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Congress Abstracts

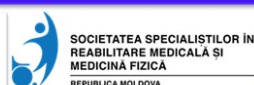


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Societatea Română de Medicină Fizică, de Recuperare și Balneoclimatologie (SRMFRB)



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## **Thematic Areas**

### ***Balneoclimatology - Therapeutic sanogenic natural factors***

- ***Mineral waters - food and natural therapeutic factor***
- ***Peloids (therapeutic mud)***
- ***Climatology***
- ***Thalassotherapy***
- ***Therapeutic gases (mofettes, solfataras)***
- ***Therapeutic salt mines and caves (Speleotherapy)***

### ***Physical Medicine and Rehabilitation & Balneology (PRM&B) in***

- ***Neurological / Neurosurgical disorders***
- ***Musculo-skeletal disorders***
- ***Pediatric disorders***
- ***Geriatric disorders***
- ***Cardio-vascular disorders***
- ***Respiratory disorders***
- ***Endocrine / Metabolic disorders***

### ***Aspects of ethics and / or legality in PRM&B***

### ***Public Health and Sanitary Management in PRM&B***

### ***Health tourism and marketing for Balneal Medical Resorts***

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### ***Physio- / Kinesio - therapy***

### ***Mechatronic / robotic interventions in medical rehabilitation***

### ***Interventions to increase performance and / or therapeutic-rehabilitation in sports medicine***

### ***Holistic / integrative interventions***

### ***Education and scientific research***

### ***Varia***

Congress Abstract – L01

## Pathophysiology of Low Back Pain: A New Venous/Mechanical/Inflammatory (VEMIN) Integrated Model

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Benign low back pain with or without sciatica is a very common and disabling condition still waiting for a precise classification (it is still labelled descriptively). After the recognition of disc herniation as a nosologic entity by Mixter and Barr in 1934, the dominant pathogenetic model became mechanical: disc prolapses and/or arthritic degenerations of the interapophyseal (facet) joints should lead to direct compression of nociceptive nerve endings within the spinal canal. This model still inspires the most common conservative and surgical approaches. Many contradictory observations, however, still need to be explained. These are, for instance:

- Pain aggravated by rest/night pain vs. pain during spinal loading
- Pain aggravated by lumbar extension vs. flexion
- Pain in pregnancy
- Pain in diseases of internal organs (heart insufficiency, liver cirrhosis, caval vein thrombosis, and others)
- Inconsistencies between imaging and symptoms
- Inconsistencies between imaging and both chronicity and spontaneous recovery
- Phenotypic differences between acute and chronic pain and the corresponding response to different drugs.
- The manifestations of Spinal stenosis and the Restless legs syndrome, often presenting with no pain.

A pathophysiologic model is proposed emphasising the role of the epidural venous plexus of Breschet (1836)-Batson (1940). This is the 4th venous system after the portal, caval and pulmonary system. The system consists in a dense network of valveless veins running in the epidural space from the sacral segments to the cranial venous system. It is highly interconnected with vertebral veins, the caval and the Azygos veins. In case of direct compression in the narrow vertebral canal, obstacles to the caval flow, or excess abdominal venous drainage (e.g., in advanced pregnancy) it can be engorged and act as a parallel escape route. The cost, however, is compression and ischemia of nerve endings and the dural sac. Phlebitis may follow and make the condition chronic.

Venous and osteodiscal compression may thus concur, to a variable extent, to back pain, and sciatica. Phlebitis stemming from venous stasis may join the causal chain.

Therapeutic techniques aiming at “deflating” the Breschet-Batson venous plexus may thus share a rationale for treatment. These include, for example, Lind-Natchev-Tesio lumbar autotraction and balneo-therapy (providing hydrostatic venous drainage).

Congress Abstract – L02

## WHO Resolution: Strengthening Rehabilitation in the Health Systems

Francesca Gimigliano

Congress Abstract – L03

## Italian thermalism between tradition and innovation

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Professor University of Pisa

President of the Italian Medical Association of Hydroclimatology and Thermal-spa Medicine

**Abstract:** Italy is a land of thermalism, not only for the high number of structures, but also and above all for its history and for all that thermalism has represented and still represents in society as a health, cultural and economic phenomenon.

A report by Federteme, the Association of Italian thermal-spa companies, shows that the thermal-spa centers are present throughout the country thanks to the availability of mineral and thermal waters with specific characteristics of recognized therapeutic value. In Italy over 380 centers are active, as Health Centers, in 20 Regions and 180 Municipalities, a real widespread network close to potential users of cures, rehabilitation and wellness treatments. To these must be added the Thalassotherapeutic Centers present on our coasts.

There are about 17,000 direct employees of the thermal-spa companies (including Doctors and Health Professionals) to which we must add the approximately 60,000 indirect Workers of related industries. The activity of the companies produces a turnover of approximately 760 million euros per year.

Balneotherapy in all its forms, mud therapy and inhalation therapies are the main treatments offered which make thermal-spa centers true places for prevention, treatment and rehabilitation. The National Health System grants a complete cycle of treatments free of charge, or with a small ticket, once a year. The strength of Italian thermalism has deep roots in history. It is known that the Romans are considered to have invented the baths, perhaps inspired by the Etruscan and then Greek baths, where the gymnasium, in addition to the teaching spaces, was equipped with a gym and swimming pool. Beyond the historical path, our country boasts a solid scientific tradition in the medical-health field, in medical hydrology and in thermal medicine.

In a complex and rapidly evolving society, lifestyles, needs and requirements are constantly changing. The demand for health and well-being is no longer the same as it was a few years ago. Thermal medicine must be able to grasp these changes and for this reason it must begin a path of true innovation.

Therefore consolidate the tradition and open up to innovation also looking at new technologies and new indications, always with the support of research and scientific validation.

Congress Abstract – L04

## Current overview and reappraisal on essays towards systematizing clinical assessment instruments used to evaluate neuro-functional deficits after spinal muscular atrophy including through the ICF(-DH) conceptual framework

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**Introduction.** We herein present a new work of ours regarding current reappraisals on clinical assessment instruments designated to evaluate functional deficits in main neurologic/ neurosurgical conditions. The actual one refers to the most frequently used evaluation tools in spinal muscular atrophy.

Like we have previously asserted, the “WHO (World Health Organization – o. n.)’s modern kind of endeavor matches with another contemporary advanced concept: of ‘Evidence-based Medicine’, an already renown



proceeding for correct and complete/ minute diagnosis and prognosis, and respectively, for consequent, specific therapeutic-rehabilitative, social, occupational – if applicable – decision-making, and consequent appropriate interventions.

**Material and method.** As in our previous related works, we reviewed the essays towards systematization through the WHO's new paradigm to approach human functioning: International Classification of Functioning, Disability and Health (ICF-DH) – as it is progressing towards implementation – based on an updated preliminary literature review.

**Results.** This approach encompasses:

- a dedicated systematic literature review of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) type
- some synthetic considerations regarding the actual clinical-epidemiological, etiological and pathophysiological status of spinal muscular atrophy
- brief emphasizes on basic characteristics of the WHO's ICF(-DH)
- an overview on the clinical assessment instruments used in spinal muscular atrophy and their proposed framing within the ICF(-DH).

**Conclusions.** There is need to continuously keep updated, make reappraisals and select for use in practice the most appropriate related clinical-functional measurement systems – considering both: their international recognition and acceptance and respectively, the specific effective possibilities for their implementation.

**Keywords:** spinal muscular atrophy, systematic literature review, International Classification of Functioning, Disability and Health (ICF-DH), assessment instruments/ measurement scales

*Congress Abstract – L05*

## Computer applications in medical geology: an example of "Balneo-check"

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**Abstract.** Balneological resources (water, rocks, minerals, and aerosols) are found in virtually all the continents of the earth, and are useful in balneotherapy. With the advent of medical hydrogeology and recent advances in software engineering, the need to inculcate computer software application in generating and analyzing medical hydrogeological data makes it compelling on modern day inter-disciplinary research to establish a link between geologic materials, their analysis, and their applications. This paper therefore, presents a brief review of AQUAMED software designed for balneological evaluation of mineral/medicinal waters as demonstrated with thermo mineral waters of West Africa. The software uses a Microsoft server SQL database to exchange data between the client system and the server. This evaluation software compares the physical/chemical properties (pH, mineralization, dominating mega ions, and phamarcodynamic elements) of mineral/medicinal waters to standards and generates reports based on these properties. The report covers medical benefits, disease applicable to, as well contra-indication of the medicinal water type. AQUAMED v1.1 was developed using Microsoft Visual Studio.Net platform. AQUAMED version1.1 is a good analytical tool in evaluating the balneological quality of mineral/medicinal waters useful for balneotherapy.

**Keywords:** Balneological, Balneotherapy, Mineral Waters, Medicinal Waters, Software Engineering

Congress Abstract – L06

# The polyfluoromethylisopropyl ether as a surface tensiometry liquid for peloids quality assessment

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**Introduction:** Surface tensiometry led to the characterization of the surface free energy (SFE: mJ/m<sup>2</sup>) of geo-materials in a rapid and non-destructive way.

A surface tensiometry parameter, based on the contact angle (CA: deg) measurement of a polyperfluoromethylisopropyl ether called Fomblin HC/25®PFPE (Solvay Solexis, Milan, Italy), now replaced (2021) with the equivalent product PFPE Oil C-250® (Fuzhou Topda New Material Co., Ltd, Fuzhou, China), has thus been developed in 2007.

This surface tensiometry parameter (TVS mud Index®) had demonstrated a direct link to the typical chemical-mineralogical pattern of a Euganean Thermal Mud (ETM) (Abano and Montegrotto Terme – Padova – Italy). This parameter demonstrated its correlation with the variations in chemical elements and surface free energy of peloids. The chemical-mineralogical characteristics (I<sub>chmi</sub>) of an ETMs had identified with Al<sub>2</sub>O<sub>3</sub> (X-ray fluorescence), which demonstrated a direct link to their surface tensiometry properties. Our work aims to report the correlations between surface tensiometry and chemical data of ETMs for cutaneous applications using the polyperfluoromethylisopropyl ether.

**Methods:** The FeO compound of ETMs was determined accordingly to Pratt and Washington methodology, and other chemical patterns have performed using an X-rays spectrometer from the Department of Geosciences of the University of Padova (Italy). SFE of ETMs samples was determined using Owens-Wendt conversion model starting from the calculation of polyperfluoromethylisopropyl ether's CAs using a static tensiometer (Department of Pharmaceutical and Pharmacological Sciences, University of Padova, Italy).

**Results:** The polyperfluoromethylisopropyl ether CAs could be a sensitive parameter for evaluating ETMs' quality in relation to their biological maturation process. The correlation analyses between the clayey fraction of ETMs (Al<sub>2</sub>O<sub>3</sub>) and surface tensiometry data revealed the link between polyperfluoromethylisopropyl ether's CAs and I<sub>chmi</sub> (R<sup>2</sup>=0.80).

The correlation analysis also under-lighted the capability of surface tensiometry to identify and discriminate a panel test of ETMs ready to use in pelotherapy (N=19).

The correlation degree between the CAs of polyperfluoromethylisopropyl ether and the dispersive component (DC: mJ/m<sup>2</sup>) of SFE related to the ETMs panel test (R<sup>2</sup>=0.88), and that obtained from a large population (N=80) of ETMs samples collected randomly from various thermal spas from Abano and Montegrotto Terme (Padova, Italy) (R<sup>2</sup>=0.68), confirm the relationships between polyperfluoromethylisopropyl ether CAs and the organic pattern of mature peloids which amount depend mainly from the maturation process. Surface tensiometry of perfluoropolyethers could be an asset for balneotherapy assessment because of the link between peloids and spring waters within the maturation process.

Congress Abstract – L07

# Challenges and Opportunities for Romanian Balneology in the Era of Artificial Intelligence: An Academic Future Perspective

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**Abstract:** Romanian Balneology, an interdisciplinary field that synergizes medical, geological, and environmental sciences, part of medical rehabilitation, is at the threshold of a transformative era marked by the incursion of Artificial Intelligence (AI). This work presents a rigorous academic examination of AI's multifaceted challenges and opportunities to Romanian balneology, offering a prospective analysis anchored in theoretical constructs and empirical evidence. The exploration commences with a nuanced delineation of Romanian balneology's rich history and the epistemological foundations that have guided its evolution. Subsequently, the paper elucidates the contemporary advances in AI methodologies, such as machine learning, neural networks, and data analytics, which have the potential to revolutionize balneological practices. The opportunities engendered by AI are systematically dissected, focusing on its potential to enhance personalized therapeutic interventions through predictive modeling, optimize resource allocation via intelligent automation, and catalyze innovation through computational simulations and high-throughput data analysis. Case studies illustrate the successful integration of AI algorithms within balneological diagnostics, treatment planning, and management. Concurrently, the paper delineates the multifarious challenges inherent to the AI-balneology nexus. These encompass complex ethical considerations related to algorithmic bias and transparency, intricate data privacy concerns guided by GDPR and other legal frameworks, technological barriers in integrating AI within existing infrastructures, and the potential erosion of heuristic methodologies in favor of data-driven paradigms. A comprehensive analysis of the Romanian technological landscape emphasizes regional disparities and the necessity for a skilled workforce adept in AI technologies. The paper also delves into the epistemic and ontological debates surrounding the potential loss of tacit knowledge and human-centric approaches in balneology in favor of algorithmically driven interventions.

In conclusion, the paper proposes an integrative framework that aligns governmental policies, academic curricula, industry collaboration, and ethical governance. Recommendations for future research are articulated, and strategic pathways are mapped, considering Romanian balneology's ontological integrity and AI's transformative potential. By employing a rigorous methodological approach, this paper contributes to the scholarly discourse on the intersection of traditional medical practices and emerging technologies. It offers a profound and critically engaged perspective on the future of Romanian balneology, setting the stage for an interdisciplinary dialogue that balances scientific innovation with cultural preservation and ethical consideration.

Congress Abstract – L08

## Sapropelic mud from Ocna Sibiului - biological effects, therapeutic indications, perspectives

Mariana Varodi, Gabriela Dogaru

The second natural therapeutic factor from the Ocna Sibiului Resort - the fossil sapropelic mud - is a black mineral mud, rich in iron hydroxysulphide, hydrated with an aqueous chloride-sodium solution that contains water (56%), mineral substances (38%; i.e., Cl, Br, I, Na, K, Fe, Ca), and organic components (6%; i.e., active estrogen substances, humic substances and zeolites with ion exchange effects, vitamins B12, B2, C, PP, and organic substances with biostimulating effect).

The fossil sapropelic mud develops through chemical, geological and biological processes under the action of microorganisms on the flora (i.e., micro and macrophyte algae: *Cladophora vagabunda* and *Cladophora cristalina*) and fauna of the aquatic environment (i.e., the arthropod *Artemia salina* which tolerates large amounts of salt - up to 300 grams /liter, and can survive in waters with low oxygen content) to which inorganic or mineral substances from the soil of salt lakes have been added.

The therapeutic effects result from its physical properties and from its chemical composition. Specifically, the fossil sapropelic mud has low thermal conductivity and high specific heat, being effective in the treatment of a wide range of musculoskeletal disorders, as well as in the management and treatment of disorders of the peripheral neurological, gynecological, dermatological, and metabolic systems. A series of processes take place at the level of the skin when applying mud, namely:

1. the sensitive reception of the mud qualities and the transmission to the higher levels involved in integration and control;
2. exchange of energy and substances with the peloid environment;
3. fulfillment of adaptive commands (circulatory, secretion, protection);
4. integration of the skin effects of mud application in the general physiology of the body.

The sapropelic mud acts on:

- a) the cardiovascular system - modulating central and peripheral hemodynamics;
  - b) the nervous system - causing sedative or exciting effects on the CNV and SNV;
  - c) immunological system - regulating the values of immunoglobulins, increasing non-specific immunity, improving the antimicrobial defense capacity by increasing the phagocytic capacity of leukocytes;
  - d) the endocrine system, via the stimulation of the hypothalamic-pituitary-adrenal axis translated by optimizing the plasma levels of B endorphins and inducing the anti-inflammatory effects of peloidotherapy;
- Mud therapy has been used since ancient times in rheumatic diseases and musculoskeletal disorders, for therapeutic purposes, detoxification or for beautification. Although recent progress has been made in understanding the mechanisms of action, further research is needed to assess the therapeutic efficiency of the sapropelic mud in different pathologies as required in the context of evidence-based medicine.



Congress Abstract – L09

## The use of mineral waters from Banat- Crisana hydrographic area as natural therapeutic factor

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The geographical location of Romania and its geological structure, presents a rich diversity and wealth of natural therapeutic factors, which can be used as preventive medical action, in rehabilitation of different pathologies and as relaxation methods in wellness. Our country is one of the richest in Europe in terms of therapeutic factors, having a third of Europe's mineral and thermal springs, but from the multitude of these thermal springs only about 10% are exploited and made possible the development of seasonal or permanent spa resorts. The banat- crisana hydrographic area is located mostly in the plain and hill area, is very rich in natural therapeutic factors and is well represented nationally and internationally by very popular resorts that treat a wide range of pathologies, both in external and internal cure.

The exploitation and use of mineral waters for therapeutic purposes is based on the unaltered maintenance of the natural physical-chemical conditions in the deposit. Each mineral water has a specific supramolecular structure and ionic balance, the number of particles in the solution and the ratio between the ions, which imprints the character of that water.

Based on the physical -chemical properties, the mineral waters from from Banat- Crisana hydrographic area present different pharmacodynamic actions and treatment indications. Moneasa resort(Arad Country), has natural therapeutic factors, springs with oligomineral, mesothermal water and a soothing, sparing bioclimate and treats a wide range of diseases of the locomotor system - inflammatory and degenerative rheumatism, abarticular rheumatism, post-traumatic conditions, central and peripheral neurological diseases chronic gynecological conditions, asthenic neurosis.

Felix resort, 1 Mai resort, Tinca resort (Bihor Country) have sedative bioclimate, with some shades of excitement, oligomineral, hypothermal and hyperthermal waters and treat diseases of the locomotor system - inflammatory and degenerative rheumatism, abarticular rheumatism, post-traumatic conditions, central and peripheral neurological diseases chronic gynecological conditions, occupational, metabolic and endocrine diseases.

Herculane resort (Caras-Severin), one of the resorts with old tradition from the western part of the country, has sedating bioclimate with some stimulating nuances, and as natural therapeutic factors: sulphurous, chlorinated, sodium, calcium, hypotonic, thermal waters.

Therapeutic indications of Herculane resort are diseases of the locomotor system- degenerative, abarticular, post-traumatic, peripheral and central neurological diseases, respiratory system and ophthalmological diseases.

Buzias resort (Timis country) has sedative climate of sparing with some shades of excitement.

Mineral waters from Buzias are a mixture of bicarbonated, magnesium-calcium, chloride-sodium, bromiodurate waters with specific for cardiovascular diseases (states after a heart attack, in the post-convalescence stage, ischemic heart disease, compensated mitral and aortic insufficiency, hypertension, peripheral arteriopathy due to arteriosclerosis, varicose veins); degenerative rheumatic diseases; abarticular rheumatic diseases, post-traumatic diseases; peripheral and central neurological disorders; associated diseases (respiratory diseases, gynecological diseases, metabolic and nutritional diseases, asthenic neurosis, occupational diseases).

Lipova, Calacea and Lovrin resorts are known mostly for their regional addressability, have chloride-sodium, bicarbonate, thermal mineral waters at a temperature of 33-39°with indications of treatment for diseases of the locomotor system, of the peripheral nervous system, as well as gynecological pathology.

Congress Abstract – L10

## Didactic spa resorts - Summer School

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Continuing professional training is extremely important and necessary, also in the specialty of recovery, physical medicine and balneology. The new socio-economic requirements in the spa industry require the correlation of the educational offer with the demand of the labor market, thus making it necessary to adapt university and postgraduate educational training. The modernization of treatment facilities in spa resorts, the introduction of new medical recovery technologies, requires the identification of new necessary skills and digital solutions in the field of balneology. For the operation and improvement of the quality of the didactic activity, we propose the development of pilot didactic spa resorts, through the development of the infrastructure of support of practical, similar didactic activities within universities. The summer schools developed in the spa resorts offer students, master's students, resident doctors, doctoral students the opportunity to improve and experience practical knowledge in this field. This initiative aims to continuously improve the quality of education, through the use of natural therapeutic factors in medical recovery, to promote health and well-being. Through courses dedicated to the participants, as well as through the organization of interactive workshops, it will combine theoretical and practical training in the field of medical rehabilitation. Proactive and free collaboration between spas and universities can lead to the formation of partnerships with a role in the implementation of integrated multidisciplinary projects, in stimulating research, in creating new research centers, in supporting student entrepreneurial activities, all of which result in an intelligent use and sustainable use of natural resources.

