



SOCIETATEA ROMANA
**DE MEDICINA
FIZICA
DE RECUPERARE
SI BALNEOCLIMATOLOGIE**

Vol 17, No. 1, April 2026

Congress Abstracts

 **Societatea Română de Medicină Fizică, de Recuperare și Balneoclimatologie (SRMFRB)**
<http://srmfrb.ro>

 **CENTRUL BALNEAR
COVASNA**
PREVENȚIE • TRATAMENT • RECUPERARE

 **Visit
COVASNA**



**Congresul Național de Medicină
Fizică, de Recuperare și
Balneologie**

cu participare internațională

 **Asociația Română de Balneologie (ARB)**

COVASNA, 23 - 25 Aprilie 2026 <http://bioclima.ro>

 **BALNEO** *Balneo and PRM Research Journal*
RESEARCH English Edition
e ISSN 2734 - 8458 p ISSN 2734 - 844X ROMANIAN ASSOCIATION OF BALNEOLOGY



Balneo and PRM Research Journal 2026, 17, 1 [https://doi.org/ 10.12680/balneo.2026.1016](https://doi.org/10.12680/balneo.2026.1016)

Website <http://bioclima.ro/Journal.htm>

E-mail: office@bioclima.ro

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Publisher: Romanian Association of Balneology (Bucharest)

Asociatia Romana de Balneologie / Romanian Association of Balneology

Editura Balneara

International title: Balneo and PRM Research Journal / Index name: BALNEO,

Journal Website <http://bioclima.ro/Journal.htm>

Publisher: Romanian Association of Balneology / Asociația Română de Balneologie

Editorial and print services: Biosafety SRL and MakeDesign Company SRL

· Aims and scope: The Journal publishes peer-reviewed original papers, case presentations, research papers, reviews, systematic reviews based on the PRISMA methodology, short communications and letters to the editor in the following fields:

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· Article Publication Charges 700 Euro per admitted for publication article - it covers indexing and editing. See submit page: Submit

· Publication Ethics and Malpractice Statement Document: [Link](#)

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Journal Impact Factor: 1,1 - Q3 - Web of Science report 2024



Scientific Program



Congresul Național de Medicină Fizică, de Recuperare și Balneologie

cu participare internațională



COVASNA, 23 - 25 Aprilie 2026

<http://srmfrb.ro>

<https://bioclima.ro>

Educational Duration and Daily Program Structure

Thursday, April 23, 2026

Total Timeframe: 10:00–19:30

Total Educational Hours: 6 hours

Time / Activity / Type / Duration

- 10:00–12:00 S1 – International Hybrid (Online and Onsite) Session - STRATIF-AI
- 12:00–14:00 S2 – International Hybrid (Online and Onsite) Session - Balneology
- 14:00–15:00 Lunch Break
- 15:00–17:00 Opening Ceremony
- 17:00–17:30 Coffee Break
- 17:30–19:30 S3 – International Hybrid (Online and Onsite) Session - PRM
- General Assemblies: SRMFRB, ARB – all day, online

Friday, April 24, 2026

Total Timeframe: 09:00–19:30

Total Educational Hours: 8 hours

Time Activity Type Duration

- 09:00–11:00 S4 – Rheumatology and Rehabilitation
- 11:00–11:30 Coffee Break
- 11:30–13:30 S5 – Physical and Rehabilitation Medicine
- 13:30–14:00 Poster Session I
- 14:00–15:00 Lunch Break
- 15:00–17:00 S6 – Pain Management and Rehabilitation
- 17:00–17:30 Coffee Break
- 17:30–19:30 S7 – Cardiac Rehabilitation and metabolic management

Saturday, April 25, 2026

Total Timeframe: 09:00–19:30

Total Educational Hours: 8 hours

Time Activity Type Duration

- 09:00–11:00 S8 – Physical and Rehabilitation Medicine
- 11:00–11:30 Coffee Break
- 11:30–13:30 S9 – Pediatric Rehabilitation
- 13:30–14:00 Poster Session II
- 14:00–15:00 Lunch Break
- 15:30–17:30 S10 – Integrative Balneology and Lifestyle Medicine
- 17:30–17:45 Coffee Break
- 17:45–19:45 S11 – Sports Medicine and Doping
- General Extraordinary Assemblies: RoSCoS, RoSNeRa – all day, online

20:30 Gala Dinner – Congress Awards



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SOCIETATEA ROMÂNĂ
DE MEDICINĂ FIZICĂ
DE RECUPERARE
ȘI BALNEOCLIMATOLOGIE



Congresul Național de Medicină Fizică, de Recuperare și Balneologie

cu participare internațională



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UEMS Scientific Program Director
Prof. univ. dr. Gelu ONOSE



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Președinte Congres, Președinte ARB
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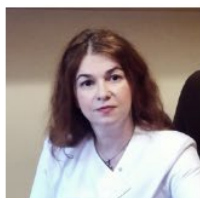
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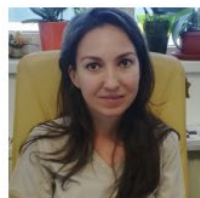
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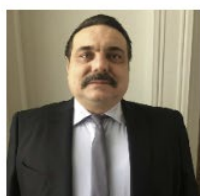
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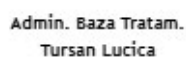
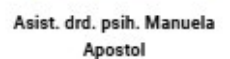
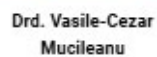
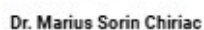
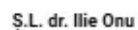
Ș.L. dr. Marius Turnea



Dr. Andreea-Iulia
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Perioada de desfășurare: 20 Aprilie - 24 Aprilie 2026

Ziua 1: Borsec
Ziua 2: Salina Târgu Ocna
Ziua 3: Balvanyos, Sf. Ana
Ziua 4: Congres Covasna
Ziua 5: Covasna

Studentii participanți la Tabăra de Balneologie vor lua parte și la lucrările congresului.

<https://bioclima.ro/tabara>

DAY 1 – Thursday, April 23, 2026

Session 1 (10:00–12:00) – International Online Session - STRATIF-AI

Chairmen: Gelu Onose, Cristina Popescu, Constantin Munteanu

- 1. 10:00–10:20** Cristina Popescu, Constantin Munteanu, Ana-Maria Vasile, Alexandru Pandrea, Andreea Frunza, Radu Retezeanu, Mircea Vasile, Gelu Onose – The importance within STRATIF-AI: from concept to clinical implementation – protocol of study afferent to WP6 in post-Stroke patients' rehabilitation
- 2. 10:20–10:40** Rory O'Connor – Rehabilitation Following Stroke with STRATIF-AI Technology
- 3. 10:40–11:10** Gelu ONOSE, Cristina POPESCU, Cristian Alex PANDREA, Andreea FRUNZĂ, Constantin MUNTEANU, Radu RETEZEANU, Ștefan Sebastian BUSNATU, Ana-Maria VASILE – Prerequisites for digital modeling and quantification of altered upper extremity movement patterns after stroke, based on Fugl-Meyer assessment, within a customized classification framework
- 4. 11:10–11:40** Ana-Maria VASILE, Cristian Alex PANDREA, Andreea FRUNZĂ, Constantin MUNTEANU, Cristina POPESCU, Radu RETEZEANU, Ștefan Sebastian BUSNATU, Gelu ONOSE – Markerless 3D Analysis of Lower Extremity Movements Mimicking Hemiplegia Using the Fugl-Meyer Assessment Paradigm Toward a Virtual Coaching System
- 5. 11:40–12:00** Constantin Munteanu, Ana-Maria Vasile, Cristina Popescu, Gelu Onose – STRATIF-AI Future Perspectives: Continuous Stratification Across the Stroke Pathway Using Digital Twins and Artificial Intelligence

Session 2 (12:00–14:00) – International Online Session - Balneology

Chairmen: Mufit Zeki Karagulle, Constantin Munteanu, Jose Carbajo

- 1. 12:00–12:30** Müfit Zeki Karagülle, Mine Karagülle – Multimodal Balneotherapy and Hydrogen Sulfide Signaling in Thermal Medicine: From Mechanisms to Clinical Implications
- 2. 12:30–12:50** Jose Carbajo – Balneary H₂S resources in Spain
- 3. 12:50–13:10** Suceveanu Mihaela Carmen, Suceveanu Paul Nicolae - A complex approach to the recovery of patients with peripheral arteriopathy, using the potential of the natural factors of the Covasna resort
- 4. 13:10–13:30** Hitomi Kanayama – Climatotherapy in the Era of Climate Change: Emerging Public Health Challenges and Future Research Directions in Japan
- 5. 13:30–13:45** Constantin Munteanu, Diana-Nicoleta Munteanu, Mihail Hoteteu, Gelu Onose – Balneary H₂S resources in Romania
- 6. 13:45–14:00** Traian-Virgiliu Surdu, Roxana – Elena Tucmeanu, Monica Surdu. Olga Surdu, Alin Iulian Tucmeanu - Framing a Global Consensus on a global definition of hydrotherapy and WHO requirements

15:00–17:00 – Opening Ceremony

Session 3 (17:30–19:30) – International Online Session - PRM

Chairmen: Gelu Onose, Constantin Munteanu

- 1. 17:30–17:50** H.S. Chhabra – Emerging Stimulation Technologies in Spinal Cord Injury Care
- 2. 17:50–18:10** Deepa Sundareswaran - Community based rehab models
- 3. 18:10–18:30** Nistor-Cseppento Carmen, Gherle Anamaria, Cevei Mariana, Tirla Sebastian, Deac Ștefania - Evolutionary features in a case of tetraplegia with predominant left hemiplegia following severe traumatic brain injury due to heteroaggression
- 4. 18:30–18:50** Gherle Anamaria, Nistor-Cseppento Carmen, Cevei Mariana, Tirla Sebastian, Deac Ștefania - Management of aseptic necrosis of the femoral head in patients with iatrogenic spinal cord injury: case report
- 5. 18:50–19:10** Constantin Munteanu, Diana-Nicoleta Munteanu, Andreea-Iulia Vlădulescu-Trandafir, Mihail Hoteteu, Gelu Onose - Mineral waters and human fibroblasts: in vitro study
- 6. 19:10–19:30** - S.L. Yadav, Munim Tomar - Multidisciplinary team members and type of rehabilitation models in India

DAY 2 - Friday, April 24, 2026

Session 4 (09:00–11:00) – Rehabilitation and Other Medical Specialities

Chairmen: Gelu Onose, Alexandru Vlad Ciurea

1. **09:00–09:20** Alexandru Vlad Ciurea, Matei Serban, Razvan Adrian Covache-Busuioc, Andrei Adrian Popa - Neurosurgery and Neurorehabilitation in the AI ERA: A holistic approach
2. **09:20–09:40** Alexandru Vlad Ciurea, Dan Aurel Nica, Ionuț Luca-Husti, Matei Șerban, Razvan Covache – Lumbar disc hernia in pediatric population
3. **09:40–10:00** Elena-Valentina Ionescu, Carmen Oprea, Alexandra Ecaterina Ciota, Stelian Ilie Mociu, Doinița Oprea, Madalina Gabriela Iliescu – Integration of Medical Rehabilitation into the Management of Oncological Patient
4. **10:00–10:10** Andra-Maria Ștefan, Andreea Cătălina Peiu, Andreea Mădălina Gamulea, Silviu Ștefan Rusu, Andra Istrate, Viorica Marin, Mujdaba Sibel - Minimally Invasive Ultrasound-Guided Puncture Decompression in De Quervain's Tenosynovitis: A Case Report
5. **10:10–10:20** Sorina Robu, Andreea-Valentina Suci, Izabela Costache, Mihai Baila, Gelu Onose - Rehabilitation particularities in neuro-oncology – case series
6. **10:20–10:30** Sabina Anamaria Bira, Irina-Alexandra Burceag, Sebastian Giuvara, Aurelian Anghelescu, Gelu Onose - Challenges in Geriatric Rehabilitation: Functional Impairment in a Patient with Surgically Treated Pertrochanteric Fracture, Dementia and Multiple Systemic Complications
7. **10:30–11:40** Izabela Costache, Ruxandra Postoiu, Sorina Robu, Baila Mihai, Gelu Onose - Rehabilitation Particularities in a Patient with Post-combustional Sequelae – Case Presentation
8. **10:40–10:50** Adrian Melnic, Anastasia Rotăreanu, Iana Sandrosean, Alisa Tăbîrță - The Role of Multimorbidity in Predicting Outcomes of Post-Stroke Rehabilitation
9. **10:50–11:00** Marina Bulai, Oleg Pascal, Alisa Tăbîrță, Svetlana Pleșca, Victoria Chihai, Mihail Cîrîm, Anastasia Rotăreanu - Multiple Factors Affecting Quality of Life in Individuals with Chronic Musculoskeletal Pain

Session 5 (11:30–13:30) – Physical and Rehabilitation Medicine

Chairmen: Otilia Rogoveanu, Ioana Andone, Aura Spînu

1. **11:30–11:50** Otilia Rogoveanu - Clinical, imaging and histopathological aspects in hip diseases
2. **11:50–12:05** Lavinia Isabela Ivan, Cristina Popescu, Ioana Andone, Alexandra Mădălina Sporici, Ioana Cazacu, Gelu Onose - Favorable clinical evolution and neurorehabilitation outcome of Frontal Lobe Syndrome after traumatic brain injury due to a motorcycle accident: A Case Report
3. **12:05–12:20** Marius Ionuț Rotaroaia, Cristina Popescu, Ioana Andone, Spînu Aura, Cosmina Lavinia Rata, Alexandru Mihai Buturuga, Gelu Onose - Multidisciplinary and complex rehabilitation program after post-traumatic femoral fracture in a patient with severe congenital visual impairment
4. **12:20–12:30** Cosmina Lavinia Rata, Cristina Popescu, Ioana Andone, Aura Spînu, Felicia Stanciu, Alexandru Mihai Buturuga, Gelu Onose - Comprehensive Rehabilitation and Functional Gait Training in a Case of Incomplete Thoracic Paraplegia Following Severe Spinal Stenosis in an Elderly Patient with Multiple Comorbidities

5. **12:30–12:40** Alexandru Mihai Buturuga, Ioana Andone, Monica Badea, Alexandra Georgiana Paruschi, Cristina Popescu, Aura Spinu, Cosmina Lavinia Rata, Gelu Onose - Multidisciplinary Approach Including Diagnosis and Rehabilitation Strategy in a Complex Case of Peripheral Facial Paralysis (Recent Left Facial Paralysis and History of Right Facial Paralysis) in a Young Postpartum Female Patient
 6. **12:40–12:50** Alexandra Georgiana Paruschi, Ioana Andone, Alexandru Mihai Buturugă, Cosmina Lavinia Rata, Cristina Popescu, Aura Spînu, Aurelia Bichir, Gelu Onose - Intricated Evolution and Rehabilitation Challenges in an Incomplete Paraplegia AIS/Frankel C Patient with Cauda Equina Syndrome and Complex Oncologic and Vascular Comorbidities
 7. **12:50–13:00** Irina-Alexandra Burceag, Sabina Anamaria Bira, Sebastian Giuvara, Aurelian Anghelescu, Gelu Onose - One Reckless Misstep, Polytrauma with Two Injured Joints- Difficulty in Functional Rehabilitation
 8. **13:00–13:10** Andreea Nicoleta Drăghici, Ana-Maria Vasile, Roxana Bistriceanu, Andreea-Valentina Suci, Mihaela Mandu, Liliana Florina Andronache, Dumitru Cristinel Badiu, Gelu ONOSE - Rehabilitation Program from the Minimally Conscious State to Regaining Mobility following Severe Traumatic Brain Injury due to a Car Crash: A Case Report
 9. **13:10–13:20** Cioroianu George, Predeanu Christian, Rogoveanu Otilia - The contribution of physical-spa therapy to the patient with complicated cerebrovascular and degenerative rheumatic pathology
 10. **13:20–13:30** Anastasia Rotăreanu, Oleg Pascal, Alisa Tăbîrță, Svetlana Pleșca, Victoria Chihai, Marina Bulai, Mihail Cîrîm, Adrian Melnic – Secondary stroke prevention: the role of medical rehabilitation in reducing recurrence and improving functional outcomes
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Session 6 (15:00–17:00) – Pain Management and Rehabilitation

Chairmen: Alisa Tăbîrță, Dan Blendea, Doroteea Teoibas-Serban

1. **15:00–15:10** Francesca Botos, Alessandra Neagu, Doroteea Teoibas-Serban, Carmen Firan-Costea, Dan Blendea - Acupressure: An Integrative Therapeutic Approach in the Management of Spinal Pain
2. **15:10–15:20** Corneliu-Dan Blendea, Mihaela-Corina Bucur, Vasile Cîrlig, Himanshu Bansal - The Platelet-Rich Plasma–Halotherapy Synergy: A New Paradigm in the Treatment of Osteoarthritis
3. **15:20–15:30** Nadina-Liana Pop, George-Serban Tincu, Remus Moldovan, Ramona Suci, Nicoleta Decea – *Treating pain in Rehabilitation Medicine: Nanomedicine as a potential new way of protecting patients with gastroduodenal ulcer*
4. **15:30–15:40** Răzvan Gabriel Drăgoi, Adina-Octavia Dușe, Daniel Popa, Ramona Andriș, Laura Nicolescu - Shockwave therapy for plantar fasciitis: a randomized controlled trial comparing two technologies
5. **15:40–15:50** Daniela Mucerschii, Mihail Cîrîm – Effect of a functional rehabilitation program on pain and disability in patients with chronic Low Back Pain
6. **15:50–16:00** Selma-Camer Omer, Aura Spinu, Sebastian Giuvara, Cristina Popescu, Ioana Andone, Alexandra-Madalina Sporici, Mihai Baila, Aurelian Anghelescu, Gelu Onose - Rehabilitation Strategies in Neurodegenerative Diseases: Case Reports in ALS and MS
7. **16:00–16:15** Elena-Roxana Tucmeanu, Carmen Oprea, Alin Iulian Tucmeanu – Organizational Communication as a strategic element in healthcare management

8. **16:15–16:30 Cristina Popescu, Alisa Tăbîrță, Mihail Cîrîm** – Effect of a rehabilitation program including post-isometric relaxation on pain and functional disability in patients with frozen shoulder
 9. **16:30–16:45 Mihail Cîrîm, Oleg Pascal, Alisa Tăbîrță, Svetlana Pleșca, Victoria Chihai, Anatolie Vizdoagă, Adrian Melnic, Marina Bulai, Anastasia Rotăreanu, Cristina Popescu** - Evaluation of the Patient with Secondary Chronic Musculoskeletal Low Back Pain: from clinical screening to identifying the predominant causes
 10. **16:45–17:00 Adrian Melnic, Mihail Cîrîm, Irina Cebanu, Svetlana Pleșca** - Musculoskeletal Pain After Stroke - Implications for Rehabilitation Programs
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Session 7 (17:30–19:30) – Cardiac and Respiratory Rehabilitation

Chairmen: Gabriela Dogaru, Liliana-Elena Stanciu, Mihaela Mandu

1. **17:30–17:40 Irina Duduca, Andrei Gheorghita, Oana-Diana Hrisca-Eva, Cezar Mucileanu, Mihai Ilea, Marius Turnea** - Physiotherapy as a Functional Re-education Strategy for Optimizing Hand Joint Mobility in Rheumatoid Arthritis
 2. **17:40–18:00 Mihaela Mandu, Catalina Liliana Andrei, Stefan Sebastian Busnatu, Andreea Elena Lacraru, Ioana Andone, Iulian Nastasa, Dragos Alin Trache, Ana-Maria Vasile, Dumitru Cristinel Badiu, Gelu Onose** - Partial results on the Cardiovascular Rehabilitation program and the Electronic Registry for Cardiovascular Rehabilitation applicable at a national level
 3. **18:00–18:15 Liliana-Elena Stanciu, Andreea-Bianca Uzun, Andreea-Dalila Nedelcu, Diana-Alexia Strîmbeschi, Luca-Mircea Neamțu, Andreea-Ioana Bîlici, Mădălina Gabriela Iliescu** – The importance of assessing Autonomic Nervous System response through heart rate variability in patients undergoing comprehensive medical rehabilitation treatment
 4. **18:15–18:30 Gabriela Dogaru, Shreedam Sachin Sharma** - Carbonated mineral waters and mofettotherapy - from basic research to clinical applications
 5. **18:30–18:40 Yuliya Manolaki, Lucia Tursan, Gabriela Dogaru** - Mofetotherapy and Carbonated Mineral Baths in the Covasna Resort: Mechanisms and Therapeutic Benefits
 6. **18:40–18:50 Nicoleta Cornea, Oleg Pascal, Alisa Tăbîrță, Svetlana Pleșca, Victoria Chihai, Svetlana Savitchi, Marina Bulai, Mihail Cîrîm, Anastasia Rotăreanu** - Evaluation of the effectiveness of the physiotherapy program in the functional recovery of patients with gonarthrosis
 7. **18:50–19:00 Mihaiela Chicu** - Pathophysiology of vasculitis
 8. **19:00–19:10 Mihaiela Chicu** - Surgery of herniated disc in young people – complications
 9. **19:10–19:20 Paraschiva Postolache, Constantin Ghimuș, Vlad-Florin Oiegar** - Integration of balneo-physiotherapy interventions in respiratory recovery: functional effects, quality of life and adherence to the program
 10. **19:20–19:30 Constantin Ghimuș, Vlad-Florin Oiegar, Paraschiva Postolache** - Sarcopenia, frailty and peripheral muscle dysfunction in chronic respiratory pathology: prognostic and therapeutic implications in recovery
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DAY 3 - Saturday, April 25, 2026

Session 8 (09:00–11:00) – Physical and Rehabilitation Medicine

Chairmen: Gelu Onose, Constantin Munteanu

1. **09:00–09:10** Irina Albadi, Mădălina Gabriela Iliescu, Elena Valentina Ionescu, Gelu Onose – From deficit to Functionality: Rehabilitation of brachial plexus palsy in a young adult patient
2. **09:10–09:20** Marcu Rahela, Dop Dalia, Rogoveanu Otilia - Diagnostic and evolution features in a patient with central neuron disease
3. **09:20–09:30** Alexandra-Andreea Mihai, Minodora Oprea, Bianca-Ioana Caranica, Alexandra Ecaterina Ciota, Andreea Alexandra Lupu, Elena Valentina Ionescu – Mechanisms of neuroplasticity in chronic axonal polyneuropathy: therapeutic potential and functional constraints – case report
4. **09:30–09:40** Nadina-Liana Pop, Ciprian Roman, Radu Samsodan - TRAUMATIC INJURY OF THE INDEX FINGER OF THE DOMINANT SIDE: IS A SMALL REHABILITATION MEDICINE TEAM ENOUGH TO CHANGE LIVES? A CASE STUDY
5. **09:40–10:30** Gelu Onose, Mihaela Mandu, Cătălina Andrei, Ioana Andone, Andreea Lăcraru, Aura Spînu, Dragoș-Alin Trache, Andreea-Valentina Suciu, Roxana Bistriceanu, Ștefan-Sebastian Busnatu - Cardio-pulmonary exercise test (CPET) in the rehabilitation of post-acute myocardial infarction
6. **10:30–10:40** Ilie Onu, Daniel-Andrei Iordan, Robert Gherghel - Integrated Multimodal Diagnostic Strategy for Focal Knee Chondral Lesions: Correlation of Clinical Findings with Ultrasound and MRI-Based ICRS Scores
7. **10:40–10:50** Daniel Andrei Iordan, Ilie Onu, Alina-Maria Stan, Valerica Zărnescu (Creangă), Carmina Liana Musat - Static Baropodometric Assessment for Musculoskeletal Rehabilitation: Plantar Pressure and Postural Load Distribution in Young Adults
8. **10:50–11:00** Predeanu Christian, Beldie Luiza, Cioroianu George, Rogoveanu Otilia - Clinical and paraclinical correlations in diabetic sensory-motor polyneuropathy

Session 9 (11:30–13:30) – Pediatric Rehabilitation

Chairmen: Andrada Mirea, Liliana Vlădăreanu

1. **11:30–11:50** Andrada Mirea - Premises for a Life Without Disabilities
2. **11:50–12:10** Madalina Leanca, Elena Neagu, Ileana Georgescu, Raluca Petcu, Georgiana Nicolae, Andrada Mirea - Interdisciplinary and Multiprofessional Intervention Plan in Children with Duchenne Muscular Dystrophy – The Experience of the “Robănescu-Pădure” National University Center for Children Neurorehabilitation
3. **12:10–12:30** Georgiana Nicolae, Cristiana-Ioana Raita, Madalina Leanca, Andrada Mirea - Response to a Novel Therapy in Duchenne Cardiomyopathy: A Case Report and Implications for Cardiac Management in DMD
4. **12:30–12:40** Daniela Vasile, Madalina Leanca, Ileana Georgescu, Diana Carabageac, Anca Grigoriu, Andrada Mirea - Gait Disorders – A multidisciplinary approach: The neurologist’s perspective
5. **12:40–13:00** Raluca Petcu , Andrada Mirea, Constantin Munteanu , Gelu Onose - Particularities of cerebral oxygenation at rest and during physical activity evaluated with the modern instrumental modality of functional exploration: near-infrared spectroscopy (N.I.R.S./ Function Near-Infrared

Spectroscopy -fN.I.R.S.), in adolescents with Hemiplegia in the context of Cerebral Palsy

6. **13:00–13:10** Liliana Vlădăreanu, Mădălina Gabriela Ilescu, Carmen Oprea, Elena Valentina Ionescu – The use of dry needling in the management of the spastic foot – paediatric case series
7. **13:10–13:20** Liliana Vlădăreanu, Liliana Stanciu, Elena Valentina Ionescu, Carmen Oprea, Mădălina Gabriela Ilescu – Imaging evaluation in vertebral static disorders – Sagittal profile
8. **13:20–13:30** Iustina Condurache, Gabriela Dascalu, Cezar Mucileanu, Cătălin Ionițe, Mihai Ilea, Mariana Rotariu - The Impact of Kinesiotherapeutic Intervention on Tone and Postural Disorders in Children with Hydrocephalus – A Community-Based Study

Session 10 (15:00–17:00) – Integrative Balneology and Lifestyle Medicine

Chairmen: Elena-Valentina Ionescu, Mariana Rotariu, Constantin Munteanu

1. **15:00–15:15** Liliana-Elena Stanciu, Lavinia Bodeanu, Elena-Roxana Tucmeanu, Daniela Profir, Carmen Oprea, Elena-Valentina Ionescu, Ilescu Mădălina Gabriela – Implementation of the pillars of Lifestyle Medicine at Techirghiol Balneal and Rehabilitation Sanatorium – A Pilot Study
2. **15:15–15:30** Bădulescu Alexandru, Burlacu Andreea, Pintrijel Andreea, Teoibaș-Șerban Doroteea-Elena, Blendea Corneliu-Dan - Balneotherapy and Hydrotherapy in Neurological Disorders of the Aging Population: A Literature Review
3. **15:30–15:45** Andreea-Iulia Vlădulescu-Trandafir, Andreea-Valentina Suciuc, Ruxandra-Luciana Postoiu, Gelu Onose - Complex multimorbidity with diagnosis hurdles but with favorable rehabilitative outcomes in an old adult patient
4. **15:45–16:00** Cezar Mucileanu, Mariana Rotariu, Iustina Condurache, Oana Roxana Bitere-Popa, Cristian Martu - Virtual and Augmented Reality in Vestibular Rehabilitation: New Therapeutic Perspectives for Peripheral Balance Disorders
5. **16:00–16:10** Marius Turnea, Mariana Rotariu, Iustina Condurache, Cezar Mucileanu, Andrei Gheorghita, Irina Duduca - Objective Assessment of Functional Hand Recovery Through Biomechanical and Kinematic Methods
6. **16:10–16:20** Andrei Gheorghita, Oana-Diana Hrisca-Eva, Iustina Condurache, Cezar Mucileanu, Irina Duduca, Marius Turnea - Functional Rehabilitation of the Upper Limb Through Kinesiotherapy Assisted by Hand-Tracking Technologies and Virtual Reality
7. **16:20–16:30** Andreea Nincă, Lorena Nincă, Amalia Teodora Vancea, Daniela Profir, Elena Valentina Ionescu, Mădălina Gabriela Ilescu, Doinița Oprea – Effects of a Comprehensive Balneotherapy-Based Rehabilitation Program on Perceived Stress, Psychological Well-Being, and Sleep Quality in Patients with Chronic Musculoskeletal Disorders
8. **16:30–16:40** Blendea Corneliu-Dan, Teoibas-Serban Doroteea - Shaping the Future of Rehabilitation in Romania: Telemedicine, Telerehabilitation, Legislation, and Innovation
9. **16:40–16:50** Marius Sorin Chiriac, Elena Valentina Ionescu, Carmen Oprea, Liliana Elena Stanciu, Madalina Gabriela Ilescu – The role of Traditional Chinese Medicine in physical kinetic Balneo recovery treatment
10. **16:50–17:00** Adina Octavia Dușe, Claudiu Avram, Georgeta Sînmărghițan, Răzvan Gabriel Drăgoi - Natural therapeutic resources in the management of patients with rheumatoid arthritis

Session 11 (17:30–19:30) – Sports Medicine and Biomechanic Mechanisms

Chairmen: Doinița Oprea, Liliana Elena Stanciu

1. **17:30–17:40** Doinița Oprea, Alina Maliu, Diana Vasile, Ioana Manoliu, Elena Valentina Ionescu, Liliana Elena Stanciu, Mădălina Gabriela Iliescu – Cauda Equina Syndrome after cesarean section: case presentation and safety implications
 2. **17:40–17:50** Ioana-Alexandra Benea, Felicia Trofin, Alexandra Ecaterina Ciota, Elena-Valentina Ionescu– Medical Rehabilitation in Pitt-Hopkins Syndrome: Challenges and clinical perspectives – case report
 3. **17:50–18:00** Gavril Gheorghievici - Postoperative rehabilitation after shoulder arthroplasty: protocols, challenges and functional outcome
 4. **18:00–18:10** Diana Elena Șerban, Simona Ioana Neagoie, Simona Ghiorghe, Cristina-Marilena Matei-Linca, Cristina-Georgeana Ghilimei, Andreea Cristina Nica Integrating musculoskeletal ultrasound into rehabilitation management of geriatric patients
 5. **18:10–18:20** Minodora Oprea, Alexandra-Andreea Mihai, Bianca-Ioana Caranica, Alexandra Ecaterina Ciota, Doinița Oprea, Elena Valentina Ionescu – Rehabilitation management of brachial plexus avulsion following severe road traffic trauma – case report
 6. **18:20–18:30** Maria Manuela Apostol, Magdalena Iorga, Mariana Rotariu - The Role of Clinical Psychological Intervention in Optimizing the Outcomes of Balneophysiokinetotherapy in Patients with Chronic Pain
 7. **18:30–18:40** Maria Manuela Apostol, Magdalena Iorga, Mariana Rotariu - Stress Management and Psychological Coping in Multidisciplinary Balneophysio-kinetotherapeutic Treatments
 8. **18:40–18:50** Oana-Diana Hrisca-Eva, Andrei Gheorghita, Mihai Ilea, Irina Duduca, Indrei Lucian-Laurentiu, Marius Turnea - Modern Approaches to Monitoring and Predicting the Effectiveness of Balneophysiotherapeutic Interventions in Patients with Schizophrenia
 9. **18:50–19:00** Cosmina Jianu, Roxana Paraschiv, Andreea-Valentina Suciu, Andreea-Iulia Vlădulescu-Trandafir, Ruxandra-Luciana Postoiu, Gelu Onose - Ongoing further consistent functional improvements in an initially asymmetrical paraplegia (complete on one side) after more than 2 years of complex, sustained rehabilitation
 10. **19:00–19:10** Andreea-Valentina Suciu, Andreea-Iulia Vlădulescu-Trandafir, Viorela Bembea, Ruxandra-Luciana Postoiu, Gelu Onose - Spectacular recovery after complex rehabilitation approaches - including specific nursing - in an initially paraplegic old female patient
 11. **19:10–19:20** Teoibas-Serban Doroteea, Popa Ana-Elena, Iordache Cristina, Blendea Corneliu-Dan - The Role of SIS Therapy in Modern Rehabilitation Medicine
 12. **19:20–19:30** Carina Braina, Adina Octavia Dușe, Claudiu Avram, Georgeta Sînmărghițan, Răzvan Gabriel Drăgoi - Educational measures to improve the quality of life in patients with rheumatoid arthritis
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Poster Sessions

1. **Ifrim Ana-Maria, Gheorghe Laura, Bănărescu Iuliana** – The importance of proprioceptive rehabilitation in pediatric patients with lower limb trauma
2. **Bănărescu Iuliana, Gheorghe Laura, Ifrim Ana-Maria** –LEGG–CALVÉ–PERTHES DISEASE: the importance of early diagnosis and rehabilitative treatment
3. **Gheorghe Laura, Bănărescu Iuliana, Ifrim Ana-Maria** – The role of natural sanogenic factors in the management of stress and disease of modern civilization
4. **Georgiana-Gabriela Capverde, Liliana Stanciu, Lavinia Hurduza, Diana Aragea, Mihaela Panduru** – Challenges in the rehabilitation of a paediatric patient with complete C7 spinal cord injury
5. **Lavinia Hurduza, Stanciu Liliana, Vlădăreanu Liliana, Capverde Georgiana-Gabriela, Aragea Diana, Panduru Mihaela** – Physiotherapy rehabilitation of post-traumatic gait disorder in a child with acute lymphoblastic leukemia - a case study
6. **Diana Aragea, Liliana Stanciu, Liliana Vlădăreanu, Lavinia Hurduza, Georgiana-Gabriela Capverde, Mihaela Panduru** – Case Study on the Rehabilitation of Surgically Treated Genu Valgum
7. **Panduru Mihaela, Stanciu Liliana, Vlădăreanu Liliana, Capverde Georgiana-Gabriela, Aragea Diana, Hurduza Lavinia** – Kinetotherapeutic approach in hypereplexia – case study
8. **Elena Cojocar Tanef, Irina Albadi, Adriana Clipa, Georgiana Cristina Stoica, Elena-Valentina Ionescu** – Balneotherapy – an important therapeutic option for chronic patient management in Family Medicine
9. **Anisia Cortea, Miruna Comanici, Amedeea Bilius, Iulia Manea, Doroteea Teoibas-Serban, Corneliu-Dan Blendea** - Post-Stroke Algoneurodystrophy: Recognition and Rehabilitation-Based Management
10. **Călin Corciovă, Robert Fuior, Cătălina Luca** – Monitoring of functional progress in medical rehabilitation based on smart sensors
11. **Raluca Ioana Șerban, Gabriel Florin Răzvan Mogoș, Cezar Mucileanu, Iulian Șerban, Florentina Severin, Mariana Rotariu** - Ozone Therapy in Rheumatoid Arthritis with Severe Inflammatory Syndrome: A Case Report
12. **Mariana Rotariu, Ancuța-Elena Ferariu, Iustina Condurache, Cezar Mucileanu, Indrei Lucian-Laurentiu, Emanuel-Andrei Piseru** - Modern Therapies Used in Post-Stroke Upper Limb Rehabilitation: The Synergy Between Functional Electrical Stimulation and Mirror Therapy
13. **Cătălin Ionițe, Iustina Condurache, Oana-Diana Hrisca-Eva, Mariana Rotariu, Indrei Lucian-Laurentiu, Cezar Mucileanu** - Therapeutic Approaches to Back Pain: A 2025 Literature Review and Efficacy Analysis
14. **Marius Turnea, Cătălin Ionițe, Cezar Mucileanu, Iustina Condurache, Andrei Gheorghită** - Occupational Therapy–Based Proprioceptive Rehabilitation of the Lower Limb
15. **Irina Duduca, Marius Turnea, Andrei Gheorghita, Cezar Mucileanu, Oana-Diana Hrisca-Eva** - Kinematic Modelling and Simulation–Based Assessment of Hand Muscle Strength Recovery Using Intelligent Pneumatic Systems

16. **Indrei Lucian-Laurentiu, Mariana Rotariu, Irina Duduca, Cezar Mucileanu, Marius Turnea, Andrei Gheorghita** - Integration of a Motion Tracking-Based Virtual Avatar into Kinesiotherapy Rehabilitation Programs
 17. **Robert Fuior, Cătălina Luca, Onita Cristiana Amalia, Călin Corciovă** - A smart interactive feedback platform for rehabilitation support
 18. **Vizitiu Lakhdari Elena, Costea Andrei Ioan, Silișteanu Sînziana Călina** - Effectiveness of aquatic exercise in reducing body fat percentage in adult women
 19. **Sebastian Giuvara, Aurelian Anghelescu, Gelu Onose** - Research on the Non-Invasive Monitoring of the Biomechanical and Viscoelastic Properties of Spastic Musculature in Post-Stroke Patients after the First Course of Neuromodulation with Botulinum Toxin – Repercussions on Functional Mobility and Balance
 20. **Roxana BISTRICEANU, Gelu ONOSE, Aurelian ANGHELESCU** -Exploring Spatial Neglect: Clinical Assessment and Neurorehabilitation-Oriented Therapeutic Methods in Patients with Brain-Acquired Lesions
 21. **Ruxandra-Luciana Postoiu, Mihai Băilă, Andreea-Valentina Suci, Andreea-Iulia Vlădulescu-Trandafir, Gelu Onose** - Innovative approaches in medical rehabilitation of severe burn patient – including with a pressure sore – through MLS LASER therapy
 22. **Ruxandra-Luciana Postoiu, Silviu Marinescu, Gelu Onose** - Comparative case series of patients with severe burns, rather concomitantly treated vs. non-treated with MLS LASER
 23. **Andreea-Iulia Vlădulescu-Trandafir, Andreea-Valentina Suci, Ruxandra-Luciana Postoiu, Gelu Onose** - Very good recovery in a patient with traumatic brain injury and marked and prolonged fidgeting, after multimodal rehabilitation approaches
 24. **Eduardo Stoean, Alexandra-Madalina Sporici, Ovidiu Manucu, Aura Spînu, Sebastian Giuvara, Ioana Cazacu, Aurelian Anghelescu, Gelu Onose** - Clinical Challenges and Rehabilitation Approaches in a Young Female Patient With Complete Tetraplegia
 25. **D. Păcurar, M. R. Păcurar** - Overcoming the Challenges of Advanced Hip Osteoarthritis Management
 26. **Diana DOMUNCO, Irina ALBADI, Adriana CLIPA, Vadym ROTAR, Elena-Valentina IONESCU** - Bruxism as a risk factor for craniocervical dysfunction: an integrated approach
 27. **Cosmina Jianu, Roxana Paraschiv, Andreea Valentina Suci, Andreea-Iulia Vladulescu-Trandafir, Ruxandra-Luciana Postoiu, Gelu Onose** - Quite Good Recovery and Rehabilitation on Medium Term Perspectives in a Patient Iteratively Operated for an Atypical Meningioma with a (Pseudo?) Tumoral Lesion Intramedullary too
 28. **Dorin Gheorghe Triff** – Musculotendinous stretch of the iliopsoas. Difficulties in diagnosis and consequences in recovery. Case study
 29. **Dorin Gheorghe Triff** – Recovery features in complications of parathyroid carcinoma. Bilateral quadriceps tendon injury. Case study
 30. **Dorin Gheorghe Triff** – Workers' perceptions of work overload and upper limb musculoskeletal disorders and Low Back Pain. Implications for prevention and medical recovery in schools
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CONGRESS ABSTRACTS

The importance within STRATIF-AI: from concept to clinical implementation – protocol of study afferent to WP6 in post-Stroke patients' rehabilitation

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Abstract

Introduction: Stroke is a leading cause of long-term disability, requiring personalized rehabilitation strategies. Conventional stratification approaches are limited by fragmented data, intermittent clinical assessments and reactive decision-making. Current rehabilitation models fail to capture the dynamic nature of recovery, leaving critical therapeutic windows underutilized.

