is to develop both in terms of research and in terms of medical and academic. I believe that the key to success is continuous learning. Thus, I want to improve from all points of view, to continue to do research in the field of surgery and pediatric orthopedics, which will add to this field. I also want to use diagnostic and therapeutic methods as innovative as possible, to contribute to excellence in pediatric surgery and orthopedics in Romania and beyond. From an academic point of view, I want to contribute to the training of students and residents with new teaching methods, in order to prepare them as well as possible, to European standards.

The final part is devoted to bibliographic references, which are utilized to integrate the research activities given in prior sections. The presentation of the ten representative scientific papers concludes the habilitation thesis.