Congress Abstract – L11

## Interorgan crosstalk: role of soleus muscle in glucose metabolism regulation

Simona Carniciu

Glucose metabolism regulation is a complex physiological process crucial for maintaining energy homeostasis in the human body. While the role of major glucose-regulating tissues, such as the liver, pancreas, and skeletal muscle, has been extensively studied, the specific contribution of individual muscles remains less understood. This abstract aims to highlight the role of the soleus muscle, a predominantly slow-twitch muscle in the lower leg, in glucose metabolism regulation. The soleus muscle plays a significant role in glucose homeostasis through its unique metabolic characteristics and insulin sensitivity. It is known to possess a high oxidative capacity, rich capillary density, and an abundance of mitochondria, making it highly efficient in utilizing glucose as a fuel source. These metabolic properties allow the soleus muscle to efficiently uptake and store glucose during postprandial periods, thereby preventing excessive glucose accumulation in the bloodstream. Furthermore, studies have demonstrated that the soleus muscle exhibits a higher insulin sensitivity compared to other skeletal muscles. Insulin, a hormone secreted by the pancreas, plays a crucial role in glucose metabolism by promoting glucose uptake into cells. The enhanced insulin sensitivity of the soleus muscle enables efficient glucose disposal, thereby contributing to the maintenance of systemic glucose homeostasis. Moreover, the soleus muscle has been shown to have a beneficial impact on whole-body glucose regulation. Several animal studies have indicated that the selective activation or overexpression of the soleus muscle can improve glucose tolerance, enhance insulin sensitivity, and attenuate the development of insulin resistance. These findings further emphasize the role of the soleus muscle in modulating glucose metabolism, suggesting its potential as a therapeutic target for metabolic disorders such as type 2 diabetes. In conclusion, the soleus muscle, with its distinctive metabolic properties and high insulin sensitivity, plays a crucial role in glucose metabolism regulation. Further research is warranted to elucidate the underlying mechanisms and therapeutic potential of targeting the soleus muscle in the management of metabolic disorders.

## Congress Abstract – L12

## Restitutio ad integrum after distal radial epiphysis fractures

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**Abstract:** Distal radial epiphyseal fractures are the most frequent fractures, representing approximately 1 out of every 5 fractures presenting to the emergency ward. The peak incidence occurs for adults above 65 years of age, but these fractures can occur at any age. Treatment of these fractures is either orthopaedic - reduction and cast or orthosis immobilization - or surgical - percutaneous fixation with Kirschner wires (Kapandji technique/pinning), external fixation with an external fixator, internal fixation with a plate and screws, a combination of the aforementioned techniques (+/- osseous graft or bone substitute), arthroscopy-assisted reduction and fixation. The anatomy of the hand and wrist is complex and can be greatly altered by fractures at this level, especially intraarticular fractures, produced by high energy trauma, especially in the younger population. The displacement of normal anatomy leads to loss of physiological articular mobility and subsequent reduction of function, with great impact in terms of quality of life and socio-economic status. In this paper, we aim to discuss the types of treatment and underline the importance of choosing an adequate treatment, according to the type of fracture, as well as the importance of a specific rehabilitation plan, compatible with the initial treatment choice - either orthopedic or surgical, in order to attain "restitutio ad integrum" with no impairment to the normal function.

**Keywords:** distal radial epiphysis, "restitutio ad integrum", treatment, rehabilitation

## Congress Abstract – L13

## Buzias resort- history, natural factors and climatology

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Buzias resort is located in the SW of the country, in the Banat plain, at an altitude of 128 m and has been known since the time of the Romans under the name AHIBIS. It is documented from 1320 and the first chemical analysis of water dates back in 1805.

In 1811, the first patients came for treatment from all over Europe and in 1819 it was declared a spa resort.

In the years 1830 Dr. Gheorghe Ciocarlan is the resort's first permanent doctor and contributes to the recognition of Buzias by publishing in Budapest the brochure "The art of preventing diseases". Few years later he was elected the president of the first medical society of Banat and in 1843, he organized the first congress in Timisoara with communications and climatology studies. Initially, the waters were used for internal treatment in diseases of the urinary system, liver and colon, and the treatment lasted between a week and a month.

Starting with 1898 Dr. Mahler, cardiologist, begun to use carbonated mineral water in external treatment of cardiovascular diseases and in 1913, based on the experience with these natural factors, he published the magazine "Balneological communications". He was until 1920 the balneologist of the Buzias resort. In addition to

the treatment with mineral water baths and medical gymnastics, he introduced massage and diet in the treatment of cardiovascular diseases. The average duration of a treatment course was 4-7 weeks.

The climate of Buzias resort has moderate continental character influenced by sub-mediterranean air masses with an average annual temperature of 11°C. There are moderate precipitations and sedative sparing bioclimate with weak excitatory influences.

The predominance of negative ions is favorable for various conditions such as: hypertension, rheumatism, bronchial asthma, neuroses, improving muscle tone and stimulating the metabolism. The mineral waters from Buzias are a mixture of bicarbonated, magnesium-calcium, chloride-sodium, bromide waters in which the mineral composition is on average: CO<sub>2</sub> 2024 mg%, Cl 750 mg%, Bicarbonate 630 mg%, Mg 184mg%, Fe 14 mg% , Na 42 mg%, Ca 306 mg% .The treatment with these natural factors are facilitating the recovery of ischemic tissues after thrombotic processes and arterial irrigation disorders, help the adaptation to circulatory disorders circulation and contribute to restoring the neurovegetative balance. There are also recommended in internal treatment for chronic gastro- duodenitis with hypoacidity, chronic non-specific enteritis and enterocolitis, allergies of digestive origin, hypotonic biliary dyskinesias, chronic cholecystitis, irritable colon, bile duct inflammations, urinary infections and operated renal lithiasis.

The continuity of the treatment cures at the Buzias resort has been uninterrupted for over 200 years which attests the effectiveness of therapies with natural factors that are found in one of the oldest and most traditional resorts in the country.

*Congress Abstract – L14*

## The effects of carbonated mineral water and mofettes in bone defects

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**Introduction.** Bone defects can occur due to severe trauma, lack of bone consolidation, infection, or resection of a tumor. However, treatments for bone defects are often difficult and have not yet been fully established. Currently, topical skin application of CO<sub>2</sub> attracts attention in various fields, such as health, sports, dermatology. These therapeutic effects of CO<sub>2</sub> are caused by an increase in blood flow, microcirculation, and nitric oxide-dependent neo capillary formation. Controlled animal experiments demonstrated that both skin and muscle blood flow and oxygen pressure increased during immersion in carbonated mineral waters.

**Material and method.** A femoral bone defect model was performed on rats. Later, they were exposed, differentiated by batch, to treatment with carbonated mineral water and mofettes-therapy. All groups were evaluated 2, 4 and 6 weeks after surgery by  $\mu$ -CT imaging examination, to quantify bone regeneration, histological examination of bone tissue, arterial doppler ultrasound.

**Results.** The processes of bone consolidation and repair are not finished at 6 weeks, because osteosynthesis and bone remodeling processes continue in all groups. Comparing the proliferated bone tissue in the hole created as well as the degree of thickening of the femoral wall, we can say that after 6 weeks, the best results are present in the group that had the carbonated mineral water bath as treatment, followed by the group with mineral water and mofettes.

**Conclusions.** Treatment with natural factors can be considered a useful therapy in accelerating bone healing in bone defects. Basic and clinical research on bone healing that could lead to an improvement in current treatments for bone defects is still needed.



Congress Abstract – L15

## Management of cardiovascular recovery in patients from Buzias resort – an observational study

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**Introduction.** Balneotherapy has been frequently used in both classical and traditional medicine to treat various pathologies. The current technological progress in the field of medical sciences has not succeeded in diminishing the importance of the application of balneotherapy, as it is complementary to rehabilitation treatment.

This observational study was carried out in the Medical Centre of the Parc Hotel Complex in the Buzias thermal medical resort, declared a balneoclimatic resort since 1819. The major characteristic of the Buzias balneoclimatic resort is the negative aeroionization and the climate that favours the treatment for cardiovascular diseases. Besides these, we mention the mineral waters used in internal and external cure, and the moffets which are carbon dioxide emissions.

The mineral waters from the Buzias thermal medical resort are used in external treatment in the management of cardiovascular recovery, being a mixture of bicarbonate, magnesium-calcium, chloride, bromide and bromide waters in which the mineral composition is on average: CO<sub>2</sub> 2024 mg%, Cl 750 mg%, bicarbonate 630 mg%, Mg 184 mg%, Fe 14 mg%, Na 42 mg%, Ca 306 mg%. Moffets are free CO<sub>2</sub> emanations, used for therapeutic purposes in specially designed rooms in the form of a "Roman circus" that allow the gas to accumulate in a sloping way, as it is heavier than air. The existing moffets in the Medical Centre of the Parc Hotel Complex in the Buzias thermal medical resort are characterised by dry gas emanations rich in carbon dioxide in concentrations of about 98% associated with low amounts of CH<sub>4</sub>, O<sub>2</sub> and N<sub>2</sub>. Increased carbon dioxide in the blood vessels increases the extensibility of cardiac muscle fibers during diastole and consequently has a favorable effect on heart filling, increasing cardiac output. This paper reviews the current medical literature on the use of balneotherapy in cardiovascular recovery.

**Objective.** The present observational study, conducted in the Medical Center of the Parc Hotel Complex in the Buzias thermal medical resort, on a sample of 70 subjects, aimed to provide data on the assessment of blood pressure (BP), heart rate (HR), peripheral oxygen saturation (SpO<sub>2</sub>) dynamics both before and after treatment with moffets and carbonated mineral baths, in patients diagnosed with hypertension and osteoarthritis. Quality of life analysis data were added to this observational study.

**Material and method.** The study group included 70 subjects (30 women, 40 men, mean age 62 years) undergoing treatment at the Medical Center of the Parc Hotel Complex with known history of osteoarthritis and hypertension stage 1 and 2. Patients were objectively assessed on entering and leaving the moffets and carbonated mineral water baths on the first and then on the seventh day of the spa treatment, by measuring BP with a blood pressure monitor and HR and SpO<sub>2</sub> with a pulse oximeter. The exposure time in the carbonated mineral bath at 33-34° Celsius, was 15 minutes and for mofete 10 minutes on step II and III respectively. After the physiokinetic and balneotherapy treatment, subjective assessment of patients was performed based on interviews using VAS(Visual Analog Scale), and EQ-5D-5L questionnaire.

**Results.** After the spa treatment, we observed on objective assessment, a 2% increase in SpO<sub>2</sub>, a decrease in BP (SBP by 6%, DBP 6%, final average blood pressure 6%) and an increase in HR by 4%. At the same time, following the qualitative analysis, we observed a 67% improvement of the VAS scale. Regarding the EQ-5D (5L version), we observed an improvement in mobility by 39%, self-care ability by 36%, improvement in usual activities by 45%, decrease in pain and discomfort by 46%, and reduction in anxiety and depression by 53%.

**Conclusions.** The present observational study started from the desire to prove our hypothesis that the treatment with carbonated mineral baths and moffets, applied in the Medical Center of the Parc Hotel Complex, influences the dynamics of the cardiovascular system. Following the balneotherapy and physiokinetic treatment, we can admit that it modifies the dynamics of BP, HR and SpO<sub>2</sub> values in the subjects, correlated with marked improvement of VAS scale and EQ-5D-5L questionnaire instruments, the results pleading for the necessity of performing carbonated mineral water baths and moffets together.

Congress Abstract – L16

## Treating rheumatoid arthritis to target – unmet needs

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Rheumatoid arthritis (RA) is a chronic autoimmune disorder that can lead to significant disability and reduced quality of life if left uncontrolled. Over the past few decades, substantial progress has been made in managing RA, and one of the most crucial developments has been the implementation of the treat-to-target (T2T) strategy. This approach emphasizes early diagnosis, close monitoring, and individualized treatment goals to achieve optimal outcomes for RA patients.

However, there are still several unmet needs that must be addressed to fully optimize the potential of this approach. While the T2T strategy has been extensively studied in clinical trials, its real-world implementation and adherence pose significant challenges. In clinical trials, patients are closely monitored and supported, which may not fully reflect the complexities of everyday clinical practice. Factors such as comorbidities, medication costs, and patient-related barriers can impact adherence to the T2T approach.

Currently, the focus is primarily on achieving clinical remission or low disease activity, which may not always align with the patient's priorities. Some patients may prioritize pain relief or improvement in functional abilities over clinical remission. Tailoring treatment goals to individual needs can enhance treatment adherence and overall patient satisfaction.

Comorbidities, especially the coexistence of secondary osteoarthritis and rheumatoid arthritis presents a unique set of challenges for patients and healthcare providers alike. The combination of chronic inflammation in RA and degenerative joint disease can significantly impact mobility, pain levels, and overall quality of life. Addressing the impact of both conditions requires a comprehensive approach that includes early diagnosis, personalized treatment plans,

Through the collaborative efforts of medical interventions and physical therapy, individuals living with RA can achieve increased mobility and a better quality of life, thus maximizing the benefits of this strategy for all RA patients.

## Congress Abstract – L17

## Maintaining or improving the quality of life in oncological patients

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Even if it's well stated and recommended that rehabilitation be part of cancer treatments modalities, useful for a quick restoration of optimal physical function, we still have to face the old medical school concept that rehabilitation is counter indicated in cancer patients.

**Aim of the study.** Referring to J. Herbert Dietz, MD who defined cancer rehabilitation according to four distinct phases - preventative, restorative, supportive and palliative, we are trying to demonstrate the rehabilitation needs of women with breast cancer that go through different stages of cancer treatment, from diagnosis to the final stage or to being a cancer survivor.

**Material.** We conducted an observational study in the Emergency Clinical County Hospital of Bihor, rehabilitation department. 35 female in and out patients with breast cancer and with cancer treatments in progress, were included. Data collected: demographic data, medical history, concurrent illnesses, medication in use, treatments in progress, actual medical complains. Clinical exam including body mass index (BMI), posture and musculoskeletal system were performed. Functional status (functionally independent or in need of assistance), frailty, cognition, quality of life and level of stress through specific screening tools were evaluated. Individual rehabilitation needs were established.

**Results.** The study group was heterogenous, median age 52,4 years, medium education level, 9 patients (26,47%) being still professionally active. 27 (79,41%) underwent surgery; Without postoperative rehabilitation treatment – preventive phase not used. 9 (26,47%) with frozen shoulder were referred to rehabilitation for exercise to gain the shoulder mobility required to be postured during radiation therapy – restorative phase. 18 (52,94) with musculoskeletal pain, myofascial pain, trigger points, shoulder pain and dysfunction, +/- lymphedema – supporting phase. 4 inpatients with metastasis – palliative phase. After rehabilitation interventions, better function in all patients.

**Conclusion.** Even if they cannot influence the evolution of the cancer itself, the rehabilitation interventions, by improving the physical function and, most of the time, the psychological status, regardless of the life expectancy, improves the quality of life of the cancer patient.

**Key words:** cancer, rehabilitation, function, quality of life

## Congress Abstract – L18

## Monoiodoacetate induced knee osteoarthritis, an alternative approach in better understanding rheumatic pathology

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Knee osteoarthritis (OA), one of the most common joint diseases worldwide, is a complex pathology characterized by changes in tissue metabolism, architecture, and function. Surgical (anterior cruciate ligament transection, meniscectomy, medial meniscal transection) and chemical (monoiodoacetate, collagenase) rodent models have been long used for understanding the physiopathology of OA. The aim of our study was to establish a protocol for inducing osteoarthritis using monoiodoacetate (MIA), a cysteine peptidase inhibitor, and for the histological preparation of the samples. MIA injection causes progressive destructions of the cartilage

along with alteration of the subchondral bone associated with pain-like symptoms and gait impairment in the experimental animal model. By either grading, the concentration of the solution or the injected volume, the desired severity and progression of the histopathological and clinical manifestations can be faster achieved. Furthermore, the MIA-induced osteoarthritis model has the benefit of being easily reproduced with a lower risk of general complications as opposed to surgical-induced models.

One of the challenges associated with knee osteoarthritis models consists in establishing a protocol for the concentration of the solution to be injected, the time needed for the desired lesions to occur, harvesting and preparation of the tissue samples for the histological assessment, critical for objective grading of the lesion. The present study aims to formulate general guidelines, from the means of anesthesia used by our team to successfully induce the MIA osteoarthritis model to the decalcification of specimens and staining protocols.

Congress Abstract – L19

## The application of the "Covasna Method" in prevention and treatment of circulatory insufficiency

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### Abstract

**Introduction.** The Covasna resort is famous for environmental factors, their beneficial effects in various pathologies have been known for over a hundred years. Also from those times, the first observational researches were implemented on the groups of patients who came to the resort, presenting different chronic pathologies, but especially the most visible effects were on the patients with circulatory failure. The "Covasna Method" developed by Dr. Benedek Geza, 60 years ago, combines in itself a combination of environmental factors (rich ozonated air, charged with negative ions, resinous aerosols, tonic and stimulating climate) with natural therapeutic factors (mofette, mineral waters) associated with a healthy lifestyle (avoiding risk factors –smoking, alcohol, drugs, stress / balanced diet, avoiding sedentary lifestyle). Applied on a large scale, this method has shown its effectiveness over time, both as a prevention and as a treatment. In the observational, prospective clinical study, started in 2020, with the name "Program for therapeutic education, prevention and medical recovery of patients with circulatory insufficiency (AOMI)" carried out in the Covasna Tourism Treatment Center, patients from different social categories were included, regardless of gender and age who were previously diagnosed with circulatory insufficiency. The known effects of natural factors, environmental factors with respect for a healthy lifestyle significantly improved the patient's health.

**Objectives:** the effectiveness of the "Covasna Method" on the selected group of patients, the effect of the mofette and the CO<sub>2</sub> bath in circulatory failure, the duration of the effect of the spa treatment, the need to repeat the treatment adapted to each individual patient in the Covasna resort (the need to return to the resort).

**Materials and methods:** The study has so far included 103 patients, diagnosed with peripheral circulatory insufficiency, who were applied the "Covasna Method", the quantified evaluation scale of the quality of life (Quality of Life), the VAS scale, EuroQol, walking distance and speed. The duration of the treatment in the resort was around 2 weeks, then they were kept under supervision by phone call for 6 months.

**Results:** The observational analytical study reported an expected effect of regeneration of structures affected by circulatory insufficiency by increasing tissue perfusion, revitalizing and restoring ischemic areas. The properties of Carbon dioxide in combination with the Radon molecule from the volcanic gas amalgam have the ability to fuse through the skin with a vasodilation effect associated with tissue reperfusion, improving circulation, stimulating the endothelial growth factor, with the formation of new nitric oxide (NO) -dependent capillaries and associated mobilization of endothelial progenitor cells.

**Conclusion:** "The Covasna method" correctly adapted and respected by patients shows its effectiveness from the very first days of treatment. Improving circulation, accelerating metabolism, increasing immunity, improving trophic disorders and pain symptoms, increasing exercise tolerance and walking distance are the effects of the Covasna method that persist over time depending on the duration of the treatment course and the associated pathologies.



## Congress Abstract – L20

## Pulmonary involvement in rheumatoid arthritis – imaging patterns

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**Background:** Rheumatoid Arthritis (RA) is a chronic, systemic inflammatory disease with a wide range of pulmonary manifestations such as interstitial lung disease (ILD), bronchiectasis, rheumatoid lung nodules, and pleural and pericardial effusions.

**Objectives:** To evaluate the spectrum of chest involvement in patients with RA.

**Material and Methods:** We analyzed a cohort of 92 RA patients (diagnosed based on the ACR/EULAR 2010 criteria). All patients underwent clinical examination, laboratory tests and chest HRCT.

**Results:** The study population was predominantly female (79.3%), with an average age of  $63.77 \pm 11.56$  years and a mean disease duration of  $15.00 \pm 11.55$  years. In regards to tobacco use 42.9% had a history of smoking, and 16.3% were current smokers at the time of evaluation. In most patients (90.2%) the rheumatoid factor (RF) was positive, and 81.5% had anti-cyclic citrullinated peptide (anti-CCP) antibodies. Respiratory symptoms were present in 65 patients (70.7%), with exertional dyspnea being the main complaint in 59 of the cases (64.1%). Radiographic changes were observed in 50% of the cases. Pulmonary CT abnormalities were found in 71 out of the 92 patients (77.2%). The most common HRCT anomalies were: linear attenuation (reticulation) (52.11%), bronchiectasis and bronchial wall thickening (45%), nodular attenuation (39.43%) and pleural involvement (pleural effusion or thickening) (39.43%).