Methods: STRATIF-AI introduces a continuously updated Digital Twin model that integrates multimodal patient data, including clinical assessments, neuroimaging, wearable sensor outputs, and functional measures, into a unified, dynamic patient profile.

Study 6 is a pilot randomized controlled trial conducted at the Neuromuscular Rehabilitation Clinic of the Teaching Emergency Hospital "Bagdasar-Arseni" (SCUBA), Bucharest, as part of a multi-site European validation framework.

Thirty post-stroke patients will be randomized into two groups: standard rehabilitation care versus STRATIF-AI-augmented care with Digital Twin support. Outcomes include feasibility, usability, patient/ user experience, and functional recovery assessed using UK FIM+FAM, alongside continuous wearable data collection via a GDPR-compliant REDCap platform.

Results: The study is expected to demonstrate the feasibility of integrating Digital Twin-based decision support into routine rehabilitation workflows, while providing preliminary evidence of its clinical value, including enhanced patient engagement and improved functional recovery trends.

Conclusions: Study 6 represents the first real-world clinical validation of continuous stratification using Digital Twins in post-stroke rehabilitation. By transforming rehabilitation from a fragmented and episodic process into a continuous, predictive, and personalized care pathway, STRATIF-AI has the potential to redefine neurorehabilitation practice and establish the foundation for large-scale implementation studies.

Keywords: *stroke rehabilitation, Digital Twins, continuous stratification; randomized controlled trial, artificial intelligence.*

Rehabilitation Following Stroke with STRATIF-AI Technology

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Abstract

Introduction. The vision of the continuous stratification for improved prevention, treatment, and rehabilitation of stroke patients using digital twins and AI (STRATIF-AI) project is to improve the care of people who are at risk of, or who have experienced, a stroke. This workpackage aims to use a digital twin strategy to offer a continuous personalised rehabilitation experience to stroke survivors in inpatient rehabilitation units.

Material and method. Thirty participants will be recruited at the three rehabilitation centres in Romania, Spain and the UK which are part of the STRATIF-AI consortium. Participants will be randomised to usual care or usual care plus the STRATIF-AI platform. Data will be collected on demographics, stroke aetiology, premorbid conditions, stroke sequelae, post-stroke complications and stroke functional assessments including the Functional Independence Measure/Functional Assessment Measure and the Fugl-Meyer Assessment. Raw motion capture data will also be captured and assessed.

Results and discussions. This project will recruit 30 participants in each centre who will use the platform for 6 weeks to determine the impact of the technology on rehabilitation after stroke.

Conclusions. We anticipate that the STRATIF-AI platform will improve motivation by: Seeing 'yourself' perform rehabilitation Showing the long-term impacts Giving feedback on exercise Helping achieve personalised goals. This will also benefit clinicians by saving time spent working 1:1 with patients.

Key words: *Rehabilitation, stroke, digital twin*

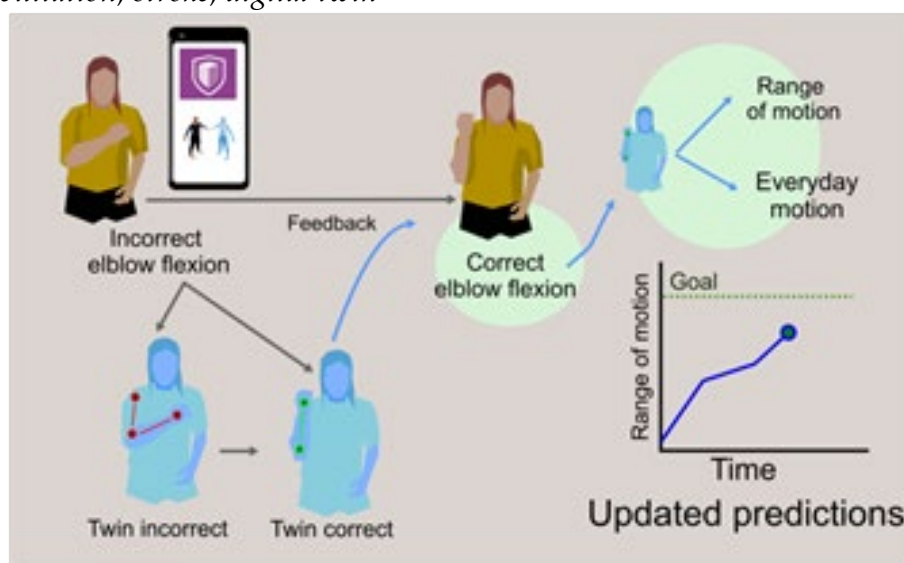


Fig. 1. Example of the STRATIF-AI digital twin technology in use in rehabilitation.

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Prerequisites for digital modeling and quantification of altered upper extremity movement patterns after stroke, based on Fugl-Meyer assessment, within a customized classification framework

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Abstract

Introduction. In this work, we describe the digital processing of the Fugl-Meyer Assessment (FMA), using a customized quantification classification of the post-stroke motor deficit in upper extremities, as a foundation for remote examination and training through Digital Twin (DT) technology - developed into the Stratif-AI project (1).

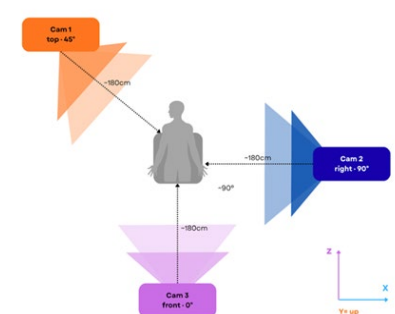
Material and method. For this purpose, a skilled physio-kinesio-therapist with relevant clinical expertise was recorded simulating all disability degrees included in the aforementioned customised classification, based on the FMA paradigm. Using a multi-camera pipeline that extracts anatomical keypoints, performs 3D triangulation, and reconstructs a motion-accurate 3D model, we were able to generate a detailed kinematic analysis of each movement at each level of motor deficit (2).

Results and discussion. The dataset covers 15 upper-extremity-specific movements, captured across 4 degrees of deficit using 3 synchronized cameras, with 34 targeted anatomical keypoints tracked per frame. Anatomical validation yielded a mean segment length error of approximately 8% against Drillis and Cortini proportionality constants for segment length estimation (3), confirming the special geometric plausibility of the reconstructed models.

Conclusions. The resulting dataset and visualization framework open a wide range of possibilities, both in telerehabilitation — through real-time virtual assessment and coaching, to overcome geographical barriers, too — and in clinical research, where objective, reproducible movement data can also support the development of automated scoring and outcome prediction tools. Current limitations include single-subject data collection and the absence of ground truth (on real patients) validation - versus optical marker-based systems - both of which are planned as next steps in the ongoing work.

Key words: Digital Twin, Fugl-Meyer Assessment, post-stroke upper extremity motor deficits, markerless motion capture, telerehabilitation, 3D kinematic analysis

Fig. 1. Top-view schematic of the three-camera recording setup



1. Fugl-Meyer AR, Jääskö L, Leyman I, Olsson S, Steglin S. **The post-stroke hemiplegic patient I. A method for evaluation of physical performance.** Scand J Rehabil Med. 1975;7(1):13-31.
2. Onose G, Anghelescu A, Ionescu A, Tataranu LG, Spînu A, Bumbea AM, Toader C, Tuță S, Carare RO, Popescu C, Munteanu C; Collaborative Working Group; Daia C. **Translation of the Fugl-Meyer assessment into Romanian: Transcultural and semantic-linguistic adaptations and clinical validation.** Front Neurol. 2023 Jan 5;13:1022546. doi: 10.3389/fneur.2022.1022546. PMID: 36712448; PMCID: PMC9879050.
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Markerless 3D Analysis of Lower Extremity Movements Mimicking Hemiplegia Using the Fugl–Meyer Assessment Paradigm Toward a Virtual Coaching System

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Abstract

Introduction. Accurate assessment of lower-extremity motor function in neurorehabilitation remains challenging, as conventional scales such as the Fugl-Meyer Assessment (FMA) rely largely on subjective visual observation(1). Even if marker-based optical motion capture systems represent the gold standard for three-dimensional kinematic analysis, their high cost, complex setup, and time-consuming sensor placement limit their use in routine clinical practice.(2)

Material and method. In this study, we explored a low-cost, markerless multi-view alternative designed to support movement evaluation within an FMA-inspired paradigm. The proposed method is based on synchronised video recordings acquired from three camera angles, followed by two-dimensional keypoint extraction and multi-view three-dimensional reconstruction to generate a coherent skeletal/segmental model.

Results and discussion. As a proof of concept, the system was tested on a healthy adult subject - a professional physio-kinesio-therapist - who performed standardized lower-extremity tasks and deliberately mimicked related movement patterns to approximate different levels of motor deficit. The results demonstrate the feasibility of reconstructing joint positions and segment motion in a reproducible manner.

Conclusions. Although further validation in the clinical population is required, this approach represents a scalable step toward more objective and accessible assessment of post-stroke motor deficits.

Key words: Fugl-Meyer Assessment, 3D Kinematic Analysis, telerehabilitation, post-stroke motor impairment

Fig. 1. Markerless multi-view 3D kinematic analysis pipeline(3)(4)



1. Fugl-Meyer AR, Jääskö L, Leyman I, Olsson S, Steglin S. The post-stroke hemiplegic patient I. A method for evaluation of physical performance. Scand J Rehabil Med. 1975;7(1):13-31.

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STRATIF-AI Future Perspectives: Continuous Stratification Across the Stroke Pathway Using Digital Twins and Artificial Intelligence

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Introduction. Stroke remains a leading cause of death, disability, and long-term socioeconomic burden, while current stratification strategies are still largely based on intermittent clinical assessments that fail to exploit the large amount of multimodal data generated between decision points. STRATIF-AI proposes a paradigm shift from episodic stratification to **continuous stratification**, enabled by hybrid digital twins that dynamically integrate clinical, imaging, biological, behavioural, and wearable-derived data. The platform is conceived as an interconnected, patient-centric architecture spanning prevention, acute treatment, and rehabilitation, with the overarching aim of improving personalization, prediction, monitoring, and long-term outcome optimization.

Material and method. The STRATIF-AI framework combines semantic data harmonization, federated learning, mechanistic multi-organ and multiscale modelling, and a secure personal data vault into a shared backend connected to phase-specific clinical applications. The conceptual architecture enables integration of heterogeneous data sources without centralizing sensitive patient data, while preserving GDPR-oriented governance and supporting trustworthy AI principles. Within this ecosystem, future translational development relies on six clinical studies designed to collect continuous and time-resolved multimodal datasets, validate hybrid models, refine user-centred interfaces, and assess feasibility and clinical utility in prevention, acute care, and rehabilitation. Particular emphasis is placed on rehabilitation, where longitudinal functional, kinematic, cognitive, and patient-generated data may be used to continuously adapt goals, personalize training intensity, and improve long-term follow-up.

Results and discussions. From a future-perspective standpoint, STRATIF-AI outlines a credible path toward a new generation of stroke management tools in which the digital twin accompanies the patient across all phases of care. In prevention, continuous updating of risk profiles may support more responsive health dialogues and secondary prevention strategies. In the acute phase, hybrid models may improve intervention planning and post-treatment monitoring by integrating repeated imaging, physiological monitoring, and longitudinal biomarkers. In rehabilitation, the expected added value is especially strong: digital twin-supported cognitive and physical rehabilitation may improve motivation, provide individualized feedback, refine difficulty levels in real time, and support clinicians through more efficient interpretation of functional trajectories. The rehabilitation work package further indicates linked pilot studies, type 1 effectiveness-implementation hybrid evaluation, and clinically relevant endpoints including Fugl-Meyer Assessment (FMA), a stroke-specific, performance-based impairment index change, vital parameters, sleep-related data, and end-user feedback.

Conclusions. STRATIF-AI represents a forward-looking conceptual and translational framework for the evolution of stroke medicine from fragmented, intermittent decision-making toward an integrated model of continuous stratification. Its future perspectives are particularly relevant for neurorehabilitation, where digital twins may connect biological understanding, longitudinal monitoring, patient engagement, and adaptive therapy into a single operational ecosystem.

Key words: stroke, digital twin, artificial intelligence, continuous stratification, rehabilitation, personalized medicine, federated learning, neurorehabilitation.

Multimodal Balneotherapy and Hydrogen Sulfide Signaling in Thermal Medicine: From Mechanisms to Clinical Implications

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Introduction. Balneology, defined as the medical discipline of therapeutic use of balneological waters, peloids and gases, has gained renewed scientific attention in chronic rheumatologic, dermatologic, inflammatory, and metabolic disorders. Among the active components of sulfurous balneological interventions, hydrogen sulfide (H₂S) is now recognized as a biologically relevant gasotransmitter involved in redox regulation, mitochondrial function, and inflammatory signaling [1,2].

Objective. This study explores environmental H₂S exposure in sulfur-rich spa settings as a natural delivery system operating through transdermal absorption, inhalation and in some cases, gastrointestinal uptake.

Material and Method. This conceptual study integrates hydrogeochemical characterization of sulfurous waters, exposure pathway analysis (transdermal, inhalation, gastrointestinal) and critical appraisal of contemporary literature on H₂S signaling. Particular emphasis is placed on mitochondrial sulfide oxidation, reactive sulfur species formation, and modulation of redox-sensitive pathways such as Nrf2 and NF-κB [3,4].

Results and Discussions. By integrating hydrogeochemical characterization, exposure pathway analysis and current literature, we propose that balneological sulfur exposure may function as a multimodal exogenous H₂S donor system. This framework aligns with a hormetic exposure model, where balneological H₂S doses occupy an adaptive, non-toxic signaling window. Available clinical and mechanistic evidence suggests that sulfur-rich mineral waters and related balneological agents may reduce inflammatory activity, enhance antioxidant defenses, modulate pain, and improve functional outcomes in rheumatologic, dermatologic, metabolic and respiratory conditions [5,6]. However, marked heterogeneity in hydrochemical composition, H₂S concentration, and treatment protocols remains a major limitation.

Conclusions. Sulfurous balneological exposure represents a systems-level environmental intervention linking traditional spa medicine with environmental medicine and gasotransmitter biology. Future research should focus on dose-response characterization, biomarker-guided protocols, and exposure standardization, enabling the transition toward precision balneology.

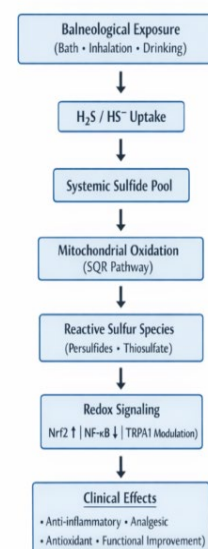
Key words. balneology, hydrogen sulfide, mineral water, redox signaling, inflammation, thermal medicine, crenotherapy

Fig. 1. Mechanistic model of multimodal H₂S exposure and redox signaling in balneotherapy.

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Mechanistic Model of Multimodal H₂S Exposure and Redox Signaling in Balneotherapy



Hydrogen Sulfide: Mechanism of action

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In balneology using sulfurous mineral waters, the therapeutic value attributable to the sulfur system depends less on “having sulfur” in the abstract and more on how much bioaccessible fraction actually reaches the target tissue and how long it remains active. This practical concept is grounded in physicochemistry: the H_2S/HS^- equilibrium is governed mainly by pH, temperature, and oxygenation. Operationally, a relatively more acidic pH favors the non-ionized H_2S form, which is more lipophilic and diffusible, whereas dissolved oxygen and aeration accelerate oxidation of the sulfhydryl system and reduce the functional fraction. Therefore, efficacy is not only a property of the spring, but also of the water’s “route” from source to patient.

From there, modern physiological foundations are linked to the thermal tradition. Endogenous sources of H_2S (CBS, CSE, and 3-MST) and its biological fate are reviewed, particularly mitochondrial catabolism, which converts H_2S into oxidized species (e.g., thiosulfate/sulfate) through specific enzymatic pathways. Under low-concentration conditions, H_2S biology is interpreted as a module for fine control of redox status, bioenergetics, and cell signaling, with responses that depend on dose, time, and tissue context.

The mechanistic core is organized around protein persulfidation, a post-translational modification that explains how a small chemical signal can translate into broad biological effects. On this basis, key pathways are integrated: activation of antioxidant defenses (via Nrf2/ARE), modulation of the inflammatory response (via NF- κ B), regulation of ion channels, and involvement in signaling cascades such as PI3K/Akt, MAPK/ERK, and Wnt/ β -catenin, along with epigenetic regulatory effects (including HDACs and sirtuins). This conceptual architecture helps explain, coherently, why classical thermal indications show effects on inflammation, pruritus, skin tolerance, tissue repair, pain, and osteoarticular function—without turning mechanistic hypotheses into clinical promises.

Finally, these principles are translated into practice by distinguishing routes of administration (baths, peloids, inhalation techniques, and drinking cures) and emphasizing that facility design and hydraulic management (minimizing aeration/turbulence, controlling recirculation and residence times, etc.) condition the preservation of useful H_2S . The conclusion highlights a non-negotiable point: modern balneology must combine its clinical heritage with water characterization, technical control, and environmental safety, including ventilation and monitoring in H_2S environments, to support a rigorous and prudent clinical translation.

A complex approach to the recovery of patients with peripheral arteriopathy, using the potential of the natural factors of the Covasna resort

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Introduction. Peripheral arterial diseases (PAD) are highly prevalent and significantly increase cardiovascular mortality and morbidity in the general population. Intensive preventive strategies are needed. Patients with PAD are generally underdiagnosed and undertreated compared with patients with coronary artery disease (CAD). In PAD and CAD often common risk factors coexist. For effective management is necessary a multidisciplinary team. Early diagnosis is very important for better outcomes. New guidelines offer guidance on diagnosis, surveillance and treatment. Optimal medical treatment (OMT) including lifestyle measures and pharmacological treatment is recommended for all patients with PAD. Covasna resort offers through the potential of its natural cure factors a complex approach to the recovery of patients with PAD. Both carbogaseous, the bath and the emanation of natural gas known under the name of moffetes, are used as natural therapeutic factors in a health resort setting, in Covasna.

Material and method. Patients are evaluated for PAD, for cardiovascular risk by a multidisciplinary team. Elements of OMT are applied: life style recommendations, physical activity and patient education, medical therapy: antithrombotic therapy, antihypertensive therapy, lipid lowering therapy, diabetes and pre-diabetes therapy. A special therapy offered by Covasna resort, with carbogaseous waters used for external cures and moffetes could be recommended.

Results and discussions. Patients with PAD should receive comprehensive OMT, including supervised exercise training and lifestyle modification. A personalized programme of guidelines-guided pharmacotherapy to reduce cardiovascular risk factors, major adverse cardiac event, major adverse limb event, should be prescribed and tightly followed. The programme with carbogaseous waters and moffetes added to classical programme to patients with PAD, improve peripheral circulation and normalize vascular hyperreactivity, improve collateral circulation and claudication index, reduce tensional values and give bradycardic tendency during cures.

Conclusions. Programmes for recovery of patients with PAD could be improved using the potential of the natural factors of Covasna resort.

Key words: *peripheral arteriopathy, rehabilitation, natural factors, Covasna resort*

Climatotherapy in the Era of Climate Change: Emerging Public Health Challenges and Future Research Directions in Japan

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Abstract

According to data from the Japan Meteorological Agency, the annual mean temperature has increased by the following amounts since records began: +0.18°C in the Hokkaido; +0.15°C in the Tohoku; +0.24°C in the Kanto-Koshin; +0.21°C in the Hokuriku; +0.25°C in the Tokai; +0.23°C in the Kinki; +0.21°C in the Chugoku; +0.21°C in the Shikoku; +0.19°C in the Kyushu; and +0.18°C in the Okinawa. An increase in the number of extremely hot days reduces the period suitable for outdoor natural therapies, such as climatotherapy. Combinations with cold water therapies, such as Kneipp therapy, will become increasingly necessary. Additionally, given the recent increase in extreme weather events, ensuring the safety of climatotherapy sessions has become paramount.

In November 2025, numerous medical doctors from across Japan participated in the Climatotherapist Instructor Training Workshop and passed the certification examination. This will enable the widespread practice of authentic climatotherapy.

Various portable devices are emerging that *can* be used to assess natural environments used in climatotherapy and evaluate their effects on participants. I will present several such devices that I have used in research or tried out.

According to preliminary data from the Ministry of the Environment covering April 2025 to January 2026, a record 49,916 bears appeared in mountains and populated areas nationwide. This resulted in 236 injuries and 13 fatalities. The ageing population and the decline in human presence in the mountains and on farmland are considered to be the main reasons for the increase in bear sightings. Consequently, measures such as transitioning from traditional bear protection policies to managing bear populations at sustainable levels and hiring government hunters are being implemented. Technologies such as 'bear sighting prediction powered by AI' and 'bear location tracking using drones' are now being developed and implemented. The fear of bear sightings is keeping more people indoors, leading to an increase in reports of physical and mental health issues. Reduced muscle strength, diminished physical fitness, and social isolation are of particular concern for the elderly. In the event of a major natural disaster, they may find evacuation difficult. I have recently obtained the national 'Meteorological Disaster Prevention Advisor Certification', in addition to my medical doctor and weather forecaster licences. I am planning initiatives that combine efforts to prevent physical decline and promote health among residents using climatotherapy, as well as raising awareness of appropriate evacuation procedures based on meteorological information.

Keywords: Climatotherapy, Climate Change, Climatotherapist Instructor Training Workshop, Wearable Devices, Bear Attacks, Prevention of Health Decline and Health Promotion

Balneary H₂S Resources in Romania

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Introduction. Hydrogen sulfide (H₂S) has emerged in recent decades as a major endogenous gaseous signaling molecule with important physiological and pathophysiological implications, including vasoregulation, cytoprotection, redox modulation, anti-inflammatory effects, mitochondrial signalling, and neuromodulation. In parallel with this modern biomedical perspective, sulfur-containing natural therapeutic factors have long represented a traditional pillar of balneary medicine. Romania benefits from a significant diversity of sulfurous mineral waters and related balneary resources, distributed in several spa areas with long-standing therapeutic use. Reassessing these resources through the contemporary lens of H₂S biology may strengthen their scientific relevance and support renewed medical, translational, and strategic interest.

Material and method. This paper proposes a conceptual and integrative analysis of Romanian balneary resources characterized by sulfurous composition, with emphasis on their potential relationship to H₂S-mediated biological effects. The approach combines classical balneological knowledge regarding sulfurous mineral waters and spa use with current biomedical understanding of H₂S as a gasotransmitter. The analysis focuses on the therapeutic significance of natural sulfurous factors in relation to skin disorders, musculoskeletal pathology, chronic inflammatory conditions, vascular dysfunction, and selected neurological and recovery-oriented contexts, while also considering the need for modernization of scientific validation frameworks.

Results and discussions. Romanian balneary sulfurous resources represent an important natural therapeutic heritage with potential relevance that extends beyond traditional empirical use. From a mechanistic perspective, sulfur-containing waters may be interpreted as complex natural exposures capable of interacting with biological systems involved in oxidative stress control, microcirculatory regulation, inflammation modulation, connective tissue metabolism, and tissue recovery processes. This perspective provides a modern explanatory framework for some of the recognized indications of sulfurous balneary therapy, especially in degenerative and inflammatory locomotor diseases, selected dermatological conditions, and chronic recovery-oriented care. At the same time, substantial heterogeneity exists among sulfurous resources in terms of chemical composition, concentration, associated mineral profiles, physical parameters, and clinical use traditions. This heterogeneity underlines the necessity of more precise characterization, standardized profiling, and contemporary translational research. In Romania, the future scientific valorization of H₂S-related balneary resources should include integrated chemical, biological, and clinical investigation, together with the development of modern biomarkers and functional outcome-based evaluation models.

Conclusions. Romanian sulfurous balneary resources constitute a highly valuable natural therapeutic asset that deserves renewed scientific attention in the context of current H₂S biology. Their reinterpretation within a mechanistic, translational, and evidence-oriented framework may contribute to the consolidation of balneology as a modern medical field, while also supporting the strategic development of Romanian spa medicine. Further interdisciplinary research is needed to clarify dose-effect relationships, mechanisms of action, clinical indications.

Key words: *hydrogen sulfide, sulfurous mineral waters, balneology, Romania, spa medicine, natural therapeutic factors, recovery medicine, translational research.*

Framing a Global Consensus on a global definition of hydrotherapy and balneotherapy aligned with WHO requirements

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Introduction: Hydrotherapy and balneotherapy encompasses a group of therapeutic interventions using tape water and natural mineral waters, gases, peloids, and related eco-environmental resources Despite their long-standing clinical application and growing evidence – based resources, no international agreements have been established for this types of therapy. Hydrotherapy and balneotherapy remain insufficiently represented within the World Health Organization (WHO) Global Strategy on Traditional, Complementary and Integrative Medicine 2025–2034. This gap limits their integration into international health policies and classification systems. **Objective:** To propose a conceptual and methodological framework for the development of an internationally accepted definition of hydrotherapy and balneotherapy, aligned with WHO requirements and classification systems.

To integrate balneotherapy into global health systems and facilitate international comparability

Material and Method: to mapp hydrotherapy and balneotherapy onto the WHO Family of International Classifications (WHO-FIC), including:

- ICHI – International Classification of Health Interventions;
- ICD-11 – International Classification of Diseases;
- ICF – International Classification of Functioning, Disability and Health**

This approach integrates existing scientific evidence on hydrotherapy and balneotherapy mechanisms and clinical applications with policy-oriented analysis, aiming to harmonize terminology, define scope, and identify pathways for classification and standardization.

Expected Results: -A standardized, WHO-compatible framework

- Clear categories for hydromineral, peloid, gas, inhalation, drinking, and environmental therapies
- Direct mapping to ICD-11 indications and ICF functional domains
- A structure suitable for international consensus documents, clinical trials, data registries, and policy integration, facilitating recognition within health systems and supporting evidence-based public health strategies.

Conclusion: Definitions exist, and many share common features, but not globally standard, universally accepted. This proposed approach is consistent with the WHO-FIC framework and provides a robust foundation for an official “International Consensus on the Definition and Classification of Hydrotherapy and Balneotherapy”, as requested by WHO. It supports harmonization, clinical coding, international research, and health-system integration. A coordinated, collaborative process involving scientific societies, academic institutions, and WHO stakeholders is essential to ensure consistency, credibility, and sustainability in advancing hydrotherapy and balneotherapy within global health systems.

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Emerging Stimulation Technologies in Spinal Cord Injury Care

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Introduction: Emerging stimulation technologies aim to improve functional recovery after spinal cord injury (SCI) by modulating spared spinal and peripheral neural pathways. These approaches include epidural and transcutaneous spinal cord stimulation to re-engage locomotor networks, as well as targeted neuromodulation to address autonomic and respiratory dysfunction (e.g., diaphragmatic pacing, Brindley sacral root stimulation, and cardiac pacing). Together, these modalities represent a shift toward restoration-focused rehabilitation beyond traditional compensatory strategies.

Discussion: Neuromodulation strategies are increasingly being explored to restore voluntary movement, autonomic regulation, and respiratory capacity, including in individuals with motor complete SCI. Epidural and transcutaneous spinal stimulation, particularly when combined with task-specific rehabilitation, have demonstrated improvements in motor output, standing, stepping, and functional independence in selected patient populations. Additional modalities such as functional electrical stimulation (FES), transcranial magnetic stimulation (TMS), brain-computer interfaces (BCIs), and implantable pacing systems provide complementary avenues for individualized rehabilitation across varying neurological levels and severities of injury. However, broader clinical implementation remains limited by heterogeneity in protocols, long-term durability of outcomes, cost, and accessibility.

Conclusion: Advances in stimulation-based rehabilitation are reshaping the therapeutic landscape of SCI by enabling targeted restoration of motor and autonomic function. Continued innovation, rigorous clinical trials, and scalable rehabilitation frameworks will be essential to translate these promising technologies into widely accessible standards of care.

COMMUNITY BASED REHABILITATION MODELS(CBR-M)

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INTRODUCTION. Community based rehabilitation models (CBR-M) are community driven that fosters empowerment and inclusion .It promotes equality among persons and emphasis on improving the quality of life. . Initiated by WHO Iit leverages local resources, families, and communities to provide rehabilitation, reduce poverty, and eliminate barriers in resource-constrained areas.

OBJECTIVES: The talk focuses on elaborating the principles of CBR, & its matrix. This talk also addresses the various models of CBR .The barriers, challenges and solutions will be discussed.

CONCLUSION: The talk addresses the paradigm shift in community based rehabilitation models.CBR is a feasible method .By embedding rehabilitation within communities ,local strengths are turned into sustainable solutions , empower persons with disabilities foster inclusion .By scaling CBR models lives can be transformed , break barriers and build a more equitable society for all.

KEYWORDS: *Community Based Rehabilitation, Models, Inclusion, Empowerment& Quality of Life (QOL).*

Evolutionary features in a case of tetraplegia with predominant left hemiplegia following severe traumatic brain injury due to heteroaggression.

Nistor-Cseppento Carmen, Gherle Anamaria, Cevei Mariana, Tirla Sebastian, Deac Ștefania

Introduction: Severe traumatic brain injury (TBI) is a leading cause of complex neurological disability, characterized by heterogeneous pathophysiological mechanisms and unpredictable recovery patterns. Compared to other acquired central nervous system lesions, TBI requires a highly individualized and multidisciplinary rehabilitation approach.

Materials and Methods: We present the case of a female patient admitted to a neurorehabilitation clinic approximately two months after severe TBI caused by heteroaggression. The initial injury consisted of a right frontal intracerebral hematoma with capsulo-lenticular extension and significant mass effect, associated with thoracic trauma. The early course was complicated by prolonged intensive care stay, multidrug-resistant infections, and septic shock. At admission, clinical evaluation revealed spastic tetraplegia with predominant left hemiplegia, severe dysphagia requiring PEG feeding, neurogenic bladder, major cognitive impairment (MMSE 5/30), and complete functional dependence (FIM 21/126; Barthel Index 5/100). A staged, interdisciplinary rehabilitation program was implemented, including physiotherapy, occupational therapy, speech therapy, functional electrical stimulation, robotic-assisted gait training, proprioceptive neuromodulation, and repetitive transcranial magnetic stimulation.

Results: The patient showed a slow but favorable recovery. Improvements were observed in trunk control, reduction of spasticity, and progressive acquisition of assisted orthostatism and gait. Cognitive function improved significantly (MMSE 25/30). Functional outcomes also improved (FIM 65/126; Barthel Index 40/100), reflecting partial recovery of independence.

Conclusion: This case highlights the clinical particularities and rehabilitation complexity of severe TBI, emphasizing the need for early, individualized, and multidisciplinary therapeutic strategies. Favorable outcomes can be achieved despite severe initial deficits, although recovery remains prolonged and resource-intensive.

Management of aseptic necrosis of the femoral head in patients with iatrogenic spinal cord injury: case report

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Introduction: Total hip arthroplasty (THA) in patients with paraplegia represents a unique surgical and rehabilitation challenge, with the main goal being the reduction of chronic pain and improvement of quality of life by facilitating transfers and sitting posture. We present the case of a patient with a complex clinical profile, including right total hip arthroplasty, left femoral head aseptic osteonecrosis, and incomplete spastic paraplegia, who required left total hip arthroplasty. **Objective:** To evaluate the particularities of prosthetic stability and the management of specific risks (dislocation, pressure ulcers, heterotopic ossification), as well as to establish a specific balneo-physiotherapeutic treatment plan in the context of severe neuromotor deficit. **Materials and Methods:** The 35-year-old patient has a history of uncemented right THA (2023) and uncemented left THA (05.2025) for femoral head necrosis. The reasons for admission were paraplegic motor deficit, with severe inability to achieve orthostatism, gait, and transfers, along with marked dependence in activities of daily living (ADL). From the medical history, we note that the neurological status deteriorated after percutaneous kyphoplasty performed in January 2025 for multiple compression fractures (T4–T7), resulting in incomplete spastic paraplegia (neurological level L1, AIS C).

Results and Discussion: Severe spasticity (Ashworth grade 3) and increased frequency of spasms increase the risk of instability of uncemented prostheses. The objectives focused on pain control and improvement of independence indices, as well as on re-education of orthostatism and therapeutic gait toward the final phase of the rehabilitation program.

Conclusions: The case demonstrates the need for a cautious rehabilitation protocol, where objectives are recalibrated from gait recovery to facilitating transfers in the initial phase. Extremely low FIM and Barthel scores highlight the devastating impact of spinal cord injury superimposed on bilateral hip pathology. By combining physiotherapy methods, postural training, and upper limb strengthening exercises, the patient can achieve partial or complete independence in transfers and self-propulsion.

Mineral waters and human fibroblasts: in vitro study

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Introduction. Mineral waters represent complex natural matrices characterized by specific physicochemical profiles, including variable mineralization, ionic composition, dissolved gases, and trace elements, all of which may exert biologically relevant effects. Beyond their traditional therapeutic use in balneology and spa medicine, mineral waters are increasingly being reconsidered from a modern biomedical perspective, particularly in relation to cellular homeostasis, redox regulation, inflammatory signaling, and tissue repair. Fibroblasts are essential stromal cells involved in extracellular matrix synthesis, wound healing, connective tissue maintenance, and adaptive responses to oxidative and inflammatory stress. For this reason, they provide a valuable in vitro model for exploring the biological effects of mineral waters at the cellular level.