**Conclusions:** When evaluated through chest HRCT, pulmonary involvement is evidenced in a high percentage of RA patients, even in those with no chest X-ray findings or respiratory complaints. The most prevalent HRCT anomaly is linear attenuation, followed by nodular attenuation and pleural changes. We found no significant correlation between DMARD use and pulmonary abnormalities.

## Congress Abstract – L21

## Medical rehabilitation of chronic patients in the context of Covid-19 pandemic

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**Introduction:** In december 2019, the COVID-19 coronavirus pandemic lead the whole world to drastic measures to limit the spread of this virus. Policies such as “stay-at-home” and strict medical instructions to defer non-urgent medical cases have limited clinical visits giving in this way a pragmatic role to telemedicine to provide follow-up care to patients. Trying to limit its spread, especially among the most vulnerable patients, the Covid-19 pandemic has lead to the closure of outpatient clinics in public hospitals. The Covid-19 pandemic had a negative effect on the care of chronic patients – including especially patients with neurological, orthopedical and rheumatological conditions – as it is well known that this categories of patients require a regular and accurate monitoring. On the other hand, the Covid-19 pandemic has also generated a socio-economic crisis with critical effects: the economy paralyzed, exploding unemployment, massive job losses, growth unemployed population, decreases in income.

**Material and method:** In the Clinical Recovery Hospital from Cluj-Napoca - between January 2016 and March 2023 - a total number of 18.833 patients with neurologic, orthopedic, rheumatic and post-traumatic pathologies from all over the country benefit from recovery treatment (patients from 39 counties were treated in this hospital in this period, Romania having a total of 41 counties). In order to be able to analyze the medical and economic impact during the Covid pandemic - on recuperative treatment programs among patients with chronic pathologies, we developed a Questionnaire in the form of a pilot program that was submitted to the attention of a number of 150 patients from all over the country (aged between 30 and 80 years old). The questions concern the behavior of patients during the pandemic, their level of satisfaction regarding the possibility of accessing recuperative treatment programs during the Covid period, and last but not least, the approach of new marketing policies that will facilitate access to recuperative medical services in the future.

**Results:** The results of the present study emphasized the following: the need to develop reserve policies regarding recovery medical services during pandemic periods; the creation and promotion of accessible and widely available medical services among patients; the implementation of marketing policies in the field of medical services so that vulnerable patients can benefit from recuperative treatment at home and at low costs.

**Conclusions:** The effects of the Covid pandemic have repercussions even today, both from a medical and socio-economical point of view. The global impact was severe and extremely fast and took the entire world's population by surprise. This fact generated on the one hand a state of global crisis and on the other hand it revealed the necessity of finding solutions in critical situations. Also, the need to approach and implement "reserve policies" at the level of countries that can be quickly applied both in the medical and socio-economic domain and the implementation of marketing policies in the field of medical services that could facilitate the access of chronic patients to medical services in times of crisis.

**Keywords:** Covid-19; pandemic; medical rehabilitation; post-Covid recovery; marketing in medical services; patients behaviour.

*Congress Abstract – L22*

## Demografic and epidemiologic data on patients undergoing balneal rehabilitation post Covid19 in 2021.

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**Introduction:** COVID-19 put unimaginable pressure on health systems of the world and upended daily life for more than two years as SARS-CoV-2, the virus spreading the disease, caused surges in infections across the whole world. In Romania, at 31st December 2020 were confirmed 632 236 cases of infection with SARS CoV2 and 17528 deaths and at 31st December 2021 were 1 810 342 cases of infections and 58 817 deaths. Most people with COVID-19 have recovered completely within a few weeks. However, some could continue experiencing symptoms for weeks or months after their diagnosis, utterly debilitating or mildly annoying, and affecting enough people to cause concern for employers, health insurers, governments and scientific community. In this context we have faced the need of rehabilitation for patients that has suffered COVID – 19. But, at the end of 2020 and beginning of 2021 in scientific journals were only some information on patients experiencing symptoms that persist after healing of infection: cognitive problems, cough, dyspnea, sleep disturbances, diabetes mellitus, etc. We conducted a study on patients that experienced COVID – 19 and were admitted to rehabilitation between 1st July and 30th December 2021.

**Materials and methods of work**

**Materials:** In this study we applied natural therapeutic factors specific of Techirghiol area, using all facilities for balneotherapy and rehabilitation (bath tubes, swimming pool, solarium, gym rooms, all device for kine therapy, massage and electro therapy).

**Methods:** The regulations of National Insurance House regarding rehabilitation ask for admission referral and medical recommendation containing diagnosis of main disease that need rehabilitation (primary diagnosis), the known comorbidities/polipathology (secondary diagnosis) and in covid situation is noted recent medical history (recent pathological antecedents). Ministry of health together with National Insurance House elaborated and approve the post-covid-19 rehabilitation protocol

The use of natural therapeutic factors is regulated by balneal law and it's methodological norms

Clinical evaluation were performed at admission and at discharge after ten days of treatment/twelve days of staying. Patients have given their written informed consent to participate in study and their agreement on processing personal data. Including and exclusion criteria were applied. At admission were established the level of disability, therapeutic objectives and methods of treatment and every day the patients were monitored: blood pressure, heartbeats, respiratory rate, etc. In total were determined 62 items from which we will present: demographic data (gender, age, domicile), and epidemiologic data (presence/absence of persistent symptoms, duration of persistent symptoms, comorbidities, vaccine status, hospitalization, clinical form of disease. All data were collected in tables and in order to be analysed statistically. Mathematical work is ongoing.

## Results

### 1. Demographic description.

The study group is formed of 250 patients distributed in two plots: 70 patients with primary diagnosis: rehabilitation post COVID – 19 (named PC19 rehab plot) and 180 patients having medical history of COVID – 19 (named PC19 medical history). Participants' ages ranged from 18 to 86 years, mean age is 58.57, +/- 11.56 distributed in four age-groups: [18 -40) years of age - 12 patients (five patients in PC19 rehab plot and seven in PC19 medical history plot); [40 – 60) years of age – 118 patients (42 in PC19 rehab, 76 in PC19 medical history); [60-75) years of age – 104 patients (20 in PC19 rehab and 84 in PC19 medical history); [+75...) years of age 16 (three patients in PC19 rehab group and thirteen in medical history). In total they were 109 man (43.6%), and 141 women (56.4%). From the 250 patients 204 (81.6%) live in urban environment and 56 (18.4%) in rural areas.

### 2. Epidemiologic description.

2.1. Persistent symptoms post COVID19 were: fatigue (32 patients, 12.8%), respiratory symptoms (cough, sputum, and dyspnea, 45 patients, 18.0%), muscle-skeletal symptoms (myalgia, arthralgia, spine pain 232 patients, 92.0%), neurological symptoms (cognitive, depression, anxiety, motor and sensitives disorders 22 patients, 8.8%). We do not find cardio-vascular and abdominal persistent symptoms due to contra indication of balneal course within six months after cardio-vascular or abdominal event (myocardial infarction, phlebitis, thrombosis, bowel/mesenteric infarction).

2.2. Persistence of symptoms after COVID19 were less than six weeks for the 180 patients in PC-19 medical history (72%), between six weeks and six months for 58 patients (23.2%) and more than six months for 12 patients (4.8%) for patients in PC-19 rehab plot.

2.3. Co-morbidities found in the study group were systematized according to the pathologic group they belong as follows: cardio-vascular diseases (114 patients, 45.6%), respiratory diseases (19 patients, 7.6%), digestive diseases (87 patients, 34.8%), kidney and sexual glands (46 patients 17.6%), rheumatologic diseases (106 patients, 42.6%), endocrine diseases (35 patients, 14%) diabetes mellitus (43 patients, 17.2%), obesity (normal weight - 42 patients, 16.8%, over weight – 84 patients, 33.6%, obesity grade I – 94 patients, 37.6%, obesity grade II – 23 patients, 9.2%, obesity grade III – 7 patients, 2.8%) and neurologic diseases (27 patients, 10.8%). Patients may have one or more comorbidities.

2.4. Vaccine status at admission shows that from 250 patients 115 were vaccinated (46.0%) and 135 (54%) were not vaccinated.

2.5. Clinical forms of COVID – 19 experienced by the 250 patients were: mild (103 patients, 5 in PC-19 rehab plot and 98 patients in PC-19 medical history), moderate (88 patients from which 68 were in PC-19 medical history) and severe (59 patients from which 45 in PC-19 rehab plot).

### Discussions and conclusions.

- the age group of adults [40-60) years is most numerous – 118 patients followed by middle - aged adults [60-75) years – 104 patients,
- men were more affected (42 men in PC-19 rehab plot from 70),

- patients needed rehabilitation were rather non-vaccinated (54%);
- muscle-skeletal symptoms (myalgia, arthralgia, low-back pain) are present at 232 (92.0%) of patients in part, due to specific indication of natural therapeutic factors of Techirghiol area in this pathology;
- persistence of symptoms were less than six weeks for the group with medical history of Covid-19;
- from the 70 patients in PC19 rehab group 45 experienced severe form from 57 patients who were hospitalised;
- comorbidity diabetes mellitus were almost equal present in the two plots: 12 patients from 70 and 31 from 180 patients;

**Keywords:** COVID-19, demographic data, epidemiologic data, vaccine status, post -COVID – 19 persistent symptoms, comorbidities

*Congress Abstract – L23*

## Aspects regarding the optimization of the morphological status of adult women with osteoporosis through the recovery of Aqua-pullpush-gym

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**Abstract:** Osteoporosis is a condition of the bone system that is characterized by loss of bone density and increased fragility of bones, which can lead to fractures and other complications. As for the Aqua-pullpush-gym can be an effective way to improve body composition, by increasing muscle mass and reducing body fat. In the experiment, two groups of adult women with osteoporosis were formed. The experimental group will follow the Aqua-pullpush-gym recovery program, while the control group will not have any specific physical activity for osteoporosis. The purpose of the experiment is to evaluate and compare the effects of the Aqua-pullpush-gym recovery program with the lack of a recovery program on morphological status, posture, bone density and body composition in adult women with osteoporosis. The recovery program will be carried out for a period of four months, starting from April 2023 and until the end of July 2023, at the Swimming and Kinetotherapy Complex of the "Stefan cel Mare" University of Suceava. The initial and final tests for both groups will take place at the CF Suceava Polyclinic. Morphological status, posture, bone density and body fat will be evaluated to analyze whether the Aqua-pullpush-gym recovery program can help optimize these aspects and recover osteoporosis in adult women with this condition.

*Congress Abstract – L24*

## Art & craft or devices?

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**Introduction:** Neonatal malformative pathology is very complex, and if rare cases are to be considered, they are almost unknown to the medical community.

Congenital cranial lacunae are considered to be all areas of increased radiological transparency due to total or partial loss of bone substance, limited by healthy or altered bone

Cranial congenital malformations represent the embryonic development disturbances which affect normal functioning of the skull bones and sometimes brain also.

**Materials and method:** We present 3 cases of newborns, diagnosed immediately after birth with congenital cranial lacunae, all within one calendar year, which exceeds the average occurrence of these extremely rare cranial malformations.



**Results:** Clinical examination reveals abnormalities of skull shape, very wide anterior fontanel and dehiscent sutures.

Craniocerebral CT scans reveal in all cases parietal agenesis or hypoplasia, as well as multiple other cranial ossification defects.

**Discussion:** Treatment is conservative, requiring a protective helmet to allow optimal development of brain structures without being endangered by the absence of bone structures at this level.

**Conclusions:** Progressive ossification in newborns highlights the importance of conservative treatment in the neonatal period, and cranial reconstruction by bone grafting and cranioplasty may be considered later. The impossibility of making or ordering a helmet for such a young age makes it difficult to make the decision to discharge to the family and prolongs the period of hospitalization

**Keywords:** skull malformations, congenital cranial gaps, protective helmet, bone anomalies

*Congress Abstract – L25*

## A dedicated robot can improve quality of life and physical function in elderly patients with mild cognitive disfunction- results from the ReMIND study

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**Objectives:** The main objective of the ReMIND project is to develop a robotic/tablet coach that through music, biographic photo books and a social app can stimulate the physical, cognitive and social conditions of people with cognitive disfunction by means of consolidating their current condition and/or restraining deterioration of their illness in order to improve their quality of life and their independent living at home and at the same time can provoke social activities with friends, informal caregivers and health professionals.

**Methods:** Elderly patients with mild cognitive disfunction (> 65 years, MOCA< 26) were invited to interact with the ReMIND integrated prototype. The prototype included a robot (James®) that can run different applications such as: games/memory games, showing physical exercises, play music/ movies, make video/ phone calls, social apps, etc. Moreover the robot can be programed to remind patients to do physical exercises, or taking the medication at predetermined times. Patients were assessed every 3 months for physical function using the Short Set for Physical Performance (sppb), cognitive function using the MOCA test, participation, emotional engagement, collective engagement, and the dimension of loneliness using the 11-question De Jong Grierveld Loneliness Scale. The first group interacted with the ReMIND prototype, while group 2 was assessed as the control group, with data collected from this group to be analyzed.

**Results:** 81 patients were evaluated meeting the inclusion criteria. 41 participants completed assessments at 3 and 6 months, 20 in G1 and 21 in G2. The interaction of patients in G1 was on average for 3 days/week, approximately 2 hours/day at least. Games application was the most used by participants (especially memory game) and playing youtube videos. The fact that James was able to move around was also appreciated. At the end of the study we found improvement in the Chair Stand Test ( mean G1: 1.9 / G2: 2), the Stand up and Go Test ( mean G1: 11s / G2: 11s), the Gait speed test for 3 meters ( mean G1: 1m/s / G2: 0.98 m/s ), in MOCA (mean G1: 23/ G2: 25) and in the loneliness domains as missing a close friend or missing a group of people, but without reaching significant statistic results in any of these.

**Conclusions:** All participants felt that the study was interesting and hope that the study findings will help them in the future. James appearance was found interesting and quite nice but some of the participants identified it as futuristic and as a robot should look like, while others would prefer a "more humanoid like" robot. Further improvements and studies are needed in order to obtain a truly reliable robot companion for the elders.

**Acknowledgment:** the present study is part of the project „Robotic ePartner for Multitarget INnovative activation of people with Dementia", AAL2017-26-ReMIND-2.

Congress Abstract – L26

## Recent results for osteoarthritis of the knee rehabilitation treatment.

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**Introduction:** Osteoarthritis is the most widespread rheumatic disease, and second most common cause for invalidity for people over 50 years of age, after ischemic heart disease. The knee is the most frequent joint affected by the degenerative process of osteoarthritis and its occurrence rises with age reaching a maximum point around 60-75 years old. The recovery treatment is essential for this type of patient, postponing it more than necessary would have irreversible repercussions.

**Material and Methods:** We performed a recent literature review on studies published between (2020-2023) trying to ascertain what are the best methods of treatment with the best results and what that involves. We were able to analyse the results from both physical part of the rehabilitation treatment as well as the electrotherapy part.

**Results:** We could see that referring to the eccentric and concentric resistance exercise it was discovered in 2 studies in total with 122 participants from which 63.5% were women; Both groups presented leg muscle strength improvement. Pain scores were reduced for 6 min walk or chair raise, and in one of the studies we could observe difference on the WOMAC with leg press being the main reason.

As for the effects of high intensity compared to low level laser therapy all the studies had a high PEDro score. And even if the studies found that both treatment modalities were effective in reducing KOA symptoms it was clear that high intensity presented slightly better results in association with other physical recovery methods of treatment.

### Conclusions

The physical part of the treatment showed that both types of exercise concentric and eccentric resistance training are methods that are useful and provide a great method of treatment for KOA and deciding depends on what is the level of osteoarthritis for every patient.

As for the debate between high and low intensity laser therapy, of course the results depend on what we associate the electrotherapy with, but the findings illustrate the fact that high intensity offers a better alternative.

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**Keywords:** osteoarthritis, knee, rehabilitation, electrotherapy, physical

## Specifics of injured athletes' rehabilitation

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Injured athletes' rehabilitation program means a great responsibility and a real challenge for the medical team. Behind sports performances there is a hard work, but also the professional support of those in charge and who assumed the responsibility of ensuring, as far as biologically and medically possible, the return to competitive activity. The management of lesions healing operated or not, requires in-depth knowledge of biology and biomechanics regarding the intimate mechanism of healing of each type of injured tissue.

The diagnosis and management of sport-related injuries requires a multidisciplinary approach. The whole program is tailored in 5 steps including diagnosis and investigation, control of inflammation, promote healing, increase fitness and control loading abuse. Only after accomplished all these, it is possible to make a responsible decision regarding to return to sport activity. Focused, high-intensity therapies for pain control, inflammation, biostimulation, scarring, callus, vascularization and neovascularization, toning, electrostimulation, proprioception are now at our disposal. Knowing the mechanisms of mechanotransduction, gradual joint loading, can be achieved with the help of a very precise antigravity equipment.

Special attention is paid to the non-pharmacological therapy of persistent pain, especially in the advanced stages, but fortunately the possibilities of modern physiotherapy are extremely generous. Pain control requires, in addition to the latest knowledge regarding its mechanism, a biopsychosocial approach. Psychosocial factors are recognized as important factors in performance attainment, injury prevention, rehabilitation and management. All current studies highlight the major importance in providing psychological support, especially in the case of elites. Cardiopulmonary assessment and exercise tolerance through CPET tests have a role both in injury prevention and in the rehabilitation process, increasing muscle mass and strength. Often, despite the complex and complete approach, the recovery of muscle mass and strength in the case of the quadriceps, becomes an obstacle, requiring a long time of treatment, a theme long studied and defined as arthrogenic inhibition.

Complete recovery implies the absence of pain, obtaining a maximum level of flexibility, strength, proprioception, biomechanics and specific skills, reproducible for the practiced sport. In the final stage, the program includes specific training exercises in the practiced sport, until the physical performance reached the level before the injury. Injured athletes' rehabilitation requires a lot of science, knowledge, access to modern possibilities of diagnosis and investigation, a complete equipment of electro-, physical therapy and immersion in augmented reality, a complex team of professionals and competent psychological support. The rehabilitation team is responsible for the future of the athlete, which is why treating him is a challenge, a responsibility, but it can also be a great satisfaction.

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## Congress Abstract – L28

# Heat exchange and impact on different function of human body during balneotherapy.

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**Introduction:** Thermotherapy is a method of physical therapy, in which heat is added to or removed from a body, by direct contact with the skin (mud, paraffin, ice, mineral waters), or contactless (ultrasound, short waves diathermy, infra-red radiations). Topic application (direct contact) of heat or cold induces a temperature modification and subsequent physiologic changes within dermis and muscles to dissipate or to accumulate heat in order to maintain thermal homeostasis.

**Mechanisms of action:** Balneotherapy is thermotherapy using natural therapeutic factors: mineral/thermal waters, mud, clay, peat in repeated topic application on the whole body, in the form of balneal cure.

Natural therapeutic factor acts first on skin and then on whole human body. Skin perceives biophysical information (temperature, pressure) and prims responses, mainly but not only through peripheral circulation. Some of mud's biochemical compounds such as: hydrogen sulphide and sulphur species, ions, humic acids, amino acids, penetrate skin and pervade within the body's fluids and in internal organs [1]. Some studies linked the mechanisms of actions and effects of mud thermotherapy to inorganic components [2,3,4] Mechanisms of action are complex and involves both biophysical properties and biochemical composition of natural therapeutic factor under neuro-endocrine control and adaptation.

**Skin and muscle vascularisation and role in thermoregulation:** Dermis and muscle are enormously well supplied with blood vessels. The peripheral circulation is concerned with the transport of blood, blood flow distribution, exchange between blood and tissue, and storage of blood (venous system). Its function is to alter the blood distribution to meet the needs of the different tissues. In dermis, vascularisation is far in excess of the maximum biologic needs of the skin itself and serves for thermoregulation.

Topical heat treatment applied directly on the skin increases both deep tissue and blood flow temperature. It has been demonstrated that heating pad treatment on the skin of the lower back region at 40°C increased deep muscle tissue temperature with 5°C, 3.5°C, and 2°C at muscle tissue depths of 19 mm, 28 mm, and 38 mm below the surface of the skin, respectively [5]. Conductive topical heat treatment of the knees of healthy subjects increased popliteal artery blood flow by 29%, 94%, and 200% after 35 minutes of treatment with heating pad temperatures of 38°C, 40°C, and 43°C, respectively [6]. It was demonstrated a strong linearly relationship between increases in local temperature (skin and muscle temperature) and local blood flow [7]. In experimental conditions on animal models studies showed capillary growth and increased blood vessel density in response to increased blood flow [8,9].

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Congress Abstract – L29

## Total knee arthroplasty for end-stage osteoarthritis of the knee with fixed flexion deformity

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### Abstract:

**Objective:** The purpose of this study is establishing an appropriate therapeutic sequence for correcting the fixed flexion deformity (genu flexum deformity) at the time of the total knee arthroplasty.

**Material and methods:** A total of 42 patients with end-stage knee osteoarthritis with fixed flexion deformity treated in the Department of Orthopaedics and Traumatology, Bucharest Emergency University Hospital were analyzed retrospectively. All patients had undergone total knee arthroplasty. The sex ratio was female:male = 32:10. The average age was 66 years (Range: 52-76 years). The right knee was the one operated on in 28 of the cases. The average flexum severity was 18 degrees (with a maximum of 30 degrees). Several surgical techniques were used to the end of correcting the flexion deformity: excision of the posterior osteophytes, partial release of the posterior capsule from its insertion on the femoral condyles, release of the medial and lateral fibrous structures, decreasing the tibial slope during osteotomy, as well as using a thinner tibial insert.

**Results:** Optimal correction of the flexion deformity was attained using the following sequence: excision of the osteophytes, releasing the medial and lateral fibrous structures, performing the femoral cut 2 mm more proximally, releasing the posterior capsule, using a thinner tibial insert (probe), decreasing the tibial slope during osteotomy.

**Conclusions:** Following the aforementioned algorithm ensures correction of the flexion deformity using the least amount of surgical maneuvers, as well as optimal mobility and stability of the operated knee. The level of correction will be assessed after each step; an adequate correction renders the remaining steps redundant.

**Keywords:** gonarthrosis, total knee arthroplasty, fixed flexion deformity, genu flexum, surgical algorithm

Congress Abstract – L30

## LASER therapy – narrative review

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**Introduction.** Light Amplification by Stimulated Emission of Radiation (LASER) is produced by using an optical device that generates electromagnetic radiation in the form of a coherent, monochromatic and unidirectional beam. Being produced by an optical LASER device, LASER therapy can also be included in the category called phototherapy.

**Material and method.** Analyzing a number of 70 articles published in WOS and BDI, we synthesized in this work the mechanisms of producing, indications and contraindications for the main types of LASER used in physiotherapy.

Low Level LASER Therapy (LLLT) is the first form developed by researchers (1960 USA, 1961 Romania Ion I Agârbiceanu) and the most used form.

Multiwave Locked System Therapy, in short called MLS, officially validated in 2003, allows the synchronized combination of continuous and pulsed LASER emission through a system with specific control: the closed system of multiple waves. High Intensity Laser Therapy (HILT) represents a relatively recent form of physical treatment officially validated since 2004, in the USA and later in Europe. HILT is part of the category of high-power LASERs, over 0.5 W, classified in class 4a, of surgical LASER.

**Conclusion.** Penetrability in the target tissue of the three types of LASER is conditioned by its absorption, scattering and power. Thus, LLLT has an optimal penetrability of 1-2 cm (dermis, epidermis), a non-homogeneous type. MLS has a penetrability of 2 cm but of a homogeneous type, HILT 7W has an optimal penetrability of 5-7 cm, and HILT 12 W has a penetrability of 10-12 cm (skin, subcutaneous, muscle tissue, joint, bone, including coxo-femoral joint and vertebro medullary). The dose (radiant energy flow per point) for LLLT and MLS is 1-10 J/cm<sup>2</sup>, HILT has 1-200 J/cm<sup>2</sup> so that the indications and therapeutic effects of the three types of LASER are particularized, instead their contraindications are basically similar.

Congress Abstract – L31

## Recommendations to the rehabilitation treatment during acute phase for post myocardial infraction of a geriatric patient.

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**Introduction:** Wenger (1971) model that has 3 phases for cardiovascular rehabilitation for patients in acute phase post myocardial infarctions represented a high point in the advancement of the rehabilitation treatment still is an unresolved question mark mainly because cardiac rehabilitation is something that according to the statistics makes the patient want to follow up on and we need to ascertain which exercise characteristics are better suited to these type of patients so we have a better understanding in the future.

**Methods:** This is a literature review performed between 2020-2023 trying to determine which best course of action a patient in an acute phase of a post myocardial infarction should turn to in his rehabilitation treatment.

**Results:** According to the studies that were conducted, they tried to assess the proper moment and the proper path to follow for a patient in post myocardial infarction acute phase. The results showed that high intensity interval training led to an increase heart rate during sleep and in supine and standing positions with an increase in exercise capacity for patients. High intensity training also improved peak oxygen uptake with no downside on the blood pressure values. There were no deaths recorded on either study. Exercise intervention showed an improvement for 6 months to a 1-year grip strength and gait speed.

**Conclusion:** The results were contradictory as well by the fact that high intensity exercises could lead to an increase heart rate during sleep for some studies and moderate- intensity exercises didn't have the same outcome. This fact alone should be reason for us to have additional studies and to determine the right moment to start the rehabilitation treatment for a patient in an acute phase - post myocardial infarction. Actualized Wenger program encourages us to begin the treatment as soon as possible with ADL's from a sitting position even on the first day.

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## Congress Abstract – L32

## The complex effect of balneal treatment associated with alternative medicine-acupuncture

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**Introduction:** Acupuncture is one of the oldest form of treatment, dated back 2000 years ago. It has a numerous indications like nevragia, lombar pain, cervical pain, flu, imune diseases, neurological disorders, gastro intestinal disease and even reproduction diseases. The balneal treatment also is known from the roman empire, with salt bath and mud baths. In our contry we have a lot of balneal resorts in which patients can find a lot of rehabilitation programes. The rehabilitation treatment that combines balneal factors and sesions of acupuncture treatment have a benefic impact for the patients with musculoskeletal pain.

**Material and method:** The study was conducted between 15.03.2022 and 20.02.2023 in the Techirghiol Balneal and Rehabilitation Sanatorium. The patients were divided into 2 two categories, those who performed rehabilitation treatment with mud baths, hydrotherapy, physiotherapy and physical therapy and the second series of patients who performed the same treatment procedures but also performed 4 acupuncture sessions for pain in knee area, cervical area and lumbar area.

Pain assessment scales were used, the visual analog pain scale, the EQ5d quality of life scale, and tests were also performed to measure the mobility of the cervical and lobar spine with the help of the Gonio Pro program both at admission and at discharge. The number of the two grpus were 22 patients in the first group and 23 in the second. They didn't have major health issues and they have a consent form for this study.

**Results:** The results shows that the pain was significantly improved in the cervical area at the patients that had the acupuncture treatment. For the mobility point of view the patients that had acupuncture in the cervical area had the biggest improvement. For the quality of life it shown no significal data between the two groups.

**Conclusions:** It was possible to observe a decrease in pain in the cervical area by 20 percent, by 5 percent at the level of the knee, and by 12 percent at the level of the lumbar spine.

It was possible to observe a global decrease in pain in the affected areas, but especially in the cervical area.

The mobility of the cervical and lumbar spine improved considerably after the acupuncture treatment and a global decrease in pain could be observed in the patients who also performed acupuncture

According to the EQ5d scale, it was not possible to establish exactly whether the acupuncture had a short-term benefit, it is necessary to extend the study to a longer interval.

**Discussions:** We must also take into account the alternative acupuncture treatment associated with the spa rehabilitation treatment.

The rehabilitation program has to focus on the patient like a whole and not only to observe the symptoms.

The balneal treatment, rehabilitation programmes and alternative medicine has to go hand in hand for the benefit of the patient.

**Keywords:** Balneal treatment, mud baths, salt water, acupuncture

## Congress Abstract – L33

## The role of balneophysiotherapy in the management of inflammatory rheumatic diseases – retrospective study on patients admitted to the techirghiol balneal and recovery sanatorium

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**Introduction:** Inflammatory rheumatic diseases are among the oldest recognized diseases. They affect the muscles, joints and supporting structures of the musculoskeletal system. Classification of inflammatory rheumatic diseases is often difficult, due to their unknown etiology and heterogeneity in clinical presentation.

**Objective:** Balneophysiotherapy aims to restore or improve some functions that the patient has lost or, if this is not possible, to adapt or develop other functions to compensate the affected ones.

**Methods:** We conducted a retrospective study, where all patients diagnosed with Ankylosing Spondylitis, Rheumatoid Arthritis and Psoriatic Arthritis, hospitalized during 2021-2022 in the Techirghiol Balneary and Recovery Sanatorium (SBRT) were included. These patients were hospitalized in SBRT for 10 days, during which they followed a balneo-physiotherapeutic treatment plan. Balneophysiotherapy treatments have an important role in these pathologies, because they present themselves as an alternative or complementary therapy with considerable effects for rheumatic diseases. We evaluated the health status, demographic variables, gender, age and disease activity scores in these patients at admission and discharge.

**Conclusions and results:** Until a curative treatment for inflammatory rheumatic conditions is found, balneophysiotherapy treatments will continue to be an extremely important part of the management of these patients with chronic rheumatic conditions.

Substantial progress has been made, with opportunities for research to lead to better medical and rehabilitative intervention that maximizes functionality, aesthetics and comfort of life.

Congress Abstract – L34

## The association between vitamin D and Climate Therapy in patients with mineral bone diseases

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**Introduction:** Vitamin D deficiency is a global health issue that accompanies a variable range of pathologies and has important consequences over general health, especially for musculoskeletal system. Climate therapy is an effective and natural treatment to increase vitamin D<sub>3</sub> synthesis in the skin and also improve the quality of life.

**Objective:** The aim of this study was to review and analyze the effect of climate therapy on vitamin D<sub>3</sub> synthesis at patients with mineral bone disorders and to observe the correlation between serum 25(OH)D concentration and other risk factors for vitamin D deficiency.

**Methods:** This is a retrospective literature research that was performed on different databases to find studies published with no initial cut-off date until May 2023 by using following keywords: “vitamin D”, “climate therapy”, “bone mineral density (BMD)”, “sun exposure”. We included studies that measured serum concentration of 25(OH)D, BMD and data about sun exposure.

**Results:** Six RCTs with 1479 participants diagnosed with osteoporosis or osteopenia were included. They were divided by sun exposure and the results showed that there is a positive correlation between sunlight and 25(OH)D and three studies reported that sun exposure increase BMD.

**Conclusion:** There is a protective association between serum 25(OH)D concentration, sun exposure and BMD, which leads to the prevention of fragility fractures. Despite this fact, more studies are needed to support the beneficial effect of climate therapy on serum vitamin D variations.

**Key words:** vitamin D, climate therapy, bone mineral density, sun exposure.



Congress Abstract – L35

# Oxidant/antioxidant status variation in patients undergoing peloidotherapy in Techirghiol Balneal and Rehabilitation Sanatorium

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**Introduction.** In biologic systems, when the balance between free radicals and the antioxidants that detoxify them is disturbed, the negative effect of free radicals in the cells is defined as oxidative stress. Different oxidant substances can be measured individually in serum. Total oxidant status (TOS) measurement methods, which collectively show the level of oxidants, have been developed. Total antioxidant status (TAS) is a parameter that reflects the total effect of antioxidants in all biologic samples, including antioxidants that have not yet been fully discovered. The percentage ratio of the total oxidant level to the total antioxidant level gives the oxidative stress index (OSI).

## Materials and methods:

**1. Materials:** sapropelic mud, mineral water from Techirghiol Lake, and all the facilities for bathing from Balneal and Rehabilitation Sanatorium Techirghiol, Romania; blood samples collected at the Balneal and Rehabilitation Sanatorium Techirghiol and processed at the Constanta Military Hospital; kits were used from Randox Laboratories, Crumlin, U.K.

## 2. Methods

- Superoxide dismutase was determined on a group of 17 patients.
- The total antioxidant status and glutathione reductase were determined on a group of 24 patients.
- In the case of the three enzymes: TAS, SOD, GR, both the enzyme values were calculated in international units per milliliter and the enzyme values calculated in units related to grams of hemoglobin, according to international standards.
- Including and exclusion criteria were applied upon the four batches;

**Results and discussions:** The determinations made suggest a beneficial effect of mud therapy on oxidative stress and implicitly on oxygen free radicals involved in the pathogenesis of inflammation, effect suggested by:

- significant increase in superoxide dismutase (SOD) level
- maintaining the level of glutathione reductase (GR)
- constant maintenance of plasma cortisol, uric acid and blood sugar levels

The significant decrease in the level of reduced glutathione and the level of the total antioxidant status (TAS), especially in the first part of the treatment, suggests their consumption induced by an additional stress most likely determined by the impact of the balneal factor on the body.

**Conclusion.** Evaluation of oxidative stress markers confirmed the anti-inflammatory potential of Techirghiol sapropelic mud in the study patients. The increase in the level of SOD in the case of sludge treatment suggests a positive response of the body considering the positive role of the enzyme in neutralizing ROS and inactivating NO. The level of glutathione reductase, uric acid or blood glucose, protective factors in the oxidative stress balance, were not influenced by the sludge treatment. This conclusion emphasizes the protective nature of mud therapy on oxidative stress, the enzymes with a positive role in this metabolism increasing, such as SOD, or maintaining GR and TAS within normal limits.

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**Keywords:** mud therapy, peloidotherapy, oxydant/ antioxydant status

Congress Abstract – L36

# Melanin deposits in epidermis after mud therapy

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**Introduction.** Nowadays, balneotherapy appears more a luxury than evidence based medicine, an application that acts on the function without changing the structure. The study aims to evaluate melanin deposits within keratinocytes and melanocytes after mud application, through histological methods.

## 1. Materials:

- sapropelic mud, mineral water from Techirghiol Lake, glycerinate extract of medicinal plants and all the facilities for bathing from Balneal and Rehabilitation Sanatorium Techirghiol, Romania;
- skin biopsy of 1,5/0,5 cm from deltoid region and facilities of Emergency Unit from Constanta University Emergency Clinical Hospital;
- blood samples for cortisol and thyroid stimulating hormone determination;
- laboratory reactive, fixators, solvents, specific dyestuffs, microtome, research microscope equipped with automatic expometer and video camera, soft of image analysis LUCIA® G of Ovidius University, Faculty of Medicine, Histology discipline;

## 2. Methods:

- 30 patients who received mud-therapy (wrapping, bath, ointment) and 5 who received non-peloid bath, during 10 days of treatment/12 days of staying;
- Including and exclusion criteria were applied upon the four batches;
- blood samples for determining serum level of hormones (cortisol and thyroid-stimulating hormone) have been cropped before the beginning of cure, at 24 hours after first application and at the end of the cure;
- The histological proofs have been collected at the end of cure, processed by conventional histological method and have been analysed at photonic microscope.
- Through biohistometry were evaluated the charge with melanin of the epidemical cells determining the report between the area occupied with melanin and the total epidemic area.

**Results and discussions:** Analysis of blades shows statistically significant increase of melanin in the basal and deep spinous layer and in melanocytes at all three types of mud administration.

The most intense melanin presence was detected at the lot that made the ointment with cold mud (expected result), where the melanin is disposed in all the keratinocytes' cytoplasm followed by the patients from the plot who received mud pack (unexpected results); the quantity of melanin within the skin cells of the patients who received plant extract bath was not statistically significant;

Hormones variation evaluation shows decrease of serum level of cortisol, statistically significant for mud wrapping, increase of serum level of thyroid-stimulating hormone, statistically significant for mud wrapping and for cold mud ointment.

**Conclusion.** The increasing amount of melanin pigment in the keratinocytes' and melanocytes' cytoplasm, presented on histological blades and confirmed by biohistometry and statistical analysis is a morphological proof of histologic modification induced by peloid therapy through the neuro-endocrine mechanisms. Increasing melanin presence within cells is correlated with decreasing serum level of cortisol: the highest charge melanin and the lowest cortisol serum level were at the batch with cold mud ointment, the second place, very close by first, is occupied by mud wrapping and the third place belong to mud bath.

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**Keywords:** mud therapy, epidermis, melanin, melanocyte, keratinocyte

## Congress Abstract – L37

## Morbidity and work capacity in education workers. Priorities of preventive and recovery strategies

Dorin-Gheorghe TRIFF

During the periodic medical check, workers from 31 schools received a questionnaire that included variables such as age, duration as an employee in the unit, height, weight, BMI, perceived self-efficacy, emotional exhaustion, work ability (Work ability index, noted -WAI). Out of a total of 1625 employees, a percentage of 81.47% of respondents completed the received questionnaires. The main 4 conditions identified in the respondents, in descending order (with the corresponding percentage of respondents who reported the respective condition) were the following: low back pain (8.3%), cervical-dorsal pain (7.81%), followed by hypertension (7.75%) and symptoms resulting from back injury (7.07%). Cervical-dorsal pain is comparatively more frequent in women compared to men ( $p=0.029$ ), those with cervical-dorsal pain have higher burnout scores ( $p=0.002$ ). Workers who have low back pain have higher age ( $p=0.044$ ) and burnout scores ( $p<0.001$ ). Workers with hypertension have significantly higher age ( $p<0.001$ ) and duration as an employee in the unit ( $p<0.001$ ). Those who present symptoms resulting from back injury have decreased perceived self-efficacy ( $p=0.041$ ) and increased emotional exhaustion ( $p<0.001$ ). Workers who have the 4 mentioned groups of ailments have significantly reduced work capacity. Results are presented for a total of 51 groups of conditions as well as associations of these conditions with the mentioned variables. The results show the need to implement in schools information and prevention programs for workers' morbidity, as well as those regarding coping strategies related to occupational stress. The importance of medical recovery in the occupational environment is emphasized by the association of the majority of workers' ailments with a significant decrease in work capacity.

**Key-words:** morbidity, employee, education, ailments, locomotor system, burnout, work ability

## Congress Abstract – L38

## Rehabilitation of a case of tibia-femoral dislocation complicated with rupture of the popliteal artery - Case Report

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**Abstract:** Tibio-femoral dislocation is a pathological condition that results in injury of at least one ligament, usually both cruciate ligaments and the injury of the others to varying degrees. The severity of the conditions can have a varied spectrum, from the spontaneous reduction of the dislocation to the injury of the neurovascular plexus. The rate of vascular complications is 3.3% among patients with tibia-femoral dislocation. Case Presentation: We present you a case of the 52-year-old female-patient who fell from ground level. She presented herself at the County Hospital for right tibia-femoral dislocation, femur and fibula fracture, cruciate ligaments rupture and post-traumatic meniscus injury. Orthopedic reduction was performed, and shortly after that she was urgently transferred at vascular surgery ward with ischemic phenomena at the level of the thigh and calf. At the University Hospital, she presents hypothermic forefoot integuments, discrete plantar cyanosis, functional impotence, significant leg edema, mobility and sensitivity abolished in the leg due to ruptures of the popliteal artery. RFA of the right lower limb is performed and little By-pass proximal popliteal-distal popliteal with inverted AVSI. Lower saphenous vein harvest for by-pass and leg fasciotomies. 5 months after the surgery, an EMG is performed on the right lower limb, where severe neuropathy of the right sciatic nerve is evident - SPE>SPI damage without acute denervation. The patient presents to our clinic with pain and stiffness when mobilizing the right knee actively and passively, muscle hypotrophy, muscle strength-3/5, pain when palpating the knee, skin hypoesthesia of the right lower limb, paresthesia at the level of the right lower leg, incapable dorsiflexion of the ankle and unstable gait. The individualized rehabilitation program begins with 2 series of 10 physical therapy sessions. After performing the doppler echography and reassuring that the patient has no blood clot remaining, in the 3rd series electrotherapy and kinesiotherapy are practiced with the rehabilitation of proprioceptive sensitivity, mobility of the foot and improvement of walking – long

distance with walker and short distance independently. This case represents a rare complication of tibia-femoral dislocation and its repercussion on the functionality of the patient and how rehabilitation proves to be yet again of great use in the therapeutic management of this type of complex injury.

**Keywords:** Tibia-femoral dislocation, rehabilitation, vascular complications, popliteal artery rupture, knee dislocation

*Congress Abstract – L39*

## Acupuncture in lumbar pathology

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**Objectives:** Acupuncture is a technique over 10,000 years old, which became well-known in Europe in 1939. It is an ancient healing method with origins in Ancient China. It treats by restoring the energetic harmony in the body with the help of special needles that are applied to the acupuncture points on the surface of the body. Acupuncture complements modern medicine, but does not replace it, making use of the body's own healing resources, it can be applied in order to restore some dysregulated functions, influencing the body's reactions to disease, or it can be applied symptomatically, addressing a symptom such as pain.