Material and method. The present study proposes an in vitro evaluation of the biological effects of mineral waters on human fibroblasts cultured under controlled laboratory conditions. The conceptual framework follows a translational experimental approach focused on the interaction between mineral water composition and fibroblast-related processes. The analysis addresses cell viability, proliferative behavior, oxidative balance, inflammatory modulation, and extracellular matrix-related responses as key outcome domains. This approach is intended to provide a biologically grounded platform for understanding how mineral waters may influence fundamental cellular mechanisms relevant to tissue maintenance, regeneration, and recovery-oriented medicine.

Results and discussions. The in vitro study of mineral waters on human fibroblasts may offer a relevant mechanistic perspective for interpreting the therapeutic significance of natural mineral factors. Depending on their composition, mineral waters can be considered complex extracellular environments capable of influencing ionic balance, membrane-associated processes, redox-sensitive signaling, and cell-matrix interactions. From a biological standpoint, fibroblasts are particularly suitable for investigating such effects because they are directly involved in collagen synthesis, extracellular matrix turnover, reparative responses, and the regulation of local inflammatory microenvironments. A modern cell-based interpretation of mineral water action may therefore contribute to a more rigorous scientific understanding of certain traditional therapeutic indications associated with balneary medicine, especially those related to tissue recovery, chronic inflammatory states, musculoskeletal dysfunction, and skin-related processes. At the same time, the heterogeneity of mineral waters in terms of source, composition, concentration, and associated physicochemical properties underlines the need for careful characterization and standardized experimental evaluation.

Conclusions. In vitro investigation of mineral waters using human fibroblasts represents a scientifically relevant strategy for clarifying the cellular and molecular basis of natural therapeutic factors. Such studies may help bridge traditional balneological knowledge with contemporary experimental biology, supporting the development of more evidence-based interpretations of mineral water use. Further research integrating physicochemical profiling, cellular assays, molecular biomarkers, and translational clinical perspectives is needed to define the mechanisms of action, biological specificity, and therapeutic relevance of different mineral waters in modern recovery medicine and preventive health contexts.

Key words: mineral waters, human fibroblasts, in vitro study, balneology, extracellular matrix, oxidative stress, inflammation, tissue repair

Multidisciplinary team members and type of rehabilitation models in India

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Introduction. Rehabilitation in India is expanding with emphasis on multidisciplinary team (MDT) care for optimal functional recovery¹.

Material and Method. A narrative review of MDT composition and rehabilitation models in India was conducted using published literature and national guidelines².

Results and Discussions

The MDT includes a physiatrist, physiotherapist, occupational therapist, speech therapist, psychologist, rehabilitation nurse, prosthetist-orthotist, and social worker³. Rehabilitation models include institution-based, community-based rehabilitation (CBR), home-based care, and outreach services⁴. Institution-based care provides specialized management, while CBR improves accessibility in rural areas. Home-based rehabilitation is increasingly relevant for chronic conditions and elderly patients. MDT integration improves functional outcomes and quality of life, though challenges like workforce shortage and resource disparity remain⁵. Conclusions

Strengthening MDT coordination and expanding community-based models are essential for effective rehabilitation delivery in India.

Keywords: multidisciplinary team, rehabilitation, India, community-based rehabilitation, MDT

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Neurosurgery and neurorehabilitation in the AI ERA: A holistic approach

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INTRODUCTION. The development of Neurosurgery as a specialty started gradually with the deepening of the nervous system. The first surgical approaches made by pioneering surgeons were based on the data of the anatomy axes. Hughes Bennet and Rickman Godle approach and publish the first case of brain tumor obtained by conturing the axes on brain structures. With the development of neuroanatomy, eloquent areas

and brain neuroimaging (pneumoencephalography, ventriculography, CT scan, MRI scan, PET scan), neurosurgery have presented an incredible evolution.

NEUROSURGERY AND NEUROREHABILITATION. Currently, modern neurosurgery benefits from an impressive pre-, intra- and postoperative imaging scans, an extremely efficient intraoperative technology and a development of the skills of the operating teams based on minimally invasive and robotic techniques.

The latest acquisitions of functional MRI, Brain Mapping, intraoperative MRI and AI assistance are leading to major neurosurgical advances, in addition to robotic-assisted approaches. Hence the results of diagnosis and treatment have improved.

Neurorehabilitation is a mandatory chapter in the operative or non-operative neurosurgical outcomes. Neurorehabilitation starts as soon as possible in the postoperative period, and continues in the acute, subacute and chronic period of postoperative reintegration.

The new procedures, which are becoming more and more complex, have a very important impact on the improvement of pain phenomena and motor deficits. All cases must have the route directly from the postoperative ICU or postoperative department to neurorehabilitation department.

CONCLUSIONS. The surgical act can only be performed in beneficial conditions with a total combination in a postoperative board with the complex neurorehabilitation teams. The neurosurgical and neurorehabilitation team are both equally important in achieving favorable postoperative outcomes. These are the major goal of patient improvement or healing.

KEY WORDS: Neurosurgery, Neurorehabilitation, Robotic Approach, AI Assistance

Lumbar disc hernia in pediatric population

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Introduction. Lumbar disc herniation (LDH) is one of the most common issue of degenerative spinal disease in adults, which has a favorable prognosis as a result of the surgical treatment. In children, however, LDH is a rare condition that requires multimodal treatment. This article presents our experience and treatment strategy for children diagnosed with lumbar disc herniation.

Materials and Methods. We present a cohort of 90 pediatric patients admitted over a 9-year period (2016–2024) for low back pain to the Department of Neurosurgery at both the “Grigore Alexandrescu” Emergency Children’s Clinical Hospital in Bucharest and at Sanador Clinical Hospital, Bucharest, Romania. Our database includes 60 girls and 30 boys patients, with a 2:1 ratio. Patient ages ranged from 6 years (the youngest patient) to 17 years, with a mean age of 14.71 years. The follow-up period ranged from 4 to 48 months. The 90 cases represent 2% of the total of 4,500 pediatric cases admitted during the above analyzed period.

After imaging examinations that we performed, the study group was divided into surgical cases (18 patients – 20%) and non-surgical cases (72 cases – 80%). Two patients were excluded from the study: one was diagnosed with a renal malformation and was transferred to the Pediatric Nephrology Department, and the other, with a confirmed diagnosis of lumbar disc herniation and an indication for surgery, chose to undergo treatment at another clinic.

Results. The results indicated the resolution of pain symptoms and motor deficits in all cases. All cases reserved operatory microdiscectomy. No complications such as wound infection, cerebrospinal fluid fistula, or

spinal instability were reported. Postoperative pain subsided within the first 48 hours. All cases reserved a special fizikinetotherapy, adapted with age and date.

Conclusions. Our clinical experience has shown that, although intervertebral disc degeneration and disc herniation are uncommon in the pediatric population, surgical treatment is not necessary in the majority of cases whether patients experienced a symptom relief following conservative treatment. On the other hand, when the clinical presentation includes radicular pain associated with motor deficits, surgical treatment is needed. The fizikinetotherapy is mandatory in all cases: pre and post operative and representative the key off MEDICAL SUCCES !

As any surgical procedure, careful patient selection is necessary to avoid potential complications. In addition, logistics also play an extremely important role in the operating room: microdiscectomy requires the use of an operating microscope, adequate lighting provided by auxiliary sources, effective retraction of the wound margins, or the use of an operating endoscope.

Further research is required to identify a range of potential risk factors for degenerative spinal disorders among pediatric patients. Last but not least, a national database dedicated to this pathology, covering the pediatric population, is mandatory to enable future studies with statistical significance.

Keywords: degenerative spinal disease, lumbar disc herniation, microdiscectomy, pediatric neurosurgery, pediatric fizikinetotherapy.

Integrating medical rehabilitation into the management of cancer patients

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Introduction. Modern oncology focuses not only on increasing survival rates but also on enhancing the quality of life for survivors. Cancer treatments, including surgery, chemotherapy, and radiotherapy, often leave patients with significant functional impairments, chronic pain, and fatigue. This study explores the necessity of integrating medical rehabilitation as a core component of the multidisciplinary management of cancer patients to mitigate treatment side effects and promote functional recovery.

Material and method. A systematic review of current clinical guidelines and recent literature (2020–2025) was conducted, focusing on the impact of early physical therapy, occupational therapy, and psychological support in various stages of cancer treatment. We analyzed the outcomes of integrative rehabilitation programs versus standard oncological care, focusing on parameters such as mobility, lymphedema management, and cancer-related fatigue.

Results and discussions. The analysis indicates that patients who participate in structured rehabilitation programs show a 30% higher improvement in functional independence and a significant reduction in the duration of hospital stays. Discussions highlight that early intervention (prehabilitation) can better prepare patients for the physiological stress of treatment. However, the lack of standardized referral protocols remains a major barrier to the widespread integration of these services into routine oncological care. **Conclusions.** Integrating medical rehabilitation into cancer management is essential for a holistic approach to patient care. It significantly improves long-term functional outcomes and psychological well-being. Future

healthcare policies should prioritize the inclusion of rehabilitation specialists within multidisciplinary oncology teams from the moment of diagnosis.

Key words: *medical rehabilitation, oncology, quality of life, multidisciplinary management, cancer survivors, prehabilitation.*

Minimally Invasive Ultrasound-Guided Puncture Decompression in De Quervain's Tenosynovitis: A Case Report

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Background: De Quervain's tenosynovitis (DQT) is primarily a painful condition characterized by tenderness and soreness at the radial styloid region during activities involving wrist and thumb movements, occurring due to repetitive activities and predominantly affecting women between 30 and 50 years of age. It involves a fibroblastic response to repetitive and sustained tension on the abductor pollicis longus (APL) and extensor pollicis brevis (EPB) tendons of the first dorsal compartment, often manifesting as stenosing tenosynovitis with thickening of the extensor retinaculum. Conventional management ranges from conservative measures to open surgical decompression; however, a minimally invasive technique — percutaneous first dorsal compartment release under live ultrasound imaging — has emerged as a viable alternative, offering faster recovery and a substantially lower risk of complications compared to open surgery.

Case Presentation: We report the case of a 52-year-old female patient presenting with progressive radial-sided wrist pain, tenderness over the first dorsal compartment, and a positive Finkelstein test, consistent with De Quervain's tenosynovitis refractory to conservative treatment. Musculoskeletal ultrasound confirmed thickening of the extensor retinaculum and peritendinous effusion around the APL and EPB tendons. High-frequency ultrasound scanning was performed to identify the anatomy of the EPB and APL tendons, assess the presence of intertendinous septa, and characterize pathological changes within the first extensor compartment. Following informed consent, ultrasound-guided puncture decompression of the first dorsal compartment was performed under local anesthesia using a minimally invasive percutaneous approach, with real-time sonographic visualization throughout the procedure.

Results: All patients in similar case series demonstrated significant reductions in pain scores and functional improvement at both short- and long-term follow-up. In our patient, immediate post-procedural relief was noted, with progressive improvement in wrist function and VAS pain scores at the 4-week and 3-month follow-up assessments. No neurovascular complications, tendon instability, or wound-related adverse events were recorded. Postprocedural ultrasound confirmed reduced inflammation and decompression of the tendons within the first extensor compartment.

Conclusions: This case illustrates that ultrasound-guided puncture decompression represents a safe, effective, and well-tolerated minimally invasive alternative for the management of De Quervain's tenosynovitis, particularly in patients refractory to conservative therapy. Ultrasound guidance improves patient satisfaction and outcomes through faster recovery time as well as enhanced visualization of subcompartments and neurovascular structures, thereby reducing the risks inherent to open surgical release. Ultrasound-guided interventional procedures present high rates of symptomatic relief through precise needle placement, especially in cases with anatomic variability such as subcompartmentalization. Further prospective studies with larger cohorts are warranted to standardize procedural protocols and establish long-term efficacy data.

Keywords: *De Quervain's tenosynovitis; ultrasound-guided; puncture decompression; minimally invasive; first dorsal compartment; case report; musculoskeletal ultrasound; percutaneous release*

Rehabilitation particularities in neuro-oncology – a case series

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Introduction. Primary and secondary malignant brain tumors are associated with poor prognosis and low survival rates, and involvement of the central nervous system (CNS) further worsens clinical outcomes. Recent therapeutic advances are improving life expectancy, leading to growing interest and importance of rehabilitation programs. The aim of this presentation is to report our experience with four cancer patients presenting neurological disabilities due to brain tumors (one meningioma and three glioblastomas), who underwent individualized rehabilitation programs tailored to their functional status at the Clinical Emergency Hospital Bagdasar-Arseni in Bucharest between November 2025 and March 2026.

Material and methods. We applied rehabilitation approaches used in nonneoplastic CNS conditions, tailoring interventions to patient needs, focusing on complication management, improving mobility and daily function, and enhancing overall quality of life. The patients were evaluated at the hospital admission: Medical Research Council scale (MRC) for muscle strength testing, Barthel Index score (BI) for overall disability severity and Karnofsky scale for functional impairment and ability to perform daily activities specifically in oncological patients. Multimorbidity was evaluated using the Charlson comorbidity index (CCI) score. All patients were transferred from neurosurgical wards following brain tumor resection (complete or partial) and before initiation of adjuvant therapies (chemotherapy, radiotherapy, or targeted treatments).

Results and discussions. All patients presented with cognitive impairments—including deficits in attention, concentration, comprehension, executive function, and fatigue—alongside motor control impairments. Bladder incontinence was observed in one patient, requiring full assistance via urinary catheterization. All patients exhibited neurogenic bowel dysfunction, characterized by reduced intestinal motility and constipation. Complications appeared due to tumor growth as well as associated pathologies.

Conclusion. Our experience as both as the published data in literature prove that patients with brain tumors who underwent rehabilitation programs appear to make functional gains in line with those seen in similar patients with nonneoplastic conditions. This improvement is demonstrated for both patients with malignant and benign tumors. However, these results are overshadowed by the guarded prognosis of the underlying condition and the severity of multimorbidity-related complications. This case series highlights the need for new tools to stratify severity in neuro-oncological patients with brain pathology and emphasizes the importance of coordinating rehabilitation with other therapeutic interventions.

Keywords: neuro-oncology, rehabilitation, functional outcome, brain, cancer patients, rehabilitative interventions

A patient with excision of a left frontal meningioma exemplified the complexity of this population. As expected from the location of the tumor, both lower extremities were weak. He exhibited paraphasic speech with moderate impairments in comprehension. His frontal lesions also caused multiple cognitive deficits with attention, concentration, executive functioning, organization, and learning. Bladder control is located in the frontal lobes as well, and his incontinence was treated with a condom catheter and a strict toileting schedule. The patient was incontinent of bowel, presumably because his executive function was impaired; the toileting schedule also improved his bowel incontinence. Despite all these problems, his FIM score improved from 53 to 82, and he was discharged home with continued physical, occupational, and speech therapy, along with a home health aide and nursing services. (2)

For the purposes of this review, rehabilitation was operationally defined to include the following disciplines and approaches to rehabilitation⁶³; physiatry, physical therapy, occupational therapy, speech and language pathology, vocational rehabilitation, recreational, therapy, neuropsychology, behavioral therapy, palliative care, integrative and lifestyle medicine, and nutrition and to encompass physical and cognitive domains of functioning. (3)

Challenges in geriatric rehabilitation: frailty, deconditioning and functional impairment in a patient with surgically treated pertrochanteric fracture, dementia and multiple systemic complications

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Abstract

Introduction: Geriatric rehabilitation represents a major clinical challenge due to the complex interplay between frailty, cognitive impairment and multiple comorbidities. Hip fractures, particularly pertrochanteric fractures, are associated with significant functional decline, especially in elderly patients with pre-existing deconditioning and dementia.

Materials and methods: We present the case of an 87-year-old female patient with a history of surgically treated left pertrochanteric fracture (internal fixation with Gamma nail), severe arterial hypertension, recurrent urinary tract infections, lower gastrointestinal bleeding and bronchopneumonia. The patient also presented with cognitive impairment (psycho-organic syndrome), cerebral atrophy and leukoaraiosis. She was repeatedly admitted to the neuromuscular rehabilitation department for persistent algo-functional syndrome and severe deconditioning secondary to prolonged immobilization. Clinical evaluation revealed left hip pain, reduced mobility, generalized hypotonia and decreased muscle strength (MRC scale: 3-4/5), with significant functional impairment. The patient required assistive devices for ambulation and assistance for activities of daily living. The rehabilitation program included pharmacological treatment (analgesics, antihypertensives, neurotrophic agents, hydration) and individualized physical therapy.

Results: During successive rehabilitation admissions, the patient showed gradual improvement in pain control and functional status. Initially bedridden, she progressed to assisted ambulation using a walking frame over short distances under supervision. Functional gains remained limited by cognitive decline, recurrent infections and overall frailty, requiring continued assistance for transfers and self-care activities

Conclusion: This case highlights the complexity of geriatric rehabilitation in patients with frailty, cognitive impairment and multiple comorbidities. A multidisciplinary and individualized rehabilitation approach is essential to achieve functional improvement, even if partial, and to enhance quality of life in this vulnerable population.

Keywords: geriatric rehabilitation, frailty, pertrochanteric fracture, deconditioning, dementia, functional impairment

Rehabilitation Particularities in a Patient with Post-combustional Sequelae – Case Presentation

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Introduction. Post-burn sequelae are frequently associated with limitations in range of motion (ROM), in the context of skin and scar changes, with a significant impact on functionality and quality of life. Medical rehabilitation plays an essential role in optimizing mobility and functional independence. **Materials and Methods.** We present the case of a 43-year-old patient with electrical burns covering 44% of the body surface area, including the upper limbs—shoulders, arms, elbows, forearms, palmar aspect of the hand, neck, and anterior and posterior chest—with significant functional impairment. The evaluation included a clinical and functional examination and quantification of joint ranges of motion, highlighting mobility limitations in the post-burn context. The rehabilitation program was individualized to target mainly the left upper limb, following surgical treatment of adhesions at the shoulder and elbow, and included physical therapy and occupational therapy aimed at increasing ROM and functional rehabilitation. **Results and discussions.** The uniqueness of this case lies in the phased approach to rehabilitation, in the context of a complex post-burn condition, with scar tissue changes affecting mobility in the upper limbs and neck. The therapeutic intervention led to a progressive and significant improvement in ROM of the left upper limb, achieving functional ranges of motion and a favorable impact on daily activities. The patient currently has significant mobility limitations in the right upper limb and will undergo surgical treatment—scar tissue release—followed by continuation of the rehabilitation program. **Conclusions.** Individualized medical rehabilitation programs focused on improving ROM are essential for optimizing functional outcomes in patients with post-burn sequelae. Physical therapy is beneficial from the earliest stages of post-burn recovery, initially through passive mobilization, which helps guide the healing process of both the skin and underlying tissues. This reduces the risk of contractures, which can lead to significant joint stiffness and major consequences for the patient’s functionality and independence in daily life. In the case of the patient described above, physical therapy proved to be effective and important, improving his mobility and degree of independence, even 10 months after the traumatic event.

Keywords: burn, post-burn scars, rehabilitation, physical therapy, occupational therapy.

The Role of Multimorbidity in Predicting Outcomes of Post-Stroke Rehabilitation

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Introduction. Stroke remains a major cause of long-term disability worldwide, and the coexistence of multiple chronic conditions frequently influences rehabilitation outcomes. Although multimorbidity is highly prevalent among stroke survivors, its prognostic significance in rehabilitation settings remains unclear.

Material and method. A cross-sectional analytical study included 382 patients with ischemic or hemorrhagic stroke admitted to inpatient neurological rehabilitation between 1 and 24 months after stroke onset. Multimorbidity burden was assessed using the Charlson Comorbidity Index (CCI), the Cumulative Illness Rating Scale (CIRS), and the number of comorbidities. Functional and clinical evaluation included the Barthel Index

and EQ VAS. Data were processed using descriptive statistics, and Receiver Operating Characteristic (ROC) curve analysis with Area Under the Curve (AUC) estimation.

Results and discussions. The mean age of the cohort was 64.17 ± 9.81 years, and patients presented a mean of 5.0 ± 2.2 comorbidities, with a mean CCI of 5.64 ± 2.62 and CIRS of 10.65 ± 5.80 . Hypertension (87.2%), dyslipidemia (51.8%), cognitive impairment (36.1%), diabetes mellitus (28.3%), depression (26.4%), and anxiety (25.4%) were the most prevalent associated conditions. The number of comorbidities showed the strongest negative correlation with the Barthel Index ($r = -0.783$; $R^2 = 0.613$; $p < 0.001$) and EQ VAS ($r = -0.851$; $R^2 = 0.724$; $p < 0.001$). ROC analysis demonstrated good predictive accuracy for significant disability, with an AUC of 0.887 for comorbidity count, compared with 0.878 for CIRS and 0.872 for CCI.

Conclusions. Multimorbidity significantly worsens post-stroke rehabilitation outcomes. The simple number of comorbidities may represent a sensitive and clinically useful predictor for prognostic stratification and individualized rehabilitation planning

Key words: stroke, multimorbidity, comorbidity, rehabilitation outcomes, Barthel Index, quality of life

Multiple Factors Affecting Quality of Life in Individuals with Chronic Musculoskeletal Pain

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Introduction: Chronic musculoskeletal pain (CMP) is a major public health concern with substantial impact on functional capacity and quality of life. Within the biopsychosocial model, CMP is influenced by the interaction of biological, psychological, and social determinants that may exacerbate pain perception and disability. Identifying these factors is crucial for optimizing rehabilitation strategies.

Materials and Methods: This study included 78 patients with primary CMP enrolled in a comprehensive rehabilitation program. Quality of life was assessed using the EQ-5D-5L, while pain intensity and catastrophizing were evaluated using the Visual Analogue Scale (VAS) and the Pain Catastrophizing Scale (PCS). Biological (pain duration, comorbidities), psychological (anxiety, depression, catastrophizing), and social (occupational status, family support) variables were analyzed.

Results: Lower quality of life scores were significantly associated with higher pain intensity ($r=0.62$) and elevated catastrophizing ($r=0.58$). Patients presenting anxiety-depressive symptoms demonstrated significantly poorer outcomes across EQ-5D-5L domains ($p<0.01$). Prolonged pain duration (>12 months) was identified as an independent predictor of diminished perceived health status. Social determinants played a notable role, as unemployment and limited family support were associated with reduced mobility and impaired performance of usual activities. Multivariate analysis suggested that psychological factors, particularly catastrophizing, exerted a stronger influence on quality of life than purely biological variables.

Conclusions: Quality of life in CMP patients is shaped by a complex interplay of biopsychosocial factors. Multidisciplinary interventions targeting psychological distress and enhancing social support are essential to improve rehabilitation outcomes.

Keywords: chronic musculoskeletal pain; quality of life; biopsychosocial model; pain catastrophizing; rehabilitation; EQ-5D-5L; psychological factors.

Clinical, imaging and histopathological aspects in hip diseases

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Introduction: The pathology of the hip joint is formed by a wide spectrum of degenerative, inflammatory, ischemic and neoplastic conditions, which represent a major cause of pain and disability worldwide. The degradation of the coxofemoral joints has a significant impact on patients' mobility and quality of life. Research papers and guidelines highlight the importance of an integrated assessment that combines clinical data with imaging investigations and histopathological examination in order to establish an accurate diagnosis and an appropriate therapeutic approach. Recent advances in imaging and histological analysis techniques have significantly contributed to understanding the pathophysiological mechanisms involved in hip disease.

Material and method: This paper has the purpose of being a narrative review of the literature, based on studies published in international databases (such as PubMed, Scopus, and Web of Science). Relevant articles regarding clinical evaluation, imaging methods (radiography, computed tomography, and magnetic resonance imaging), and the histopathological characteristics of the main hip disorders (hip osteoarthritis, avascular necrosis of the femoral head, and inflammatory arthritis) were selected. The selection criteria included clinical relevance, data currency, and the clarity of correlations between diagnostic methods.

Results and discussions: Literature data highlights that clinical symptomatology, although essential, is often nonspecific and requires confirmation through imaging methods. Radiography remains the first-line method for evaluating structural changes, particularly in hip osteoarthritis, where joint space narrowing, osteophytes, and subchondral sclerosis are most frequently described. Magnetic resonance imaging is considered the gold standard for the early detection of avascular necrosis and soft tissue lesions, providing detailed information about the stage of the disease. Histopathological examination complements the diagnosis by identifying changes such as cartilage degeneration, bone necrosis, or inflammatory infiltrates, depending on the etiology. Recent studies emphasize the importance of correlating these data in order to differentiate between various pathological entities and to establish prognosis.

Conclusions: Current literature supports the need for a multidisciplinary approach in the evaluation of hip disorders, based on the integration of clinical, imaging, and histopathological data. This strategy allows for an early and accurate diagnosis, contributing to the selection of the best course of treatment and to the improvement of patients' functional outcomes. The continuous development of imaging technologies and tissue analysis methods will further strengthen the role of this integrated approach in the future.

Favorable clinical evolution and neurorehabilitation outcome of Frontal Lobe Syndrome after traumatic brain injury due to a motorcycle accident: A Case Report

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Introduction. Traumatic Brain Injury (TBI), particularly in moderate-to-severe cases, remains a leading cause of long-term disability worldwide, affecting over 64 million individuals annually. Its complex and multifactorial nature demands an integrated, multidisciplinary rehabilitation approach to address the diverse physical, cognitive, behavioral, and psychosocial impairments that follow injury.

Material and method. This paper presents a case report of neuromuscular rehabilitation in a young patient with neurocognitive status and tetraplegia following a severe TBI (traumatic brain injury) that occurred in a road traffic accident on 02.08.2025. The patient was a motorcyclist and was not wearing protective equipment. During hospitalization, a PEG tube and tracheostomy were performed, and on 28.08.2025 the patient underwent neurosurgical intervention with surgical evacuation of a right frontal chronic subdural hematoma. On 22.09.2025 the tracheostomy was removed. At discharge, he remains in minimally conscious state (MCS) and tetraparetic. On 17.10.2025, he was admitted into our clinic for initiation of the rehabilitation program. His progress was evaluated using various scales, including the Barthel Index and Modified Rankin Scale, focusing on motor function and quality of life improvements.

Results and discussions. Following appropriate treatment and a comprehensive rehabilitation program, the patient showed significant progress in muscle strength and also in mental status. He regained the ability to feed independently (following the removal of PEG tube) and can be mobilized to a wheelchair with assistance. Additionally, functionality assessment scales indicated marked improvement, highlighting the effectiveness of the interventions and the overall favorable evolution of his condition.

Conclusions. Neuromuscular rehabilitation plays a pivotal role in the recovery of patients with neurocognitive disorders and tetraplegia. This case highlights remarkable recovery despite the history of traumatic brain injury in a young patient with no prior health issues.

Key words: tetraplegia, traumatic brain injury, rehabilitation, motor recovery, cognitive status

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Multidisciplinary and complex rehabilitation program after post-traumatic femoral fracture in a patient with severe congenital visual impairment

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Introduction: Hip fractures represent a leading cause of disability and loss of independence, with outcomes strongly influenced by associated comorbidities. Severe visual impairment is a critical yet frequently unrecognized risk factor, significantly increasing fall risk and complicating rehabilitation. The coexistence of major locomotor trauma and profound sensory deficit imposes substantial challenges on neuromuscular recovery, necessitating a tailored multidisciplinary approach.

Materials and Methods: We present the case of a 52-year-old female patient with severe bilateral visual impairment due to congenital retinopathy and secondary glaucoma, who sustained a post-traumatic femoral fracture following an accidental fall., emphasizing the impact of sensory deficits on functional prognosis and rehabilitation. The fracture was surgically treated by intramedullary nailing and screw fixation. Postoperatively, the patient was admitted to a specialized rehabilitation clinic, 10 days after surgery, for the initiation of a specialized rehabilitation program

Clinical and functional evaluation was performed using standardized scales assessing functional independence, muscle strength, and gait capacity. At admission, the patient presented with severe functional impairment, characterized by marked limitation of mobility in the operated lower limb and reduced ability to perform activities of daily living.

A multidisciplinary rehabilitation program was implemented, integrating medical rehabilitation, physiotherapy, occupational therapy, visual impairment-adapted strategies, and patient education. The rehabilitation plan focused on gait re-education, balance training, muscle strengthening, functional mobility, environmental adaptation, and fall prevention strategies tailored to severe visual impairment.

Results: Following a comprehensive rehabilitation program combined with appropriate pharmacological management, the patient demonstrated favorable and progressive functional recovery. Significant improvements were observed in functional independence, muscle strength, and motor control, with gradual restoration of lower limb function. Despite the constraints imposed by severe visual impairment, recovery was facilitated by high motivation and strong adherence to therapy.

Conclusions: Multidisciplinary rehabilitation with a strong focus on fall prevention and functional adaptation is essential in visually impaired patients following femoral fracture. Individualized rehabilitation programs addressing both orthopaedic and sensory limitations can significantly improve functional outcomes and quality of life.

Keywords: *hip fracture; visual impairment; rehabilitation, gait reeducation*

Comprehensive rehabilitation and functional gait training in a case of incomplete thoracic paraplegia following severe spinal stenosis in an elderly patient with multiple comorbidities

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Abstract

Introduction: Incomplete spinal cord injuries secondary to thoracic spinal canal stenosis may lead to significant motor and sensory deficits, adversely affecting mobility and functional independence. Early, individualized neuromuscular rehabilitation is essential for optimizing neurological and functional recovery. This paper presents the rehabilitation evolution of a patient with incomplete paraplegia following thoracic spinal decompression.

Materials and Methods: We report the case of a 69-year-old female with multiple comorbidities who developed incomplete paraplegia (AIS/Frankel C) with a neurological level at T9, secondary to severe thoracic spinal stenosis at T10–T11, treated by surgical decompression. At admission to the neuromuscular rehabilitation department, clinical examination revealed lower limb motor deficit associated with sensory impairment, resulting in significant functional limitation of mobility.

Results: The patient underwent a comprehensive rehabilitation program, including individualized kinesiotherapy with gait re-education and physiotherapy modalities (including electrotherapy). Progressive improvement in muscle strength, postural stability and gait capacity was observed, allowing transition from walker-assisted ambulation to short-distance walking with a single cane and increased independence in transfers.

Conclusion: This case highlights the important role of early, individualized, and multidisciplinary neuromuscular rehabilitation in patients with incomplete spinal cord injury secondary to thoracic spinal stenosis. Moreover, even in the presence of advanced age and multiple comorbidities, significant functional gains can be achieved, supporting the need for timely referral to specialized rehabilitation services. These findings underscore the value of tailored rehabilitation strategies in optimizing recovery and improving quality of life in this patient population.

Keywords: *spinal cord injuries, thoracic spinal stenosis, incomplete paraplegia, rehabilitation, gait re-education*

Multidisciplinary approach including diagnosis and rehabilitation strategy in a complex case of peripheral facial paralysis (recent left facial paralysis and history of right facial paralysis) in a young postpartum patient

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Introduction: Bilateral peripheral facial palsy, whether simultaneous or sequential, represents a rare and complex clinical challenge with significant diagnostic and therapeutic implications. This condition occurs when damage to the facial nerve develops peripherally on one side of the face, followed by a prior or subsequent episode on the contralateral side, suggesting an underlying vulnerability or a partially understood pathological mechanism. Although unilateral peripheral facial palsy is relatively common, recurrence on the opposite side raises additional concerns regarding etiology, the risk of functional sequelae, and optimal management strategies. The mechanisms involved are varied and may include inflammatory, infectious, ischemic, demyelinating, or compressive processes, making comprehensive evaluation necessary to exclude secondary causes. Risk factors such as age, cardiovascular comorbidities, immunosuppression, or infectious-inflammatory history may contribute to increased susceptibility of the facial nerve lesion.

This paper presents a case report of neuromuscular rehabilitation and complex clinical and therapeutic management in a female patient with left peripheral facial palsy and a history of right peripheral facial palsy.

Material and methods: We followed the evolution of a 32 years old female patient who recently became a mother, with an otherwise normal pregnancy, who was breastfeeding a 1-year-and-10-month-old child at the onset of facial palsy, and initiated corticosteroid therapy without interrupting breastfeeding. She had a known history of right-sided peripheral facial palsy, for which she was admitted to the Neuromuscular Rehabilitation Clinic Division of TEHBA in January 2023, being treated with corticosteroids, physiotherapy and kinesiotherapy, showing a favorable clinical course, with improvement in symptoms. On December 31st, 2025, she developed a left-sided peripheral facial palsy and left-sided otalgia. After multiple clinical evaluations and paraclinical investigations she started corticosteroid and vitamin therapy. On February 2nd, she was again admitted to Neuromuscular Clinic Division due to persistent symptoms and for the initiation of specialized rehabilitation treatment. For the clinico-functional assessment of the patient's motor deficit and the degree to which it affects his quality of life, we following scales: House-Brackmann Scale and Quality of Life (QOL) Assessment, and also taking into consideration the sequential peripheral facial palsy, a further complex paraclinical evaluation and a multidisciplinary approach was needed.

Results: After receiving an adequate corticosteroid and neurotrophic treatment and also a complex rehabilitation program (including: physiotherapy, speech therapy, kinesiotherapy, psychological evaluation) the patient had a favourable evolution: reduction of the facial asymmetry and improvement of the scores in the assessing functionality scales.

Conclusions: Integrating a thorough clinical and paraclinical assessment with a personalized rehabilitation program enabled progressive functional recovery in a patient with left peripheral facial palsy and a history of right peripheral facial palsy, a context that complicated both evolution and prognosis. The recurrent involvement of the facial nerve can generate significant aesthetic, functional, and psychosocial limitations, requiring a complex and sustained therapeutic approach. Given the rarity of such cases (...un procent din literatura) and their major impact on quality of life, multidisciplinary approach (including rehabilitation doctor, physiotherapist, speech therapist, ORL, neurologist, and psychologist) is essential for achieving the patient's optimal functional level and increasing autonomy.

Keywords: *Bilateral, Facial Nerve Palsy, Bell's Palsy, Rehabilitation.*

Intricate evolution and rehabilitation challenges in an incomplete paraplegia AIS/FRANKEL C patient with CAUDA EQUINA syndrome and complex oncologica and vascular comorbidities

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Traumatic spinal cord injury is a serious condition with devastating sequels, such as paraplegia and also with an important psychosocial impact, for the rest of the patient's life. When associated with cauda equina syndrome, the post SCI condition is even more challenging due to lower motor neuron deficits, sphincter dysfunction, neuropathic pain and sensory impairment. Although spinal metastases are relatively frequently implicated in SCI etiology, sacral involvement, especially in colorectal cancer, is less common, but may lead to pathological fractures and significant neurological deficits. In such complex clinical situations, the presence of multiple comorbidities requires an individualized and multidisciplinary rehabilitation approach, aimed at improving function and quality of life. We followed the evolution of a 77-year-old patient, with multiple associated comorbidities, including rectal carcinoma (diagnosed in July 2025) who underwent chemotherapy and radiotherapy, which were discontinued after approximately two months and who suffered due to falling from standing height in 12.11.2025, a lumbosacral SCI with S1 vertebral body fracture, which was neurosurgically treated on 26.11.2025, consisting of posterior unilateral spinal fixation (L4–L5–S1–S2). Histopathological examination was performed on two samples obtained from the S1 vertebral body. One confirmed bone metastasis of rectal origin, while the second showed osteoporotic changes. After post-operative favorable evolution, the patient was transferred to our Neurorehabilitation Clinic Division for further nursing management of incomplete paraplegia AIS/Frankel C, associated with sphincter dysfunction, sensory deficits, and marked impairment in locomotion and self-care abilities, as well as for initiation of a rehabilitation program. At the admission and for a relatively long period of time the patient also presented intense lumbosacral pain as well as left shoulder pain (due to severe associated comorbidities). Further investigation due to spinal MRI revealed metastatic lesions in the lumbar spine and sacrum, while shoulder X-ray showed an osteolytic lesion of the left humeral head, suggestive of metastasis. In our clinic, the patient was functionally assessed using standardized scales, including AIS/ Frankel, modified Ashworth, FAC International Scale, Life Quality Assessment (QOL), and also for the lack of autonomy in daily basic activities using Independence Assessment Scale in Daily Activities (ADL / IADL), Spinal Cord Independence Measure (SCIM). An important component of the rehabilitation program was pain management. This included a multimodal approach, combining pharmacological treatment with physiotherapy modalities such as TENS and deep oscillation. The patient also followed an individualized complex physical program. During multiple hospitalizations in our clinic, the patient benefited from adequate pharmacological treatment (including management of comorbidities) and a complex rehabilitation program, with a slow but favorable evolution. This was influenced by multiple complications and the patient's overall clinical condition. Improvement was reflected by increasing scores on the evaluated scales and by achieving walking with support (walking frame) over medium distances. Pain intensity decreased during hospitalization, contributing to better participation in the rehabilitation program. Bladder reeducation was initiated; however, due to associated complications, the patient was discharged with a permanent urinary catheter. At discharge, the patient was able to walk over medium distances with a walking frame under supervision. Associating a complex clinical and paraclinical approach with a customized rehabilitation program in a patient with incomplete paraplegia AIS/Frankel C in the context of cauda equina syndrome, on a severe oncological condition and multiple systemic complications, led to improvement in lower limb motor control and the patient's functional status. Even if the main functional target in this case was achieved at discharge: meaning performing walking with bilateral support for medium distances, the long-term prognosis remains unfavorable due to severe oncological status. Further, a multidisciplinary approach and continuation of the individualized rehabilitation program are essential for maintaining and even improving motor deficit, autonomy and QoL.