**Material and Method:** A clinical case study was conducted on a 50-year-old patient, who presented for pain in the lumbar spine with radiation in the left lower limb, for approximately 3 weeks with periods of exacerbation or worsening remission of effort and prolonged standing. From the acupuncture's standpoint, lumbar disease is represented by the obstruction in the circulation of Qi energy. The objectives of acupuncture treatment are to remove the obstruction at the level of the interested meridians and at the level of the collaterals, activating the circulation of Qi. The treatment consists of 10 sessions, 2 times a week, the duration of the session being 30 minutes.

**Results:** The clinical evolution was favorable with the reduction of pain at the lumbar spine level, the reduction of pain irradiation in the left lower limb level and the increase of mobility of the lumbar segment.

**Conclusions:** Acupuncture alone or in combination with other alternative methods (balneo physical kinetic treatment, locoregional/periarticular infiltrations) has an important role in musculoskeletal conditions, reducing pain and the days of inactivity in patients, as well as the adverse effects of drug treatment (NSAIDs, analgesics, corticosteroid therapy).

*Congress Abstract – L40*

## The role of electrotherapy in the recovery of the lower limb in neurological patients

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The recovery of the lower limb is much more comfortable compared to the upper limb. The spasticity developed during the evolution of the disease is beneficial for the stabilization of the lower limb.

**Objective:** Our aim is to evidence the role of electrotherapy in the recovery of the lower limb and walking.

**Method:** The authors studied 70 split in two groups patients to whom different types of electrostimulation, galvanic current and ultrasound were applied. All patients followed an adapted physical therapy program. patients were evaluated initially and at the end of the program for spasticity using the Aswoth scale and gait using the Tinetti gait scale.

**Results:** The patients who followed the electrostimulation program obtained much better scores compared to the group that did not have electrostimulation in the protocol.

**Conclusions:** The patients who had electrostimulation in the recovery program had a good evolution in a short time and sustained over time.

## Congress Abstract – L41

## Rehabilitation approach to the patient with chronic dyspnea

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**Abstract:** Dyspnea is defined as the subjective perception of a respiratory discomfort which consists of qualitatively distinct sensations and of varying intensity. The dyspneic patient who has a dyspneal affection persisting for more than 4-8 weeks fits the concept of chronic dyspnea. Dyspnea can have various causes – pulmonary, cardiac or other causes such as anemia, lack of physical condition, anxiety. Many times there are multiple reasons for this sensation. The cardio-respiratory recovery aims at the improvement of physical and mental performance by using programmes that consist of medical evaluation, kinetotherapy, risk factors intervention, educating the patient about a healthy lifestyle, but also psychological counseling. It is an intervention based on detailed evaluation of the patient, followed by therapies adapted to the patient, which include physical exercise, education and behaviour changes, meant to improve the long term adherence to health improving behaviour. The cardio-respiratory recovery is meant to reduce dyspnea, by enhancing the capacity for effort, thus improving the quality of life as well.

## Congress Abstract – L42

## Improving the physical performance of patients with heart failure and frailty through physical training

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**Introduction.** Decreases in physiological reserve and function of the systems and organs level characterise a biological syndrome called frailty. Frailty can be understood as the patient's vulnerability becoming dependent under physiological or psychological stress conditions. Physical activity is related to various indicators of physical and mental health. Physical frailty, expressed by impaired physical functional domains (muscle weakness, slowness, and low activity), is associated with sarcopenia. The risk of developing frailty in cardiovascular patients is three times higher than in the general population. The prevalence of heart failure (HF) is increasing and is expected to double in the next 40 years. The association of frailty with HF is common in the elderly, and its presence is a poor prognostic factor; it increases the risk of falls, disability, hospitalisation and mortality. Physical frailty and HF have been shown to correlate with age. The prevalence of physical frailty is over 50% in HF patients, compared to 10% in the general population.

**Materials and Methods.** One hundred forty-six consecutive hospitalized patients with various musculoskeletal conditions (neurological, degenerative or inflammatory) were evaluated for inclusion in the study. The selection of subjects followed the formation of two groups: Group I - group HF (patients with heart failure-HF) and Group II - group N- HF (patients without HF). All patients were clinically assessed by applying The Edmonton Frail Scale (EFS) questionnaire to assess physical performance.

**Results.** At initial determination, mild and moderate frailty was detected in 20.56% of enrolled patients; the severe form of frailty was identified in 2.83% of cases. The mean values obtained for the two groups indicate increased vulnerability, with significant differences between the two groups. The mean for group HF is  $7.11 \pm 2.54$ , and for group N-HF is  $6.10 \pm 1.67$  ( $p=0.001$ ) at first determination. After six months, the EFS score means to remain in the range of increased vulnerability; they change as follows: for group HF the score obtained is  $6.94 \pm 2.53$ ; for group N-HF, it is  $5.57 \pm 1.39$ , maintaining significant differences ( $p=0.001$ ). The functional performance scores showed significant differences between the two groups at baseline ( $p=0.001$ ) and the end of the study ( $p=0.001$ ).

**Conclusion:** Exercise-based rehabilitation is a primary therapy for improving physical performance, reflected by increased independence related to activities of daily living and functional performance in HF patients.

*Congress Abstract – L43*

## Magnetic nanoparticles functionalized with chitosan in peripheral nerve regeneration

Nadina-Liana Pop

Peripheral nerve injuries can significantly affect, in the medium or long term, the quality of life of patients, the development of a conservative treatment that addresses both the symptomatology and the regeneration of the damaged peripheral nerve representing a necessity.

The research conducted evaluated the effectiveness of daily oral administration for 21 days of chitosan-functionalized magnetic nanoparticles in functional recovery following experimentally induced right sciatic nerve injury in healthy white male Wistar rats.

To quantify the level of nerve recovery and regeneration, the following parameters were dynamically analyzed: sciatic functional index, animal behavior associated with pain, total body weight, serum levels of nerve growth factor and interleukin-6. Histological analysis and transmission electron microscopy and energy dispersive X-ray spectroscopy of injured nerve samples were performed. The evaluations obtained were analyzed statistically, by comparison with a control group, which suffered the same sciatic nerve injury, but which received placebo treatment (simple NaCl solution 0.9%) and, respectively, by comparison with a control group, of healthy animals without nerve injury and without treatment for the interpretation of IL-6 serum levels.

Histological studies, TEM and TEM-EDX confirmed nerve regeneration for both treatment methods, as well as the presence of nanoparticles at the level of the injured nerve. The results of the research showed that the magnetic nanoparticles functionalized with chitosan, administered orally, in the form of a solution, by gavage, daily, in a dose of 2.5mg/kg body, for 21 days, produced peripheral nerve regeneration, respectively a good functional recovery or even excellent, by reference to the evaluated parameters and the literature data.

*Congress Abstract – L44*

## Disc herniation electromyographic diagnosis

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**Abstract:** Pain and numbness along the radicular path may represent the clinical picture of a disc herniation, which is confirmed by paraclinical spinal MRI imaging, which objectify the diagnosis of disc herniation. But what happens when several disc herniations are objectified? Are all operable or only a few or just one? What is or are those with significant peripheral consequences that must be addressed? Is it only a discopathy or is the symptomatology the expression of another neurological disease? These questions can be answered accurately by electromyographic exploration, which is beginning to become indispensable in the battery of pre-operative screening tests for patients who turn to the neurosurgery service for disc herniation intervention.

The electromyographic diagnosis necessarily involves the needle EMG examination and the exploration of all the root levels of the investigated spine segment, by examining the degree of innervation of the paraspinal muscles, but also of the limb muscles related to the roots affected by discogenic disease.

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## Congress Abstract – L45

## The use of artificial intelligence in computer-aided diagnosis of medical conditions

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**Abstract:** Digital radiography is widely available and the standard modality in trauma imaging, often enabling to diagnose pediatric wrist fractures. Artificial intelligence can "read" radiology specialists' electronic reports and raise the alarm about patients at risk, identifying fractures that the specialist's eye might miss. Due to the amazing progress in computer algorithms, automatic fracture detection has become a topic of research interest. Wrist fractures, whose prevalence increases with age, are one of the most common fractures. Wrist radiographs are routinely acquired to assess injuries around the wrist, distal forearm and the carpal bones, in the acute setting as well as in follow-up. Distal radius and ulna fractures account for the majority of pediatric wrist injuries with an incidence peak in adolescence. Although the neural network for object detection cannot solve all current problems, it has the potential to completely change the way image interpretation is done. AI algorithms have the ability to automatically detect complex abnormal patterns in image data to provide assistive diagnosis for patients. The app aims to detect wrist fractures in children, helping pediatric surgeons in training or emergency physicians who often interpret trauma radiographs. The lack of experienced radiologists represents an important factor and risk in treating patients' fractures, therefore the use of artificial intelligence can be a useful tool in emergency centers. The application is based on the YOLO ("You only live once") algorithm that detects and recognizes different objects in an image, in real time. Traditional approaches often involve multiple stages, such as region proposal and object classification. YOLO revolutionized this field by proposing a single-stage object detection algorithm that can detect objects in real-time with remarkable accuracy.

**Keywords:** digital radiography, wrist fracture, pediatrics, patients, algorithm YOLO.

## Congress Abstract – L46

## Rebuilding life after stroke: The use of virtual reality in the physical and psychological recovery of patient

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**Abstract:** Stroke is a medical event that often leaves individuals with significant physical and psychological challenges. Recovery after a Stroke, trauma or as a result of neurological conditions is related to neuroplasticity, which helps healthy brain tissue to take over the functions of damaged areas. The system also addresses post-stroke cognitive deficits as it can track user feedback in response to different levels of training. The exercises aim to exploit and train the cognitive processes between perception and action. This research explores the emerging role of virtual reality (VR) technology as a transformative tool in the recovery process for stroke patients. Virtual reality offers a dynamic and immersive platform that enables tailored interventions for both physical rehabilitation and psychological well-being. Virtual Reality is one of the most promising technologies for neuromotor rehabilitation, able to combine the principles of neuroscience and physiotherapy techniques in the motivation and recovery of people requiring neurological rehabilitation. In the realm of physical recovery, VR-based and game-based rehabilitation programs provide engaging and interactive exercises that target motor skills, balance, coordination, and muscle strength. By simulating real-world activities within a controlled digital environment, stroke survivors can engage in repetitive and challenging movements that promote neural plasticity and motor relearning. These virtual exercises can be customized to individual needs and adjusted as progress is made, fostering a sense of achievement and motivation. Virtual reality interfaces allow patients to explore a computer-generated environment. Even if these interfaces are used in video games, this is a tool with great therapeutic and recovery potential. Stroke survivors often contend with depression, anxiety, and reduced quality of life. VR therapy offers immersive relaxation experiences, cognitive exercises, and exposure therapy to confront and manage these psychological issues. By creating safe spaces for gradual exposure to anxiety-inducing situations, VR enables patients to regain confidence and autonomy in their daily lives.

The utilization of virtual reality technology in post-stroke rehabilitation demonstrates remarkable promise in both physical and psychological recovery. As research and innovation continue to advance, VR holds the potential to redefine the landscape of stroke rehabilitation, offering a holistic approach that empowers patients to rebuild their lives with newfound resilience and optimism.

**Keywords:** Stroke rehabilitation, virtual reality, physical recovery, psychological recovery

*Congress Abstract – L47*

## Ludotherapy in the rehabilitation of patients with Coffin Lowry syndrome

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Coffin Lowry syndrome is a rare X-linked condition in which affected males show severe mental retardation with characteristic dysmorphism, especially of the face and hands. Typical facial features consist of: prominent forehead, hypertelorism, wide nasal pyramid, abnormally elongated palpebral fissures, and exaggerated oral cavity with fleshy lips. The hands are large with stubby fingers. Other clinical features include short stature, pectoral deformity, and/or mitral dysfunction, and sensorineural deafness.

Ludotherapy, also called play therapy, is a method by which, with the help of play, mental illnesses are treated. In the modern era, play therapy is a primary therapeutic tool used to treat children's emotional problems, but it is also beneficial for adults.

In the rehabilitation of the patient with Coffin Lowry disease, ludotherapy aims to stimulate and develop psycho-individual abilities in order to adapt to the environment, to form manual skills and practical-applicative skills, to form independent behaviors for social integration and to stimulate self-knowledge, knowledge of others and the surrounding environment.

*Congress Abstract – L48*

## Patient recovery after Lisfranc injury

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Lisfranc joint injuries occur most frequently following road accidents, but also in military personnel, athletes, horse riders, football players and contact sports participants. Lisfranc injuries occur as a result of direct (crushing the leg by a blunt object) or indirect (twisting the leg) forces acting on the forefoot.

Approximately 20% of Lisfranc injuries go unnoticed or are diagnosed late, especially low-energy injuries or purely ligamentous injuries. Severe sequelae such as post-traumatic osteoarthritis and foot deformities can create serious disability.

The paper presents a 19-year-old male patient, diagnosed with a Lisfranc type lesion in the left leg. The patient was functionally assessed postoperatively, during and at the end of the recovery program. During the recovery program, a good progress and evolution of the patient could be observed. Thus, the patient followed the kinetic program initially established by the physical therapist, and it was also possible to observe the increase in joint mobility, stability and muscle strength.

The physical therapy program designed must be preceded by an appropriate assessment and must include techniques adapted to the patient's abilities. An essential condition is a good collaboration between the patient-physiotherapist-orthopedic surgeon, so that complications and relapses can be avoided.



## Congress Abstract – L49

## The effects of exercises in sagittal plane of the spine on the anterior-posterior balance of the human body

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**Introduction:** Anteroposterior oscillations represent the periodic back and forth rocking movements of the human body. These oscillations are closely related to the muscle coordination of the lower limbs and the control of the vestibular system, which regulates balance. Treatments based on specific exercises, therapeutic massage and balance training can influence these oscillations, improving the patient's ability to control their balance and prevent the risk of falls or other complications related to movement and posture.

**Material and method:** The study took place over a period of 6 months, with a group formed by 5 subjects, having the following criteria; age between 30-40 years, weight between 70-85 kg, height between 170 cm - 185 cm, plant size 40-43 EU, diagnosed by the specialist doctor with postural problems (increased anterior-posterior oscillations). The treatment consisted of massage, warming up, exercises for stabilizing muscles, exercises for restoring anterior-posterior balance, cooldown.

**Results:** During three weeks, five patients participated in a physical therapy evaluation and treatment study. After the initial assessment, they followed a customized protocol of exercises and interventions. At the end of the 15 days, significant improvements were observed in the antero-posterior balance of the patients, underlining the effectiveness of the applied treatment.

**Conclusion:** The three-week study of five patients demonstrated that personalized physiotherapy treatment led to significant improvements in antero-posterior balance. This emphasizes the effectiveness of physical therapy in improving patients' functionality.

## Congress Abstract – L50

## Predictors of work ability in education workers. Implications in medical recovery in locomotor disorders and in the use of coping strategies

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Workers from 3 school units were administered questionnaires that tracked individual characteristics (biological sex, type of residence, age as an employee in the unit, level of education), perceived self-efficacy, emotional exhaustion, presence of locomotor system disorders and work capacity. Although significant differences appear between the school units according to the monitored variables, work capacity is positively correlated with perceived self-efficacy ( $p_1=0.011$ ;  $p_2=0.002$ ;  $p<0.001$ ) and negatively correlated with emotional exhaustion ( $p_1<0.001$ ;  $p_2<0.001$ ;  $p_3<0.001$ ) and with locomotor disorders ( $p_1<0.001$ ;  $p_2=0.018$ ;  $p_3<0.001$ ) in all 3 school units. The regression analysis showed that the following variables have the role of predictor for work capacity, explaining a percentage of the variation in work capacity as follows: perceived self-efficacy (12.2%; 11.3%; 15.6%), emotional exhaustion (26, 7%; 24.5%; 44.1%), the presence of locomotor disorders (25.4%; 24.8%; 29.4%). In contrast to emotional exhaustion that correlates with perceived self-efficacy in all 3 school units,

locomotor disorders correlate only in one school unit with emotional exhaustion and, respectively, with perceived self-efficacy. Thus, in the workers from the studied schools, the locomotor system conditions are predictors that explain between 25-30% of the variation in work capacity, a result that underlines the importance of both their prevention and the medical recovery of workers with these conditions not only in terms of the costs related to temporary incapacity for work but also the costs related to the decrease in the work capacity of workers with such conditions. Emotional exhaustion predicts between 27%-44% and perceived self-efficacy between 11%-15% of the variation in work capacity. Also, the data presented support the priority of using effective individual and organizational strategies to prevent emotional exhaustion.

**Keywords:** education workers, ailments, locomotor system, work ability, burnout, self-efficacy

*Congress Abstract – L51*

## From newborn screening to early treatment and kinetotherapeutic interventions, including advanced assistance in patients with spinal muscular atrophy

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**Introduction.** Spinal muscular atrophy (SMA) is a degenerative disorder of the nervous system with autosomal recessive transmission that affects motor neurons in the anterior horn of the medullary, often those in the brainstem, and leads to their death with loss of muscle mass and motor deficits. SMA is caused by deletion or mutation of the survival motor neuron 1 (SMN1) gene, and the nearly identical SMN2 gene fails to generate adequate levels of functional SMN protein due to a splicing defect. Currently, three therapies are available in Romania that aim to increase the SMN protein: Onasemnogene Asepavoice, Nusinersen and Risdiplam. The best results were obtained in presymptomatic patients, but the introduction of therapy in the early symptomatic stage of the disease appears to be crucial to maximize the effects.

**Objectives.** The availability of treatment for patients with SMA and access to the application of standards of care in this disease allow this presentation to be supported to demonstrate that high efficiency and maximal motor acquisitions depend on the age/stage of the disease at which therapy is initiated.

**Material and methods.** The paper aims to reproduce patient images, diagnostic methods and innovative treatments used in NUHCN. Current options are effective in improving mobility, optimal ventilation, and improving ventilation-free survival in the patient who starts treatment early.

**Results.** We have observed disease trajectories that differ significantly from the known natural history of the disease. These new phenotypes now also cross the traditional subtypes of SMA. It is now more appropriate to rely on a combination of age of onset, number of SMN2 copies, and age at start of drug treatment rather than the traditional subtypes to define a clinical phenotype of SMA.

**Conclusions.** Early treatment leads to a better outcome and we need to improve our diagnostic capacity and reduce all procedures to ensure rapid treatment. We need to guarantee the best standards of care to achieve the best results and to describe new phenotypes in patients with SMA. We need consensus on the classification of SMA type and the endpoints that determine the efficacy of any treatment intervention. Standard newborn screening appears to be an appropriate tool to achieve maximum treatment effects, timely diagnosis and initiation of treatment.

**Keywords:** spinal muscular atrophy, new phenotypes, antisense oligonucleotide, gene therapy

## Congress Abstract – L52

## "Recovery of the spastic leg after botulinum toxin (Dysport) through the intervention of augmented virtual reality (AVR) in cerebral palsy (CP) in children"

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**Introduction:** Inability to maintain a stable orthostatic position with imprecise/disorganized movements and a constant feeling of falling, with risk of injury.

Treatment with botulinum toxin acts at the level of the neuromuscular junction which allows relaxation characterized by a local weakness of the contracted/spastic muscles.

**Material and method:** The study was carried out within the "Dr. Nicolae Robănescu" National Clinical Center for Neuropsychomotor Recovery for Children Bucharest, and included a number of 28 adolescents aged between 13-18 years (156-216 months) in order to obtain a partial fingerprint/ total "physiological" - plantar, of the spastic leg from PC.

**Results:** Following the results obtained on the Ashworth Scale - almost all children with CP showed improvements (decrease in grade) in terms of "tense"/spasticity of the leg, which represents a multifactorial characteristic almost emblematic of this category of patients, using a whole therapeutic arsenal – disport, physical therapy, including these new modern approaches of augmented RV.

**Conclusion:** This study examined the potential use (by accredited personnel) and acceptability (of the patient with CP) of the augmented RV, as a tool provided and recommended in the therapeutic-restorative arsenal of the spastic leg in patients with CP.

## Congress Abstract – L53

## Cerebral palsy - types and associated pathologies

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**Introduction:** Cerebral palsy (CP) is the most common form of non-degenerative pediatric neurological pathology. It has no fixed etiopathogenesis, but the ones that are the most common are prematurity of the nervous system due to premature birth and/ or neurological lesions due to severe perinatal pathology. There are four different types of CP defined depending on their motor manifestation: spastic, dyskinetic, ataxic and mixed. The literature mentions that the patients affected by CP usually have other associated conditions as well, that can vary from mental retardation, secondary dysplasia, chronic pain, to permanent disability or invalidity [1].

**Material and method:** This paper researched data bases such as PubMed, Embase, Scopus for the last 5 years to determine which are the most common types of CP and if there is any pattern in the association of other pathologies and the type of CP that the patient has.

**Discussion and conclusion:** There are no known/ predetermined patterns in the association of CP type and other associated conditions, even if there is a bigger incidence for the spastic type of CP, followed by the dyskinetic type [2].

1. <https://www.cdc.gov/ncbddd/cp/facts.html#:~:text=The%20most%20common%20type%20of,their%20movements%20can%20be%20awkward.>

2. Anil Agarwal, Indreshwar Verma, Cerebral palsy in children: An overview, Journal of Clinical Orthopaedics and Trauma, Volume 3, Issue 2, 2012, Pages 77-81, ISSN 0976-5662, <https://doi.org/10.1016/j.jcot.2012.09.001>

## Congress Abstract – L54

## Comparative study of static posture analysis

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**Introduction:** Posture detection is used in various situations such as medical care, surveillance, virtual environment, indoor monitoring, virtual reality for animations and entertainment. The exact position of certain segments of the human body can be easily inferred using the Kinect Azure device's cameras, this information can be processed by the body tracking modules to produce accurate estimates of the segments position in real time.

**Objective:** This study aims to compare the results obtained by the Kinect Azure device with the results obtained using the Posture Pro software, the latter being already validated and used on the market in posture assessment. This comparison aims to analyze the accuracy of posture assessment using the Kinect Azure device.

**Material and Method:** A number of 85 students of the Faculty of Physical Education and Sport from the West University of Timisoara participated in the study, who had their posture analyzed from the standing position using both the Kinect Azure device and the Posture Pro software, at the same time.

**Results:** The alignment of the shoulders and hips was followed through both assessment methods. Following the comparisons, it was observed that in 78.82% of cases both assessment methods recognized the same high shoulder, and in 71.76% of cases they recognized the same high balance. Of the cases in which the recognition of the joint that is higher was wrong, in only 26% of the cases the alignment deviation was greater than 1cm.

**Conclusions:** Following the results obtained and their analysis, we can state that the posture evaluation method using the Azure Kinect device has very similar results to the already validated Posture Pro software. In conclusion, the proposed evaluation method is one that obtains favorable results and urges to be studied further in order to be perfected.

**Keywords:** posture analysis, Kinect azure, Posture Pro, artificial intelligence

## Congress Abstract – L55

## Rehabilitation in juvenile idiopathic arthritis- case report

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**Introduction:** Juvenile idiopathic arthritis (JIA) is the most common type of arthritis in kids and teens. The inflammation of various joints causes pain. Early diagnosis and management of the patients, which include medication and rehabilitation therapies, can reduce the onset of complications. Despite the progress in managing this disease, there are cases which present severe complications.

**Material and Methods:** We present the case of a young girl diagnosed with JIA who was admitted in the Medical Rehabilitation Hospital of Băile Felix.

**Results:** A 13 year old girl, diagnosed with JIA, who is under treatment with Sulfasalazine since 2019, presents in the Medical Rehabilitation Hospital of Băile Felix with mechanical pain in the hips, knees and the dorsal spine, and inflammatory pain in the MCP and MTP on the both sides, right shoulder and both elbows. Even more, the patient doesn't have the ability to stand up and walk, she uses a wheelchair for ambulation. She was first admitted in the rehabilitation hospital in 2022. The examination reveals that there is a severe limitation of mobility in both hips and knees, the left side being more affected. She underwent a complex program of rehabilitation therapy and slight improvements were seen in the evolution. But the pain was still present, and the ability of standing up and walking were not recovered. She received the recommendation to be seen by a rheumatologist and a paediatric orthopedist, for treatment adjustments, but she did not go for a check up.

**Conclusion:** In conclusion, JIA is a complex disease, which needs an early diagnosis and an early management programme. The lack of compliance, and inadequate medication can lead to disabling complications

## Congress Abstract – L56

## Primitive reflexes – do they matter after the age of 6 months?

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**Introduction:** Primitive reflexes are involuntary motor responses originating in the brainstem, present after birth in the early development of the child, with the role of facilitating survival. They are important in assessing newborns – immediately after birth, and young children up to the age of one year and even later. These motor responses of the central nervous system are eventually inhibited around the age of 4 to 6 months, some around the age of 1-3 years, as the brain matures and replaces them with voluntary motor activities but may remain active or return to the presence of neurological diseases.

**Material and method:** In up-to-date research related to the neuro-psycho-motor development of children and adolescents, it seems that these reflexes play a very important role in ensuring not only survival, but the efficient acquisition of new motor, sensory, mental knowledge, and their effective integration into normal neural models. The integration deficit of some of the primitive reflexes can lead to the appearance of specific learning disorders such as: dysgraphia, dyslexia, dysortographia, dyscalculia, etc., and sensory-motor integration disorders such as dyspraxia. This paper aims to research literature and bring to the fore the latest papers written on this topic, and highlight that easy-to-do clinical evaluation can lead to the resolution/ improvement of seemingly unmanageable pathologies.

**Discussions and conclusions:** Primitive reflex integration techniques are an effective method of correcting minor / medium neural organization defects, with the improvement of symptoms including for patients with chronic degenerative neurological diseases.

## Congress Abstract – L57

## Friedrich ataxia – rare disease with case presentation

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**Introduction:** Ataxia Friedrich belongs to the category of genetic neurological diseases, being the most common of autosomal recessive cerebellar ataxias and at the same time the ataxia with the highest incidence among the Caucasian population with 2-5 cases / 100,000. The diagnosis is genetic, with autosomal recessive changes in the gene that encodes Frataxin, a protein needed to transmit the nervous impulse. This protein is found in the mitochondria of nerve cells and plays an important role in iron metabolism at this level, being involved in the biogenesis, maintenance, and repair of the Fe-S connection at this level. Atypical phenotypes: LOFA (Friedrich late-onset ataxia), VLOFA (Friedrich ataxia with very late onset), FARR (Friedrich ataxia with non-integrated primitive reflexes), FORDA (with early onset). The most commonly associated with the neurological symptoms are cardiac symptoms due to hypertrophic cardiomyopathy – 50-70%, but there may also be symptoms in the category of foot malformations (pes caves), neuromuscular scoliosis – associated phenomena in 20-90% of patients, and pathology such as type I diabetes that is associated with the underlying disease in 20-30% of patients.

**Material and Method:** In this paper were shown, a case presentation of a patient with a diagnosis for an atypical genetic phenotype of Friedrich ataxia, FARR and the importance of introducing the integration of primitive reflexes into the treatment plan.

**Results:** The patient managed to improve the times for orthostatism, functional independence and to carry out their daily activities safely.

**Conclusions:** Even in the case of degenerative genetic diseases, considered with irreversible loss of cerebellar functional capacity, integrated treatment methods can lead to neuronal plasticity and the creation of compensatory motor patterns in the remaining nervous matter.

## Congress Abstract – L58

## Complex case of congenital hip dysplasia and cerebral palsy

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**Introduction:** Cerebral palsy is the most common non-degenerative neurological pathology of the child being associated in over 20% of cases with secondary, paralytic dysplasia of the hip, but very rarely with congenital hip dysplasia. For the right treatment, the initial diagnosis needs to take place early and correctly. In the case of the patient with congenital hip dysplasia, the diagnosis is made by ultrasound with the help of screening programs for hip dysplasia, in the first weeks of life. For patients with hip dysplasia secondary to cerebral palsy, symptoms appear later, the diagnosis is made with the help of a hip antero-posterior radiograph in the first year of life or later when no efficient ambulation is purchased, either by quadrupeding or orthostatism.

**Material and method:** Patient P.Ș.P. aged 18 years, with diagnoses of: Cerebral palsy diplegic spastic form, Congenital bilateral hip dysplasia, multiple times operated, Inequality of the lower limbs, Bilateral flat neuromuscular leg, Secondary dorsal-lumbar scoliosis, Mild psycho-intellectual retardation without declaring a behavioral disorder, has been monitored in the clinic since the age of 9 years. The patient underwent serial, bilateral surgeries to reduce hip dislocations and streamline ambulation. She required individualized plantar orthosis, a medical rehabilitation program with a multidisciplinary team (orthopedics, medical rehabilitation, pediatric neurology, speech therapy, psychology, physical therapy) in order to manage the case.

**Discussions and conclusions:** Although rare, the association between cerebral palsy and congenital hip dysplasia is a complex of pathologies that require serial interventions, both orthopedic and physical, so that the patient can be rehabilitated and included in the appropriate social setting, thus preparing him/ her for an independent life.

1.Gavrankapetanovic I, Cobeljic G, Bajin Z, Vukasinovic Z, Gavrankapetanovic F. Developmental dysplasia of the hip in cerebral palsy--surgical treatment. *Int Orthop*. 2007 Aug;31(4):561-8. doi: 10.1007/s00264-006-0224-6. Epub 2006 Sep 9. PMID: 16964486; PMCID: PMC2267646.

## Congress Abstract – L59

## Scoliosis diagnosis and treatment protocols

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**Introduction:** Scoliosis is the most common spinal pathology, varying from idiopathic to secondary due to neuromuscular, orthopedic, metabolic, or genetic causes. It can affect all ages from infants to elders, with mild to severe cases, with no associated pathologies or with a plethora of them. General reports note a prevalence of adult scoliosis up to 32%, but there are studies with results that indicate a scoliosis rate of 68% in a healthy adult population, with an average age of 70.5 years. (1) For the younger population the reported prevalence figures ranged from 13 to 68% with a pooled prevalence estimate from the mixed-effects logistic regression analysis was 37.6% in a 2020 meta-analysis. (2) This shows how important it is to know which is the correct way to diagnose, monitor and treat scoliosis.

**Material and method:** Latest research publications on the topic of scoliosis and SOSORT, EuroSpine Society protocols of diagnosis, treatment and monitoring have been put on display for the presentation.

**Discussion and conclusion:** The diagnosing process for scoliosis is the same for most types of scoliosis, however treatment and monitoring methods differ according to the age of the patient and the type of scoliosis he/she is suffering from.

1. Schwab F, Dubey A, Gamez L, El Fegoun AB, Hwang K, Pagala M, Farcy JP. Adult scoliosis: prevalence, SF-36, and nutritional parameters in an elderly volunteer population. *Spine (Phila Pa 1976)*. 2005 May 1;30(9):1082-5. doi: 10.1097/01.brs.0000160842.43482.cd. PMID: 15864163.

2. McAviney J, Roberts C, Sullivan B, Alevras A.J, Graham P.L, Brown P.T. The prevalence of adult de novo scoliosis: A systematic review and meta-analysis. *European Spine Journal* (2020) 29:2960–2969 <https://doi.org/10.1007/s00586-020-06453-0>

## Congress Abstract – L60

**Pediatric oncological rehabilitation in Romania – does it exist?**Vlădăreanu L.<sup>1,2</sup>, Fărcășanu C.<sup>3</sup><sup>1</sup> - Ovidius University of Constanța, Medical Doctoral School, Faculty of Medicine<sup>2</sup> - Techirghiol Balneal and Rehabilitation Sanatorium<sup>3</sup> - Asociația Părinților cu Afecțiuni Oncologice

**Introduction:** In the European Union, the number one cause of death for children over 1 year of age is pediatric cancer. One out of every 413 children develop a tumor in their first 15 years of life. The incidence of these neoplasms corresponds to 16.5 cases/ year/100 000 children, with the majority surviving into adulthood. Leukemia, central nervous system (CNS) tumors, and bone tumors are the most frequent pediatric neoplasms. Out of all leukemias, acute lymphoblastic leukemia (ALL) is the most common oncological pediatric pathology, with a European incidence of about 4 cases/year/100 000 children. Their prognosis has gone to an overall survival rate of 90% due to increases in early diagnosis and chemotherapy treatments and to easier accessibility to treatment in Romania and European countries, as well as transfers in between the European clinics. Most common solid malignant tumors in children are CNS tumors, with them representing 20-25% of all neoplasms for children with ages between 0 and 15 years. Out of the bone tumors 40% are represented by osteosarcomas, and in total they represent 2% of neoplasia in children, with a European incidence rate of 0.33 cases/year/100 000 children. The estimated survival rate for all neoplasms in Europe between 2003-2008 was close to 80% at 5 years. Often the survivors must pay a high toll on functionality and life quality as there are many secondary effects of the oncological treatment they have undergone. These vary from muscle weakness to permanent loss of limbs and impairment. (The Italian consensus conference on the role of rehabilitation for children and adolescents with leukemia, central nervous system, and bone tumors, part 1: Review of the conference and presentation of consensus statements on rehabilitative evaluation of motor aspects - Francesca Rossi, Federica Ricci, Stefano Botti, Daniele Bertin, Simona Breggiè, Roberto Casalaz, Marta Cervo, Paola Ciullini, Monica Coppo, Annalisa Cornelli, Maria Esposito, <https://doi.org/10.1002/pbc.28681>)

**Material and Method:** This paper aims to bring into focus for the Rehabilitation community in Romania that it is mandatory to include these patients into a rehabilitation plan even starting from the time they are on the hospital bed for their oncological treatment or in Intensive Care Units due to complications. Up to date literature will be used to emphasize this need and to show if there is any consensus over it.

**Results and Discussion:** In Romania there are few state clinics that rehabilitate children, and even fewer that rehabilitate oncological pediatric patients. They use international protocols for the treatment they provide and use support associations/ NGOs to follow the patients.

## Congress Abstract – L61

**Adaptability, creativity and objective feedback.****Connecting the employees and patients of the Techirghiol Spa and Rehabilitation Sanatorium to the application of transformational management**

Roxana-Elena Țucmeanu, Alin-Iulian Țucmeanu, Carmen Oprea, Liliana Vladareanu, Madalina Iliescu

**Introduction.** Transformational management with applicability in rehabilitation units with a balneal profile, remains an important tool for evaluating performance criteria. Transformational leaders must not only guide the changes taking place in the organization but manage employee morale, which is often a challenge in the present days.

**Material and method.** In this paper, we present a case study carried out in the Balneal and Rehabilitation Sanatorium of Techirghiol, Romania, a reference unit in the field, with great national and international impact, where more than 529 employees work at a number of 900 hospital beds. Questionnaires applied to both, employees and patients, were analyzed, regarding the satisfaction with work or accommodation and medical services or other administrative issues, etc., and the data obtained were processed statistically. All the data offers a lot of objective information, of great value from the medical management field.

**Discussion and conclusions.** We can conclude that through this objective feedback, which is permanently carried out in the unit, the management becomes adaptable and creative, being able to generate work plans based on real data collected. Also, leadership can be improved permanently, and be pleasant and effective. Communication is the basis of effective medical management, with sustainable results, centered on the patient and medical act.

*Congress Abstract – L62*

## The advantages of musculoskeletal ultrasound regarding the knee joint assessment

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**Introduction:** Pain and dysfunctionality of the knee are the most common reasons of patients' addressability to the Medical Rehabilitation and Rheumatology departments. For subacute and chronic symptoms (more than 6 weeks), for diagnosis, staging of osteoarthritis and posttraumatic condition, X-Ray examination is the first choice<sup>1</sup>. Additionally, musculoskeletal ultrasound (MSK-UUS) is a sensitive technique for joint's evaluation and also the surrounding structures, not so expensive and easy to perform, used more and more in the last 15 years.

**Objective:** Ultrasound assessment of the knee in order to set the most accurate diagnosis to establish the appropriate therapy.

**Methods:** Detailed knowledge of the knee anatomy, proper settings of the machine and use of a correct technique and a standard scanning protocol through a systematic joint's evaluation in short and long axes of the anterior, lateral, medial and posterior views.

**Results:** UUS examination is useful for detecting bursal or tendon sheath fluid collection, injuries of the tendons, ligaments, to evaluate the space between the bones, to identify its erosions or productions, in short, to differentiate degenerative changes by inflammatory pathology.

**Conclusions:** Knee's structure, as a diarthrodial synovial joint with a complex anatomy, made up by bones, hyaline and fibrous cartilage, covered by ligaments, tendons and muscle, is essential in maintaining the orthostatism, a proper gait and the locomotion. That's why a quick and clear diagnosis of the knee's pathological changes is necessary for treating the issue, using MSK-UUS being the recommended way.

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*Congress Abstract – L63*

## Recognised physical models for treating scoliosis

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**Introduction:** Scoliosis is a global spinal pathology that according to recent studies, affects approximately 32-45% of the general adult population [1] and approximately 25% of the population under 18 years of age [2] causing symptoms, that depending on etiopathogenesis, vary from spinal pain to paresis, paralysis, even permanent disability in forms associated with bone malformations or secondary neurological pathologies. Given the spread of this spinal pathology, it is believed that treatment methods are also standardized, objective. However, the clinical and literature realities show that there is still no consensus on this issue.



**Material and method:** The present paper analyzed the latest (2015-2023) publications from databases such as PubMed, Embase, Physiopedia, showing whether there is a method of kinetic treatment that is universally accepted in the treatment of scoliosis.

**Discussions and conclusions:** The databases studied showed that there are at least three kinetic methods used in the treatment of scoliosis (Schroth, Rigo, RPG Souhard) that have partially standardized protocols, but that there is no consensus in scientific societies such as SOSORT or the EuroSpine Society, to validate or favor one of these methods to the detriment of another.

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*Congress Abstract – L64*

## The importance of complex rehabilitation treatment in patients with axillary nerve palsy - a case presentation

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**Introduction.** The brachial plexus is the network of innervation of the upper limb, consisting of the ventral branches from C5 to T1. The five terminal branches are the musculoskeletal nerve, median nerve, ulnar nerve, radial nerve, and axillary nerve. The axillary nerve is the terminal branch and will be our area of interest to be discussed in this presentation. Axillary nerve injury remains the most common peripheral nerve injury affecting the shoulder. The purpose of this paper is to highlight the importance of conservative management of the axillary nerve. Premature return to intense activities can predispose the patient to re-injury. A prompt diagnosis and a timely rehabilitation protocol allow a safe, complete return to professional activity and can prevent relapses.

**Material and methods.** This paper presents the case of a 64-year-old male patient who, in April 2021, suffered a trauma to the right shoulder, after performing untimely movements at home. The impairment of mobility at the level of the right shoulder, the aggravation of the motor deficit for flexion, extension, abduction and external rotation movements, the proximal hypotrophy of the right upper limb, the right C6 hypoesthesia determined the patient to perform multiple investigations and consultations (neurosurgery, plastic surgery, orthopedics). During the admission to the Balneal and Rehabilitation Sanatorium of Techirghiol, the patient was clinically and functionally evaluated in dynamics to follow the effectiveness of the medical rehabilitation program.

**Results and discussions.** The treatment at the Balneal and Rehabilitation Sanatorium of Techirghiol, included pool- general hydrokinotherapy, general mud bath, galvanic current, magnetotherapy, high-frequency laser, massage and individual kinetotherapy. The medical rehabilitation program had to be included in the patient's therapeutic approach as early as possible, immediately after the trauma.

**Conclusions.** Through the established rehabilitation program, the therapeutic yield was significant, with increased mobility, autonomy, as well as social reintegration and family life. Axillary nerve injuries can vary widely in severity and presentation, ranging from mild pain to severe muscle weakness. They usually respond well to conservative treatment, with no surgical intervention required. It is important to promptly diagnose these conditions and initiate a comprehensive medical rehabilitation program to increase functional status and quality of life. Failure to accurately diagnose and manage patients can lead to lifelong disability. Therefore, the role of an interdisciplinary team in evaluating and managing these patients is essential.

## Congress Abstract – L65

## To be or not to be, ChatGPT ... that is the question. Navigating between truths and hallucinations.

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**Background and hypothesis.** ChatGPT can generate increasingly realistic language, but the correctness and integrity of implementing these models in scientific papers remain unknown. Several sources cited ChatGPT as an effective and promising technique for conducting extensive literature reviews. Based on recently published literature and current progress trends, we assumed that artificial intelligence (AI) and, in particular, ChatGPT might be helpful tools in research and scientific documentation because of their presumed efficiency in analyzing and conducting extensive searches of references across multiple databases. ChatGPT's impacts on academic writing are primarily unknown.