Keywords: incomplete paraplegia, cauda equina syndrome, spinal metastasis, rectal cancer, rehabilitation

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One Reckless Misstep, Polytrauma with Two Injured Joints – Difficulty in Functional Rehabilitation

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Abstract

Introduction

Gonarthrosis is a common degenerative condition that can develop secondary to traumatic injuries affecting joint structures. Post-traumatic gonarthrosis represents a challenging clinical entity, especially in patients with complex associated lesions. This paper presents the case of a patient with post-traumatic gonarthrosis following a high-energy injury caused by a fall from height, resulting in tibial plateau fracture and proximal humerus fracture.

Material and methods

We followed the evolution of a 58-year-old female patient, known with essential hypertension, who suffered a fall from height, resulting in a right tibial plateau fracture and right proximal humerus fracture. The upper limb fracture was managed conservatively, while the lower limb fracture required surgical intervention, performed in the Orthopedics Department between 20.11.2025–28.11.2025.

Subsequently, the patient underwent three admissions in the Rehabilitation Department (28.11.2025–22.12.2025, 12.01.2026–30.01.2026, 20.02.2026–13.03.2026).

At admission in the rehabilitation unit, the patient presented with preserved general condition, was overweight, conscious and cooperative, with a supple postoperative wound at the level of the right knee and tibia. Neuromuscular assessment revealed pain and functional impairment in the right shoulder and right knee, with non-testable muscle strength (MRC) in the right upper and lower limbs, without sensory disturbances. Functional evaluation showed limited autonomy, the patient being able to maintain a shortened sitting position at the edge of the bed.

During hospitalization, the patient received anticoagulant therapy (LMWH), antihypertensive, analgesic and gastric protection treatment, alongside a personalized rehabilitation program including kinesitherapy and physiotherapy.

Results

A favorable evolution was observed throughout the rehabilitation program, with significant improvement in pain and functional status. At the last admission, neuromuscular evaluation showed muscle strength of 4/5 (MRC) in the right upper and lower limbs, with symmetrical osteotendinous reflexes. Functionally, the patient was able to ambulate with support using a walking frame, without weight-bearing on the right lower limb for short to medium distances. At discharge, the patient was able to walk short distances using a crutch.

Conclusions

A multidisciplinary approach combining surgical management and a structured, personalized rehabilitation program led to significant improvement in functional capacity and pain control in a patient with post-traumatic gonarthrosis. Early and continuous rehabilitation plays a key role in optimizing functional recovery and quality of life in such complex cases.

Keywords: *gonarthrosis, post-traumatic, rehabilitation, tibial plateau fracture, functional recovery*

Rehabilitation Program from the Minimally Conscious State to Regaining Mobility following Severe Traumatic Brain Injury due to a Car Crash: A Case Report

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Abstract

Introduction: Traumatic Brain Injuries (TBIs) accompanied by diffuse axonal lesions are frequently followed by physical as well as cognitive disability, requiring careful observation and thorough assessment, along with prolonged rehabilitative intervention. (1)

Material and methods: We report the case of a 19-year-old female patient with severe TBI presenting with a 3 Glasgow Coma Scale (GCS) score upon admission after a car crash. Imaging revealed DAI (grade I–II), subdural and subarachnoid hemorrhage. The initial clinical presentation included severe impairment of consciousness with akinetic mutism. The evolution was complicated by tracheostomy, gastrostomy, and a tracheoesophageal fistula requiring endoscopic closure. Upon admission to the rehabilitation unit, the patient was in a minimally conscious state with severe spastic tetraparesis. A multidisciplinary rehabilitation program including physiotherapy, communication disorder therapy, and cognitive stimulation was initiated early.

Results and discussion: Progressive neurological and functional improvement was observed, with recovery of consciousness (GCS 15), emergence of verbal interaction, improvement of motor control allowing assisted standing and ambulation, and recovery of oral nutritional intake. Functional status improved from total dependence to partial autonomy, with residual motor and speech deficits, highlighting the potential for recovery even after the severe initial impairment. Young age is known to be associated with better functional recovery after TBI compared to elderly patients, due to the increased neuroplastic potential. (2)

Conclusions:

Despite the severe initial impairment, this case demonstrates that substantial functional recovery can be achieved in severe TBI with DAI through early and sustained multidisciplinary rehabilitation.

Key words: TBI, spastic tetraparesis, minimally conscious state, rehabilitation

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The contribution of physical-spa therapy to the patient with complicated cerebrovascular and degenerative rheumatic pathology

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Introduction: Cerebrovascular pathology, especially post-stroke disability, is frequently associated with degenerative rheumatic conditions such as osteoarthritis, generating a major impact on functional autonomy and quality of life. Recent literature highlights the essential role of complex rehabilitation programs, in which physical therapy and balneotherapy significantly contribute to the improvement of neurological and musculoskeletal deficits. Evaluation of the effectiveness that such interventions may bring, is based on validated scales such as the Barthel Index, Functional Independence Measure (FIM), Visual Analog Scale (VAS), and the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC).

Material and method: The present paper has the purpose of being a short narrative review of the literature, based on research published in international databases such as PubMed, Scopus, and Web of Science. Papers, clinical studies, meta-analyses, and guidelines investigating the effectiveness of interventions such as kinesiotherapy, hydrotherapy, electrotherapy, and balneotherapy in patients with post-stroke disability associated with degenerative joint pathology were included. The primary outcomes analysed were functional results, pain levels, and the impact on quality of life, measured by standardized scales.

Results and discussions: Literature data shows that physical and balneal therapy have a significantly beneficial effect on functional recovery in patients with mixed cerebrovascular and degenerative joint pathology, and the analysed studies report that rehabilitation interventions based on these approaches lead to significant improvements in functional scores (Barthel Index, FIM), indicating increased independence in daily activities. Kinesiotherapy, through individualized programs, contributes to the recovery of motor control and the reduction of spasticity. Hydrotherapy helps mobilization by decreasing gravitational load and increasing the range of motion of the joints. Balneal procedures and electrotherapy are associated with pain reduction (assessed using the Visual Analog Scale) and improvement of joint stiffness, reflected in decreased WOMAC scores. The literature highlights the synergistic effects of these interventions, especially when they are integrated into a multidisciplinary program adapted to the severity of the neurological deficit and to the degree of degenerative involvement of the respective joints.

Conclusions: Physical and balneal therapy play an essential role in the rehabilitation of patients with cerebrovascular pathology complicated by degenerative rheumatic conditions. The use of individualized programs, which can be evaluated through standardized scales, allows for the optimization of functional outcomes, reduction of pain, and improvement of quality of life. The integration of such interventions into modern rehabilitation protocols is supported by consistent scientific evidence.

Secondary stroke prevention: the role of medical rehabilitation in reducing recurrence and improving functional outcomes

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Introduction. Stroke is one of the leading causes of disability worldwide, with a recurrence risk of 10–20% during the first year, especially within the first 90 days. Medical rehabilitation plays an essential role in secondary stroke prevention through risk factor control, prevention of complications, and functional optimization across the early, late, and chronic post-stroke phases.

Material and method. A narrative analysis was conducted based on international guidelines and relevant clinical studies on secondary stroke prevention. The review addressed blood pressure control, antithrombotic therapy, lipid-lowering treatment, diabetes management, sleep apnea treatment, and physio-functional rehabilitation. Risk stratification tools such as CHA₂DS₂-VASc, HAS-BLED, Padua, and IMPROVE scores were also considered to support individualized therapeutic decisions.

Results and discussions. Strict blood pressure control (<130/80 mmHg) is one of the most effective strategies for reducing stroke recurrence. Antithrombotic therapy should be individualized according to stroke subtype and hemorrhagic risk. Statins and PCSK9 inhibitors contribute to cardiovascular risk reduction, particularly in patients with atherosclerotic disease. CPAP treatment for obstructive sleep apnea is associated with a lower rate of recurrent vascular events. Rehabilitation interventions, including kinesiotherapy, aerobic training, strength and balance exercises, and neuromuscular electrical stimulation, improve motor performance, reduce metabolic and cardiovascular risk factors, and enhance neuroplasticity.

Conclusions. Medical rehabilitation is a key component of secondary stroke prevention, integrating personalized pharmacological and physio-functional interventions to reduce recurrence, improve quality of life, and decrease long-term disability.

Key words: *stroke, secondary prevention, medical rehabilitation, risk factors.*

Acupressure: An Integrative Therapeutic Approach in the Management of Spinal Pain

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Introduction. Spinal pain is one of the most prevalent causes of disability worldwide, affecting physical function, work capacity, and overall quality of life. Despite advances in pharmacological and interventional management, a significant proportion of patients continue to experience chronic or recurrent symptoms. This has led to increasing interest in integrative therapeutic approaches that combine conventional rehabilitation strategies with complementary techniques. Acupressure has a non-invasive nature that stems from Traditional Chinese Medicine. By targeting specific points on the body, acupressure aims to restore physiological balance and modulate pain perception. The purpose of this study is to highlight the relevance and

applicability of acupressure as part of a comprehensive rehabilitation program for patients with spinal pain. **Material and method.** This work is based on a narrative review of current literature focusing on the use of acupressure in spinal pain management. Relevant studies were identified from medical databases, including clinical trials, systematic reviews, and observational studies addressing cervical, thoracic, and lumbar pain. The analysis focused on therapeutic protocols, frequency and duration of interventions, outcome measures such as pain intensity and functional status, as well as safety and feasibility. Additionally, data regarding integration into physical and rehabilitation medicine programs were considered, emphasizing multidisciplinary approaches combining acupressure with physiotherapy, exercise therapy, and patient education. **Results and discussions.** The reviewed evidence suggests that acupressure may contribute to significant reductions in pain intensity and improvements in functional outcomes in patients with spinal disorders. The mechanism of action is explained through both traditional concepts and modern neurophysiological perspectives, including stimulation of peripheral nerves, activation of descending inhibitory pathways, and release of endogenous opioids. Furthermore, acupressure may enhance local circulation, reduce muscle tension, and promote relaxation, which are essential factors in chronic pain management. Its non-invasive nature, low cost, and minimal risk of adverse effects make it particularly suitable for inclusion in rehabilitation settings. Another important aspect is patient empowerment, as individuals can be trained to perform self-acupressure techniques, supporting long-term symptom control. However, heterogeneity in study design and variability in treatment protocols highlight the need for standardized guidelines and further high-quality research. **Conclusions.** Acupressure represents a valuable integrative therapeutic approach in the management of spinal pain. When incorporated into multidisciplinary rehabilitation programs, it may enhance clinical outcomes, reduce pain burden, and improve quality of life. Further research is required to establish standardized protocols and strengthen the evidence base for its routine clinical application. **Key words:** acupressure, spinal pain, pain management, physical and rehabilitation medicine, integrative therapy.

The Platelet-Rich Plasma–Halotherapy Synergy: A New Paradigm in the Treatment of Osteoarthritis

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Introduction. In rehabilitative medicine, osteoarthritis represents a major cause of chronic pain, functional limitation, and decreased quality of life, significantly impacting patient autonomy and socio-professional reintegration. Consequently, the optimization of regenerative interventions has become a priority direction in the field. To establish the foundation for an innovative methodology based on the synergy between Platelet-Rich Plasma (PRP) and halotherapy, aiming to potentiate the biological response through systemic preconditioning and the modulation of cellular redox and metabolic mechanisms.

Material and method. The protocol involves 10 halotherapy sessions of 40 minutes each, conducted prior to blood collection for PRP, to achieve biological preconditioning. Exposure to saline aerosols and low

concentrations of ozone induces controlled oxidative stress (hormesis), generating secondary messengers such as hydrogen peroxide and lipid peroxidation products. These initiate a cellular signaling cascade by activating Nuclear factor erythroid 2-related factor 2 (Nrf2), Hypoxia-inducible factor 1-alpha (HIF-1 α), and Nuclear factor kappa B (NF- κ B), as well as the redox-sensitive cationic channel Transient receptor potential melastatin 2 (TRPM2). The signal is amplified through phosphorylation mechanisms and secondary messengers, leading to cytoprotective adaptations. Concurrently, the activation of Peroxisome proliferator-activated receptor-gamma coactivator 1-alpha (PGC-1 α) modulates the Krebs cycle, increasing the efficiency of adenosine triphosphate (ATP) production and cellular bioenergetic capacity.

Results and discussions. Halotherapy preconditioning acts by optimizing the biological profile of the PRP, favoring the release of Platelet-derived growth factor (PDGF), Vascular endothelial growth factor (VEGF), Transforming growth factor-beta (TGF- β), and Insulin-like growth factor 1 (IGF-1). The activation of signaling cascades and the optimization of mitochondrial metabolism support chondrocyte proliferation, mesenchymal stem cell recruitment, and the enhancement of tissue function, resulting in pain reduction and increased joint functional performance.

Conclusions. The PRP-halotherapy synergy represents an innovative direction in rehabilitative medicine, based on biological preconditioning and the integrated modulation of cellular signaling and energy metabolism.

Key words: *cellular adaptation, mitochondrial bioenergetics, growth factors, tissue regeneration, controlled oxidative stress.*

Treating Pain in Rehabilitation Medicine: Nanomedicine as a Potential New Way of Protecting Patients with Gastroduodenal Ulcer

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Introduction. Treating pain associated with different pathologies is a very important aspect in rehabilitation medicine, as pain can negatively influence the functional outcome and can impair the rehabilitation specific treatment. Patients that experience gastroduodenal ulcer (GDU) can represent a challenge regarding proper pain management, especially because literature reports up to 6% of patients that are asymptomatic GDU carriers. The aim of the present study was to compare the administration of omeprazole alone with titanium dioxide magnetic nanoparticles functionalized with omeprazole in an experimental model of induced GDU, in order to observe if adding nanoparticles to a classic GDU treatment drug can enhance the latter's effects and, in this way, improve pain management.

Material and method. Gastroduodenal ulcer was experimentally induced in 30 white Wistar male rats by administering a single dose of 5mg/kg of ethanol 30% purity after 24h prior fasting. The animals were divided into 3 equal groups and treatment was administered daily, by oral gavage, during 30 days as follows: 20mg/kg/day of NaCl solution (control), 20 mg/kg/day omeprazole (OMP group) and 20mg/kg/day titanium dioxide magnetic nanoparticles functionalized with omeprazole (OMNPs group). Total body weight of the animals, gastric secretion pH, hepatic function (ALT, AST serum levels) and oxidative stress parameters (MDA, GSH, GSSG and GSH/GSSG) were compared between groups before ulcer inducement, at 7 days and, respectively, 30 days after treatment begun. Oxidative stress parameters were evaluated at serum level, but also at organ level (stomach, duodenum, liver) after the animals were euthanized by sedation.

Results and discussions. The study findings showed that OMNPs appear to have a greater systemic antioxidant effect and stimulated weight gain, but with no significant differences regarding the gastric pH values or hepatic function compared to the control group and OMP group. Oxidative stress parameters modification in different organs exposed in the study shows a systemic distribution of the titanium dioxide (TiO₂) nanoparticles, similar with other studies that reported to find TiO₂ in lungs, liver and kidneys (1). Low MDA levels at duodenum stie for OMP and OMNPs groups suggest a protective effect against oxidative stress and lipid peroxidation induced by GDU. At liver site, only the OMNPs group showed a significant reduction of MDA levels, indicating a potential antioxidant systemic effect of the nanoparticles, similar with other literature reports (2,3). On the other hand, the study presents some limitations like the relatively reduced number of animals used, which can influence the accuracy of the results. Another limitation was lacking of a solo nanoparticles treatment group, without omeprazole, which could have generated a better evaluation of the TiO₂ nanoparticles impact on ulcer.

Conclusions. OMNPs seem to be a promising drug combination that has a protective oxidative stress systemic effect, which can transform in a new direction in managing both GDU, but also pain treatment. In order to secure this hypothesis, more studies are needed to be elaborated.

Key words: *nanoparticles, gastroduodenal ulcer, omeprazole*

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Shock Wave Therapy for Plantar Fasciitis: A Randomized Controlled Trial Comparing Two Technologies

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Objective: This randomized controlled trial aimed to compare the efficacy of two distinct shockwave technologies, diamagnetic shockwave therapy and electrohydraulic shockwave therapy, in treating chronic plantar fasciitis, assessing pain reduction and functional improvement, and contributing to evidence-based recommendations for their application.

Methods: Patients aged 18 to 65 years with chronic plantar fasciitis (duration ≥ 3 months, initial VAS score ≥ 5) were recruited and randomized into two groups. Group A received DSWT, and Group B received EHSWT. Both groups underwent treatment twice a week for 10 minutes, with intensity set according to manufacturer guidelines, and participated in a standardized, physiotherapist-supervised intervention program. Pain intensity and functional limitations were assessed at baseline, 1 week, 2 weeks, and 4 weeks after the start of treatment. Patient satisfaction was also assessed via a Likert scale.

Results: Both DSWT and EHSWT groups demonstrated significant reductions in pain and improvements in function over the study period. Group A showed a statistically significant and more rapid reduction in pain at week 1 and week 2 () compared to Group B. By week 3, the difference in pain scores between the

groups was no longer statistically significant (), indicating a convergence of outcomes over a slightly longer period. Both groups achieved substantial functional gains, with FAOS total scores improving from approximately 55-57% at baseline to 97% at the end of the study, with no significant differences between groups in overall functional improvement. High patient satisfaction was reported in both groups. The integrated physiotherapist intervention significantly contributed to patient recovery.

Conclusion: Diamagnetic shockwave therapy provides a superior and more rapid reduction in pain compared to electrohydraulic shockwave therapy in the early stages of treatment for chronic plantar fasciitis. While both technologies achieve comparable long-term pain reduction and functional improvement, the quicker initial response with DSWT suggests it may be considered a primary intervention for this condition. This highlights the importance of considering the specific biophysical properties of shockwave modalities when formulating treatment plans.

Organizational communication as a strategic element in healthcare management

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Introduction. In the complex environment of healthcare systems, organizational communication transcends simple information exchange, becoming a vital strategic asset. Effective communication is directly linked to patient safety, operational efficiency, and staff retention. This study aims to analyze how structured communication strategies can be integrated into healthcare management to optimize clinical outcomes and organizational performance.

Material and method. The research involved a multi-methodological approach, combining a systematic literature review of management models with a qualitative analysis of internal communication protocols in several hospital settings. We evaluated the effectiveness of both top-down and horizontal communication channels, focusing on the impact of digital tools and standardized reporting methods (such as SBAR) on interdisciplinary team coordination.

Results and discussions. The findings indicate that healthcare organizations with high "communication maturity" experience 25% fewer medical errors related to handovers and significantly higher levels of employee engagement. Discussions emphasize that the primary barriers to strategic communication are "information silos" and the lack of feedback loops between administrative leadership and frontline medical staff. Integrating digital communication platforms was found to be effective only when accompanied by a culture of transparency and psychological safety.

Conclusions. Organizational communication must be treated as a core pillar of healthcare strategic planning rather than a secondary administrative task. Robust communication frameworks reduce systemic risks and improve the overall quality of care. For sustainable management, healthcare leaders should invest in continuous communication training and the implementation of integrated digital ecosystems that facilitate real-time data sharing.

Key words: *organizational communication, healthcare management, strategic planning, patient safety, internal communication, hospital leadership.*

Rehabilitation Strategies in Neurodegenerative Diseases: Case Reports in ALS and MS

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Introduction: Multiple sclerosis and amyotrophic lateral sclerosis are chronic, progressive neurological disorders characterized by motor, sensory, and functional impairments that significantly affect quality of life. Although the pathophysiology and prognosis differ, both conditions benefit from individualized neurorehabilitation aimed at preserving function, reducing disability, and improving patient autonomy. This paper presents the rehabilitation progress of two patients diagnosed with multiple sclerosis and amyotrophic lateral sclerosis, respectively.

Materials and Methods: We followed the rehabilitation evolution of two patients admitted to the Neurorehabilitation Department in 2025. The first patient, a 51-year-old male diagnosed with relapsing-remitting multiple sclerosis, presented with lower limb weakness, spasticity, balance disorders, fatigue, and impaired gait. The second patient, a 66-year-old female diagnosed with amyotrophic lateral sclerosis, presented with progressive upper limb weakness, muscle atrophy, fasciculations, dysarthria, and reduced functional independence. Both patients underwent individualized, multidisciplinary rehabilitation programs including physiotherapy, occupational therapy, respiratory exercises (for the ALS patient), pain management, spasticity control, and functional training. Functional assessment was performed using the Barthel Index for Activities of Daily Living (ADL), Medical Research Council (MRC) scale for muscle strength, Functional Ambulation Categories (FAC), and Quality of Life (QOL) questionnaires. Evaluations were conducted at admission and after completion of the rehabilitation program.

Results: The patient with multiple sclerosis showed a favorable rehabilitation outcome, with improvement in muscle strength, balance, gait stability, and functional independence, reflected by increased ADL and FAC scores. Fatigue and spasticity were reduced, allowing improved participation in daily activities. The patient with amyotrophic lateral sclerosis demonstrated stabilization of functional decline, with slight improvements in posture control, respiratory efficiency, and upper limb function. Although disease progression continued, rehabilitation contributed to maintaining autonomy in basic activities, reducing discomfort, and improving overall quality of life.

Conclusions: A personalized and multidisciplinary rehabilitation approach plays a crucial role in the management of patients with multiple sclerosis and amyotrophic lateral sclerosis. While functional recovery is more evident in multiple sclerosis, rehabilitation in amyotrophic lateral sclerosis is essential for slowing functional deterioration, maintaining independence for as long as possible, and enhancing quality of life. Early and continuous neurorehabilitation should be considered an integral part of care in both conditions.

Keywords: *multiple sclerosis, amyotrophic lateral sclerosis, neurorehabilitation, functional recovery, quality of life.*

Effect of a functional rehabilitation program on pain and disability in patients with chronic low back pain

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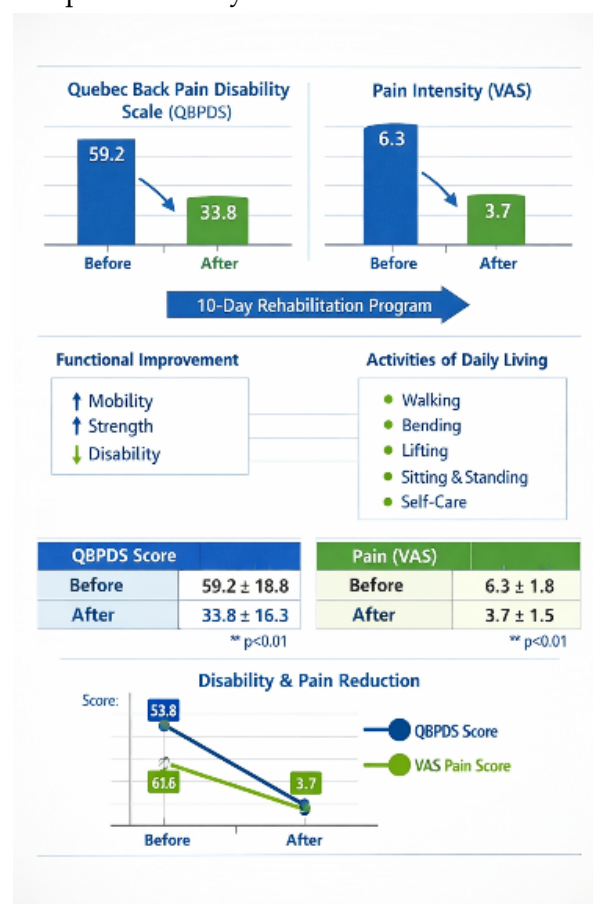
Introduction. Chronic low back pain is one of the leading causes of disability worldwide, with a substantial negative impact on functional status, autonomy, and quality of life. Therefore, the assessment of disability represents an essential component of clinical evaluation and rehabilitation outcomes. The Quebec Back Pain Disability Scale (QBPDS) is a specific instrument designed to evaluate disability related to low back pain and may provide relevant information regarding functional limitations in this patient population.

Material and method. The study included 85 patients with chronic low back pain lasting more than 3 months, who completed a 10-day rehabilitation program consisting of stabilization exercises, stretching exercises, and therapeutic education. Functional disability and pain intensity were assessed before and after the intervention using the Quebec Back Pain Disability Scale and the Visual Analogue Scale (VAS). Statistical analysis was performed using Student's *t*-test.

Results and discussions. Following the 10-day rehabilitation program, a statistically significant reduction in disability was observed, with the mean QBPDS score decreasing from 59.2 ± 18.8 to 33.8 ± 16.3 ($p < 0.01$), indicating a marked improvement in functional status. At the same time, the mean VAS score decreased significantly from 6.3 ± 1.8 to 3.7 ± 1.5 ($p < 0.01$), reflecting a substantial reduction in pain intensity. These improvements were associated with better tolerance for daily functional activities, including walking, sitting and standing, bending, lifting, lying down, self-care, household activities, work-related tasks, sleep, and social participation. The findings support the beneficial role of structured rehabilitation interventions in reducing disability and pain in patients with chronic low back pain.

Conclusions. A structured functional rehabilitation program was associated with a significant reduction in both pain intensity and disability in patients with chronic low back pain. The observed improvement in functional capacity supports the effectiveness of rehabilitation-based management in this population. The Quebec Back Pain Disability Scale proved useful for monitoring disability-related changes following treatment.

Key words: chronic low back pain, rehabilitation, disability, Quebec Back Pain Disability Scale, pain assessment



Effect of a rehabilitation program including post-isometric relaxation on pain and functional disability with frozen shoulder

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Introduction. Frozen shoulder, also known as adhesive capsulitis, is a disabling musculoskeletal condition characterized by pain, progressive restriction of both active and passive shoulder motion, and impaired upper limb function. These limitations significantly interfere with daily activities and reduce quality of life. In rehabilitation practice, pain intensity and functional disability are essential outcome measures. The Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire and the Visual Analogue Scale (VAS) are commonly used tools for the assessment of functional impairment and pain in patients with shoulder disorders.

Material and method. The study included patients diagnosed with frozen shoulder who completed a 10-day rehabilitation program. The intervention consisted of manual therapy using post-isometric relaxation techniques, therapeutic exercises, stretching, and patient education. Functional disability and pain intensity were assessed before and after the rehabilitation program using the DASH questionnaire and the Visual Analogue Scale (VAS). Statistical analysis was performed using Student's *t*-test.

Results and discussions. Following the 10-day rehabilitation program, a statistically significant improvement in upper limb function was observed, reflected by a decrease in the mean DASH score from 58.6 ± 15.4 to 36.2 ± 13.1 ($p < 0.01$). Pain intensity also decreased significantly, with the mean VAS score improving from 5.1 ± 1.4 to 2.6 ± 1.2 ($p < 0.01$). These changes were associated with improved shoulder mobility and better performance of daily activities, including dressing, grooming, reaching overhead, lifting objects and sleeping on the affected side. The findings support the beneficial role of a structured rehabilitation program including post-isometric relaxation in reducing pain and disability in patients with frozen shoulder.

Conclusions. A rehabilitation program including manual therapy through post-isometric relaxation was associated with a significant reduction in pain and functional disability in patients with frozen shoulder. The observed clinical improvement supports the effectiveness of this rehabilitation approach in the management of adhesive capsulitis.

Key words: frozen shoulder, adhesive capsulitis, rehabilitation, post-isometric relaxation, DASH, pain assessment

Evaluation of the Patient with Secondary Chronic Musculoskeletal Low Back Pain: from clinical screening to identifying the predominant causes

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Introduction. Chronic musculoskeletal low back pain is a major health problem associated with persistent disability, limitation of daily activities, and reduced quality of life [1]. Its multifactorial nature requires a structured clinical assessment capable of distinguishing the main pain generators and highlighting the predominant cause [1,2]. **Material and method.** A narrative synthesis of the literature and of the clinical assessment principles applicable to patients with chronic musculoskeletal low back pain was conducted. The approach included initial clinical screening to exclude red flags and non-musculoskeletal causes, followed by clinico-functional evaluation aimed at identifying the main pain generators [2]. The analysis covered history taking, neurological and functional examination, and targeted clinical tests suggestive of discogenic pain, lumbar facet syndrome, sacroiliac joint pain, piriformis syndrome, and degenerative lumbar spinal stenosis [2-6]. **Results and discussions.** A stepwise assessment of the patient with chronic musculoskeletal low back pain allows for a more rigorous diagnostic orientation and a clearer delineation of the predominant cause. Initial clinical screening remains essential for excluding serious pathology [2]. Correlating the medical history with the physical examination and targeted functional tests increases the relevance of the differential diagnosis. For suspected discogenic or radicular pain, neurodynamic tests such as the Slump and Straight Leg Raise may contribute to clinical orientation, with the Slump test showing higher sensitivity in patients with lumbar disc herniation [3]. For sacroiliac joint pain, clusters of provocation tests are useful as part of the examination, although their rule-in value remains limited [4]. Piriformis syndrome and degenerative lumbar spinal stenosis should be considered when symptoms suggest extraspinal sciatic irritation or neurogenic claudication patterns [5,6]. In this context, patient assessment should not be limited to identifying a single lesion, but should aim to recognize the predominant source of pain and any overlapping mechanisms [1,2]. **Conclusions.** The assessment of the patient with chronic musculoskeletal low back pain should be integrated, stepwise, and oriented both toward initial clinical screening and toward identifying the predominant causes. The combination of structured history taking, clinico-functional examination, and targeted tests allows a more comprehensive appraisal of the clinical picture and may support individualized rehabilitation planning [1,2].

Key words: chronic low back pain, clinical assessment, disability, discogenic pain, sacroiliac joint, facet syndrome, piriformis syndrome, lumbar spinal stenosis

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Musculoskeletal Pain After Stroke - Implications for Rehabilitation Programs

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Introduction. Musculoskeletal pain is a frequent and relevant comorbidity in stroke survivors, that determines a great impact on rehabilitation. Shoulder pain, low back pain, and osteoarthritis may limit participation in therapy and negatively influence recovery.

Material and method. This cross-sectional study included 382 post-stroke patients admitted for inpatient neurological rehabilitation. Musculoskeletal comorbidities were identified using standardized clinical and ICD-10-based criteria, and included shoulder pain syndrome, osteoarthritis, and chronic low back pain. Functional status and health-related quality of life were assessed using the Barthel Index and EQ VAS, while psychological domains were assessed through PHQ-9 and GAD-7 scales. Hierarchical cluster analysis, Pearson correlations, and multiple linear regression were applied.

Results and discussions. Shoulder pain was identified in 17.3% of patients, osteoarthritis in 15.4%, and low back pain in 9.9%. These conditions formed a distinct musculoskeletal cluster, with moderate internal cohesion (Jaccard = 0.41), and showed meaningful overlap with the cognitive-affective domain, particularly depression and anxiety. Osteoarthritis independently predicted poorer functional independence ($\beta = -0.123$, $p = 0.001$) and lower quality of life ($\beta = -0.186$, $p < 0.001$). Low back pain was also a significant negative predictor of Barthel Index ($\beta = -0.106$, $p = 0.003$) and EQ VAS ($\beta = -0.097$, $p = 0.009$).

Conclusions. Musculoskeletal pain represents a distinct and clinically meaningful comorbidity domain in post-stroke rehabilitation and should be systematically integrated into rehabilitation assessment and management.

Key words: stroke rehabilitation, musculoskeletal pain, shoulder pain, low back pain, osteoarthritis, quality of life

Physiotherapy as a Functional Re-education Strategy for Optimizing Hand Joint Mobility in Rheumatoid Arthritis

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Introduction. Hand functionality is essential for performing daily activities, and joint impairment caused by rheumatoid arthritis leads to significant mobility limitations. In this context, the development of objective and reproducible biomechanical assessment methods becomes relevant for functional monitoring and for increasing the efficiency of rehabilitation programs.

Material and method. This paper proposes the development of an integrated system for the kinematic analysis of fingers, specifically customized for the index finger. Mathematical modelling was performed

using Denavit-Hartenberg parameterization, employing forward kinematics to determine joint angle values. The developed graphical interface allows for the organization, analysis, and comparison of articular parameters recorded by sensors, thereby providing support to the physiotherapist during the functional assessment process.

Results and discussions. The functional prototype is capable of capturing joint movements and converting them into clinically relevant biomechanical information. The interface enables both the real-time visualization of joint angles and the analysis of stored data, facilitating the monitoring of progress throughout the recovery program.

Conclusions. The developed system confirms the utility of integrating biomechanical modelling, inertial sensors, and software processing into an accessible solution for the objective assessment of hand joint mobility by physiotherapists. Consequently, the proposed concept has application potential in monitoring rheumatoid arthritis and developing modern tools for functional assessment and personalized rehabilitation aimed at improving the patient's quality of life.

Key words: *Rheumatoid Arthritis, Joint Biomechanics, Forward Kinematics, Personalized Rehabilitation, Objective Assessment*

Partial results on the Cardiovascular Rehabilitation program and the Electronic Registry for Cardiovascular Rehabilitation applicable at a national level

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Introduction: The analysis of the specialized literature revealed that there is no cardiovascular rehabilitation program regulated by the national medical facilities in Romania. Moreover, Romania does not have any National Electronic Registry for Cardiovascular Rehabilitation (NERCVR)[1].

Material and Methods: In the process of selecting an IT structure that would meet the requirements of a national electronic medical registry, we identified the "Research Electronic Data Capture (REDCap) web platform"[2]. We analyzed the demographic and clinical parameters, including those measured by means of a sensor ergometric bicycle of the patients who suffered from acute MI and who benefited from the CVR program.

Results and discussion: We designed the project entitled "Cardiovascular Rehabilitation and Secondary Prevention" using REDCap. Most of the patients included in the study exhibited a positive energy consumption efficiency on the sensor ergometric bicycle.

Conclusions: This study confirms the role of interdisciplinarity, as well as of personalization and regular adaptation of CVR programs.

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The importance of assessing the autonomic nervous system response through heart rate variability in patients undergoing comprehensive medical rehabilitation treatment

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Introduction. Heart rate variability (HRV) represents an important non-invasive indicator of autonomic nervous system (ANS) function, reflecting the balance between sympathetic and parasympathetic activity. HRV analysis is increasingly used in medical practice to assess the body's response to stress, disease, and therapeutic interventions, having particular relevance in monitoring patients undergoing medical rehabilitation programs.

Material and method. We conducted a study of 30 patients admitted to the Balneal and Rehabilitation Sanatorium of Techirghiol who received complex medical rehabilitation. HRV assessment was performed at admission and discharge using a device that utilizes intermittent hypoxia-hyperoxia therapy (IHHT). The study aimed to evaluate changes in ANS response, as reflected by HRV parameters, following medical rehabilitation treatment, and to phenotype patients into different categories based on their HRV profiles.

Results and discussions. Although a trend toward improvement in HRV parameters was observed, these changes did not reach statistical significance *p*. Phenotyping of ANS function based on HRV classified patients into four groups: parasympathetically adapted (10%), parasympathetic at risk (73.3%), sympathetic (16.7%), and unstable (0%). Subsequently, risk stratification was performed to further assess potential clinical implications.

Conclusions. Preliminary results suggest a trend toward improvement in HRV parameters following the complex medical rehabilitation treatment, indicating a possible optimization of autonomic balance and a favorable physiological adaptation to the therapeutic interventions applied. However, these findings should be interpreted with caution, as the duration of the intervention (two weeks) may have been insufficient to induce significant autonomic changes. Additionally, key training variables such as VO₂ max, exercise intensity, and heart rate were not specifically targeted or standardized, and the relatively small sample size may have limited the statistical power of the analysis.