**Aim.** The primary goal was to expand the search for high-quality literature on a proposed topic.

**Method:** An advanced search in international databases is based on syntactic associations between keywords indicated by the researcher. During “conversations” with ChatGPT, the same search strategy was employed.

**Results.** The authors posed probing queries on the validity and reality of the titles provided by the AI, and Chat GPT responded firmly in the affirmative.

There were significant content flaws in the information provided by ChatGPT; none of the references (paper titles) supplied by ChatGPT existed. When searching PubMed IDs for randomized controlled trials and/or meta-analyses, all DOI numbers correlated to various unconnected manuscripts. As a result, documents were completely different, in another field or subject.

**Discussion.** ChatGPT supplied bibliographic resources we could not uncover through a systematic literature search or open sources. We discovered a “hallucinatory” trend, which included “fake” references and attempts to paraphrase a “research paper” (which turned out to be confabulatory). The paradox of ChatGPT's wrong conclusions stems from the fact that, despite keyword syntactic correlations, the titles and authors were chosen in a confabulatory manner, and also it manufactured hallucinogenic explanations, presented as authentic articles.

**Conclusions.** The usage of ChatGPT as a possible adjunct in academic writing and scientific research should take into account restrictions that may jeopardize the study's quality. Incorrect content was commonly mentioned as a ChatGPT flaw.

ChatGPT is still in its “childhood” early stages, but it can swiftly deliver simple, rapid, and practical general knowledge as a possible complement to medical education for students and young doctors. However, the human mind and intelligence must first carefully assess all data provided through AI.

## Congress Abstract – L66

## Challenges for neuromuscular rehabilitation in a case of flaccid paraparesis with an uncertain cause

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**Abstract:** Partial (-paresis) or total (-plegia) loss of voluntary motor function in the pelvic limbs is referred to as paraparesis. Tetraparesis (sometimes referred to as tetraplegia) involves the same involvement of all four limbs. Typically, spinal cord lesions proximal to the second thoracic spinal cord segment cause paraparesis.

This paper presents a case of flaccid paraparesis of uncertain etiology that was admitted to the Balneal and Recovery Sanatorium Techirghiol (BRST) multiple times due to the motor deficit acquired approximately one month after a road accident and whose exact cause could not be established. During the hospitalizations, the patient benefited from clinical-functional evaluations and balneo-physical-kinetic treatment, having a favorable evolution, with an increase in the degree of functional independence, both from a motor point of view and from a cognitive point of view. At the same time, during the clinical examination performed at the last admission to the BRST, we found that the patient regained the tonicity and trophicity of the right thigh.

As a conclusion, paraparesis is a debilitating condition that seriously affects the quality of life of patients, who need rehabilitation, psychological support and special attention for the prevention of complications for the rest of their lives. At the same time, innovative methods are needed in investigating the cause and the diagnosis of this pathology in order to be able to offer an effective treatment that determines the regaining of the lost functions by the patient.

*Congress Abstract – L67*

## The effects of intermittent hypoxia-hyperoxia exposure on patients with obesity.

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**Objectives.** Intermittent hypoxia-hyperoxia treatment may find utility in the management of obesity and its associated metabolic risks. This study aims to demonstrate the possibilities of weight loss, the increase of exercise capacity, and the improvement of the general state of health in the context of patients with obesity, by performing intermittent hypoxia-hyperoxia therapy, simultaneously with balneo-physical-kinetic recovery treatment.

**Material and Method.** To achieve the objectives, 40 patients with obesity, admitted to the Balneal and Rehabilitation Sanatorium Techirghiol, were included in the study. The patients were divided into two groups. The interventional group included 20 patients with obesity who underwent complex medical recovery treatment and intermittent hypoxia-hyperoxia therapy, provided by a control unit. The control group included 20 patients with obesity who performed only complex medical recovery treatment. Both at admission and discharge, the following parameters were evaluated: weight, anthropometric measurements, glycemic profile, lipid profile, six-minute walk test, and paraclinical investigations that evaluate liver function, kidney function, and respiratory function. It was analyzed whether there is statistical significance between the values of the parameters of the intervention group and the control group, as well as between the values in dynamics (admission-discharge).

**Results.** Obtaining satisfactory results in the control group confirms that the complex recovery treatment that includes physical exercise contributes to the improvement of the general state of health. Obtaining promising results in the interventional group attests to the utility of intermittent hypoxia-hyperoxia therapy in weight loss and in improving exercise capacity.

**Conclusions.** As an innovative non-pharmacological treatment modality, intermittent hypoxia-hyperoxia therapy applied with medical recovery treatment can contribute to maximizing the therapeutic benefits on the whole body. A multimodal therapeutic strategy that includes both forms of treatment may represent a promising alternative in the approach to the patient with obesity who requires medical recovery. Future studies are needed to investigate the way weight loss occurs and to confirm the utility of intermittent hypoxia-hyperoxia therapy in the context of obesity and associated comorbidities.

**Keywords:** intermittent hypoxia-hyperoxia, obesity, medical recovery treatment

## Congress Abstract – L68

## Complex case of neurorehabilitation after extremely severe craniocerebral and facial trauma

Ramona Gavrilov, Andreea Bujduveanu, Kamel Abu Zaluk, Mihaela Minea, Liliana-Elena Stanciu, Doinița Oprea, Mădălina-Gabriela Iliescu, Elena-Valentina Ionescu

Traumatic brain injury (TBI) refers to any damage or injury to the brain caused by an impact or force applied to the head. TBI is a significant public health issue and a leading cause of disability and mortality worldwide. Rehabilitation in cases of traumatic brain injury is essential for optimizing neurological function and improving the quality of life for patients.

This summary aims to present a complex clinical case of rehabilitation in a severe TBI. We present the case of a 33-year-old patient who suffered a severe TBI following a car accident. After a period of intensive care, the patient was admitted to the Balneal and Rehabilitation Sanatorium of Techirghiol, where they underwent physical kinetic therapy with the following objectives: generalized toning, reduction of spasticity, reeducation of transfers, reintroduction to standing and subsequently walking, and improvement of manual abilities.

Physical therapy included mobilization exercises, balance and motor coordination training, aiming to improve muscle strength and mobility. Occupational therapy focused on regaining independence in daily activities through the use of adaptive techniques and assistive devices. Speech therapy was included to address language and speech disorders, utilizing vocal rehabilitation exercises and articulation exercises.

Throughout the recovery process, the patient received psychological support. The psychologist provided counseling and emotional support, addressing the psychological and social aspects of trauma and adjustment to the changes brought about by the brain injury.

As a result of this comprehensive rehabilitation program, the patient showed favorable progress. Medical recovery in TBI is a complex and individualized process. By implementing a personalized treatment plan, the goal is to improve functionality and the patient's quality of life.

## Congress Abstract – L69

## The importance of medical rehabilitation in neurological disorders associated with chronic alcoholic hepatitis

Lorena Nincă, Andreea Nincă, Liliana Elena Stanciu, Carmen Oprea, Elena Valentina Ionescu, Mădălina Gabriela Iliescu, Doinița Oprea

**Introduction:** The real prevalence of alcoholic hepatitis is hard to be estimated, but it is related to the alcohol consumption. Although the rate of alcoholism is declining in Europe, the number of patients suffering from its complications is still high. Alcoholic hepatitis is characterized by inflammation of the hepatocytes, caused by the toxic effects of alcohol and it can occur after acute or chronic drinking. The toxicity of alcohol can also affect the muscular system, the central and peripheral nervous system. Some of the most important neuromuscular complications of alcohol induced hepatitis are peripheral neuropathy and alcoholic myopathy, which can co-exist and aggravate the impairment. For these patients, medical rehabilitation plays an important part in improving motor function and treating disability.

**Objectives:**

- Mentioning the neurological disorders associated with chronic alcoholic hepatitis;
- Presenting those complications that can benefit from medical rehabilitation ;
- Emphasizing the importance of medical rehabilitation in comparison to other therapeutic options available;

**Material and method:** Our team has researched multiple databases using the key words “alcoholic hepatitis”, “neurological complications”, “ alcohol consumption” and found out that the patients included in those studies were avid drinkers, with a minimum daily intake of 100g alcohol. These patients were subjected to clinical and psychological evaluation as well as laboratory tests and imagistic examinations, after a period of 2-3 weeks of abstinence. The results of the neurophysiological and neuropsychological tests were compared to those of the control group.

**Results:** Out of all the neurological complications of chronic alcoholic hepatitis those that affect the muscular and the peripheral nervous system generate locomotor deficits and various grades of impairment. Peripheral neuropathy and alcoholic myopathy respond well to physio- and kinetotherapy and can be remitted if the patient refrains from further drinking.

**Conclusions:**

- Chronic alcohol consumption can cause a large spectrum of neurological disorders. One of the most frequent ones is peripheral neuropathy, which can occur with or without a diagnosis of alcoholic hepatitis;
- The neurological complications of alcohol-induced hepatitis can cause various degrees of impairment;
- Without targeted therapies available for alcoholic hepatitis and its neurological complications, medical rehabilitation is the basis in regaining the lost self-care and mobility skills.

*Congress Abstract – L70*

## **The paradigm shift in educational methodology for a resilient university education system in the context of the COVID-19 pandemic. Judicious use of e-Health education and social media platforms as complementary sources of reliable medical information for physiotherapy students - qualitative analysis of videos posted on YouTube**

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**Abstract:** The pandemic represented a significant challenge to traditional pedagogical and educational models, emphasizing the need for flexibility, adaptability, and fair access to education.

The widespread closure of schools and universities has disrupted traditional teaching and learning and forced educational institutions to quickly adapt to distance learning (e-learning) and online education.

The pandemic has led to changes in education policies, with authorities having to reassess the management of academic calendars, grading systems, and assessment methods, develop strategies for online learning, and incorporate technology into education.

The transition to online learning has been challenging for educators and scholars, as they have had to adapt to new technologies and teaching methodologies.

Limiting direct interactions with patients due to hospital access restrictions has prompted a paradigm shift in educational methodology for a resilient medical university education system.

Epidemiological safety measures have determined the reorientation of the classic application methods for practical recovery programs from direct interactions to e-health and teleneuro-rehabilitation.

In this context, the judicious use of e-health education and social media platforms as reliable complementary sources of medical information and possible tools for the medical education of students specializing in physiotherapy represented an alternative in the context of epidemiological isolation measures.

The paper analyzed the qualitative content of videos posted on the YouTube social media platform, which was used as a complementary source of information during the COVID pandemic and as a premise for a modern digital and medical education strategy among physiotherapy students.

A structured descriptive analysis of the characteristics and information contained in each video clip (the scientific quality and reliability, respectively its audio-video technical characteristics) was performed using DISCERN scale and the global quality scale (GQS).

The ANOVA test revealed a statistically significant correlation ( $< 0.001$ ) between the analytical performance of the two assessment methods (DISCERN and GQS rating scores) and between the mean final DISCERN scores and the average number of „likes” and „dislikes” for the analyzed videos.

Videos posted by healthcare professionals (including experienced physiotherapists), healthcare institutions, or academic and professional health organizations achieved the highest DISCERN and GQS scores compared to other video sources. Conversely, videos posted by independent vloggers received the lowest reliability and quality scores.

It may be helpful for YouTube administrators to utilize validity scales such as DISCERN and GQS to ensure the accuracy of videos shared and promote the dissemination of reliable, evidence-based information.

The paper aligns with the strategic line regarding the digitization of education in Romania 2021–2027 (SMART.Edu), launched by the Ministry of Education and Research, with the main guidelines: „Accessibility, Connectivity, Community, Digital Educational Ecosystem, Innovation, and Sustainability”.

*Congress Abstract – L71*

## Balneotherapeutic options in hyperhidrosis

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Variety of treatment strategies reported in medical literature for patients suffering from excess sweat production. Commonly localised axillar, palmoplantar, craniofacial region (where eccrine sweat glands highly concentrated), hyperhidrosis is a chronic disorder altering temperature regulation, concluded in impairment daily activities (presence of wet clothes, repetitive showering conduct to socio-emotional distress and anxiety, lead to altered quality of life). Due to follow accurate lifestyle and behaviour recommendations, the control of this dermato- metabolic- endocrine disfunction is a challenge, clinical guidelines reveal algorithms for each anatomic segment affected by hyperhidrosis. The aim is to reduce sweating with minimal adverse events. First-line therapy are pharmacological agents like topical antiperspirants, anticholinergics, botulinum toxin and physiotherapy methods (iontophoresis, laser, ultrasound, microwave, fractional needle radiotherapy), if failure of conservative therapy, surgical techniques need to request. The balneotherapy is a non-invasive, safety and efficient method in hyperhidrosis management concept. We focus to describe the benefits of mineral waters, with astringent and antiperspirant properties, because the specific compounds contribute to regularize Ph, temperature, vasovagal reactions, hydration level, electrolyte balance in sweat release prevent.

*Congress Abstract – L72*

## Analysis of cervical disability and sitting posture particularities in IT professionals

Oana-Ruxandra Vuinov, Claudiu Avram, Mihaela Oravitan

**Introduction:** In our society prolonged sitting during office hours have become a conventional practice. Although sitting positions do contribute to energy conservation, sustained over an extended period of time, non-neutral postures tend to exert forces that cause loading and tensions on the tissues throughout the entire body, in many cases being associated with the presence of pain symptoms.

**Objective:** Our study aimed to analyze the relationship between cervical disability (NDI) and sitting posture particularities in the case of 73 IT professionals.

**Material and Method:** In this correlational study we evaluated 73 IT professionals with a mean age of  $32.56 \pm 5.46$  years. Posture assessment was conducted using Posture Screen Mobile software and neck disability was evaluated using Neck Disability Index questionnaire. Workspace ergonomics were evaluated with the use of Rapid Office Strain Assessment checklist.

**Results:** The result of the Neck Disability Index (NDI) indicated a slight level of neck-related functional impairment ( $8.19 \pm 7.51$ ) which was significantly correlated with elbow angle ( $r(73) = -.23$ ,  $p < .05$ ) and with ROSA ( $r(73) = .28$ ,  $p < .05$ ). A highly significant correlation was observed between NDI and trunk-thigh angle ( $r(73) = -.36$ ,  $p < .01$ ). Highly significant correlations were observed between elbow angle and wrist angle ( $r(73) = -.55$ ,



$p < .01$ ), elbow angle and trunk thigh-angle ( $r(73) = -.304$ ,  $p < .01$ ), elbow angle and ROSA score ( $r(73) = -.39$ ,  $p < .01$ ), wrist angle and thigh angle ( $r(73) = -.42$ ,  $p < .01$ ) and wrist angle and ROSA score ( $r(73) = -.35$ ,  $p < .01$ ). Other significant correlations were observed between neck posture and thorax angle, thorax angle and elbow angle, elbow angle and thigh angle, respectively with lower leg angle.

**Conclusion:** Our findings demonstrate that among IT professionals, there is a noteworthy correlation between the extent of neck-related impairment and the absence of ergonomic workspace setups as well as specific sitting habits. Based on our research results, significant concerns arise regarding the impact of sitting posture on body biomechanics.

Congress Abstract – L73

## Chronic pain in stroke rehabilitation - an overlooked issue.

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**Introduction:** Pain is a frequently overlooked issue in stroke rehabilitation, despite its significant impact on patient outcomes and quality of life. This study aimed to investigate the frequency, nature, and regional distribution of pain experienced by individuals undergoing stroke rehabilitation, with a specific focus on acute and chronic pain.

**Materials and Methods:** A retrospective study was conducted involving 270 stroke patients. Pain presence and type were assessed using medical records obtained from the Rehabilitation Unit of the Ministry of Health Hospital, Republic of Moldova. Descriptive statistics, including frequencies and percentages, were utilized for data analysis. Additionally, the number of painful sites was reported based on responses from the Nordic Musculoskeletal Questionnaire.

**Results:** Among the participants, 59.3% reported experiencing pain during their rehabilitation, while 40.7% reported no pain. Among those experiencing pain, 42.2% had chronic pain, 18.1% had acute pain, and 39.6% reported no pain at the time of the study. Individuals who reported pain exhibited variability in the extent of pain, ranging from 1-8 affected regions. The average number of affected regions was 2.6, with a standard deviation of 1.4.

**Conclusion:** Chronic pain emerged as the most prevalent form of pain experienced during stroke rehabilitation. These findings emphasize the importance of enhancing pain assessment practices and implementing targeted pain management strategies within rehabilitation programs. Further research is needed to optimize pain management approaches and improve patient outcomes in stroke rehabilitation settings.

**Keywords:** stroke rehabilitation, pain frequency, pain nature, regional distribution, chronic pain.

Congress Abstract – L74

## Multimorbidity as a predictor of functional outcomes for stroke rehabilitation

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**Introduction:** Multimorbidity, characterized by the coexistence of multiple chronic conditions, presents a significant challenge in the rehabilitation of stroke survivors. Understanding the impact of multimorbidity on functional outcomes is crucial for optimizing post-stroke care. This study aimed to investigate the association between multimorbidity and functional outcomes in stroke survivors undergoing rehabilitation.

**Materials and Methods:** Descriptive statistics were employed to analyze data from 270 stroke survivors. Multimorbidity was assessed based on the count of chronic conditions, and its influence on functional outcomes was evaluated using the Barthel Index scores. The reported statistics included means, 95% confidence intervals, and standard deviations.

**Results:** Among the stroke survivors, 95.2% had multimorbidity, with 54.4% falling into the group with fewer than four chronic conditions and 49.6% in the group with four or more conditions. The mean Barthel Index score for stroke survivors with greater than four comorbidities was 60.74 (SD  $\pm$  13.08), with a 95% confidence interval ranging from 58.51 to 62.98. In comparison, stroke survivors with fewer than four comorbidities had a mean Barthel Index score of 71.06 (SD  $\pm$  9.47), with a 95% confidence interval ranging from 69.45 to 72.67.

**Conclusions:** The high prevalence of multimorbidity among stroke survivors underscores its potential negative impact on post-stroke rehabilitation outcomes. The findings suggest that stroke survivors with a greater number of comorbidities tend to have lower functional scores, indicating poorer rehabilitation outcomes.

**Keywords:** Multimorbidity, post-stroke rehabilitation, functional outcomes

Congress Abstract – L75

## Chronic lumbar musculoskeletal pain: medical rehabilitation interventions.

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**Introduction.** Physical and rehabilitation medicine is one the core support for the patients with Chronic lumbar musculoskeletal pain. Recovery and physical medicine interventions can have a significant impact on patients, which can improve quality of life. Aim of the study: To estimate the impact of rehabilitation interventions on patients with chronic lumbar musculoskeletal pain. Material and Methods. 146 patients with chronic lumbar musculoskeletal pain were evaluated. All the patients were assessed through evaluation tools: Visual Analogue Scale for pain intensity, Roland-Morris Disability Questionnaire (RMDQ) and Health Questionnaire - EQ-5D-5L were assessed at baseline and after the rehabilitation interventions.

**Results:** Musculoskeletal pain was initially detected in 85.6% of cases, of which 16.4% of cases presented insignificant pain, 51.1% of cases moderate pain and 18.1% of cases severe pain. After the rehabilitation interventions the pain decreased in 36.4% cases, of which 14.2% cases presented moderate pain and 21.1% cases - insignificant pain and 1.1% cases severe pain. Health questionnaire - EQ-5D-5L initially presented level-1 1.23%, level 2- 23.5%, level 3 -69.5%, level 4-4.9%, level 5- 0.87 %. Final level 1 4.8%, level 2- 44.3%, level 3 - 45.1%, level 4- 4.8%, level 5- 0.80%. Assessment of disability due to chronic lumbar musculoskeletal pain assessed by the RMDQ showed a decrease to a mean value of 14,0 to 10,0 points,

**Conclusion.** Medical rehabilitation interventions can have a significant positive impact on patients with chronic lumbar musculoskeletal pain by improving initial functional status, reducing pain and improving quality of life.