Keywords: HRV, intermittent hypoxia-hyperoxia therapy, medical rehabilitation

Carbonated mineral waters and mofettotherapy - from basic research to clinical applications

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Introduction. In recent decades, significant progress has been made in the field of food quality, and according to the regulations of the European Council, water is included in the food category. The use of natural factors for therapeutic purposes requires monitoring of their microbiological status, and the

frequency must be permanently adapted to the particularities of the hydromineral source, in order to ensure the beneficial therapeutic effect and sanogenic quality. Objective. Research into the clinical and biological effects of carbonated mineral waters and mofeta from Băile Tușnad. Material and method. Clinical and experimental studies in various pathologies, hepatic steatosis, myocardial ischemia, bone defect, peripheral arterial flow, experimentally induced, and clinical studies in diabetic neuropathy, chronic obliterating arteriopathy, post-stroke state. Results. Results were obtained in pain improvement, walking speed and distance, in increasing arterial flow, in bone regeneration.

Conclusions. It is necessary to continue research on the clinical and biological effects of carbonated mineral waters and mofeta for the safety of mineral water, for the industry involved in bottling mineral waters, for balneary treatments indicated in medical recovery and prophylaxis.

Mofettotherapy and Carbonated Baths in the Covasna Resort: Physiological Mechanisms and Therapeutic Benefits

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Mofettotherapy and carbonated baths are complementary balneotherapeutic interventions that capitalize on the therapeutic properties of CO₂-rich environments and mineral waters. In Covasna, Romania, mofetts—natural CO₂ emanations—offer a unique mixture of gases (CO₂, N₂, He, radon, NH₃, SO₂, etc), without equivalent in Europe. The mineral waters of the region, with a varied physicochemical composition and a CO₂ content of approximately 2.5 g/L, are used both internally and externally to enhance systemic and local effects.

Exposure to CO₂ through mofettotherapy and carbonated baths induces generalized vasodilation, improves microcirculation, optimizes oxygen transport through the Bohr and Haldane effects, and stimulates nitric oxide production, thus exerting anti-inflammatory, analgesic, and antioxidant effects. Physiological responses include improved muscle and cerebral perfusion, modulation of smooth muscle tone, detoxification and increased metabolic activity.

These interventions are particularly beneficial for patients with cardiovascular and peripheral vascular diseases, including hypertension (stages I–II), chronic ischemic heart disease, chronic arterial or venous insufficiency, Raynaud's disease and post-cardiological interventions (bypass or stents), metabolic diseases, etc. Contraindications include severe hematological disorders, recent surgery or infarction, advanced heart failure, oncological pathology and other clinically acute conditions.

In conclusion, mofettotherapy and carbonic baths in Covasna offer a synergistic combination of physical, chemical and thermal stimuli that support cardiovascular health, metabolic function and general well-being, especially in patients who cannot perform sustained physical activity. The natural environment of the Covasna resort, rich in mofetta with high concentrations of CO₂ and other therapeutic factors, constitutes a unique balneotherapeutic setting, with demonstrable clinical benefits used for both prevention and treatment.

Evaluation of the effectiveness of the physiotherapy program in the functional recovery of patients with gonarthrosis

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Introduction. Gonarthrosis is a frequent degenerative disorder of the locomotor system characterized by pain, limited joint mobility, and reduced functional capacity. Conservative management includes physiotherapeutic interventions aimed at reducing symptoms and improving joint function.

Material and method. The study included 23 patients with gonarthrosis. It was a quasi-experimental pre-post study without a control group. Patients followed an individualized rehabilitation program consisting of physiotherapy, electrotherapy, and massage. Assessment was performed before and after intervention using the Visual Analog Scale (VAS), range of motion, and the Western Ontario and McMaster Universities Arthritis Index (WOMAC).

Results and discussions. The comparative analysis of data obtained at the initial and final evaluations revealed significant improvements in the clinical and functional parameters of the patients included in the study. Pain, assessed using the Visual Analog Scale (VAS), showed a decrease in the mean value from 7.1 ± 1.2 to 4.3 ± 1.0 , with the difference being statistically significant ($p < 0.05$). The range of motion at the knee joint improved, with flexion increasing from a mean value of $98.5^\circ \pm 8.4$ to $112.6^\circ \pm 7.9$, this change also being statistically significant ($p < 0.05$). Functional status, evaluated using the WOMAC index, demonstrated a decrease in the mean score from 62.4 ± 6.3 to 45.2 ± 5.8 , indicating a significant improvement in joint function and the ability to perform activities of daily living ($p < 0.05$).

Conclusions. The individualized rehabilitation program improved pain, joint mobility, and functional status in patients with gonarthrosis.

Key words: gonarthrosis, physiotherapy, therapeutic exercise

Pathophysiology of vasculitis

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Introduction: Systemic vasculitis is part of the group of rare diseases, with unknown etiology and autoimmune pathology. Depending on the type of vessel affected, vasculitis can be localized at the level of a single organ or can simultaneously affect several organs and systems.

Material and method: Vasculitis can be classified into primary and secondary and is characterized by the presence of inflammatory infiltrate at the level of the vascular wall. Depending on the predominance of the type of infiltrate, vasculitis can be granulomatous, necrotizing or mixed. Vasculitis with single organ involvement includes: cutaneous leukocytoclastic angiitis, primary vasculitis of the nervous system, isolated aortitis.

Results and discussions: Large vessel vasculitis (GVA) the most common primary vasculitis affects all large vessels.

Conclusions: Vasculitis are systemic inflammatory diseases of the vessels that are associated with high morbidity and mortality. Early diagnosis is essential in the evolution of the disease.

Keywords: *vasculitis, infiltrate, leucocytoclastic*

Surgery of herniated disc in young people - complications

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Introduction: Herniated disc is a condition that occurs when there is severe damage to the intervertebral discs, discs that act as a shock absorber, thus reducing pressure on the spine. In the event that conservative treatments fail, surgical treatment is indicated.

Material and method- Complications of operated disc herniation include: infection, paresis, deep venous thrombosis. The risk of complication is higher in patients with obesity, diabetes or cardiovascular diseases. Alarm signs that may suggest the occurrence of a complication are: fever and chills, sudden decrease in muscle strength in the lower limbs, pain that does not respond to class II analgesics.

Conclusions: Patients with operated disc herniation have a decrease in quality of life. The most common complication is persistent pain in the lower limbs, 0.1 to 1% of patients may present deep venous thrombosis. **Keywords:** *herniated disc, complication, deep vein thrombosis.*

Integration of balneophysiotherapy interventions in respiratory recovery: functional effects, quality of life and adherence to the program

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Respiratory rehabilitation is a key intervention in the therapeutic spectrum of chronic respiratory diseases, addressing ventilatory dysfunction and progressive functional decline. The objectives of respiratory rehabilitation include optimizing the functional and psychological state of patients with chronic lung diseases, improving symptoms, reducing anxiety and depression, improving exercise capacity and quality of life, and increasing survival by reducing the number and severity of exacerbations and increasing the time between them. Respiratory rehabilitation programs are multimodal and personalized according to the capabilities and needs of each patient, including comprehensive interventions such as resistance and strength exercises, respiratory muscle training, breathing exercises, physiotherapy and balneo-physiotherapy, techniques for secretion management, educational and nutritional counseling, and social support. Patient evaluation is complex and includes the assessment of pulmonary function, exercise capacity testing, measurement of respiratory and peripheral muscle strength, and the impact of symptoms on quality of life. Respiratory rehabilitation demonstrates consistent improvements in ventilatory capacity, physical endurance, and physical and mental quality of life domains, associated with superior adherence compared to conventional interventions. The presentation illustrates emerging paradigms in respiratory rehabilitation, highlighting the synergy between functional interventions and psychosocial support to maximize therapeutic adherence.

Sarcopenia, frailty and peripheral muscle dysfunction in chronic respiratory pathology: prognostic and therapeutic implications in recovery

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Sarcopenia and frailty are geriatric syndromes defined by progressive multisystem decline, manifested and intimately correlated with markers and biomarkers of skeletal muscle dysfunction. At the clinical level, these entities have been integrated into risk stratification protocols in elderly patients, facilitating the prediction of exacerbations and the initiation of targeted therapeutic interventions aimed at preventing functional decline in high-risk patients. This review assesses the impact of sarcopenia and frailty in the context of chronic respiratory disease, providing a comprehensive synthesis of standardized assessment tools and evidence accumulated from existing studies. It also makes a rigorous comparison between sarcopenia metrics, which focus on muscle mass and functional performance, and those of frailty, which often integrate multidomain dimensions, including social, cognitive, and psychological aspects. Frailty is emerging as a syndrome of primary clinical relevance in chronic respiratory pathology, being closely correlated with a negative long-term prognosis. In addition, we analyze the interconnections between sarcopenia, frailty, and skeletal muscle dysfunction in chronic respiratory diseases, highlighting these interdependent but conceptually distinct clinical phenotypes.

From Deficit to Functionality: Rehabilitation of Brachial Plexus Palsy in a Young Adult Patient

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Introduction. Brachial plexus injuries represent complex neurological conditions that can lead to significant motor deficits, sensory disturbances and reduced functional independence of the upper limb. Early diagnosis and the implementation of a structured rehabilitation program are essential for optimizing functional rehabilitation, particularly in young, active patients.

Material and method. We present the case of a 26-year-old patient with no significant medical history, who developed functional impairment of the left upper limb following an occupational incident involving welding equipment. Clinical examination at presentation demonstrated reduced active range of motion and decreased muscle strength of the affected upper limb, with partial distal motor control and associated cutaneous hypoesthesia. Functional assessment showed significant limitations in activities of daily living. The patient underwent pharmacological treatment consisting of corticosteroids, neurotrophic agents, metabolic agents and antioxidant therapy, in addition to a comprehensive rehabilitation program including electrotherapy, laser therapy, massage therapy, therapeutic exercises, neuromuscular facilitation, progressive muscle strengthening and functional training.

Results and discussions. Following the rehabilitation program, significant clinical and functional improvements were observed. At final evaluation we observed a substantial rehabilitation of upper limb function, with improved motor control, reduced pain and enhanced functional independence. The case highlights the importance of early, structured and individualized rehabilitation in brachial plexus injuries. The correlation between clinical improvement and functional scores supports the effectiveness of the rehabilitation approach.

Conclusions. Rehabilitation plays a central role in the management of brachial plexus palsy. Early intervention and the use of objective functional assessment tools can significantly improve outcomes. In young patients, a structured rehabilitation program may lead to substantial functional rehabilitation and reintegration into daily and professional activities.

Key words: *brachial plexus palsy, rehabilitation, functional rehabilitation, nerve injury, upper limb disfunction*

Diagnostic and evolution features in a patient with central motor neuron disease

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Amyotrophic lateral sclerosis (ALS) is a progressive neurodegenerative disease characterized by damage to central and peripheral motor neurons, leading to muscle weakness, atrophy, and progressive paralysis. We present the case of a 69-year-old female patient diagnosed with central motor neuron disease in 2021, who initially presented with weakness in the upper limbs, followed by speech disorders over a period of four years. The neurological examination revealed marked amyotrophy, fasciculations, and a positive Babinski sign on the left side. The electromyography confirmed chronic diffuse denervation, consistent with motor neuron disease. Brain and spinal cord imaging ruled out other structural causes, and laboratory tests did not reveal any relevant abnormalities. The diagnosis of ALS was established according to the El Escorial criteria. The patient received multidisciplinary care, including physical therapy, kinesiotherapy, and treatment with riluzole. The case highlights the importance of early recognition of clinical signs, accurate diagnosis, and an integrated approach to the management of ALS patients, with the aim of maintaining quality of life and slowing disease progression.

Mechanisms of neuroplasticity in chronic axonal polyneuropathy: therapeutic potential and functional constraints – case report

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Introduction. Chronic axonal polyneuropathy is characterized by a progressive loss of peripheral nerve fibers, leading to significant motor and sensory deficits. While axonal regeneration is often slow and incomplete, the concept of neuroplasticity—encompassing both peripheral nerve remodeling and central nervous system adaptation—presents a critical therapeutic window. This paper aims to analyze the

mechanisms through which the nervous system compensates for chronic axonal loss and the inherent constraints that limit full functional restoration.

Material and method. The study follows a single-case clinical design, monitoring the progression of a patient with confirmed axonal polyneuropathy through a specialized neurorehabilitation protocol. The methodology focused on the application of task-oriented training, proprioceptive enrichment, and targeted neuromuscular stimulation. Evaluation was conducted using longitudinal electrophysiological assessments and standardized functional outcome measures to track the correlation between nerve conduction and motor performance.

Results and discussions. The analysis reveals a distinct divergence between structural recovery and functional improvement. While electrophysiological parameters showed a plateau in axonal regeneration, the patient demonstrated significant gains in gait stability and motor control. This suggests that "functional neuroplasticity"—specifically cortical remapping and the recruitment of collateral motor units—can bypass peripheral structural damage. However, "functional constraints" were identified in tasks requiring high-frequency neural output and fine motor coordination, indicating a biological "ceiling effect" where plasticity can no longer compensate for the absolute reduction in axonal density.

Conclusions. Neuroplasticity serves as a fundamental mechanism for functional recovery in chronic axonal polyneuropathy, offering significant therapeutic potential even when peripheral regeneration is limited. Nevertheless, the presence of structural constraints underscores the necessity of a realistic prognosis in chronic stages. Effective management must prioritize the exploitation of compensatory neural pathways through intensive rehabilitation, while acknowledging the physiological limits imposed by axonal depletion.

Key words: *neuroplasticity, axonal polyneuropathy, case report, functional recovery, axonal regeneration, clinical constraints.*

Traumatic Injury of the Index Finger of the Dominant Side: Is a Small Rehabilitation Medicine Team Enough to Change Lives? A Case Study

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Introduction. Injuries that involved the hands, especially on the dominant side, can profoundly affect the patient's quality of life, activities of daily living and also impair their capacity to independently take care of themselves or be employed.

Material and method. A 25 years old female, from a rural area, who worked as a commercial worker in a butchery as a meat slicer, presented in September 2025 to an ambulatory rehabilitation medicine specialty consult. In August 2025, the patient had a work accident, where she severely injured her right index in the meat slicer machine. At presentation for the rehabilitation medicine consult, the patient still had a medium to severe skin defect, after her discharge from a plastic surgery department, where she underwent a skin graft reconstruction of the right index finger, with skin flap prelevated from her right radiocarpal region. The patient also suffered from pain (right index and right radiocarpal joint), mild affected superficial sensibility, highly affected range of motion-ROM (right index and right radiocarpal joint) and a mild difficulty

of self-care. The patient was prescribed local treatment for the right index and right radiocarpal joint scars, local and oral treatment for the pain and was asked to revisit the rehabilitation medicine physician after 10 days. After the medical check-up, the patient started the rehabilitation medicine programme, that included several physiotherapy methods and physical therapy techniques in multiple treatment sessions, from the beginning of October 2025 to the middle of February 2026.

Results and discussions. At the end of her rehabilitation medicine programme, the patient's quality of life was significantly improved, with an enhanced capacity to do her daily life activities and she also got back to work (in the same butchery). The patient's ROM for the right index finger and the right radiocarpal joint also improved considerably and she regain her sensibility. On the other hand, the current national health insurance company regulations prevent us from prescribing more than 21 days/year of rehabilitation medicine specific treatment reimbursed by the state, which limits our possibilities, especially for patients that cannot afford to pay for treatment themselves, as was the case of our patient. Despite those administrative limitations, the rehabilitation team managed to regain this patient's independency, as she also resumed her household animal care activities (pigs, chickens).

Conclusions. We consider that regular medical check-ups and a close collaboration between the rehabilitation medicine physician and the rehabilitation team (physical therapist, physiotherapist, occupation therapist) together with an active collaboration from the patient can genuinely change a patient's quality of life, even with a small rehabilitation team, that consisted in only three persons in this case.

Key words: *rehabilitation team, traumatic index injury, physiotherapy, physical therapy*

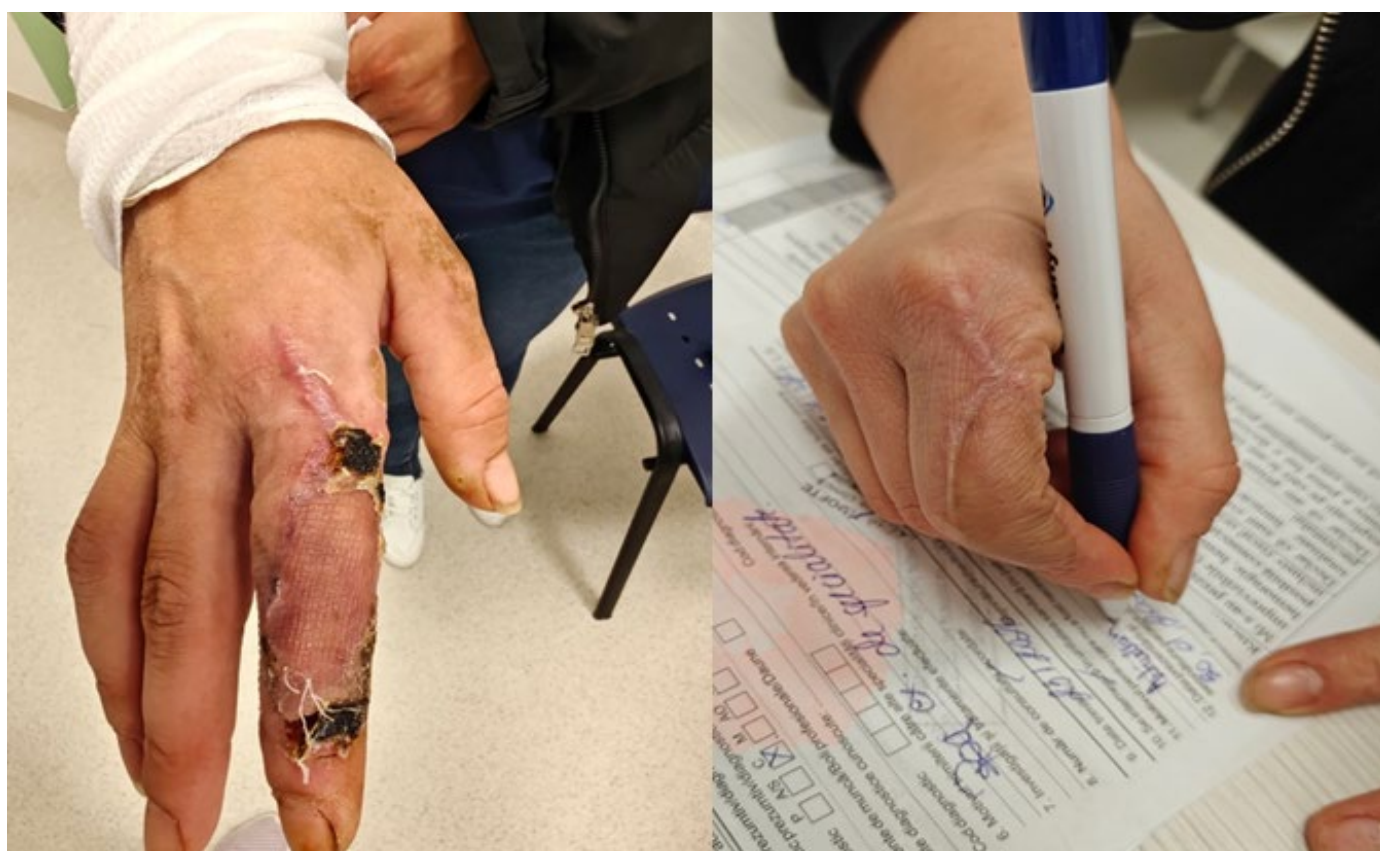


Fig. 1. Left image: at presentation (September 2025). Right image: at the end of treatment (February 2026)

Cardio-pulmonary exercise testing (CPET) in the rehabilitation of post-acute myocardial infarction patients

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CPET is a paramount complex (clinical and instrumental), quantified assessment, instrument, for the modern and precise evaluation of the of cardiac patients' physical effort – and their interplay, including energetic metabolic – capability, especially for those who bore myocardial infarction (at minimum one week after this supra-acute event): at baseline – even (by permissivity) to determine whether the patient is eligible to abide such a specific aerobic exercise based rehabilitation intervention – and after accomplishing the recommended set of re-training sessions, thereby providing the possibility to objectify the related outcomes achieved, as well.

To perform CPET there is usually availed an ergometric, endowed with sensors, bike, which is connected to a specially conceived system, that monitors including the patient's ECG.

Thereby, an appropriate CPET apparatus – through hardware and software incorporated facilities – enables the ECG quantified cardiac response to physical effort and hence, to be tracked the cardiac frequency, eventual ischemic alterations appeared during it, and also to be measured the respiratory levels of CO₂ si O₂ – the calculation of the ratio VO₂/ VO₂max. (considering VO₂ is constant) is an equally important parameter – as the device automatically generates VO₂ max., too, in different moments of the physical effort.

The measurement of ventilatory parameters and of respiratory gases is enabled using a dedicated mask that does not allow the commixture of the expired air with the inhaled one. The analyzers of O₂ and CO₂ are incorporate within a "metabolic cart", thus underpinning connection in assaying the intensity of physical effort expended at the ergometric, endowed with sensors, bike – measured in watts (W) – to the metabolic equivalent (MET) predicted value – acting geneder and age – to which the measured VO₂ max. is referred percentually.

Key words: CPET, ECG, VO₂ max., MET cardiac rehabilitation

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Integrated Multimodal Diagnostic Strategy for Focal Knee Chondral Lesions: Correlation of Clinical Findings with Ultrasound and MRI-Based ICRS Scores

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Introduction. The focal chondral lesions of the knee are frequently underdiagnosed because clinical symptoms and functional impairment do not always reflect the true structural severity of cartilage damage. Accurate differentiation between advanced partial-thickness lesions and full-thickness osteochondral defects is essential for therapeutic planning and preoperative stratification. This study aimed to evaluate the diagnostic utility of clinical examination tests and musculoskeletal ultrasound (MSK-US) in identifying high-grade focal chondral lesions, using MRI-based International Cartilage Repair Society (ICRS) grading as the imaging reference standard, and to propose an integrated multimodal diagnostic algorithm.

Material and method. This observational cross-sectional study included 57 consecutive patients with symptomatic mechanical knee pain, recurrent joint effusion, and MRI-confirmed focal chondral lesions, evaluated between January 2021 and July 2023. All participants underwent standardized clinical examination, including Wilson's test, McMurray's test, J-sign, Lachman, anterior and posterior drawer, pivot-shift, and varus-valgus stress tests. Pain intensity was assessed using the Visual Analog Scale (VAS), while functional impairment was quantified with the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). MSK-US examination was performed with a high-frequency linear transducer to assess effusion, synovial hypertrophy, cartilage irregularities, and meniscal morphology. MRI was used to classify lesions according to ICRS grading. Statistical analysis included Chi-square testing, Pearson correlations, and odds ratios (OR) with 95% confidence intervals.

Results and discussions. According to MRI-based grading, 50 patients (87.7%) had ICRS Grade 3 lesions and 7 patients (12.3%) had ICRS Grade 4 lesions. Mechanical pain and recurrent joint effusion were present in all patients, while VAS and WOMAC scores showed moderate and comparable symptom burden between groups, indicating that symptom severity alone could not distinguish lesion depth. Wilson's test showed high sensitivity in both groups, positive in 66% of ICRS 3 lesions and 100% of ICRS 4 lesions, but there was no significant association with lesion severity. McMurray's test demonstrated the strongest discriminative value, being positive in 30% of ICRS 3 lesions versus 86% of ICRS 4 lesions, and was the only test significantly associated with lesion grade ($\chi^2 = 4.29$, $p = 0.038$; OR = 0.20, 95% CI: 0.05–0.79). MRI also revealed meniscal pathology in 86% of Grade 4 lesions compared with 30% of Grade 3 lesions. These findings suggest that McMurray positivity reflects lesion complexity through associated meniscal damage rather than cartilage depth itself. MSK-US provided complementary information regarding synovial and inflammatory changes, supporting its role as an accessible adjunctive tool in the diagnostic pathway.

Conclusions. Symptom intensity and functional impairment do not reliably differentiate between ICRS Grade 3 and Grade 4 focal chondral lesions. Wilson's test is useful as a sensitive indicator of medial compartment overload, whereas McMurray's test serves as an indirect clinical marker of combined chondral–meniscal injury. The integration of targeted clinical tests, MSK-US, and MRI-based ICRS grading offers a pragmatic multimodal diagnostic framework that may improve clinical orientation, imaging triage, and preoperative risk stratification in patients with focal knee chondral defects.

Key words: focal chondral lesions; knee cartilage injury; ICRS grading; musculoskeletal ultrasound; MRI; McMurray test; Wilson test; diagnostic algorithm; meniscal pathology; knee pain

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Static Baropodometric Assessment for Musculoskeletal Rehabilitation: Plantar Pressure and Postural Load Distribution in Young Adults

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Abstract

Plantar pressure distribution and foot loading patterns are critical indicators for assessing postural alignment, neuromuscular control, and the potential risk of developing musculoskeletal disorders. This cross-sectional investigation evaluated static plantar pressure in a cohort of 113 healthy young adults aged 18–35 years using the Spine 3D Sensor Medica system. Bilateral measurements were obtained for contact area, load distribution, mean pressure, and peak pressure at the forefoot and hindfoot levels. The analysis revealed significant correlations between body weight, body mass index, and plantar load—particularly in the hindfoot region—while peak pressure values appeared to be influenced predominantly by individual biomechanical characteristics rather than anthropometric factors. Additionally, female participants exhibited greater inter-limb asymmetries compared to males. These findings contribute to the establishment of reference values for static plantar pressure and emphasize their relevance in clinical assessment and rehabilitation. Baropodometric evaluation enables early identification of postural imbalances and abnormal load distribution, supporting targeted therapeutic strategies, improved pain management, and enhanced functional recovery. In conclusion, static plantar pressure is strongly related to anthropometric factors and exhibits gender-specific asymmetries, supporting its clinical relevance in musculoskeletal assessment.

Keywords: physical rehabilitation; musculoskeletal disorders; plantar pressure; baropodometry; postural balance; functional mobility; foot biomechanics; physiotherapy; manual therapy

Clinical and paraclinical correlations in diabetic sensorimotor polyneuropathy

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Introduction: Diabetic sensorimotor polyneuropathy (DSPN) represents the most common form of neuropathy associated with diabetes and constitutes a major cause of disability in patients with type 2 diabetes mellitus (T2DM). It is characterized by a progressive, length-dependent impairment of nerve fibers, reflecting the cumulative impact of chronic hyperglycemia on neuronal and microvascular structures. Identifying significant clinico-paraclinical correlations is essential for early diagnosis, accurate staging, and optimization of therapeutic and rehabilitation strategies.

Material and Method: The present paper provides an integrative analysis of recent literature regarding the relationship between clinical manifestations and paraclinical findings in DSPN. The biochemical mechanisms underlying hyperglycemia-induced nerve damage are examined, along with alterations in nerve excitability in advanced stages and the diagnostic utility of the Michigan Neuropathy Screening Instrument (MNSI) in correlation with nerve conduction studies (NCS).

Results and Discussions: Persistent hyperglycemia induces a complex cascade of metabolic and vascular disturbances, including activation of the polyol pathway, accumulation of advanced glycation end products (AGEs), oxidative stress, and endothelial dysfunction, ultimately leading to microangiopathy and ischemic injury of peripheral nerves. These mechanisms promote progressive axonal degeneration and demyelination, associated with alterations in nerve excitability, reflecting ion channel dysfunction and membrane instability. From a clinical perspective, DSPN manifests as symmetric sensory deficits in a “stocking-glove” distribution, initially affecting small fibers (pain and temperature), followed by large fibers (vibration and proprioception). Motor involvement, less evident in early stages, becomes significant as the disease progresses, leading to distal muscle weakness, atrophy, and impaired neuromuscular control. These deficits contribute to gait disturbances, postural instability, increased risk of falls, and susceptibility to plantar ulcerations. Paraclinical evaluation reveals significant correlations between clinical severity scores and electrophysiological parameters. Nerve conduction studies demonstrate reduced conduction velocities and amplitudes, suggesting large fiber involvement. The MNSI proves to be a practical and reliable screening tool, facilitating early detection and clinical stratification. Recent data indicate that alterations in nerve excitability may precede changes detectable by standard NCS, offering valuable perspectives for the early diagnosis of diabetic neuropathy. The frequent association of T2DM with cerebrovascular pathology further amplifies disability, highlighting the need for an integrated neurorehabilitation approach targeting both peripheral and central components.

Conclusions: Diabetic sensorimotor polyneuropathy is a complex and multifactorial complication of T2DM, in which clinical manifestations closely correlate with paraclinical changes. Early detection through combined clinical and electrophysiological assessment is essential for initiating appropriate therapeutic interventions. Integrating these correlations into rehabilitation practice may optimize functional outcomes, reduce disability, and improve patients’ quality of life.

Key words: diabetic sensory-motor polyneuropathy, type 2 diabetes mellitus, nerve conduction studies, MNSI, nerve excitability, medical rehabilitation

Premises for a Life Without Disabilities

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Introduction. A life without disabilities is grounded in early prevention, timely diagnosis, and comprehensive rehabilitation, which together reduce the long-term impact of congenital and acquired conditions on functional status and social participation. Disability affects not only the individual child's physical, cognitive, and emotional development, but also the overall balance of the family, including its social and economic stability. Given the high global prevalence of disability, estimated at approximately 1.3 billion people, there is a growing need to emphasize preventive strategies, particularly in early life stages, where intervention can significantly alter developmental trajectories and improve long-term outcomes.(1)

Material and method. The study aims to identify key medical, educational, and social premises that support optimal development, functional independence, and inclusion of children at risk of disability or with established impairments. The approach includes the analysis of preventive strategies such as prenatal and post-natal care, vaccination programs, early screening, and health education aimed at reducing exposure to risk factors.(2,3) In addition, the study considers multidisciplinary intervention models and the role of coordinated healthcare and community services in promoting early diagnosis and effective management.

Results and discussions. We reviewed current evidence and institutional experience in pediatric neurorehabilitation, focusing on early screening programs, multidisciplinary intervention models, and community-based services that target developmental risk and functional limitations. The findings highlight that up to 80% of childhood disabilities may be preventable through appropriate preventive measures, including vaccination, early detection of complications, and avoidance of environmental risks such as injuries and infections.(2,4) However, gaps in vaccination coverage and limited access to early intervention services remain significant challenges. Educational programs aimed at promoting healthy behaviors and preventing harmful exposures play a critical role in reducing preventable disabilities and improving long-term outcomes.

Conclusions. Early identification of risk, coordinated multidisciplinary management, and family-centered, community-integrated services were associated with improved functional outcomes, better school participation, and reduced long-term care needs.(3,5) Strengthening prevention strategies, increasing vaccination coverage, and expanding access to early intervention and rehabilitation services are essential for improving quality of life and reducing the overall burden of disability. A comprehensive, integrated approach that combines medical, educational, and social interventions is key to achieving sustainable outcomes.

Key words: disability, prevention, screening, early intervention

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Interdisciplinary and Multiprofessional Intervention Plan in Children with Duchenne Muscular Dystrophy – The Experience of the “Robănescu-Pădure” National University Center for Children Neurorehabilitation

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Abstract

Introduction. Duchenne muscular dystrophy (DMD) is a severe neuromuscular disorder with autosomal X-linked recessive genetic transmission and is caused by pathogenic variants of the dystrophin gene (Xp21.2-p21.1) that result in absence or insufficient functional dystrophin protein which is essential for muscle tissue growth and function. The disease is characterized by progressive muscular damage with muscle weakness, contractures, loss of walking around 9.5 years old, scoliosis, respiratory failure, cardiomyopathy. Besides these evolution it is critical to follow correct and comprehensive standards of care and kinetotherapeutic interventions, including advanced assistance.

Material and method. The paper aims to reproduce images with patients, methods of multidisciplinary rehabilitation management used in NCHCN, to best exemplify how we apply the standards of care in DMD patients. Physiotherapy techniques, including advanced assistive physical therapy interventions are performed constantly and completely and include the following: stretching method, hydrokinotherapy, interactive physical therapy in a virtual game/augmented reality “Nirvana”, computerized “sensor-based” interactive physical therapy activity through virtual facilitation “serious gaming” for the development/recovery of the dexterity of the upper limb “Diego”, the assessment and training of the functionality of the proximo-intermediate-distal upper limb, including grips and forceps/prehension by using the “Pablo” robotic device, ergotherapy.

Results and discussions. Aiming treatment efficiency and good evolution for DMD patients, aware of the need to apply the standards of care in this disease, we have designed this presentation in order to share the expertise of NCHCN about the multidisciplinary rehabilitation management across all disease stages: stage 1 – at diagnosis, stage 2 – early ambulatory, stage 3 – late ambulatory, stage 4 – early non-ambulatory, stage 5 – late non-ambulatory. We have 75 DMD patients treated in NCHCN. This allowed us to observe and assert that there are significant differences between those who precisely meet the standards of care (as we recommend and insist each time) and those who do not.

Conclusions. It is necessary to correctly apply the standards of care in DMD patients by the physical, occupational and speech language therapist tailored for stage of disease, good quality of life and sometimes even monitoring them regularly to ensure that they also benefit at home from those learned in NCHCN.

Key words: *Duchenne muscular dystrophy, interdisciplinary and multiprofessional care, quality of life*

Response to a Novel Therapy in Duchenne Cardiomyopathy: A Case Report and Implications for Cardiac Management in DMD

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Introduction. DMD-associated cardiomyopathy is a leading cause of morbidity and mortality, highlighting the need for early detection and targeted therapy. We report a 14-year-old adolescent with late-diagnosed dilated cardiomyopathy and severe left ventricular dysfunction secondary to DMD who received novel targeted therapy for heart failure with reduced ejection fraction.

Materials and methods. The patient underwent periodic clinical, electrocardiographic, and transthoracic echocardiographic evaluations, as well as laboratory tests including cardiac enzymes, serum electrolytes, and digoxin levels. He received standard heart failure therapy at maximal tolerated doses; after clinical decompensation, sacubitril-valsartan (Entresto) was initiated.

Results and discussions. Treatment improved left ventricular contractility, reduced mitral regurgitation and pulmonary hypertension, and led to a more favorable GLS, despite persistent severe dysfunction, with overall clinical improvement.

Conclusions. Patients with Duchenne muscular dystrophy require multidisciplinary care and early cardiac evaluation, and sacubitril-valsartan may be considered early in cardiomyopathy, including when ejection fraction falls below 40%.

Key words: *Duchenne muscular dystrophy, Dilated cardiomyopathy, Sacubitril-valsartan (Entresto), Pediatric heart failure, Novel heart failure therapy*

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Gait Disorders – A multidisciplinary approach: The neurologist's perspective

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Introduction: Gait disorders are a frequent reason for pediatric medical visits, either to the emergency room, if the symptoms had a sudden onset or to the outpatient clinic if the symptoms have been present for a longer period. The causes of the symptomatology are diverse and often require extensive investigations and evaluations. **Materials and methods:** We present the main types of gait disorders in children, the necessary investigations to identify potential causes and methods for treatment and monitoring.

Conclusions: Gait disorders in children have a diverse etiology, from orthopedic, neurological and infectious causes to habitual or somatization causes. It is important to correctly identify the underlying cause and to intervene promptly and effectively to achieve positive outcomes and improve the quality of life for patients and their families.

Keywords: gait disorder, children

Particularities of cerebral oxygenation at rest and during physical activity evaluated using modern functional exploration equipment: near-infrared spectroscopy - NIRS) / Function Near-Infrared Spectroscopy -fN.I.R.S), an exploratory assessment in adolescents with hemiplegia in the context of cerebral palsy

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Introduction. Hemiplegic cerebral palsy is characterized by unilateral neuromotor impairment associated with changes in voluntary motor control and cortical functional organization. Assessment of brain function in this pathology is essential for understanding the mechanisms of neuroplasticity and adaptation. Cerebral oxygenation is an indirect indicator of neuronal activity and neurovascular coupling, and its analysis at rest and during physical activity provides relevant information on cortical functioning. Near-infrared functional spectroscopy (fNIRS) is a non-invasive, safe, and pediatric-friendly method that allows monitoring of cortical hemodynamic changes via optodes placed on the scalp.

Material and method. The exploratory assessment of cerebral oxygenation in adolescents with hemiparesis cerebral palsy was performed using a setup consisting of four optodes, arranged as two emitters and two receivers, positioned according to the cortical correspondence of Brodmann area 4 (primary motor cortex), corresponding to the representation of the affected lower limb. The assessment protocol included measurements of cerebral oxygenation at rest and during a standardized physical activity—pedaling on a motomed, adapted to the functional capacity of the subjects. Variations in oxyhemoglobin and deoxyhemoglobin concentrations were analyzed, looking for differences in cortical activation in the affected hemisphere at rest, as well as changes induced by exercise.

Conclusions. The analysis of cerebral oxygenation using fNIRS revealed particularities in the cortical response in adolescents with hemiplegia, both at rest and during physical activity. Oxygenation asymmetries and changes in activation patterns in the primary motor cortex suggest processes of cortical reorganization and neurofunctional adaptation. The fNIRS method, through the use of optodes precisely positioned in the relevant motor areas, proves to be a valuable tool for functional brain exploration in cerebral palsy, with potential applications in the individualization and monitoring of neuromotor rehabilitation interventions. This will enable us to model future neuromotor rehabilitation strategies based on C.P.H. neurobiology and therapy-induced changes observed in cerebral circulation oxygenation levels.

The Use of Dry Needling in the Management of the Spastic Foot - Paediatric Case Series

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Introduction: Spastic foot deformities are a common manifestation in pediatric patients with upper motor neuron disorders, particularly in conditions such as cerebral palsy. These deformities can impair gait, balance, and overall functional mobility. Conventional management includes physical therapy, orthotics, pharmacologic interventions, and surgical approaches. Dry needling has emerged as a minimally invasive technique aimed at reducing muscle hypertonicity, yet its application in pediatric populations remains underexplored.

Objective: To evaluate the feasibility, safety, and preliminary effectiveness of dry needling in the management of spastic foot in a pediatric case series.

Methods: This case series included pediatric patients presenting with spastic foot deformities secondary to neurological conditions. Participants underwent a structured dry needling protocol targeting key hypertonic muscles contributing to equinus and varus positioning. Outcomes were assessed pre- and post-intervention using measures of muscle tone (Modified Ashworth Scale), passive range of motion, gait parameters, and functional mobility scores. Adverse events and patient tolerance were also recorded.

Results: Across cases, dry needling was associated with a reduction in muscle tone and improvements in ankle dorsiflexion range. Functional gains were observed in gait patterns and weight-bearing capacity. The intervention was well tolerated, with no serious adverse effects reported. Variability in response was noted, suggesting patient-specific factors may influence outcomes.

Conclusion: Dry needling appears to be a feasible and safe adjunctive intervention for managing spastic foot in pediatric patients, with potential benefits in reducing spasticity and improving function. Further controlled studies with larger sample sizes are warranted to establish efficacy, optimize protocols, and determine long-term outcomes.

Key words: *dry needling, pediatric spasticity, spastic foot, cerebral palsy, case series, rehabilitation*

Imaging Evaluation in Vertebral Static Disorders – Sagittal Profile

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Introduction: Sagittal spinal alignment is a critical determinant of biomechanical efficiency and energy expenditure in the standing posture. Alterations in the sagittal profile are closely associated with vertebral static disorders, contributing to pain, functional limitation, and progressive deformity. Imaging plays a central role in the quantitative assessment of these parameters and in guiding therapeutic decision-making.

Objective: To analyze the role of imaging modalities in the evaluation of sagittal spinal profile in patients with vertebral static disorders, with emphasis on key radiographic parameters and their clinical relevance.

Methods: A descriptive and analytical review was conducted on published data on patients presenting with suspected or confirmed vertebral static disorders. Standardized imaging protocols, including standing lateral radiographs, were utilized to assess sagittal alignment. Parameters such as pelvic incidence, pelvic tilt, sacral slope, lumbar lordosis, thoracic kyphosis, and sagittal vertical axis were measured and correlated with clinical findings. The reproducibility and diagnostic value of these measurements were also evaluated in the reviewed literature.

Results: Imaging-based assessment of the sagittal profile provided objective characterization of spinopelvic alignment and revealed significant variability among patients with vertebral static disorders. Deviations from physiological ranges were associated with symptom severity and functional impairment. Standing radiographs proved essential for accurate evaluation, while advanced imaging modalities offered complementary anatomical detail in selected cases.

Conclusion: Imaging evaluation of the sagittal profile is fundamental in the diagnosis and management of vertebral static disorders. Quantitative radiographic parameters enable precise characterization of alignment abnormalities and support individualized treatment planning. Standardization of measurement techniques and further research are needed to enhance diagnostic accuracy and improve clinical outcomes.

Keywords: *sagittal profile, vertebral static disorders, spinopelvic parameters, radiographic evaluation, spinal alignment, biomechanics*

The Impact of Kinesiotherapeutic Intervention on Tone and Postural Disorders in Children with Hydrocephalus – A Community-Based Study

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Introduction. A child's harmonious development depends on the proper functioning of the central nervous system and the integration of motor mechanisms. Hydrocephalus, characterized by the excessive accumulation of cerebrospinal fluid in the brain, can significantly affect neuromotor maturation, leading to difficulties in movement control, posture maintenance, and muscle tone regulation. Children with hydrocephalus often present delays in motor development, affecting their independence and participation in daily activities.

Material and method. This paper analyzes the impact of physical therapy intervention on tone and posture disorders in children with hydrocephalus from a community in Tanzania. Adapted and early therapeutic interventions are applied, aiming to improve postural control, regulate muscle tone, and enhance motor functionality.

Results and discussions. Physical therapy contributes to improving motor control, balance, and coordination, playing an important role in preventing complications and supporting neuromotor development. In the context of limited access to rehabilitation services in regions such as Tanzania, the results highlight the need to expand these interventions to support functionality and social integration in affected children.

Conclusions. Physical therapy intervention is essential in the rehabilitation of children with hydrocephalus, having a positive impact on muscle tone, posture, and motor skills. Early and individualized therapy, along with improved access to rehabilitation services, is crucial for enhancing quality of life and social integration for these children. **Key words:** *Hydrocephalus, recovery, physical therapy*

Implementation of the pillars of lifestyle medicine at the Techirghiol Balneal and Rehabilitation Sanatorium - A pilot study

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Introduction. Lifestyle Medicine is a translational, evidence-based therapeutic model that addresses the behavioral determinants of non-communicable chronic diseases through integrated interventions targeting nutrition, physical activity, sleep, stress regulation, social connections, and exposure to harmful factors. In medical rehabilitation, integrating these pillars enables a shift from a symptom-oriented approach to one focused on restoring homeostasis and optimizing biological resilience. **Objective.** To define a conceptual and operational framework for integrating the pillars of Lifestyle Medicine, as defined by the Romanian Society of Lifestyle Medicine, into the therapeutic structure of the Balneal and Rehabilitation Sanatorium of Techirghiol.

Material and Methods. A systematic descriptive analysis of the therapeutic ecosystem was conducted, including natural therapeutic factors (hypersaline mineral water, sapropelic mud, marine bioclimate), rehabilitation interventions (balneotherapy, hydrotherapy, electrotherapy, massage, kinesiotherapy), and educational components. These were conceptually mapped onto the Lifestyle Medicine pillars to evaluate functional congruence, integration capacity, and operational feasibility within a multimodal therapeutic model. **Results and Discussion.** The analysis demonstrates high structural and functional compatibility between existing interventions and Lifestyle Medicine. Kinesiotherapy supports physical activity, while balneal factors influence neuroendocrine regulation and stress response. Opportunities were identified for integrating nutritional interventions, sleep optimization, and behavioral education. Implementation requires standardized protocols, staff training, and objective monitoring tools. **Conclusions.** The Balneal and Rehabilitation Sanatorium of Techirghiol provides a favorable framework for integrating Lifestyle Medicine as a strategic extension of rehabilitation. This model may support personalized interventions focused on prevention and longevity, and represents a replicable approach to informing public health policies at the Ministry of Health level, particularly for integrating behavioral interventions into chronic disease management. **Keywords:** *lifestyle medicine, medical rehabilitation, balneotherapy, prevention, longevity*

Balneotherapy and Hydrotherapy in Neurological Disorders of the Aging Population: A Literature Review

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Introduction. Neurological disorders in older adults are frequently accompanied by mobility limitation, balance impairment, loss of independence, and reduced quality of life. Hydrotherapy and balneotherapy have been increasingly used in rehabilitation because the aquatic environment may facilitate movement, improve safety during training, and support patient participation.

Material and method. This literature review analyzed studies identified through targeted searches of PubMed/NCBI and the Cochrane Library focusing on hydrotherapy, balneotherapy, and related water-based interventions in major neurological disorders relevant to aging: Parkinson's disease, stroke, multiple

sclerosis, and dementia. Evidence was synthesized across the selected pathologies with emphasis on shared rehabilitation outcomes, including activities of daily living, balance, gait and functional mobility, symptom burden, and quality of life.

Results and discussions. The literature showed a consistent positive effect of aquatic therapies across all selected neurological disorders. The most reproducible benefits concerned balance, functional mobility, and quality of life, particularly in Parkinson's disease and stroke. Additional favorable effects were identified for fatigue in multiple sclerosis and for well-being and engagement in dementia. Overall, hydrotherapy and balneotherapy were associated with functional, symptomatic, and patient-centered benefits that support their rehabilitative value.

Conclusions. Hydrotherapy and balneotherapy are promising adjuncts in the management of neurological disorders of the aging population. Their benefits extend beyond motor outcomes alone and support a broader role in improving well-being, rehabilitation tolerance, and quality of life.

Key words: *balneotherapy; hydrotherapy; neurorehabilitation; aging.*

Complex Multimorbidity with Diagnosis Hurdles but with Favorable Rehabilitative Outcomes in an Old Adult Patient

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Introduction: The management of elderly patients with cerebrovascular disease and concurrent hematological and cardio-metabolic comorbidities is particularly challenging, especially when balancing thrombotic and bleeding risks. Evidence on rehabilitation in such complex clinical contexts remains limited (1,2).

Materials and Methods: With informed consent, we report the case of a 75-year-old male with multiple metabolic, cardiovascular, hematological, gastrointestinal, and neurological comorbidities, admitted to the Neuromuscular Clinic Division of the Teaching Emergency Hospital "Bagdasar-Arseni", Bucharest, due to severe locomotor deficit and liquids dysphagia following recurrent right parietal ischemic strokes.

Results: Neurological examination revealed mild left hemiparesis (MRC 4/5), liquids dysphagia and mild dysarthria, hypotonia, and abnormal posture of the left lower limb (abduction, external rotation, and irreducible knee flexion of 10°). Functionally, the patient was confined to bed, and could be positioned in sitting only with assistance. The clinical course was complicated by recurrent bleeding episodes (melena), investigated through upper and lower endoscopy, leading to the diagnosis of hemorrhagic gastro-duodenitis and colonic angiodysplasia. The patient also presented severe pancytopenia (hemoglobin=5.7 g/dL, platelets=43×10³/μL, white blood cells=2.2×10³/μL, lymphocytes=0.6×10³/μL), requiring transfusions and raising significant diagnostic challenges. Extensive hematological work-up (including osteomedullary biopsy) excluded a primary hematologic cause. Management required continuous reassessment, including temporary discontinuation of anticoagulation. Despite severe clinical instability, the patient underwent a structured rehabilitation program, including specialized nursing care (respiratory and skin care with pressure ulcer prevention), progressive mobilization, and assisted gait training. Functional status improved from bed confinement to assisted standing and walking with a frame over short to moderate distances.

Discussion: This case highlights the complexity of integrated management in patients with overlapping cerebrovascular, hematological, and cardio-metabolic conditions, where therapeutic decisions require continuous risk-benefit reassessment. Notably, functional recovery was achieved in a context where rehabilitation would typically be considered limited or delayed due to severe biological instability (1-3).

Keywords: *rehabilitation, stroke, pancytopenia, hemorrhagic risk*

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Virtual and Augmented Reality in Vestibular Rehabilitation: New Therapeutic Perspectives for Peripheral Balance Disorders

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Introduction. Peripheral vestibular disorders are frequently associated with vertigo, dizziness, postural instability, and anxiety, significantly affecting daily functioning, mobility, and quality of life. In recent years, virtual reality and augmented reality have attracted increasing interest in vestibular rehabilitation because they allow the creation of controlled, interactive, and motivating therapeutic environments that may enhance patient participation and training specificity.

Material and method. This paper is based on a narrative analysis of scientific literature published between 2015 and 2025 and identified in major scientific databases. Clinically relevant papers addressing the use of virtual reality and augmented reality in peripheral vestibular rehabilitation were examined, with emphasis on their therapeutic applicability, reported outcomes, and potential advantages compared with conventional rehabilitation strategies.

Results and discussions. The reviewed literature suggests that these technologies may improve postural stability, reduce dizziness intensity, alleviate anxiety, and increase patient engagement and adherence to treatment. In some cases, reported outcomes were comparable to or even better than those obtained through conventional vestibular rehabilitation, particularly in relation to balance training and functional performance.

Conclusions. Virtual reality and augmented reality represent promising therapeutic perspectives in peripheral vestibular rehabilitation and may open important directions for future research. However, larger and better standardized clinical studies are still needed to clarify their long-term effectiveness and optimal integration into rehabilitation protocols.

Key words: vestibular rehabilitation; virtual reality; augmented reality

Objective Assessment of Functional Hand Recovery Through Biomechanical and Kinematic Methods

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Introduction. Rheumatoid arthritis (RA) progressively affects hand biomechanics, altering inter-articular coordination and fostering the emergence of compensatory movement mechanisms that cannot be fully captured through conventional joint range of motion assessments. In this context, the use of kinematic modeling and descriptive statistical analysis can provide an objective perspective on the functional reorganization of the finger joint chain during the recovery process.

Material and method. This paper proposes an integrated approach for assessing joint function and hand mobility, based on the kinematic modeling of the joint chain and the descriptive analysis of functional parameters. Finger flexion-extension movements were recorded using a system based on inertial sensors, and the data were processed via a graphical interface developed in Matlab, designed for the acquisition, processing, visualization, and comparison of articular parameters.

Results and discussions. The results highlighted a progressive redistribution of movement within the joint chain, associated with a reduction in compensatory behaviors and an improvement in the coordination of articular components. Kinematic and statistical analyses allowed for the identification of functional changes occurring throughout recovery, providing a quantification of progress compared to isolated conventional assessments of joint amplitudes.

Conclusions. The integration of kinematic modeling and statistical analysis into a dedicated software tool supports the objective assessment of hand mobility and functional monitoring in rheumatoid arthritis. The proposed approach has clinical application potential in personalizing recovery programs and optimizing therapeutic strategies.

Key words: Joint Biomechanics, Statistical Analysis, Kinematic Modeling, Compensatory Mechanisms, Functional Monitoring

Functional Rehabilitation of the Upper Limb Through Kinesiotherapy Assisted by Hand-Tracking Technologies and Virtual Reality

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Introduction: Functional rehabilitation of the upper limb requires both an optimal therapeutic environment and objective methods for assessing patient progress. Balneotherapy offers favorable conditions due to the physical properties of water, but precise motion monitoring remains a challenge in the aquatic environment. The emergence of standalone virtual reality technologies, such as the Meta Quest 3, which natively integrates high-precision hand-tracking, opens new perspectives for the objective quantification of upper limb kinematic parameters during balneotherapy sessions.

Materials and Methods: Real-time hand and finger motion is captured using the device's integrated cameras, eliminating the need for external sensors or physical controllers. The hand-tracking algorithms provide kinematic data, including joint angles (metacarpophalangeal and interphalangeal), spatial trajectories, angular and linear velocities, and range of motion parameters for grasping, extension, rotation, and elongation. Synchronous recording of these data enables the generation of objective kinematic profiles that characterize the patient's functional performance.

Results and Discussions: The passive hand-tracking capability eliminates the need for additional sensors that could be affected by the aquatic environment, while simultaneously ensuring millimeter-precision motion capture. Objective measurement of joint angles during therapeutic exercises allows for precise quantification of functional deficits and progress over time, surpassing the subjectivity of conventional clinical scales. The immersive virtual environment provides the patient with real-time visual feedback, facilitating movement self-correction and increasing treatment compliance. Gamification of exercises—where the patient interacts with virtual objects in an engaging environment—transforms the therapeutic process into a motivating experience, increasing the intensity and duration of training. From a biomechanical perspective, the collected data enable the therapist to adjust the protocol based on objective performance parameters, thereby personalizing the rehabilitation process.

Conclusions: Employing VR headsets equipped with integrated hand-tracking technology in the context of balneotherapy offers a sophisticated solution for upper limb rehabilitation, merging the physiological benefits of the aquatic milieu with objective, high-fidelity kinematic analysis. The resultant capacity to quantify joint angles, movement trajectories, and velocities provides a robust clinical framework for accurately evaluating functional progress and delivering personalized therapeutic care.

Keywords: *balneotherapy, hand-tracking, virtual reality, upper limb rehabilitation, kinematics, angular measurement, gamification*

Effects of a Comprehensive Balneotherapy-Based Rehabilitation Program on Perceived Stress, Psychological Well-Being, and Sleep Quality in Patients with Chronic Musculoskeletal Disorders

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Introduction. Chronic musculoskeletal disorders represent a major cause of disability worldwide and are associated not only with pain and functional limitation, but also with psychological distress and sleep disturbances. Within the biopsychosocial model of chronic pain, perceived stress is recognized as a multidimensional factor involved in disease progression and response to therapeutic interventions.

Persistent pain is associated with reduced autonomy, decreased involvement in daily activities, and diminished social participation, frequently accompanied by mood alterations. These mechanisms contribute to the development of a vicious cycle in which functional and psychological impairments reinforce each other, leading to a decline in quality of life and, at a population level, to an increased level of functional dependency, with significant socio-economic impact.

Objective. The present study aimed to evaluate the impact of a comprehensive medical rehabilitation program, conducted over a 10-day period, on perceived stress, psychological well-being, and sleep quality in patients with chronic musculoskeletal disorders. The term "psychological well-being" is used preferentially, as it reflects measurable dimensions of emotional and cognitive well-being, in accordance with the assessment instruments used in this study.

Methods. Perceived stress was assessed using the Perceived Stress Scale (PSS-10), psychological well-being using the WHO-5 Well-Being Index, and sleep quality using the Pittsburgh Sleep Quality Index (PSQI). The study included 42 patients admitted to the Techirghiol Balneal and Rehabilitation Sanatorium between March 16 and April 3, 2026, with assessments performed at admission and discharge. Patients followed an individualized rehabilitation program, including hydrokinetotherapy in saline water from Techirghiol Lake, sapropelic mud applications, thermotherapy,

electrotherapy, and therapeutic exercise. **Results.** Following the therapeutic intervention, improvements were observed in perceived stress (PSS-10), psychological well-being (WHO-5), and sleep quality (PSQI), reflected by favorable changes in the corresponding scores. Item-level analysis highlighted improvements in perceived control over stressful situations (PSS-10), levels of activity and energy (WHO-5), sleep onset latency, and subjective sleep quality, while total sleep duration showed minimal variation (PSQI). **Conclusions.** These findings suggest that a comprehensive medical rehabilitation program favorably influences not only physical symptoms, but also psychological and behavioral dimensions associated with chronic musculoskeletal conditions, contributing to improved overall health status and quality of life within a biopsychosocial framework.

Keywords: *rehabilitation; balneotherapy; musculoskeletal disorders; pain; stress; sleep quality; well-being.*

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Shaping the Future of Rehabilitation in Romania: Telemedicine, Telerehabilitation, Legislation and Innovation

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Introduction. The rapid digitalization of healthcare, accelerated by the COVID-19 pandemic, has significantly transformed rehabilitation services worldwide. In Romania, telemedicine and telerehabilitation have emerged as key tools to improve access to care, particularly for patients in rural or underserved areas. Legislative reforms—beginning with the integration of telemedicine into Law no. 95/2006 and subsequent emergency ordinances—have established a legal framework enabling remote healthcare delivery. However, alongside these advances, rehabilitation medicine faces increasing professional and regulatory challenges related to scope-of-practice overlaps and evolving healthcare roles.

Material and method. This paper represents a narrative review of Romanian legislation, policy documents, and recent literature (2020–2026) related to telemedicine, telerehabilitation, and professional practice in rehabilitation medicine. Key normative acts analyzed include Government Emergency Ordinance no. 196/2020, Government Decision no. 1133/2022, as well as recent legislative and regulatory initiatives impacting physiotherapy and interdisciplinary practice. The analysis focuses on regulatory provisions, implementation mechanisms, and their implications for rehabilitation physicians. **Results and discussions.** Telemedicine in Romania was formally regulated through Government Emergency Ordinance no. 196/2020, which amended Law no. 95/2006 and introduced a general legal framework for remote medical services. Subsequent implementation norms, particularly Government Decision no. 1133/2022, defined telemedicine services and extended their applicability to multiple specialties, including rehabilitation medicine. At the same time, recent legislative developments have contributed to a reconfiguration of professional roles within rehabilitation services. The increasing autonomy granted to physiotherapists—particularly in functional assessment and therapeutic intervention—has raised concerns regarding the potential overlap with competencies traditionally reserved for

rehabilitation physicians. In parallel, other medical specialties (such as orthopedics, neurology, and rheumatology) are increasingly involved in prescribing and managing rehabilitation protocols, sometimes in the absence of coordinated multidisciplinary frameworks. These trends create challenges related to clinical responsibility, continuity of care, and the preservation of a holistic, physician-led rehabilitation approach. The risk of fragmentation of care is further amplified in telemedicine contexts, where clear delineation of roles and accountability is essential. Rehabilitation physicians face the dual challenge of adapting to digital transformation while advocating for appropriate recognition of their integrative role in patient management. Despite these concerns, telemedicine and telerehabilitation remain valuable tools, offering improved accessibility, continuity of care, and monitoring possibilities for chronic patients. Their successful integration depends on coherent legislation that balances innovation with clearly defined professional boundaries.

Conclusions. Romania has made significant progress in establishing a legislative and technological framework for telemedicine and telerehabilitation. However, the evolving regulatory environment also introduces important challenges for rehabilitation physicians, particularly regarding scope-of-practice boundaries and interdisciplinary collaboration. Future policies should aim to strengthen the role of rehabilitation medicine specialists, ensure coordinated team-based care, and prevent fragmentation of services. A balanced approach—integrating innovation with professional clarity—will be essential in shaping a sustainable and effective future for rehabilitation in Romania.

Key words: Telemedicine; Telerehabilitation; Rehabilitation Medicine; Health Legislation; Romania; Digital Health; Physiotherapy; Scope of Practice; Multidisciplinary Care

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The role of traditional Chinese medicine in physical-kinetic balneo recovery treatment

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Traditional Chinese Medicine (TCM), a multi-millennia therapeutic system based on concepts such as energy balance, Qi circulation and harmony between Yin and Yang, represents a valuable complementary approach in recovery medicine. The integration of specific TCM techniques – such as acupuncture, moxibustion, cupping therapy and phytotherapy – into balneo-physical-kinetic recovery programs contributes to the optimization of therapeutic results, especially in musculoskeletal and neurological pathology.

Recent studies highlight the beneficial effects of acupuncture in reducing pain, improving motor function and accelerating post-traumatic or post-operative recovery processes. Also, the combination of balneal therapies (natural factors such as mud and mineral waters), modern physiotherapy and TCM techniques can have a synergistic effect, favoring both the improvement of symptoms and the increase in the quality of life of patients. In the context of an integrated and personalized approach, traditional Chinese medicine is emerging as an effective adjuvant in medical recovery, with potential for development within modern treatment protocols. However, standardization of methodologies and support through rigorous clinical studies are necessary for the large-scale validation of these practices.

Keywords: traditional Chinese medicine, acupuncture, medical recovery, balneophysiokinetotherapy, pain, complementary therapy

Cauda equina syndrome after cesarean section: case presentation and safety implications

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Introduction. Cauda equina syndrome is a rare neurological emergency caused by damage to the lumbosacral nerve roots, characterized by motor and sensory deficits associated with sphincter dysfunction, with a significant impact on functional prognosis and quality of life. Its occurrence following cesarean section performed under epidural anesthesia is exceptional but associated with severe consequences, involving multiple possible mechanisms and requiring prompt recognition.

Material and method. A 23-year-old patient, with grade II gestational obesity (BMI 35.32), was admitted at 39 weeks of gestation for vaginal delivery. Epidural analgesia was performed by the anesthesiologist under conditions of technically difficult lumbar puncture (requiring numerous attempts to place the catheter, approximately 13). In the absence of labor progression, cesarean section was decided. Approximately 24 hours postoperatively, the patient developed severe bilateral motor deficit in the lower limbs, associated with sphincter dysfunction.

The objectives of neurological treatment and the medical rehabilitation program aimed at preventing complications of prolonged immobilization and maintaining muscle trophicity, recovery of motor deficit by increasing muscle strength and re-education of voluntary motor control at the level of the lower limbs, gait and orthostatism re-education, sphincter re-education, as well as increasing the level of functional independence in daily activities.

Results and discussions. Under a comprehensive rehabilitation program carried out over approximately two years, the outcome was favorable, with progressive improvement of motor deficit and increased muscle strength in the lower limbs, recovery of gait (initially assisted, subsequently independent), and improvement of sphincter control, associated with a significant increase in functional independence.

Conclusions. Post-cesarean cauda equina syndrome following epidural anesthesia requires prompt diagnosis and multidisciplinary management. Early, intensive, and individualized rehabilitation represents a key element in optimizing functional prognosis. This case highlights the need for increased vigilance in anesthetic practice and for an integrated therapeutic approach.

Key words: cauda equina syndrome, epidural anesthesia, medical rehabilitation.

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Medical rehabilitation in pitt-hopkins syndrome: challenges and clinical perspectives- case report

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Introduction. Pitt-Hopkins Syndrome (PTHS) is a rare disorder caused by mutations in the TCF4 gene, characterized by severe developmental delay, distinctive facial features, absent or minimal speech, motor impairment, episodic breathing abnormalities and possible epilepsy. Due to its rarity and phenotypic overlap with other syndromes, diagnosis is often delayed. While the genetic basis is established, data on rehabilitation strategies and functional outcomes remain limited. Medical rehabilitation plays a crucial role in improving functional independence and quality of life, yet access to consistent therapy may be limited by socioeconomic factors. This paper aims to highlight the challenges and clinical perspectives of rehabilitation in a pediatric case with restricted therapy frequency.

Material and method. We present the case of a 13-year-old female diagnosed with Pitt-Hopkins Syndrome, enrolled in a medical rehabilitation program consisting of one session of medical exercises per week, due to financial constraints. The rehabilitation approach included physiotherapy focused on motor control, balance, coordination and gait training, along with elements of occupational therapy aimed at improving activities of daily living. Clinical evaluation was performed periodically using functional assessment scales and observational analysis.

Results and discussions. Despite the reduced frequency of therapy sessions, the patient demonstrated gradual improvements in postural stability, joint mobility and basic motor skills. However, progress was slower compared to expected outcomes in intensive rehabilitation programs (3-4 sessions per week). Limited access to therapy posed a significant barrier to optimizing functional recovery. The case underscores the importance of individualized rehabilitation plans, caregiver involvement and home-based exercise programs as compensatory strategies. Additionally, it highlights disparities in access to rehabilitation services and their impact on long-term outcomes in rare diseases.

Conclusions. Medical rehabilitation remains essential in managing Pitt-Hopkins Syndrome, even when delivered at a lower frequency. Although improvements can be achieved, optimal outcomes require increased therapy intensity and multidisciplinary support. Addressing socioeconomic barriers and promoting accessible rehabilitation strategies are critical for enhancing patient outcomes.

Key words: Pitt-Hopkins Syndrome, medical rehabilitation, socioeconomic factors, case reports

Postoperative rehabilitation after shoulder arthroplasty: protocols, challenges and functional outcome

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Introduction. Shoulder arthroplasty has become an increasing surgical technique for various shoulder pathologies, including osteoarthritis, rotator cuff arthropathy and complex fractures. Postoperative rehabilitation remains a critical determinant of functional outcomes. This presentation aims to review current rehabilitation strategies, the variability of rehabilitation protocols and to discuss practical challenges encountered in clinical settings.

Material and method. A systematic review of the literature was conducted, focusing on recent studies, clinical guidelines and meta-analyses addressing rehabilitation after anatomic and reverse shoulder arthroplasty. Databases such as PubMed and Cochrane Library were consulted. Key aspects analyzed included timing of mobilization, progression of range of motion, strengthening protocols and patient-specific adaptations. In addition, personal clinical experience was integrated to highlight everyday challenges in implementing rehabilitation protocols.

Results and discussions. The reviewed data demonstrates variability in rehabilitation approaches, particularly regarding early vs. delayed mobilization and progression criteria. While early mobilization may reduce stiffness, it must be balanced against the risk of compromising soft tissue healing. Common challenges identified include patient adherence, pain management, comorbidities and differences in surgical techniques. The integration of standardized protocols with individualized patient care appears to provide the best functional outcome.

Conclusions. Postoperative rehabilitation following shoulder arthroplasty represents an important part in optimizing recovery and restoring function. Although multiple protocols exist, there is no consensus regarding approach. An adapted rehabilitation program, guided by surgical factors and patient characteristics appears to be the preferred solution.

Key words: *shoulder arthroplasty, rehabilitation, postoperative care, functional outcome*

Integrating musculoskeletal ultrasound into rehabilitation management of geriatric patients

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Introduction. Musculoskeletal disorders are a major cause of pain, disability, and reduced quality of life in older adults [4]. Sarcopenia, the progressive loss of muscle mass, strength, and function, increases frailty, fall risk, and loss of independence [4]. Musculoskeletal ultrasound (MSK-US) allows real-time assessment and quantitative evaluation of muscle status [1–3].

Materials and Methods. Elderly patients enrolled in rehabilitation programs were evaluated using functional tests such as handgrip strength and chair rise combined with MSK-US [1,3]. Muscle thickness and rectus femoris cross-sectional area were measured, and correlations were analyzed [1,3].

Results. MSK-US improved diagnostic accuracy and supported personalized rehabilitation strategies, enabling early sarcopenia detection and treatment adaptation [1–3]. Rectus femoris cross-sectional area correlated with muscle strength, suggesting that ultrasound can reflect functional status [1,4].

Conclusions. MSK-US is a valuable tool in geriatric rehabilitation, supporting diagnostic and therapeutic decisions [2,3]. Its real-time evaluation enables individualized strategies, improving functional outcomes and monitoring sarcopenia effectively [1,4].

Keywords: *musculoskeletal ultrasound, sarcopenia, rehabilitation, muscle strength, geriatrics, functional assessment*

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Rehabilitation management of brachial plexus avulsion following severe road traffic trauma - case report

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Introduction. Brachial plexus avulsion represents one of the most debilitating neurological injuries resulting from high-energy road traffic accidents. Characterized by the physical detachment of nerve roots from the spinal cord, it leads to complete or partial loss of motor and sensory function in the upper limb. This case report aims to outline a comprehensive rehabilitation management strategy and to evaluate the effectiveness of a multi-staged therapeutic approach in restoring functional autonomy.

Material and method. The methodology consists of a longitudinal clinical case study focusing on the rehabilitation phases following a severe traction injury of the brachial plexus. The intervention program integrated advanced physiotherapy, neuromuscular electrical stimulation (NMES), pain management for deafferentation pain, and the use of specialized orthotics to prevent joint contractures. Progress was monitored using the Medical Research Council (MRC) scale for muscle strength, joint Range of Motion (ROM) measurements, and the DASH (Disabilities of the Arm, Shoulder, and Hand) questionnaire..

Results and discussions. The results highlight that while motor recovery in avulsion injuries is limited by the pre-ganglionic nature of the lesion, targeted rehabilitation significantly improved the patient's compensatory capabilities and quality of life. Discussions focus on the synergy between surgical timing (such as nerve or muscle transfers) and postoperative rehabilitation. A critical finding was that early integration of sensory re-education and psychological support reduced the impact of chronic pain and "learned non-use" of the affected limb. However, the recovery of distal fine motor skills remained a significant challenge, illustrating the functional ceiling inherent in total avulsion cases.

Conclusions. The management of brachial plexus avulsion requires a highly specialized, multidisciplinary rehabilitation framework that must be initiated immediately following the trauma. Success depends not only on physical recovery but also on the patient's adaptation to functional limitations. A structured, long-term

rehabilitation protocol is essential to optimize the outcomes of surgical interventions and to ensure the highest possible level of independence in activities of daily living.

Key words: *brachial plexus avulsion, rehabilitation management, road traffic trauma, nerve injury, functional recovery, physiotherapy*

The Role of Clinical Psychological Intervention in Optimizing Balneophysiokinetotherapy Outcomes in Patients with Chronic Pain

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Introduction. Chronic pain is a multifactorial condition with biological, psychological, and social determinants, significantly affecting functionality and quality of life. According to recent literature, the effectiveness of medical rehabilitation interventions, including balneophysiokinetotherapy, is substantially influenced by psychological factors such as anxiety, depression, coping strategies, and pain catastrophizing.

Material and method. This paper aims to provide a narrative review of the scientific literature regarding the role of clinical psychological intervention in optimizing balneophysiokinetotherapy outcomes in patients with chronic pain, from a biopsychosocial perspective. A narrative review of recent international studies was conducted, focusing on the interaction between clinical psychological interventions and physical rehabilitation therapies. The analyzed literature included studies addressing cognitive-behavioral interventions, psychological support, and emotional management integrated into rehabilitation programs.

Results and discussions. International studies highlight that the integration of clinical psychological intervention within rehabilitation programs contributes to reduced perceived pain intensity, increased treatment adherence, and improved functional outcomes and quality of life. Psychological approaches also enhance patient adaptation to long-term treatments and decrease the risk of symptom chronicity.

Conclusions. Evidence from the literature supports the inclusion of clinical psychologists as integral members of balneophysiokinetotherapy teams, emphasizing their role in optimizing therapeutic outcomes in chronic pain management.

Key words: *chronic pain, clinical psychology, rehabilitation*

Stress Management and Psychological Coping in Multidisciplinary Balneophysiokinetotherapeutic Treatments

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Introduction. Psychological stress and coping strategies play a crucial role in the progression of chronic conditions and the effectiveness of medical rehabilitation programs. According to recent literature, elevated

stress levels negatively affect treatment adherence, perceived efficacy, and functional outcomes in balneo-physiokinetotherapy.

Material and method. This paper aims to analyze existing evidence regarding stress management and psychological coping within multidisciplinary balneophysiokinetotherapeutic treatments and to formulate evidence-based recommendations for clinical practice. A narrative review of international studies was conducted, focusing on the impact of stress management interventions and coping strategies on rehabilitation outcomes. The reviewed literature highlights the role of the clinical psychologist within interdisciplinary teams, alongside balneologists and balneophysiokinetotherapists.

Results and discussions. International studies indicate that psychological interventions targeting stress reduction, psychoeducation, and adaptive coping are associated with improved treatment adherence, increased patient engagement, and superior functional outcomes. Effective interdisciplinary collaboration enhances the coherence of therapeutic interventions and patient satisfaction.

Conclusions. Stress management and the development of adaptive coping strategies are essential components of multidisciplinary balneophysiokinetotherapeutic treatments. The integration of clinical psychology into rehabilitation teams is strongly supported by scientific evidence and enables the implementation of practical, evidence-based recommendations.

Key words: stress management, coping strategies, rehabilitation

Modern Approaches to Monitoring and Predicting the Effectiveness of Balneophysiotherapeutic Interventions in Patients with Schizophrenia

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Introduction. Schizophrenia represents a complex disorder characterized by disturbances in thinking, perception, and behavior, requiring multidisciplinary interventions. For patients with schizophrenia, balneophysiotherapy constitutes a valuable complementary strategy, contributing to functional recovery. The integration of modern monitoring technologies and predictive models enables a more accurate assessment of treatment response. Furthermore, the use of statistical tools and predictive analyses facilitates the personalization of therapeutic interventions.

Material and method. The study used electroencephalographic signals (EEG) acquired from 5 subjects with schizophrenia before and after balneophysiotherapeutic interventions in order to assess neural activity patterns. Signal preprocessing included noise reduction and artifact rejection. Pearson correlation coefficients were computed to quantify the linear associations between pairs of EEG channels. Statistical differences among channels were assessed in order to identify significant variations in signal characteristics. Supervised machine learning approaches, support vector machine (SVM) and k-Nearest Neighbors (k-NN), were employed to classify EEG patterns before and after therapy. These classifiers enabled the discrimination between conditions based on extracted features, complementing traditional statistical analyses. The integration of artificial intelligence techniques like LSTM with classical statistical methods provides a robust framework for improving predictive accuracy and supporting the evaluation of kinesiotherapeutic interventions in schizophrenia, contributing to a more comprehensive understanding of neurofunctional recovery.

Results and discussions. The Pearson correlation analysis of EEG signals across the channels demonstrated consistently high positive connectivity both prior to and following the therapeutic intervention. Prior therapeutic interventions the correlation coefficients were between 0.76 and 0.87, reflecting a strong synchronization mostly in the central cortical regions. After therapy results revealed a slight reduction in correlation

values, suggesting a modulation of functional connectivity. The paired samples t-test analysis revealed statistically significant differences between before and after therapy values for channels F3, F4, C3, C4, and Cz ($p < 0.05$). The most pronounced changes were observed in the frontal regions, particularly for F3 and F4. Significant differences were also identified in central regions (C3, C4, Cz). In contrast, no statistically significant changes were found for Pz and P3 suggesting limited intervention effects in posterior areas. A 5-fold cross-validation accuracy of 99.61% and 98.91% were attained using k-NN and SVM classifiers.

Conclusions. Recent computational technologies provide a valuable tool for the analysis and classification of EEG signals for schizophrenic patients, enabling the integration of artificial intelligence methods with classical methods. This combined framework highlights the potential of EEG-based approaches for monitoring and predicting the effectiveness of balneophysiotherapeutic interventions, supporting their role in optimizing personalized rehabilitation strategies at patients with schizophrenia.

Key words: *schizophrenia, EEG, predictive analysis*

Ongoing motivative rehabilitation progresses in an already chronic case of a male patient with posttraumatic asymmetric paraplegia

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Introduction. Data from specialized literature reveals the fact that spinal cord injuries are continuously increasing, especially among middle-aged patients. However, their incidence varies in different countries of the world, their most frequent etiology being traumatic injuries from road accidents.

Material and method. This work presents the case of a 34-year-old patient with asymmetric paraparesis AIS/FRANKEL C-D left lower limb, AIS/FRANKEL D right lower limb after thoracic vertebro-medullary trauma with neurological level T6. He suffered a road accident on 06.10.2023 resulting in T5 comminuted fracture, T5-T6-stg articular mass and T5 lamina; operated T6 dislocation fracture: decompression and bilateral fixation with T4 and T7 screws joined by 2 interconnecting rods; rib fracture at the level of the right C6 costal articular process - consolidated).

The patient was admitted to the Neuromuscular Recovery Clinic of SCUBA for AIS/FRANKEL A paraplegia type motor deficit, bilateral lower limb hypoesthesia sensitivity disorders, severe locomotor and self-care dysfunction, specific recovery program.

Results and discussions During the hospitalization, the patient followed a complex program of neuromotor recovery, recuperative care/rehabilitation nursing and it was necessary to establish a multidisciplinary team. Currently, the patient shows a remarkable improvement in the quality of life, being able to move over medium-long distances in a wheelchair with very good tolerance and over short distances with the help of two crutches.

Conclusions The incidence of traumatic spine pathology varies in different age groups and is continuously increasing. Progresses can occur in an already chronic case and that is something that motivates the rehabilitation process. **Key words:** *asymmetric paraplegia, traumatic injuries, chronic case, section,*

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Spectacular recovery after complex rehabilitation approaches - including specific nursing - in an initially paraplegic old female patient

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Abstract

Introduction: Spinal cord injuries (SCIs) may arise from acute traumatic events or from non-traumatic etiologies. SCI following disc herniation can result in severe motor and autonomic deficits, with a major impact on mobility and independence. Restoration of bladder function is often uncertain and may not follow the same course as motor improvement, making functional prognosis difficult to anticipate(1,2). **Materials and Methods:** This paper presents the case of a 72-year-old female patient with a history of multiple spinal surgeries over the past 2 years (L1–S1 spinal stenosis, L4–L5 and C7–T1 disc herniations), who was admitted to our clinic presenting motor (severe flaccid paraplegia, AIS/Frankel B) and sensory deficit (T8 - level anesthesia), neurogenic retention-type bladder and bowel, and severe locomotor and self-care dysfunction. Functionally, the patient was bedridden, requiring assistance for transfers and activities of daily living. The patient was evaluated both clinically and functionally using standardized assessment scales (AIS, Ashworth, Penn, WHOQOL, SCIM, FAC, B/ADL), paraclinical investigations, and interdisciplinary consultations to establish an appropriate rehabilitation program. **Results:** The clinical course was complicated by intercurrent conditions, including urinary tract infection, acute colitis, electrolyte imbalances, and persistent cervical pain, all of which were appropriately treated with favorable resolution. During her 3-month hospitalization in our clinic, a comprehensive rehabilitation approach was implemented, combining individualized nursing care (postoperative wound care, skin protection and prevention of pressure injuries) with kinesiotherapy (gradual mobilization, progressive upright positioning, and task-oriented gait training). She also benefited from neurogenic bladder management: initially, the Foley catheter was removed, followed by intermittent catheterization combined with physiotherapy and medication. The patient had a remarkable recovery, advancing from bedridden to standing and gait training, ultimately achieving independent ambulation without assistive devices over medium-long distances. Sphincter function also improved, with restoration of spontaneous voiding and discontinuation of catheterization. **Discussion and Conclusions:** This case highlights that, despite an initially unfavorable clinical presentation, a comprehensive and sustained rehabilitation program led to improvements in both motor and autonomic functions, with significant recovery of locomotor ability and self-care independence.

Keywords: *spinal cord injury, paraplegia, rehabilitation, neurogenic bladder*

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The Role of SIS Therapy in Modern Rehabilitation Medicine

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Abstract

Introduction. Super Inductive Stimulation (SIS) therapy represents an emerging non-invasive modality in modern rehabilitation medicine, utilizing high-intensity electromagnetic fields to stimulate neuromuscular tissues. This technology has gained increasing attention due to its analgesic, regenerative, and functional recovery effects in a wide spectrum of musculoskeletal and neurological conditions. SIS therapy acts by inducing muscle contractions, enhancing circulation, and modulating neural activity, thereby contributing to pain reduction and tissue healing.

Material and method. This presentation reviews recent literature on SIS therapy and integrates findings from clinical observational studies and rehabilitation protocols involving patients with acute and chronic musculoskeletal disorders. Key outcome measures analyzed include pain intensity (Visual Analogue Scale), range of motion (ROM), muscle strength, functional recovery, and patient-reported outcomes. Additionally, mechanisms of action were evaluated based on physiological and electrophysiological responses to electromagnetic stimulation.

Results and discussions. Evidence suggests that SIS therapy provides rapid pain relief and functional improvement in both acute and chronic conditions. Clinical observations indicate significant reductions in pain (up to 80–87% in some cohorts) and improvements in joint mobility and muscle performance following repeated sessions. The therapy's mechanism—deep tissue penetration of electromagnetic fields—enables stimulation of nerves and muscles without direct contact, promoting neuromuscular re-education and circulation enhancement. In rehabilitation contexts such as shoulder disorders (e.g., subacromial impingement syndrome), combining physiotherapy with advanced modalities improves outcomes in pain, strength, and function, although neuromuscular activation patterns may not fully normalize. SIS therapy also demonstrates benefits in neurological rehabilitation, including reduction of spasticity and facilitation of motor recovery. Its versatility and safety profile make it suitable as an adjunct to conventional physiotherapy, particularly in multidisciplinary rehabilitation programs.

Conclusions. SIS therapy is a promising adjunctive modality in modern rehabilitation medicine, offering non-invasive, safe, and effective management of pain and functional impairments. Its ability to stimulate deep neuromuscular structures and accelerate tissue healing supports its integration into comprehensive rehabilitation protocols. However, further high-quality randomized controlled trials are needed to standardize treatment protocols and confirm long-term efficacy.

Key words: SIS, Therapy, Pain management, Rehabilitation

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Educational Measures for Improving Quality of Life in Patients with Rheumatoid Arthritis

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Background: Rheumatoid arthritis (RA) is a chronic inflammatory disease associated with significant functional limitations and reduced quality of life, necessitating a multidisciplinary therapeutic approach in which non-pharmacological interventions play a central role.

Objective: This paper aims to synthesize current evidence regarding the effectiveness of educational interventions in improving quality of life, self-management capacity, and treatment adherence in patients with rheumatoid arthritis.

Methods: A narrative review of the relevant literature was conducted, focusing on structured educational programs, digital interventions, and their impact on clinical, psychological, and behavioral outcomes in RA patients.

Results: Educational interventions demonstrate significant benefits, particularly in the short and medium term, including reduction of symptom burden, improvement of psychological well-being, and enhancement of disease-related knowledge. Structured programs based on interactive sessions or standardized educational materials proved effective and accessible, facilitating optimized decision-making and improved self-management skills. The effectiveness of these interventions was modulated by patient characteristics — more pronounced effects were observed in younger individuals and those with lower baseline educational levels. Digital interventions, in their current form, showed limited efficacy, potentially attributable to poor adherence and insufficient user engagement. Furthermore, a direct correlation between knowledge acquisition and quality of life was not consistently demonstrated across studies, with disease activity and socioeconomic factors remaining the primary determinants of health outcomes.

Conclusions: The personalization of educational measures and their systematic integration into clinical practice are essential for maximizing therapeutic benefit. Standardization of program design, identification of target patient subgroups, and rigorous evaluation of long-term outcomes represent key priorities for future research in therapeutic education for rheumatoid arthritis.

Keywords: rheumatoid arthritis, therapeutic education, quality of life, self-management, non-pharmacological intervention, patient education

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Poster Sessions

The Importance of Proprioceptive Rehabilitation in Pediatric Patients with lower limb injury

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Proprioception is the unconscious awareness of body position, movement, and spatial orientation, often referred to as the "body awareness" sense. This neural process matures alongside physical development, improving coordination and motor skills.²

Signs of poor proprioception are: clumsiness, falling often, or running into objects, difficulty with spatial planning or in physical activities

Child injuries are an important public health and development issue. More than 2000 children die every day as a result of unintentional or accidental injuries according to WHO statistics.³

Proprioceptive dysfunction in children can cause accidental injuries thus proprioceptive rehabilitation is critical in reducing the risk of recurring injuries.¹

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LEGG-CALVÉ-PERTHES DISEASE: the importance of early diagnosis and rehabilitative treatment

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Legg-Calvé-Perthes Disease (LCPD) represents idiopathic avascular femoral head necrosis in pediatric population, affecting children aging 2–10 years old.¹

Clinically, LCPD usually presents with limping and localized pain in the thigh and/or knee, occurring after sustained physical activity in a healthy child, and/or deficits in abduction and internal rotation, and Trendelenburg gait in advanced stages.¹

Diagnosis is primarily based on history and physical examination findings, usually radiographs and sometimes MRI²

Treatment includes bed rest and immobilization. Sometimes surgery may be helpful, if a child is over 6 years of age and has moderate or severe bone destruction.² Indications for treatment depend mostly on prognosis about femoral head sphericity and hip congruence at the end of growth.¹

Management of LCPD is aimed at preserving the sphericity of the femoral head and maintaining hip joint function and also prevent residual distortion of the femoral head and acetabulum which predisposes to secondary degenerative osteoarthritis.²

We present two cases of LCPD, both patients are boys that undergo surgery followed by rehabilitation in our ward. Result of this comparison was clearly in the favor of early diagnosis and sustained physical therapy post surgery.

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The role of natural sanogenic factors in the management of stress and disease of modern civilization

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Natural sanogenic factors, such as climate, mineral waters, therapeutic muds, and exposure to the natural environment, represent fundamental components of physical and balneological therapy, with beneficial effects on the human body. Their action is mediated through complex neuroendocrine, metabolic, and immunological mechanisms, contributing to the regulation of body functions and enhancing the capacity to adapt to stress. Balneotherapy and climatotherapy, widely used in both traditional and modern medicine, have demonstrated favorable effects in reducing symptoms associated with chronic stress and improving conditions frequently encountered in modern civilization diseases, including rheumatic, metabolic, and neuropsychological disorders. Exposure to natural factors leads to improved circulation, muscle relaxation, and optimization of the psychological response to stress.

In the context of the increasing incidence of lifestyle – related diseases, the integration of natural sanogenic factors into therapeutic strategies represents a valuable complementary approach with both preventive and curative roles. Their appropriate use contributes to improving quality of life and promoting health within contemporary integrative medicine.

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Challenges in the rehabilitation of a paediatric patient with complete C7 spinal cord injury

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Introduction Traumatic spinal cord injuries in pediatric patients represent a severe pathology, with a major impact on functionality, autonomy, and quality of life. Their complexity is amplified by age-related particularities and the psychological context of the trauma, requiring a multidisciplinary and individualized therapeutic approach. The aim of this study is to highlight the effectiveness of a comprehensive neurorehabilitation program in a patient with a complete C7 spinal cord injury.

Materials and Methods We present the case of a 17-year-old patient with tetraplegia following a polytrauma due to a fall, resulting in a comminuted C7 fracture and a complete spinal cord injury (Frankel A). The patient initiated a rehabilitation program for severe motor deficits, sphincter disorders of neurogenic bladder and bowel type, as well as major impairments in mobility and self-care capacity.

The patient underwent surgical interventions (decompressive laminectomy, C7 corpectomy, anterior spinal fusion) and subsequently a comprehensive neurorehabilitation program at the Techirghiol Balneary and Rehabilitation Sanatorium, with repeated readmissions. The therapeutic protocol included hygienic-dietary measures, pharmacological treatment, psychological counseling, and physical-kinetic interventions

(electrostimulation, physiotherapy, robot-assisted therapies). The interventions aimed to improve joint mobility, increase muscle strength, optimize trunk stability, reduce spasticity, and re-educate transfers and standing.

Results and Discussion Comparative analysis of evaluations over approximately four months revealed favorable progress. During hospitalizations and sustained therapy, the patient achieved important functional gains. Significant improvements were noted in postural control and overall mobility, particularly of the trunk. At the upper limb level, partial recovery of prehension was observed, along with improved mobility and muscle strength. Additionally, the patient learned to perform transfers, representing a crucial step toward autonomy. During standing, with the aid of medical devices, tolerance improved, and episodes of dizziness became less frequent and less intense.

Conclusions Although the progress is not spectacular in quantitative terms, it is significant relative to the severity of the clinical presentation and the complexity of the case. These results demonstrate the effectiveness of a multidisciplinary therapeutic intervention and the importance of continuity in the rehabilitation process, aiming to optimize quality of life, maximize functional potential, and increase the patient's degree of independence.

Keywords: Pediatric spinal cord injury, tetraplegia, C7 fracture, neurorehabilitation, multidisciplinary therapy, functional recovery, quality of life

Physiotherapy rehabilitation of post-traumatic gait disorder in a child with acute lymphoblastic leukemia - a case study

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Introduction Acute lymphoblastic leukemia in pediatric patients is frequently associated with complex complications due to both the disease and its treatment. Musculoskeletal sequelae, such as gait disorders and muscle weakness, may occur secondary to chemotherapy and associated conditions like thrombosis. The aim of this case study is to highlight the role of rehabilitation in managing functional deficits in a child with oncological history.

Materials and Methods This study presents the case of a 5-year-old patient diagnosed at the age of 4 with acute lymphoblastic leukemia (B-cell type), associated with thrombophilia and secondary immunodeficiency. The patient underwent a complete chemotherapy protocol, followed by maintenance treatment. During therapy, a thrombosis of the right lower limb occurred, leading to gait disturbances. The rehabilitation program, carried out in a specialized clinical setting, included massage therapy, vibration platform training, balance and gait re-education using assistive technologies, virtual reality therapy, occupational therapy, psychological support, and individualized physiotherapy. The interventions aimed to improve joint mobility, muscle strength, coordination, balance, and functional independence.

Results and Discussion The complex rehabilitation program was well tolerated by the patient and led to favorable outcomes. Improvements were observed in gait pattern, postural stability, and overall muscle strength. Joint mobility increased, particularly at the sacroiliac level, and coordination deficits were reduced. The absence of pain during movement and improved functional test results further confirmed the effectiveness of the therapeutic approach. Early intervention played a key role in optimizing recovery, especially considering the patient's developmental stage.

Conclusions Complex balneo-physical and kinetic rehabilitation, adapted to the patient's age and clinical condition, significantly contributes to functional recovery in pediatric patients with oncological and

musculoskeletal complications. Early, individualized, and multidisciplinary intervention is essential for improving mobility, enhancing quality of life, and supporting long-term functional outcomes.

Keywords: acute lymphoblastic leukemia, pediatric rehabilitation, gait disorder, thrombosis, physiotherapy, musculoskeletal sequelae, motor recovery

Case Study on the Rehabilitation of Surgically Treated Genu Valgum

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Introduction. Genu valgum is a coronal plane deformity of the knee, frequently associated with spastic diplegic cerebral palsy [1,2]. In pediatric patients with complex neuromuscular disorders, surgical correction through hemiepiphysiodesis requires an individualized physiotherapy rehabilitation program [3,4]. The aim of this case study is to highlight the role of physiotherapy in the postoperative management of bilateral genu valgum in a child with cerebral palsy.

Material and method. This study presents the case of a 12-year-old female patient diagnosed at the age of 4 months with cerebral palsy, spastic diplegic form, born prematurely (GA < 27 weeks, BW = 930 g), with a history of developmental dislocation of the left hip and multiple percutaneous fibromyotomies. In 2025, the patient underwent bilateral medial distal femoral hemiepiphysiodesis. The rehabilitation program, carried out at the Techirghiol Balneal and Rehabilitation Sanatorium, included physiotherapy using the ZeroG system, hydrokinetotherapy in salt water, mud packs, trophic massage, laser therapy, Bioptron, and HIVAMAT. The physiotherapeutic interventions targeted progressive joint mobilization, strengthening of the periarticular muscles, gait re-education on functional routes and treadmill, balance and proprioception exercises, and integration of vestibulo-ocular reflexes.

Results and discussion. The rehabilitation treatment, adapted to the patient's functional level, was well tolerated. A favorable evolution was observed, with reduced spasticity in the adductor musculature, improved posture and balance, as well as an improved gait pattern. The patient demonstrated progress in standing stability and lower-limb motor control, with a reduction in mechanical pain in the right forefoot.

Conclusions. Postoperative physiotherapy rehabilitation, integrated into a complex balneal, physical medicine, and physiotherapy program, contributes significantly to optimizing functional outcomes in children with surgically treated genu valgum associated with cerebral palsy, facilitating reintegration into daily and school activities.

Keywords: *genu valgum, cerebral palsy, physiotherapy, hemiepiphysiodesis, postoperative rehabilitation, spastic diplegia*

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Case Study on the Kinetotherapeutic Approach in Hyperekplexia

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Introduction. Hyperekplexia, also known as startle disease, is a rare neurogenetic disorder characterized by an exaggerated, non-habituating startle response to sudden auditory, tactile, or visual stimuli and is frequently associated with generalized stiffness and impaired motor control [1-3]. The disorder is most commonly linked to abnormalities in glycinergic inhibitory neurotransmission, especially pathogenic variants involving GLRA1, GLRB, and SLC6A5, which lead to spinal hyperexcitability and functional limitation [1,2]. **The aim** of the present paper is to describe the evaluation and kinetotherapeutic management of an adolescent patient diagnosed with hyperekplexia during an eight-week rehabilitation program.

Material and method. The kinetotherapeutic program was individualized according to the patient's clinical and functional profile. The main objectives of the intervention were reducing muscle stiffness, improving balance and coordination, decreasing the risk of falls, and relieving anxiety associated with startling episodes. The rehabilitation plan was implemented over a period of eight weeks and adapted progressively according to the patient's response to treatment.

Results and discussion. At the end of the eight-week intervention, the patient demonstrated a reduction in the frequency of startling episodes, improved postural control and coordination, increased self-confidence during daily activities, and a significant decrease in anxiety. These findings suggest that individualized kinetotherapeutic intervention, associated with pharmacological treatment and multidisciplinary follow-up, may contribute to functional improvement and better quality of life in patients with hyperekplexia [1,4].

Conclusions. Early diagnosis, continuous assessment, and tailored rehabilitation remain important for optimizing long-term outcomes in this rare disorder.

Keywords: hyperekplexia, startle disease, kinetotherapy, physiotherapy, balance, coordination, case study

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Balneotherapy – an important therapeutic option for chronic patient management in family medicine

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Introduction. Balneotherapy is a complementary treatment method that involves the use of mineral waters, therapeutic muds and gases, based on the thermal, chemical and mechanical effects of these natural factors on the human body. In family medicine practice, chronic patient require an integrated approach that includes

both symptomatic treatment and a personalized rehabilitation program, combining physiotherapy, kineto-therapy and periodic balneotherapy.

Material and method. This paper represents a narrative analysis of the literature regarding the role of balneotherapy in chronic patient management. Data on the mechanisms of action and clinical benefits of balneotherapy were analyzed.

Results and discussions. The symptoms of chronic diseases, particularly musculoskeletal disorders, lead to decreased quality of life, loss of independence and reduced self-care capacity, as well as psychological effects such as anxiety and social isolation. Medical interventions should aim not only to control symptoms but also to support the patient's reintegration into daily activities through a holistic approach. Balneotherapy acts through complex mechanisms, including anti-inflammatory, analgesic and antioxidant effects. Studies highlight pain reduction, improved mobility and enhanced quality of life, especially in patients with musculoskeletal disorders.

Conclusions. Balneotherapy is an important and accessible therapeutic option in the management of chronic patients. The family doctor plays a significant role in optimizing therapeutic outcomes and improving patients quality of life.

Key words: balneotherapy, family medicine, chronic patient, quality of life

Post-Stroke Algoneurodystrophy: Recognition and Rehabilitation-Based Management

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Introduction. Post-stroke algoneurodystrophy, commonly recognized as Complex Regional Pain Syndrome (CRPS) type I or shoulder-hand syndrome, represents a debilitating complication following Stroke. It is characterized by disproportionate regional pain, sensory abnormalities, edema, and motor dysfunction, significantly impairing functional recovery and quality of life. Despite its clinical impact, the condition remains underdiagnosed, particularly in early stages, due to heterogeneous presentation and overlap with other post-stroke musculoskeletal disorders.

Material and method. This paper provides a narrative synthesis of current literature on the recognition and rehabilitation-based management of post-stroke CRPS, integrating contemporary diagnostic criteria, including the Budapest clinical criteria, alongside recent insights into pathophysiological mechanisms and evidence-based physiotherapeutic interventions.

Results and discussions. The pathophysiology of post-stroke CRPS is complex and multifactorial, involving central and peripheral sensitization, neurogenic inflammation, cortical reorganization, and autonomic nervous system dysfunction. Early clinical manifestations often include shoulder pain, restricted range of motion, and distal limb edema, which may progress to trophic changes and severe functional impairment if left untreated. Early recognition is critical, as timely intervention is associated with improved outcomes. Rehabilitation constitutes the cornerstone of management, with strong emphasis on early mobilization, graded activity, and functional restoration. Evidence supports the use of targeted physiotherapeutic strategies, including desensitization techniques, mirror therapy, and graded motor imagery, aimed at modulating pain perception and restoring cortical representation. Multimodal rehabilitation programs have demonstrated beneficial effects on pain reduction and functional recovery. Pharmacological interventions, such as corticosteroids and neuropathic pain agents, may serve as adjuncts in selected cases, but should not replace active rehabilitation approaches.

Conclusions. Post-stroke CRPS is a potentially reversible yet frequently overlooked condition that significantly affects rehabilitation outcomes. Early diagnosis based on standardized criteria and prompt initiation of multidisciplinary, rehabilitation-centered management are essential to prevent chronic disability. Increasing clinician awareness and integrating evidence-based physiotherapy into standard post-stroke care pathways are critical steps toward optimizing patient outcomes.

Key words: post-stroke, CRPS, algoneurodystrophy, rehabilitation, physiotherapy, pain management

Fig. 1. Clinical appearance suggestive of post-stroke algoneurodystrophy (CRPS type I). This figure shows bilateral asymmetry between the upper limbs, with visible distal edema, skin color changes, and early trophic alterations of the affected hand. The clinical aspect is consistent with shoulder-hand syndrome occurring after stroke.



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Monitoring of functional progress in medical rehabilitation based on smart sensors

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Introduction. Rehabilitation of neurological patients requires precise and continuous monitoring of functional progress, given the complexity of motor deficits and the variability of response to treatment. Modern technologies based on inertial sensors (IMU), integration into IoT networks, and the use of artificial intelligence algorithms offer innovative solutions for objective and personalized assessment of recovery.

Material and method. The study proposes an integrated system consisting of wearable IMU sensors, connected through an IoT infrastructure for real-time data collection and transmission. The analyzed parameters include gait, balance, coordination, and amplitude of movements. The data is processed using artificial intelligence (machine learning) algorithms to identify movement patterns and quantify functional progress. The system was applied to a group of 6 neurological patients undergoing rehabilitation, and the results were compared with standard clinical scales commonly used in neurological recovery assessment.

Results and discussions. The analysis of the 6 patients demonstrated consistent improvements in functional parameters, particularly in gait symmetry, balance stability, and movement amplitude. Sensor-derived metrics indicated early functional gains even in cases where clinical scale changes were minimal, highlighting increased sensitivity. A strong correlation was observed between IMU-based measurements and clinical assessment scores, supporting the validity of the system. Additionally, inter-patient variability was captured effectively, allowing individualized tracking of recovery trajectories. The integration of AI enabled the identification of subtle movement patterns and supported predictive insights regarding patient evolution. The system proved effective for continuous and remote monitoring, improving both objectivity and frequency of evaluation.

Conclusions. The combined use of IMU sensors, IoT technologies, and artificial intelligence represents an effective and reliable approach for monitoring functional progress in neurological patients. The results obtained from the 6-patient cohort support the feasibility and clinical relevance of the system, demonstrating its potential to optimize therapeutic interventions and enhance the quality of the rehabilitation process.

Key words: neurological rehabilitation, IMU sensors, IoT, artificial intelligence, functional monitoring, machine learning.

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Ozone Therapy in Rheumatoid Arthritis with Severe Inflammatory Syndrome: A Case Report

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Introduction. Rheumatoid arthritis is a chronic autoimmune inflammatory disease associated with progressive joint damage and major functional impairment. In patients with metabolic comorbidities, the use of corticosteroid therapy may be limited, which highlights the need to identify additional therapeutic options. Systemic ozone therapy has been proposed as a complementary intervention because of its immunomodulatory and anti-inflammatory effects.

Material and method. We present the case of a 67-year-old female patient with type two diabetes mellitus, reassessed clinically, biologically, and through imaging because of persistent pain and inflammatory signs. Severe active rheumatoid arthritis was diagnosed based on clinical findings, inflammatory markers, and disease activity scores. Treatment included methotrexate, folic acid, hepatoprotective therapy, and systemic ozone therapy administered through major autohemotherapy, with follow-up over twelve months.

Results and discussions. The patient showed favorable clinical evolution, with reduced pain, lower disease activity, and significant improvement in inflammatory markers, including decreases in erythrocyte sedimentation rate and C-reactive protein. These findings suggest a beneficial contribution of systemic ozone therapy as an adjunct to standard treatment, particularly in a clinical context requiring careful therapeutic adaptation.

Conclusions. Systemic ozone therapy may be a useful and safe adjunctive option in severe rheumatoid arthritis, especially in patients with limited therapeutic alternatives, although larger studies are needed to confirm its efficacy and safety.

Key words: *rheumatoid arthritis, ozone therapy, severe inflammatory syndrome*

Modern Therapies Used in Post-Stroke Upper Limb Rehabilitation: The Synergy Between Functional Electrical Stimulation and Mirror Therapy

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Introduction: Stroke is a major cause of mortality and disability, frequently leading to upper limb dysfunction, reduced independence, and impaired quality of life. Modern rehabilitation approaches such as functional electrical stimulation and mirror therapy may support motor recovery through neuromuscular activation and functional reorganization.

Materials and Methods: The study included four patients with ischemic stroke, aged 68 to 75 years, who followed a rehabilitation program consisting of three admissions of 10 days each. Evaluation was performed using the Fugl-Meyer Scale, Modified Ashworth Scale, Barthel Index, and Visual Analogue Scale. The therapeutic program included functional electrical stimulation, mirror therapy, passive mobilization, Kabat diagnostics, and Super Inductive System therapy.

Results: The patients showed reduced spasticity, improved motor control, increased functional independence, and lower pain intensity after treatment. These findings suggest a favorable clinical evolution and support the potential benefit of combining several rehabilitation techniques in post-stroke upper limb recovery.

Conclusions: The combined rehabilitation program had a favorable effect on post-stroke upper limb recovery and may represent a useful multimodal strategy in neurological rehabilitation. The association of conventional and modern therapeutic methods appears to support functional improvement and may contribute to a more effective recovery process.

Key words: *stroke rehabilitation; upper limb; functional electrical stimulation*

Therapeutic Approaches to Back Pain: A 2025 Literature Review and Efficacy Analysis

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Introduction: This paper investigates current therapeutic approaches to back pain, evaluating emerging strategies and their efficacy according to the specialized literature published during 2025.

Material and Method: A bibliometric search was performed in the Clarivate (Web of Science) and Scopus databases, using search terms fixed in the "Title" field. Queries included: "back pain approach" (34 Clarivate articles / 40 Scopus), "back pain therapy" (142 Clarivate / 142 Scopus) and "back pain physical therapy" (23 Clarivate / 21 Scopus).

Results: The collected data reveal a heterogeneous distribution of interventions, from conservative methods to adjuvant techniques. Although numerous treatment modalities have been identified, the results regarding efficacy are mixed; a part of the studies do not report improvements superior to standard methods.

Conclusions: Back pain therapy in 2025 remains anchored in conventional paradigms, without disruptive changes in core protocols. Most research emphasizes the need for additional clinical trials to validate the long-term sustainability.

Key words: *back pain, therapeutic approaches, therapy, conservative, adjuvant*

Occupational Therapy–Based Proprioceptive Rehabilitation of the Lower Limb

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Introduction. Proprioception is essential for lower limb motor control, postural stability, gait coordination, and functional independence. When impaired, it may affect balance, movement efficiency, and safety during daily activities, particularly in neurological, orthopedic, and post-traumatic rehabilitation. It is also relevant in pediatric rehabilitation, where it may support both recovery and motor development.

Material and method. This work presents an occupational therapy–based proprioceptive rehabilitation approach for the lower limb using sensory mats and rehabilitation boards. The intervention included standing and dynamic support exercises with progressive difficulty levels adapted to the patient’s functional status. Activities were task-oriented, functionally relevant, and individualized, targeting plantar sensory stimulation, postural control, controlled loading, and lower limb coordination.

Results and discussions. The integration of proprioceptive stimulation into occupational therapy was associated with functional and behavioral benefits. Sensory mats and rehabilitation boards improved postural control, movement organization, safety in daily activities, and patient compliance. In children, this approach may also support body awareness, coordination, postural regulation, and motor planning, particularly in pathological contexts requiring individualized intervention.

Conclusions. Occupational therapy–based proprioceptive rehabilitation of the lower limb may represent a valuable adjunctive strategy in rehabilitation practice. By integrating sensory input into functional activities, it may support sensorimotor adaptation, functional performance, and participation in daily life.

Key words: proprioceptive rehabilitation, occupational therapy, lower limb

Kinematic Modeling and Simulation-Based Assessment of Hand Muscle Strength Recovery Using Intelligent Pneumatic Systems

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Introduction. The recovery of hand muscle strength is a complex process, dependent on the interaction between biomechanical structures and neuromuscular control. In this context, kinematic modelling – combined with physiological models such as the Hill Muscle Model and modern predictive analysis methods – provides an advanced framework for the assessment and optimization of functional rehabilitation.

Material and method. This paper describes an integrated system consisting of an intelligent pneumatic glove designed for finger mobilization and a testing ball equipped with a pressure sensor to evaluate grip strength. The system enables the acquisition of relevant biomechanical data, while the interpretation of muscular behaviour utilized a Hill-type model, capable of describing the relationship between force, length, and muscle contraction velocity. Furthermore, the data time series were analysed using Long Short-Term Memory (LSTM) recurrent neural networks to identify evolutionary patterns in recovery.

Results and discussions. The results demonstrated that the system allows for the controlled mobilization of the fingers and the objective recording of pressure variations during gripping exercises. The integration of the Hill muscle model provides theoretical support for interpreting muscular response, while the use of LSTM networks enables the evolutionary analysis of data, the identification of functional patterns, and the estimation of therapeutic progress. Thus, the proposed system emerges as an intelligent solution for monitoring and optimizing functional hand recovery

Conclusions. By integrating an intelligent pneumatic system with grip strength assessment, Hill Muscle Model interpretation of muscular behaviour, and LSTM-based predictive analysis, this work highlights a modern direction for the evaluation of functional hand rehabilitation. The proposed approach supports the monitoring of therapeutic progress through quantifiable data and provides a foundation for the optimization of rehabilitation programs.

Key words: *Functional Rehabilitation, Intelligent Pneumatic Systems, Hill Muscle Model, Predictive Analysis, Grip Strength*

Integration of a Motion Tracking–Based Virtual Avatar into Kinesiotherapy Rehabilitation Programs

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Introduction: The digitalization of balneological rehabilitation requires accessible solutions for monitoring and guiding therapeutic exercises. Computer vision technologies offer viable alternatives to expensive motion capture systems. This paper presents the design of a system based on a virtual avatar controlled through motion tracking using a standard webcam, intended for balneological rehabilitation programs.

Materials and Methods: The system integrates three modules: (1) image acquisition and processing using computer vision libraries for real-time human skeleton detection; (2) modeling and animation for mapping skeleton data onto a three-dimensional avatar; (3) feedback and evaluation by comparing executed movements against a therapeutic reference. The architecture relies exclusively on an RGB webcam, eliminating the need for specialized sensors.

Results and Discussions: The implementation demonstrated stable system operation under controlled lighting conditions, with sufficiently low latency to ensure an immersive experience and real-time visual feedback. The proposed solution significantly reduces hardware costs compared to systems based on depth sensors or IMUs, enhancing accessibility for implementation in balneological facilities. Identified limitations include sensitivity to uneven lighting and challenges in capturing fine movements in the depth plane.

Conclusions: The presented system establishes the clinical viability of webcam-driven avatar control for rehabilitative applications. Through the removal of specialized sensor requirements and the integration of real-time visual guidance, this approach facilitates the delivery of patient-tailored, widely accessible, and easily scalable rehabilitation interventions.

Keywords: *virtual avatar, motion tracking, computer vision, webcam, balneological rehabilitation*

A smart interactive feedback platform for rehabilitation support

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Introduction. Balance is a fundamental component of physical health, relying on a complex sensorimotor control system. Various conditions, including fractures, sprains, muscle strains, stroke, Parkinson’s disease, and multiple sclerosis, can impair balance by reducing joint mobility, muscle strength, and proprioceptive feedback. These deficits often lead to gait disturbances, instability, and an increased fear of movement, negatively impacting overall mobility and confidence. [1]

Material and method. The system (Fig.1) developed in this study consists of two primary components: hardware and software. The hardware includes four 50 kg load sensors. These sensors detect weight shifts in four distinct regions front, back, left, and right capturing real-time pressure distribution to generate

movement commands. The software processes the sensor data and translates the detected weight shifts into digital signals, which are then used as input for a Unity-based application. Sensor data is calibrated to account for individual weight distribution, ensuring consistent and reliable movement detection across different users.

Results and discussions. The evaluation of the device demonstrated the accuracy and responsiveness of the four weight sensors in detecting variations in pressure distribution. The system effectively translated these weight shifts into game commands, allowing seamless interaction with the rehabilitation software. By integrating gaming mechanics, the device fosters an immersive and engaging rehabilitation process, encouraging patients to stay motivated, focused, and actively involved in their recovery. The approach underlying the device has shown substantial therapeutic value in addressing both musculoskeletal and neuromotor conditions. Beyond aiding in functional recovery, the system promotes neuroplastic adaptations by leveraging interactive experiences and real-time visual feedback.

Conclusions. The integration of weight-sensing technology and interactive gaming elements in rehabilitation offers a promising approach to enhancing balance, proprioception, and overall functional recovery. By providing real-time feedback and engaging patients through dynamic interaction, the device facilitates motivation and adherence to therapy. Monitor and improve key aspects such as joint mobility, muscle strength, and coordination makes it a valuable tool in both rehabilitation and injury prevention. This innovative solution holds potential for advancing rehabilitation strategies and improving the quality of life for patients with musculoskeletal and neurological impairments.

Key words: interactive feedback, personalized rehabilitation, microcontroller, remote rehabilitation

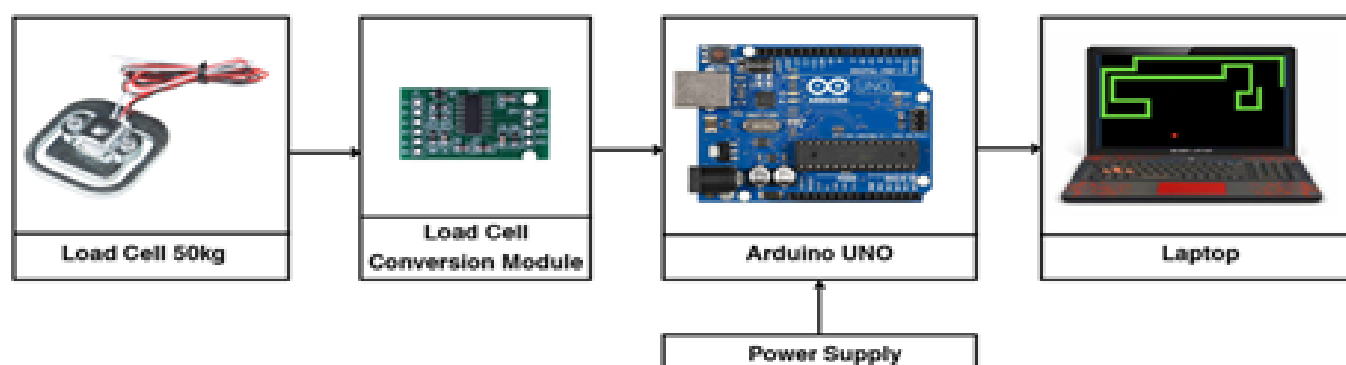


Fig. 1. Block diagram

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Effectiveness of Aquatic Exercise in Reducing Body Fat Percentage in Adult Women

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Introduction. Physical activity represents an important factor in maintaining health and preventing conditions associated with excess adipose tissue. In this context, aquatic exercises have gained increasing popularity due to the specific properties of water, such as buoyancy, resistance, and hydrostatic pressure, which reduce joint impact and allow movements to be performed safely. For adult women, this type of activity represents an effective alternative to land-based exercises, contributing to the improvement of body

composition and functional capacity. The aim of the study was to evaluate the effectiveness of aquatic exercises in reducing body fat percentage in adult women.

Material and method. The research was conducted on a group of 30 adult women, voluntary participants without medical contraindications for physical exercise. The aquatic program consisted of exercises performed twice a week, with a duration of 45–60 minutes per session, over a period of 12 weeks. Body composition was assessed using bioelectrical impedance analysis (Tanita), before and after the proposed program. The collected data were statistically analyzed to determine the significance of the observed changes. The objectives included assessing body fat percentage before and after the intervention, implementing an adapted aquatic exercise program, analyzing changes in body composition, identifying the relationship between the frequency of aquatic sessions and the obtained results, as well as evaluating tolerance and adaptation to physical effort.

Results and discussions. The results showed a reduction in body fat percentage in most participants, along with improvements in muscle tone and exercise capacity. These changes can be explained by the increased energy expenditure in the aquatic environment and the simultaneous involvement of multiple muscle groups. The findings are consistent with the scientific literature, which supports the effectiveness of aquatic exercise in weight management programs.

Conclusions. Aquatic exercises represent an effective and safe method for reducing body fat percentage in adult women, significantly contributing to improvements in body composition and functional capacity.

Key words: *aquatic exercise, body fat, adult women, physical activity, body composition*

Research on the Non-Invasive Monitoring of the Biomechanical and Viscoelastic Properties of Spastic Musculature in Post-Stroke Patients after the First Course of Neuromodulation with Botulinum Toxin – Repercussions on Functional Mobility and Balance

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Background: Stroke is a leading cause of disability worldwide and a major contributor to long-term functional impairment. Post-stroke spasticity, a common manifestation of upper motor neuron syndrome, significantly affects mobility, balance, and quality of life. It is characterized by altered neuromuscular control and changes in biomechanical and viscoelastic muscle properties, including increased tone and stiffness and reduced elasticity. Botulinum toxin (BoNT) is widely used as a neuromodulation therapy to reduce spasticity, while kinetic therapy supports functional recovery. However, objective, non-invasive monitoring of muscle properties and their relationship with functional outcomes remains insufficiently explored.

Objective: To investigate the effects of BoNT neuromodulation on the biomechanical and viscoelastic properties of spastic muscles and their impact on functional mobility and balance in post-stroke patients, while also reviewing current non-invasive assessment techniques.

Methods: A dual approach was applied. A systematic literature review was conducted following PRISMA guidelines; after applying inclusion and exclusion criteria, 27 studies were retained. The review examined non-invasive techniques for assessing muscle properties, including myotonometry, elastography, and inertial sensors, highlighting their clinical applicability and limitations. In parallel, a prospective controlled study will include 60 post-stroke patients with lower limb spasticity in the late subacute and chronic phases. Participants will be divided into a BoNT-treated group (n=30) and a control group (n=30), both undergoing a 6-week kinetic therapy program. Assessments will be performed at baseline and post-intervention. Muscle properties (tone, stiffness, elasticity) will be measured using the Myoton device. Functional outcomes will include ProKin proprioceptive-stabilometric analysis, Timed Up and Go (TUG), 10-Meter Walk Test

(10MWT), 6-Minute Walk Test (6MWT), Functional Assessment Measure (FAM), Modified Rankin Scale, and Fugl-Meyer Assessment.

Results: The literature indicates that non-invasive techniques provide valuable insights into biomechanical muscle changes following BoNT, yet existing studies do not integrate muscle property assessment with functional and stabilometric evaluation. It is anticipated that the experimental study will demonstrate reduced muscle tone and stiffness and improved elasticity in the BoNT group, correlating with enhanced balance, gait performance, endurance, and functional independence.

Conclusions: This study aims to fill a gap in current research by integrating objective biomechanical and proprioceptive-stabilometric assessments to evaluate pre- and post-intervention changes in muscle properties and balance. Such an approach may improve individualized rehabilitation strategies and optimize the management of post-stroke spasticity.

Key words: *Post-stroke spasticity; Botulinum toxin; Muscle viscoelastic properties; Myotonometry; Balance assessment; ProKin; Neurorehabilitation; Functional mobility*

Exploring Spatial Neglect: Clinical Assessment and Neurorehabilitation-Oriented Therapeutic Methods in Patients with Brain-Acquired Lesions

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Introduction. Unilateral Spatial Neglect (USN) is a neurological impairment defined by an inability to attend to or process stimuli on one side of space, typically opposite to the affected cerebral hemisphere (1). This condition is frequently associated with unfavorable clinical outcomes, including prolonged hospitalization, delayed motor recovery, challenges in resuming occupational activities, increased dependency on long-term care, potential cognitive and emotional decline, and a marked reduction in overall quality of life (2).

Material and method. The study included patients at different stages of recovery who exhibited varying degrees of USN, caused by conditions such as stroke, intracranial hemorrhage, brain tumors, or aneurysms. All participants followed a standardized rehabilitation program centered on kinesiotherapy. Patient evaluation was conducted using a comprehensive set of validated tools: the Sunnybrook Neglect Assessment Procedure, the Montreal Cognitive Assessment (MoCA), the Activities of Daily Living (ADL) scale, the Functional Independence Measure (FIM), the Functional Assessment Measure (FAM), the Catherine Bergego Scale, and the WHOQOL-BREF questionnaire. These instruments enabled a multidimensional assessment of neglect severity, functional independence, and quality of life.

Results and discussions. After a two-week rehabilitation period consisting of active and passive movement exercises, patients demonstrated statistically significant improvements across all assessment scales used. The level of recovery progress varied by condition stage, with individuals in the subacute phase showing more pronounced progress than those in the chronic phase.

Conclusions. Enhancing diagnostic and therapeutic strategies for patients with USN can improve rehabilitation efficiency and long-term outcomes. Such optimization has the potential to positively impact not only patients' recovery trajectories but also healthcare resource utilization and social reintegration.

Key words: Unilateral Spatial Neglect, neurorehabilitation, brain injuries

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Innovative approaches in medical rehabilitation of severe burn patient – including with a pressure sore – through MLS LASER therapy

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Introduction. Burn injuries remain a complex challenge in medical rehabilitation, often requiring prolonged care and multidisciplinary management. In addition to the primary tissue damage, complications related to immobilization, such as pressure sores, may further delay recovery and negatively influence functional outcomes. The integration of modern therapeutic technologies into rehabilitation protocols has become increasingly important in optimizing healing and improving patient quality of life.

Material and methods. This paper presents the case of a patient who sustained burn injuries of the lower limbs, with varying degrees of severity ranging from IIa to IIb. During the period of immobilization, the patient developed a sacral pressure sore (grade II), which required additional targeted therapeutic intervention. The rehabilitation program was comprehensive and included both kinesiotherapy and physical therapy with MLS LASER, applied to the post-burn lesions on the bilateral lower limbs as well as to the sacral pressure sore, for a total of 10 sessions. To evaluate patient progress, the lesions were measured at the beginning and at the end of the 10 MLS LASER sessions, and clinical evolution was monitored using assessment scales specific to their condition, applied at both the initiation and completion of therapy. The scales included the Vancouver Scar Scale, Pain Assessment Scale, 5D Itch Scale, and Carmeli Score, providing an objective assessment of wound healing, pain reduction, and tissue quality improvement.

Results and discussions. The patient demonstrated significant functional improvement, achieving independent ambulation by the end of the program. Both the post-burn lesions and the sacral pressure sore showed near-complete closure, with reduced pain and improved tissue quality.

Conclusions. MLS LASER therapy, integrated into a multidisciplinary rehabilitation program, appears to accelerate wound healing, reduce pain, and support the recovery of functional independence in burn patients, including those with associated pressure sores.

Key words: Burns, Pressure sore, Multiwave Locked System (MLS) LASER, Rehabilitation program

Comparative case series of patients with severe burns, rather concomitantly treated vs. non-treated with MLS LASER

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Introduction. Burn injuries require timely and effective interventions to promote wound healing and prevent complications. Adjunctive therapies, such as Multiwave Locked System (MLS) LASER, are increasingly explored to enhance recovery in burn patients. This study aimed to compare the outcomes of patients treated with MLS LASER in addition to standard burn care versus those receiving standard care alone.

Material and methods. A comparative case series included 20 patients with IIA–IIB burns, all presenting within 20 days of lesion onset. Ten patients underwent a rehabilitation program including MLS LASER therapy, applied in ten sessions at a frequency of three times per week (Monday, Wednesday, Friday), alongside standard care and topical cream application on the affected areas. The control group of ten patients, retrospectively selected from the hospital information system, received standard burn care with the same topical

treatment. Wound healing and clinical progress were evaluated for all patients. In the MLS LASER group, assessments were performed at the beginning and at the end of the LASER therapy, while the control group was evaluated at baseline and after a comparable period. Evaluations included measurement of lesion dimensions and monitoring using assessment scales specific to their condition, including the Vancouver Scar Scale, Pain Assessment Scale, 5D Itch Scale, and Carmeli Score.

Results and discussions. Patients treated with MLS LASER exhibited accelerated healing of burn lesions compared with the control group. The adjunctive LASER therapy promoted more rapid reduction of lesion size and progression toward tissue recovery. These findings indicate that MLS LASER can enhance the reparative process and overall recovery when combined with conventional burn management.

Conclusions. MLS LASER therapy, integrated into a structured rehabilitation program, appears to accelerate burn wound healing in patients with IIA–IIB injuries. Its adjunctive use alongside standard care may improve the efficiency of rehabilitation and support overall recovery outcomes.

Key words: Burns, Multiwave Locked System (MLS) LASER, Comparative study, Rehabilitation, Wound healing,

Very Good Recovery in a Patient with Traumatic Brain Injury and Marked and Prolonged Fidgeting, after Multimodal Rehabilitation Approaches

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Introduction: Traumatic brain injury (TBI) is a significant public health concern. When frontal lobes are involved, clinical manifestations include behavioral dysregulation, reduced cooperation, executive dysfunction, and impaired motivation, often accompanied by agitation or disinhibition, which can significantly hinder rehabilitation. In severe cases, these disturbances may also affect vital functions, basic activities (e.g., feeding), autonomic regulation, and increased risk of complications. Data on functional recovery in patients with prominent frontal lobe syndrome remain limited (1–3). **Materials and Methods:** We present the case of a 38-year-old male who sustained a severe TBI following a bicycle accident, initially admitted with a Glasgow Coma Scale score of 3. Neuroimaging revealed a right frontal intraparenchymal hematoma, bilateral frontal subarachnoid hemorrhage, and left thalamic involvement, associated with multiple comminuted fractures, requiring emergency bilateral frontal surgery. **Results:** Despite favorable neurological recovery, the patient developed severe psychomotor agitation, disinhibition, and lack of cooperation, with repeated episodes of aggression toward the medical team, making structured rehabilitation initially impossible. Differential diagnosis included post-traumatic delirium and primary psychiatric decompensation; however, the clinical picture was consistent with frontal lobe syndrome. At admission, the patient was confined to bed, requiring full assistance for positioning and basic needs. Clinical examination revealed a left-sided motor deficit (4/5 MRC in the upper limb) and bilateral grade I calcaneal pressure ulcers. A comprehensive rehabilitation program was initiated, including intensive nursing care (pressure ulcer management, alternating positioning, anti-decubitus mattress), deep vein thrombosis prophylaxis, and gradual mobilization. Due to persistent behavioral disturbances, the patient required transfer to a psychiatric unit. Following treatment adjustment, cooperation improved, allowing re-initiation of rehabilitation. Functional status improved from full dependency to assisted standing and initiation of gait training under close supervision. **Discussion:** This case highlights the significant impact of frontal lobe syndrome on rehabilitation feasibility, even in young patients with otherwise favorable neurological recovery following TBI. The main objectives of rehabilitation focus on restoring functionality and facilitating social reintegration. Effective interdisciplinary management is essential and directly conditions functional improvement (1,2).

Keywords: traumatic brain injury, TBI, frontal lobe syndrome, neurorehabilitation

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Clinical challenges and rehabilitation approaches in a young female patient with complete tetraplegia-case report

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Characterized by the partial or total loss of function in all four limbs and the torso, tetraplegia most frequently stems from cervical spinal cord trauma or various non-traumatic clinical etiologies. This impairment precipitates a widespread disruption of motor and sensory pathways, often compromising critical systems such as respiratory function and autonomic regulation. Management begins with neurological stabilization, often requiring surgical intervention, followed by a specialized multidisciplinary rehabilitation program tailored to maximize respiratory capacity and optimize upper-limb function.

Material and methods: This case follows the clinical progression of a 23-year-old female who presented with a cervical spinal cord injury involving C5 and C6 fractures. Following surgical stabilization, she was admitted to our Neuromuscular Clinic Division exhibiting complete tetraplegia at the C4 neurological level. Over the course of consecutive hospitalizations, the patient demonstrated measurable clinical progress, including gains in muscle strength and motor control in the upper extremities. While these changes represent incremental steps in a highly complex case, they signify important neurological responsiveness within the localized motor groups.

Results and discussions: The patient adhered to a pharmacological regimen and a tailored rehabilitation protocol, which resulted in a stabilization of her clinical status. While she remained unable to achieve unassisted mobilization, periodic assessments indicated subtle improvements in her functional scale scores. These gains were primarily reflected in increased proximal muscle strength and improved motor control of the upper extremities. Although significant mobility milestones were not reached, the therapeutic interventions contributed to enhanced trunk stability and better management of autonomic symptoms.

Conclusions: Managing high-level cervical spinal cord injuries necessitates a rigorous integration of clinical monitoring and specialized rehabilitation. In this case, while a multidisciplinary intervention was fundamental for physiological maintenance and the prevention of secondary medical complications, it provided a critical framework for achieving targeted neurological gains and improving the patient’s specialized motor capacity. These outcomes highlight that even in the most severe lesions, structured protocols are essential for unlocking latent functional potential and ensuring clinical stability.

Key words: Tetraplegia ,Cervical Spinal Cord Injury ,Neurological Stabilization, Autonomic Dysfunction.

Overcoming the Challenges of Advanced Hip Osteoarthritis Management

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Objectives: Osteoarthritis is the most prevalent joint disease in the population over 55 years of age. The objectives of treatment in patients with osteoarthritis are to increase joint mobility, muscle tone, trophism, and strength; control pain; improve the ability to perform daily activities; enhance quality of life; and reduce the high economic and social costs associated with this condition. The sequelae of stroke, the leading cause of disability worldwide, have a significant impact on patients' quality of life. A comprehensive approach to patients with associated polyopathy, including degenerative rheumatic conditions and neurological sequelae (such as hemiparesis after stroke), is essential for proper diagnosis, evaluation, and the adoption of appropriate therapeutic strategies. Comorbidities that influence the rehabilitation program—such as high blood pressure, cardiovascular disease, gastritis, gastroduodenal ulcer, chronic kidney disease, osteoporosis, diabetes mellitus, and obesity—must be optimally controlled. Optimal recovery in patients with both stroke sequelae and osteoarthritis involves improving their quality of life. The contribution of a multidisciplinary team—including a neurologist, cardiologist, rehabilitation specialist, family physician, orthopedist, and psychologist—is essential in case management.

Material and method: We will present the case of a patient with known hypertension, right carotid ischemic stroke with spastic left hemiparesis, advanced bilateral decompensated algofunctional coxarthrosis on the left, bilateral gonarthrosis, lumbar polydiscopathy, bilateral flat foot, chronic kidney disease, polycystic kidney, asymptomatic hyperuricemia, chronic gastritis after NSAID consumption, who was admitted to our department due to persistence of the following complaints: stiffness and pain of a mixed nature in the lumbar spine region with radiculalgia, bilateral coxalgia, left gonalgia, left limb motor deficit, left shoulder stiffness, gait deficit.

Results: At presentation the patient had BMI= 24; BP= 140/70 mmHg, HR=70 BPM, respiration rate=20/min, SO₂=98% on room air, T=37°C, conscious, cooperative patient, OTS, osteotendinous hyperreflexia left limbs, Babinski S. (+) left, Ashworth S. 1+ on the extensors of the left lower limb, FMS left limbs: MS=4/5 proximal, 3/5 distal, MI=4/5 proximal distal, sensitivity to palpation of the left rotator cuff, spastic gait left possible over short distances with significant support in a cane, limitation of mobility of the left coxo-femoral joint in all axes of movement, Patrick T. (+), bilateral paravertebral muscle contracture DL, limited L flexion antalgic, Lassegue S. (-) bilateral, medial, slight deviation of the metatarsal I and lateral of the hallux bilaterally, flattening of the medial longitudinal arch of the left foot. Biologically, it was detected: nonspecific inflammatory syndrome, nitrogen retention syndrome, hyperuricemia, hyposideremia, R. Gregersen (+).

The radiographs performed revealed lumbar polydiscopathy, dextroconvex lumbar scoliosis, advanced left coxarthrosis, left gonarthrosis.

We initiated analgesics, muscle relaxant drugs, neurotrophic, hypolipidemic, diuretics, antiplatelet agents, ACE inhibitors, PPIs, anxiolytics and kineto-physiotherapy treatment, with favorable response. Due to the advanced coxarthrosis, the pain in the left coxofemoral joint persisted. Following the multidisciplinary consultation, it was decided to perform total left coxofemoral arthroplasty in the orthopedics service, with subsequent favorable evolution.

Bruxism as a risk factor for craniocervical dysfunction: an integrated approach

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Bruxism, defined as a repetitive activity of the masticatory muscles characterized by clenching or grinding of the teeth and sustained mandibular positioning, is considered a major etiological factor in temporomandibular disorders. The functional interdependence between the stomatognathic system and the craniocervical complex, mediated by shared muscular chains and neurophysiological mechanisms, suggests the involvement of bruxism in the onset and perpetuation of cervical dysfunctions. The aim of this study is to evaluate the association between bruxism and craniocervical dysfunction and to highlight the need for an interdisciplinary therapeutic approach. The study included a group of patients diagnosed with awake and/or sleep bruxism, clinically evaluated through dental and functional examination. Bruxism diagnosis was based on clinical criteria and specific patient history. The assessment of craniocervical dysfunction included evaluation of cervical range of motion, palpation of paravertebral muscles, and identification of myofascial trigger points. Pain intensity was quantified using the Visual Analog Scale (VAS), and functional limitations were assessed using specific indices. This methodological approach is supported by the findings of Armijo-Olivo et al. in the study *“Patients with temporomandibular disorders have increased fatigability of the cervical extensor muscles”*(1), which demonstrated that individuals with temporomandibular disorders present significantly increased fatigability of cervical extensor muscles, highlighting the functional linkage between the masticatory system and cervical spine. Our results demonstrated a significant association between bruxism and the presence of craniocervical dysfunction, with patients frequently presenting cervical pain, stiffness, and reduced range of motion. A positive correlation was observed between the degree of tooth wear and cervical pain intensity (VAS, for exemple). Bruxism represents a relevant risk factor in the etiopathogenesis of craniocervical dysfunction through complex biomechanical and neuromuscular mechanisms. An integrated, multidisciplinary approach is essential for optimizing diagnosis and treatment, contributing to symptom reduction and prevention of chronicity.

Key words: *bruxism, craniocervical dysfunction, temporomandibular disorders, myofascial pain, posture*

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Quite Good Recovery and Rehabilitation on Medium Term Perspectives in a Patient Iteratively Operated for an Atypical Meningioma with a (Pseudo?) Tumoral Lesion Intramedullary too

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Introduction Meningiomas are the second most common central nervous system neoplasm in adults and account for 15–20% of all primary brain tumors. Although most meningiomas are benign, approximately 10% demonstrate a more aggressive clinical behaviour and are classified as non-benign meningiomas.

Among these, atypical meningiomas are most common and account for between 4.7% and 7.2% of all meningiomas. **Material and method.** This work presents the case of a 71-year-old patient known with left fronto-temporal Atypical Meningioma multiple operated and radiotherapy-treated. A (pseudo?) tumoral lesion located intramedullary level L3 is also discovered. She is known with cardiovascular risk factors such as HTAE grade II, atherosclerosis, insulin-requiring type 2 diabetes mellitus and dislipidemia.

The patient was admitted to the Neuromuscular Recovery Clinic of SCUBA for right hemiplegia, severe locomotor and self-care dysfunction, specific recovery program.

Results and discussions During the hospitalization, the patient followed a complex program of neuromotor recovery, recuperative care/rehabilitation nursing and it was necessary to establish a multidisciplinary team. Currently, the patient shows good improvement in the quality of life, being able to perform walking with unilateral support between parallel bars and supervised by another person, on short-medium distances.

Conclusions Patients with an atypical meningioma may develop a recurrent tumor that is more aggressive than the original. Although the rehabilitation process is complex and complications may occur, the patient quality of life significantly increases. **Key words:** *atypical meningioma, intramedullary lesion, multiple operated, complex rehabilitation process*

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Musculotendinous stretch of the iliopsoas. Difficulties in diagnosis and consequences in recovery. Case study

Dorin-Gheorghe Triff

Emergency Hospital County Baia Mare

Initially transient pain complaints, which became persistent, for approximately 3 months, at the level of the hip joint in an adult patient who did not report overloading of the locomotor system during professional activity and in whom the previous treatment (medication and physiotherapy for hip osteoarthritis) did not improve the patient's symptoms, require anamnestic and clinical evaluation in the medical rehabilitation service. The patient, previously diagnosed and treated for bilateral hip osteoarthritis without obtaining obvious symptomatic and clinical improvements, presented to the specialized medical rehabilitation consultation. Episodic lower limb pain complaints in a patient known to have chronic venous insufficiency, varicose veins, hemorrhoidal disease and atrial fibrillation, along with episodic, predominantly vesperal bilateral pain complaints at the hip joint (with pelvic radiography supporting the diagnosis of coxarthrosis), are differentiated from persistent unilateral pain complaints, accentuated when walking. The musculoskeletal ultrasound, recommended for diagnostic purposes, shows the etiology of the newly appeared complaints by unilateral iliopsoas musculotendinous stretching and subsequently the customization of the recovery treatment of this pathology leads to a clear symptomatic and functional improvement with the remission of the pain complaints. The presented case shows the importance of the diagnostic contribution of musculoskeletal ultrasound in pelvic pain disorders. At the same time, the role of knowing and distinguishing symptoms and signs in the anamnesis and clinical examination is emphasized, which directs the relevant imaging method and leads to therapeutic results in the patient with pain disorders in the lower limb and pelvis.

Keywords: stretch, iliopsoas, musculoskeletal ultrasound, coxarthrosis

Recovery features in complications of parathyroid carcinoma. Bilateral quadriceps tendon injury. Case study

Dorin-Gheorghe Triff

Emergency Hospital County Baia Mare

Bilateral quadriceps tendon rupture due to accidental fall while walking, in an obese patient, urgently admitted to the orthopedics department, identified through multidisciplinary consultation, the etiology of the muscle weakness due to parathyroid carcinoma. After surgical treatment of the parotid carcinoma by partial thyroid lobectomy followed by bilateral quadriceps tenorraphy and subsequent treatment of comorbidities (Cushing's syndrome, hypercalcemia, hypokalemia, bronchopneumonia, acute renal failure, diabetes mellitus, urinary tract infection, postoperative Hungry Bone Syndrome), the patient is transferred to the medical recovery department. Recovery after tenorraphy from bilateral quadriceps tendon rupture is slow, through physiotherapy with progressive mobilizations, with control of flexion-extension angles, by wearing an adjustable angle orthosis, the association of physiotherapy and drug treatment of comorbidities, the association of trophic, vitamin, calcium drugs. Recovery of active mobility in the knee joints, voluntary achievement of transfers and walking was achieved without haste, in stages, progressively with the avoidance of sudden mobilizations and stretches at the level of the bilateral quadriceps tendon and with the gradual resumption of its functions. Paradoxically, the complications of thyroid carcinoma, through traumatic rupture by fall, bilateral, of the quadriceps tendon led to the diagnosis of parathyroid carcinoma, to surgical treatment and the patient's good vital prognosis. The data presented show both the importance of the treatment algorithm (surgical, orthopedic, endocrinological, staged medical recovery) and the need for prevention through consultation and specialized investigations in patients with symptoms and chronic diseases that can prevent the occurrence of complications. **Keywords:** *parathyroid carcinoma, Injury, rupture, quadriceps tendon, medical recovery.*

Workers' perceptions of work overload and upper limb musculoskeletal disorders and Low Back Pain. Implications for prevention and medical recovery in schools

Dorin-Gheorghe Triff

Emergency Hospital County Baia Mare

During the annual periodic medical check-up, workers from 3 school units voluntarily completed a questionnaire that included the following:

- their perception of the demands and risks present at work was assessed through a questionnaire adapted to the legislation (occupational risk factors identification sheet).
- Socio-demographic variables: age, length of employment in the unit, biological gender, domicile,
- functional limitations caused by low back pain (Roland-Morris Disability Questionnaire) and those of the upper limb (The Disabilities of the Arm, Shoulder, and Hand (DASH))

The following results are present in all 3 schools:

- The score on the DASH questionnaire is positively associated with the Roland-Morris Disability Questionnaire score ($p_1=0.001$; $p_2=0.001$; $p_3=0.021$);
- The perception of the presence of neuropsychic stress is associated with that of the presence of disturbing noise at work ($p_1<0.0001$; $p_2=0.011$; $p_3=0.005$);
- While the proportion of workers who perceive osteo-musculo-articular overload at work in the 3 schools is between 0.1 (one tenth) and 0.16, the proportion of workers who report functional limitations is over half of the workers. There is no correlation between the presence of functional limitations and the presence of overload at the level of the locomotor apparatus. Noise in school, even if is intermittent, is associated with increased stress in workers. The data presented show that workers do not perceive the positions (sitting or standing) of the locomotor apparatus as overload of the locomotor apparatus. At the same time, the increased proportion of the presence of functional limitations caused by upper limb disorders is noted. Preventive actions are required to raise awareness among workers about overexertion present at the workplace as a recuperative treatment for workers with locomotor apparatus disorders to prevent their aggravation. **Keywords:** *musculoskeletal disorders, medical recovery, schools, perceptions*

Recuperare Funcțională

Principiile recuperării funcționale asistate tehnologic



Recuperarea funcțională modernă se bazează pe câteva principii esențiale:

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- Repetiție intensivă și specifică sarcinii
- Feedback în timp real
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- Motivație prin interactivitate și vizualizare

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PRINCIPIILE RECUPERĂRII

- 👁️ EVALUAȚIEA OBIECTIVĂ
- 📶 BIOFEEDBACK
- 🔄 ADAPTARE



ECOSISTEMUL INTEGRAT

- ☁️ CENTRALIZARE DATE
- ← CLOUD
- DECIZII BAZA PE DATE

1. EVALUARE FUNCȚIONALĂ

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Postură & Control Motor



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WALKER VIEW
Analiză Biomecanică a Mersului



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Reeducare Inteligentă



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Analiza Alergării



TRANZIȚIE SPRE SPORT

PROKIN
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FEEDBACK ÎN TIMP REAL

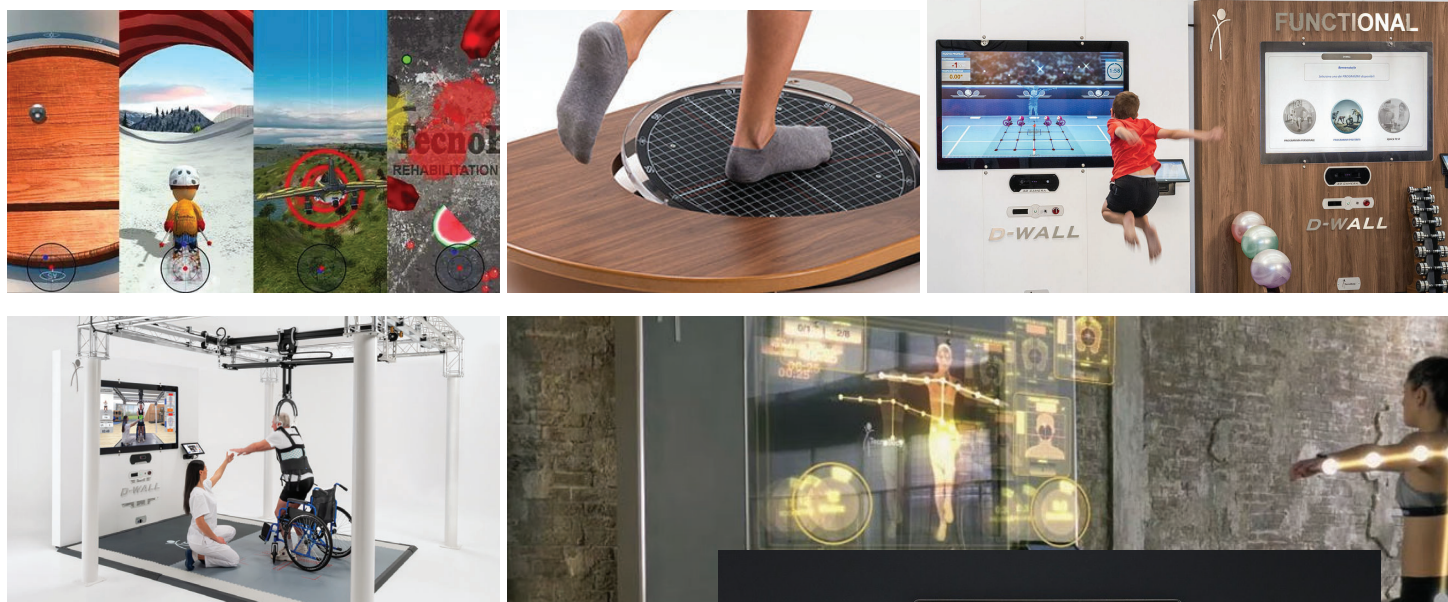


IMPACT CLINIC

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- 🎯 MOTIVANT
- 🎯 PRECIS

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2 în 1

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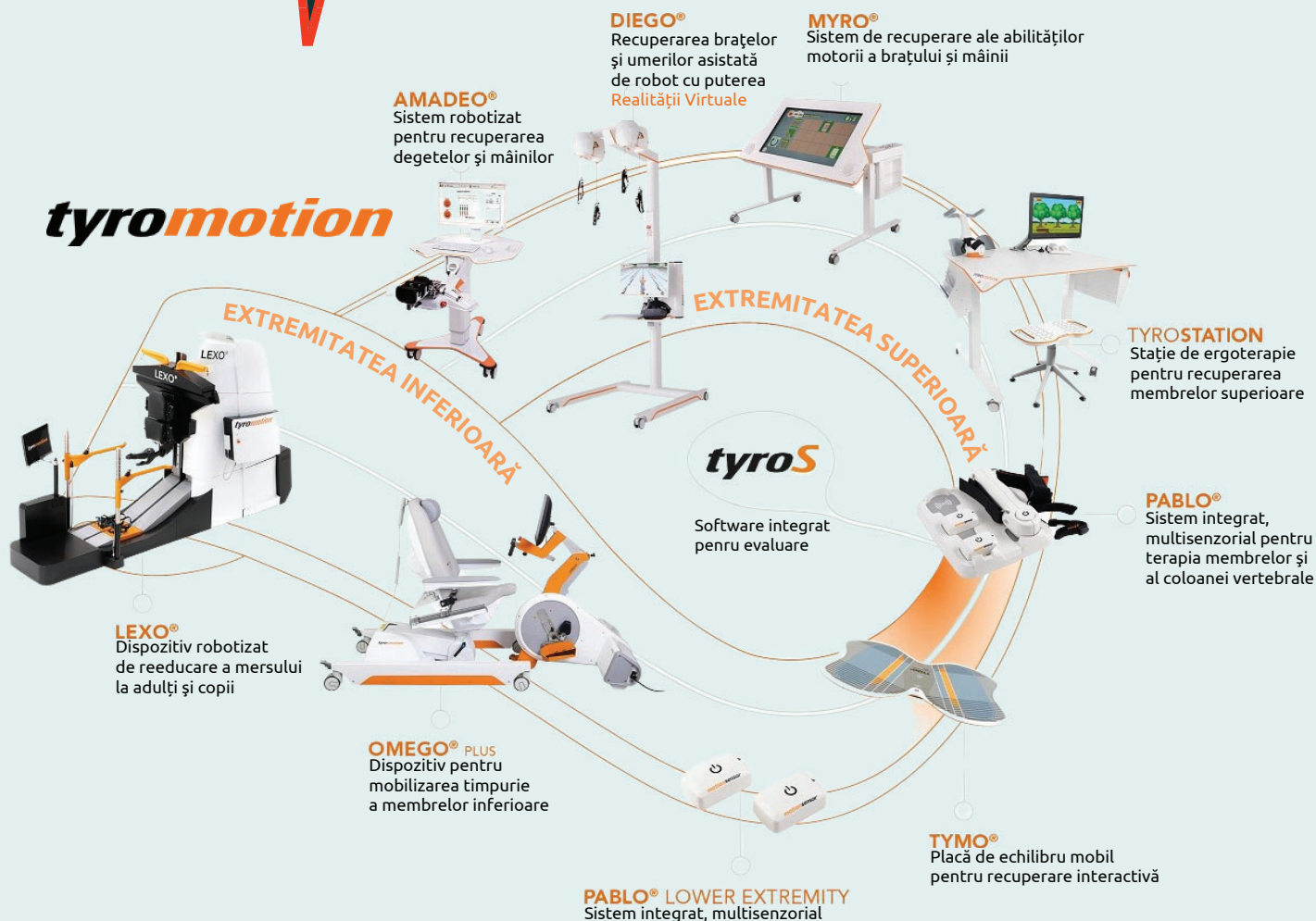
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1, 2. Hagen M, Baker M. Curr Med Res Opin 2017; 33:1623-34. *Ilustrația a fost adaptată și modificată în conformitate cu referința "Hagen M. Baker M. Curr Med Press Opin 2017; 33:1623-34"

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2. RCP Voltaren 140 mg emplastru medicamentos, Data reînnoirii autorizației: Februarie 2024, Data revizuirii textului: Noiembrie 2024.

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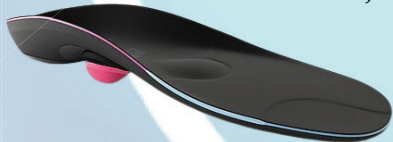
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