**Key words:** chronic lumbar musculoskeletal pain, rehabilitation

Congress Abstract – L76

## The impact of medical rehabilitation with kinetic techniques on patients with chronic lumbar musculoskeletal pain: a case report

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**Introduction:** Chronic lumbar musculoskeletal pain is a disabling condition that affects a significant number of individuals, leading to decreased functionality and reduced quality of life. Medical rehabilitation, employing a range of kinetic techniques, has emerged as a potential intervention for managing chronic lower back pain. This case report focuses on evaluating the impact of medical rehabilitation utilizing kinetic techniques on patients with chronic lumbar musculoskeletal pain



**Methods:** A 46-year-old male patient with a history of chronic lumbar musculoskeletal pain was enrolled in a 2-week medical rehabilitation program. The program incorporated a variety of kinetic techniques, including Williams and Jacobson techniques along with TENS. Pain levels were assessed using a visual analog scale (VAS), and functional capacity was evaluated through the Oswestry Disability Index (ODI)

**Results:** Considering the risk of atrial fibrillation and another cardiovascular comorbidity the patient was directed to a rehabilitation treatment plan, along with pharmaceutical interventions that included nonsteroid anti-inflammation, and myorelaxant drugs. Following the 2-week rehabilitation program, the patient reported a significant reduction in pain intensity, with the VAS score decreasing from 8/10 to 3/10. The ODI score showed a notable improvement in functional capacity, decreasing from 58% to 32%.

**Conclusion:** Medical rehabilitation incorporating kinetic techniques demonstrated a positive impact on a patient with chronic lumbar musculoskeletal pain. The comprehensive rehabilitation program led to a significant reduction in pain intensity, improved functional capacity, and enhanced quality of life outcomes.

**Keywords:** lumbar musculoskeletal pain, medical rehabilitation, kinetic techniques.

*Congress Abstract – L77*

## The importance of foot and ankle rehabilitation

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**Introduction:** Foot and ankle provide a stable base for the whole body. There is a wide range of disorders involving the foot and ankle site, which varies from acute to chronic. We are aiming to evaluate the correlation between foot and ankle characteristics and injuries and further pain in knee, hip or lumbar spine, in order to emphasise the importance of foot and ankle rehabilitation in prevention of other algic syndromes.

**Materials and methods:** We used the PubMed database to select and evaluate articles about foot and ankle injuries and the relationship between characteristics of the foot and ankle and impairment in other joints (knee, hip or lumbar spine). Further, we use PubMed database to select and evaluate articles about foot and ankle rehabilitation programs, to assess the efficacy of these programs. We filtered results by year, text availability and publication date.

**Conclusions:** Foot and ankle rehabilitation provides a solid base for ambulation, with great impact on the functional abilities. Identification and treatment of these conditions is important for pain management. Larger clinical trials are needed to establish the most effective method in foot and ankle rehabilitation.

**Keywords:** foot, ankle, knee, spine, pain

*Congress Abstract – L78*

## Hippocampal theta rhythm in recovery REM sleep after experimental modeling of extreme working

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The strongest external influences on our circadian rhythms under extreme working conditions are sunlight and ambient temperature, the timing of sleep, eating behavior, exercise, and social jetlag. Optimizing our daily habits to create a strong circadian rhythm can improve our sleep, alertness, metabolism, and overall health. Spatial and temporal differential theta rhythm-driven neuroplasticity is found in the hippocampus. A distinctive feature of the hippocampus is the presence of place cells in it, the ensemble of which forms a map of space when navigating in a certain environment. Experimental modeling was based on the forcible induction of physical overactivity during the rest period (the "night shift work" model) and during the active period (dark hours). Polysomnographic 24-hour recording was carried out in mature male rat (n=20) by using of electroencephalogram (EEG), electrohippocampogram (EHIG), electrooculogram (EOG) and 1 electromyogram (EMG)

channels using “Spike4” software (Cambridge Electronic Design) and was accompanied by video behavior monitoring. Averaged total spectral power of hippocampus theta band in post-stimulus REM sleep episodes during postdeprivational recovery sleep was gradually increased by frequency and duration in comparison with baseline recordings. The theta-delta ratio was also elevated in EEG during restorative sleep. These findings suggest that physical overactivity could contribute to neuromodulation of synaptic plasticity in neocortex-hippocampus networks, then lead to REM sleep rebound formation during recovery sleep. It is believed that EEG theta rhythm has entorhinal cortex-hippocampus originality. Theta rhythm (4-8 Hz) rebound may reflect intensification of explorative behavior and spatial memory formation. The hippocampal theta rhythm could be a therapeutic target due to its vital role in neuroplasticity, neuroprotection, learning, and memory.

*Congress Abstract – L79*

## Body mass composition and bone mineral density in relation to physical activity level in osteoporotic women. A pilot study

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**Objective:** This study aimed to investigate the relationships between different anthropometric parameters, body composition measurements, physical activity and bone mineral density of the calcaneus assessed by ultrasound among osteoporotic women.

**Methods:** The study involved 30 menopausal osteoporotic women aged between 48-82 years. Anthropometric measurements (weight, height, body mass index) and body composition analysis (body fat percentage, skeletal muscle mass, visceral fat, basal metabolic rate) by bioimpedance analysis system, were performed. Bone Density and Bone Quality Indexes were measured with a Osteosys Sonost-3000, ultrasound bone densitometer. The physical activity level of included patients was assessed using the International Physical Activity Questionnaire (IPAQ)

**Results:** Our results provide evidence of the effects of body composition on bone density and quality. Among the measurements, a negative correlation was found between T-score and visceral fat ( $r = -0.33$ ).

**Conclusions:** Visceral fat has a negative association with bone density in osteoporotic women. Regular physical activity exerts a decrease in visceral fat and an increase in skeletal muscle mass improving bone health in women with osteoporosis.

**Keywords:** visceral fat, skeletal muscle mass, physical activity, osteoporosis

*Congress Abstract – L80*

## Visual biofeedback techniques in the recovery of the upper limb in stroke patients

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Visual biofeedback techniques are a new acquisition in the field of recovery. the emergence of robotics and virtual therapy in the rehabilitation of prehension represents a challenge for stroke patients in the recovery of the upper limb. Besides the new modern acquisitions of recovery, the established techniques remain in force, especially the mirror technique, being cheap, easy to achieve and the results are obvious. Combining the old techniques with the modern ones using the virtual therapy, the robotic glove, the recovery of the upper limb has become much easier and faster, significantly improving the patient's quality of life.

## Congress Abstract – L81

# Grip force tracking system for assessment and rehabilitation of hand sensory motor performance

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**Introduction.** Current treatments to rehabilitate grip movements or restore strength are generally subjective, meaning that the results obtained from the patient are based on the perception and experience of the physical therapist performing the treatment. In this case, there can be many situations for the modification of these results, from errors of perception to a possible wrong diagnosis. It is therefore necessary to be able to keep track of the progress of grip strength recovery. These records make it possible to determine whether the treatment is successful or to quantify how much the patient is improving. Because of these issues, a medical device was developed to measure and store grip force in hand motor rehabilitation.

**Objectives:** A series of diseases or injuries, mainly muscles and tendons can decrease the functions performed by the hand. These complications can be caused by congenital conditions, overuse injuries due to the repetition of a certain movement or trauma. In this sense, a device was designed and made that makes it possible to quantitatively determine the value of the force exerted when grasping objects, useful both in diagnosis and in treatment.

**Methods.** The designed system is a cylinder with a diameter of 50 mm and a height of 100 mm and was fixed on the experimental table. It contains four axisymmetrically placed force sensors (horizontal center-to-center distance: 30 mm, vertical center-to-center distance: 40 mm) to measure the clamping force and calculate the torque of rotation. The data acquired from the sensors is transmitted to a microcontroller for display and analysis. On an additional screen in front of the participants, both the target and actual force levels are displayed, thus providing visual feedback for each subject. An analysis software has been created in LabView to control the visual presentation of each task and also process the data during task execution. Force and torque data are saved for offline analysis.

**Results.** A prototype of the device for motor rehabilitation of the hand is already developed. The two sections of the device (patient's perspective and physiotherapist's perspective) work correctly. The system is measuring changes in grip force depending on the pressure exerted in the grip handle in a given time. From the patient's perspective, it is possible to actively participate in the recovery process by observing the results and progress.

**Conclusions.** The results indicated that grip control tasks with different levels of force have the potential to quantitatively assess hand motor function after a mild to moderate stroke.

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## Congress Abstract – L82

# Advanced technology for cognitive rehabilitation of children with ADHD

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**Introduction.** Cognitive stimulation starts at an early age and aims to acquire the necessary knowledge and essential problem-solving skills. Games and toys help the little one to develop a healthy way of thinking. Toys should be chosen as best as possible, depending on his age and abilities. As the child develops fine motor skills

and hand-eye coordination, he will be interested in increasingly complex games with an important role in his cognitive development. From this point, the child will also develop a preference for toys, often wanting to choose them himself. This system is intended for both analysis and treatment of various cognitive deficits of patients. Through the set of multi-colored pushbuttons that are connected to the Arduino Uno development platform, which "runs" a software that identifies whether the buttons have been pressed correctly to score the final score. The therapy session is carried out in work sessions of 15-30 minutes, 3-5 times a week.

**Material and method.** Deterioration of cognitive abilities leads to the inability to process stimuli received from the outside. The type of stroke, the affected brain area and its intensity lead to a lesser or greater degree of restriction of the person's functions. The terms "cognitive recovery" or "cognitive training" are used more narrowly to refer to exercises that have a stimulatory effect on one or more cognitive areas that are deficient after a stroke. In about 16% to 20% of stroke survivors, cognitive impairment improves spontaneously within the first three months, and recovery can take at least a year after that. The designed and built system consists of an ATmega328P microcontroller located on the Arduino UNO development platform, which is defined as an analysis and control unit according to the block diagram. (Fig.1)

**Results and discussions.** The preliminary results of the achieved system meet the criteria through the use of the system and the permanent monitoring in terms of the degree of attention. Being a discreet, portable device that can be used not only in recovery centers, but also at the patient's home, upon the doctor's recommendation, as it does not endanger his life.

**Conclusions.** Following the system testing, the working mode of the buttons was checked from a functional point of view together with the lighting of the LEDs in correlation with the source code made. A series of stages with different levels of work were carried out, reflecting the degree of difficulty and precision of the subjects' commands by achieving a score at the end of the stage. Thus, rubrics were created for: attention, perception, memory, thinking, will, temporo-spatial orientation. At the end, the staff has a series of recommendations regarding the need to further introduce the patient to a cognitive optimization program and indications related to how to approach the intervention. Feedback is provided for assessment by physiotherapists.

**Key words:** recovery, interactive application, microcontroller, physiotherapists

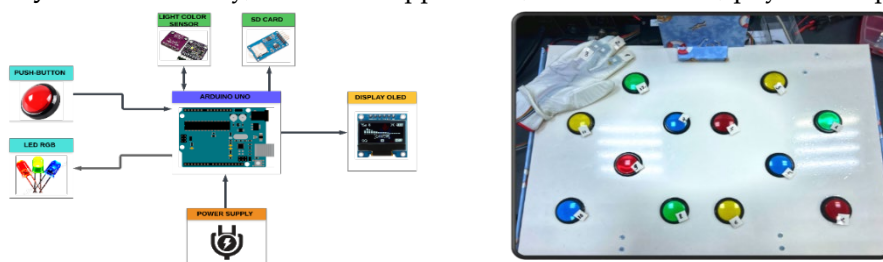


Fig. 1 Device block diagram and application

Congress Abstract – L83

## Trigger Finger Management- Surgical Release

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**Introduction:** Trigger finger (TF) is an inflammation of the flexor tendons also known as stenosing tenosynovitis. It is a condition that causes pain, stiffness, and a sensation of locking or catching when the finger is flexed and extended. Because nonsurgical treatment in TF is rarely effective, we analyzed only surgical release: open release, approaches by needle or blade (percutaneous) and endoscopic release.

**Material and Method:** The analyzed articles were published in the databases of PubMed, Medscape, Scopus and Cochrane during the period of 2018-2023. All the selected articles were in English language. Studies performed on cadavers were excluded because certain parameters cannot be followed.

**Results:** Currently, there is no universal treatment algorithm for TF. Usually, TF that fail to respond to two corticosteroid injections require surgical treatment (surgical release of A1 pulley). The open technique is important for the thumb and little finger or in a presence of a proximal interphalangeal (PIP) contracture. Percutaneous release should be reserved for the index, middle and ring fingers. A nonpalmar endoscopic release allows a quick healing without scars.

**Conclusions:** 1. All surgical methods are effective in the management of TF, depend on the equipment of the clinic, the surgeon experience and last but not least the patient choice. 2. Between the corticosteroid injection and the surgical treatment, a period of at least 90 days must be kept to avoid postoperative infections.

**Keywords:** Trigger finger, percutaneous release, open release, endoscopic release

Congress Abstract – L84

## Research on the health effects of Mineral Waters from Slănic Moldova's Spring 1 and Spring 1 bis

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**Abstract:** The present study represents a comprehensive scientific investigation into the health effects of mineral waters from Slănic Moldova's Spring 1 and Spring 1 bis, two significant geothermal sources in Romania. These springs have long been acclaimed for their therapeutic qualities, but systematic, empirical research substantiating their medicinal attributes has been sparse. Primary fibroblast cultures obtained from Wistar rats were investigated with a focus on two vital physiological mechanisms: inflammatory processes and oxidative stress balance. These are believed to be affected by mud and sulfurous natural mineral waters, forming the fundamental biological basis for understanding the therapeutic effects of these substances.

Existing scientific research highlights that various cell types, including fibroblasts, are recruited during inflammation. These cells respond to various intercellular and microenvironmental signals, leading to a regulated production of both pro- and anti-inflammatory mediators. Examples include cytokines such as tumor necrosis factor (TNF)- $\alpha$ , interleukin (IL)-1 $\beta$ , and IL-6, as well as chemokines and enzymes like cyclooxygenase (COX)-2. Together, these play vital roles in modulating the inflammatory response. In this study, we investigated mineral water's therapeutic and prophylactic effects from springs 1 and 1 bis in Slanic Moldova, focusing on identifying the molecular mechanisms responsible for these effects. We collected water samples from these springs and analyzed their chemical composition using various analytical techniques. In addition, we tested the effects of water on cell viability using primary fibroblasts in culture and performed MTT assays to assess the metabolic activity of the cells. Our results indicate that water from both springs has beneficial properties on cells, including improving cell viability and stimulating metabolic activity. This suggests that the mineral water from springs 1 and 1 bis could have therapeutic and prophylactic potential due to its unique chemical composition. Our study could contribute to developing new mineral water-based therapies for various health conditions.

In conclusion, the research on the mineral waters from Slănic Moldova's Spring 1 and Spring 1 bis offers an unprecedented scientific insight into the complex interplay between their unique geochemical attributes and the observed therapeutic effects. The findings contribute significantly to the field of balneology, providing empirical evidence that augments traditional knowledge and paves the way for informed targeted therapeutic applications. This work stands as a working model for the convergence of natural resources and scientific exploration, reinforcing the potential of natural springs as a vital asset in contemporary healthcare.

**Keywords:** fibroblaste, ape minerale sulfuroase, citokine, factorul de necroză tumorală (TNF)- $\alpha$  și inter-leukine (IL)-1 $\beta$  și IL-6, chemokine, ciclooxygenaza (COX)-2



## Congress Abstract – L85

**"Worse than hell" (tetraplegia & blindness): associated complex neuraxial lesions, with severe disabilities - case presentation**

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**Background.** Injuries to the vertebral artery (VA) may be traumatic or spontaneous. Traumatic injuries are most frequently due to blunt spinal cord injury (SCI) or may be due to penetrating trauma.

Fracture patterns associated with an increased risk of VA injuries are fractures involving the upper cervical spine, associated subluxation, and/or transverse process fractures extending into the arterial bone foramen.

**Clinical cases.** A 63-year-old female patient was transferred from the Spinal neurosurgical department with flaccid C4 AIS A quadriplegia (global motor score 3/100), vertebral myelopathy, neurogenic bladder, sacral pressure sore grade one. The patient fell from the same level and suffered a minor TBI and cervical spinal cord injury (on 01.10.2022) followed by C6 vertebral body fracture and C5-6 dislocation, operated on 07.10.2022 (anterior spinal cord decompression, with dislocation reduction and mixed anterior fusion with bone graft and fixation screws).

She complained of blindness with partial optic atrophy in both eyes that progressively occurred after the traumatic event due to a stroke in the territory of bilateral cerebral arteries secondary to injuries of bilateral VA. Imagery confirmed the diagnosis and the outcomes: bilateral occipital stroke and revealed a subacute/chronic lacunar lesion in the right thalamus.

**Discussion.** VA lesions after cervical trauma were considered rare, and the diagnosis was difficult because most patients do not present with neurological symptoms (because of collateral compensatory blood supply from the circle of Willis). In unilateral traumatic VA (occlusion/thrombosis), only 20% of the subjects are symptomatic. Most patients with bilateral VA lesions are symptomatic, leading to rapid and/or fatal ischemic damage to the encephalon, cerebellum, or brain stem.

**Conclusions.** Blindness and tetraplegia - what could be worse? The clinical case describes the cause, pathophysiology, and diagnosis of a complex associated neuraxial lesion situation: stroke in the posterior cerebral arteries, post bilateral traumatic VA secondary to SCI. The clinical case highlights the importance of the inter-professional team's role in managing this patient.

**Keywords:** vertebral artery, SCI, tetraplegia, stroke, posterior cerebral arteries, blindness

## Congress Abstract – L86

**"Old age is heavy clothes": Multiple comorbidities and severely disabling complications (orthopedic, traumatic, neurosurgical, psycho-cognitive, infectious) - case presentation**

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**Background:** Parkinson's disease is a neurodegenerative and progressive disorder characterized by intracytoplasmic inclusions called Lewy bodies and degeneration of dopaminergic neurons in the substantia nigra. Reduction of dopamine leads to motor symptoms such as tremors, impaired balance, rigid muscles, and difficulty/freezing of gait. The non-motor symptoms (the submerged part of the iceberg) are the result of dopaminergic, serotonergic, noradrenergic, and cholinergic dysfunctions.

Alzheimer's disease is the most frequent neurodegenerative disease, leading to progressive cognitive decline and memory loss. Its anatomopathological hallmarks are the amyloid plaques (extracellular deposits of amyloid-beta protein that accumulate between the neurons) and intracellular neurofibrillary tangles composed of the protein tau.

Parkinson's and Alzheimer's disease can occur together. Patients have an exponentially increased risk of falling due to a lack of mobility and are susceptible to infectious diseases caused by poor nutrition and self-care. Finally, they remain immobilized in bed and dependent on health care centers.

**Case report:** Written informed consent was obtained from the patient. The Ethics Commission found that the article complies with the legal regulations. An 84 years-old woman with severe psycho-cognitive dysfunctions (Parkinson's and Alzheimer's disease) and movement impairments (right hip prosthesis in 2014), with impaired pelvic posture and multiples arthrosis, was fallen from the same level and had a traumatic brain injury. CT scan emphasized a small cerebellum hematoma and a subarachnoid hemorrhage, both of them being naturally resorbed without neurosurgical indication. The patient was admitted to the Neuromuscular Rehabilitation Clinic, she was cachectic, dehydrated, and agitated. Her blood pressure was 140/70 mmHg and a heart rate of 80 beats per minute (pacemaker), had a urinary catheter, and sacral small bedsores. Her right hip was externally rotated at 90 degrees due to a chronic dislocation of the head of a femoral prosthesis. The main objective in the management of this patient consisted of nursing: hygiene maneuvers, semi-solid and liquid foods, oral liquids, and intravenous Ringer solution. We applied a complex pharmacological approach (prophylactic anticoagulation, antalgic medication, neurotrophic medication, beta-blockers, digitalis glycosides, ACE inhibitors, sedative-hypnotics, antibiotics). A low-intensity kinetic-therapeutic program was focused on daily activities and ROM articular passive mobilization.

During evolution occurred suppurative left parotitis, and was treated with Clindamycin, Metronidazole, and cephalosporins. The puss was evacuated daily and the gland was instilled with serum and antibiotics through the Stensen's duct.

Despite her severe comorbidities and complications, the patient had a favorable biologic outcome: at discharge, she was afebrile and cardio-pulmonary stable, cooperative within her limits of mental disorders. The urinary catheter was changed. The patient was totally dependent on palliative nursing care.

**Conclusions:** The paper synthesizes the complex, multidisciplinary tailored rehabilitation program in a patient with multiple comorbidities and complications: Alzheimer's and Parkinson's disease, a dysfunctional right hip prosthesis, cardiac pacing, neurogenic bladder, and suppurative parotitis due to poor oral hygiene.

**Keywords:** Parkinson's disease, Alzheimer's disease, hip prosthesis, suppurative left parotitis

*Congress Abstract – L87*

## The functional outcome of the rehabilitation approach in an elderly female patient undergoing hip hemi arthroplasty and non-surgically treated distal radius fracture in a “fall from own height” context – case presentation

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**Introduction:** Hip prostheses have emerged as a remarkable medical advancement, revolutionizing the treatment of hip joint conditions and significantly improving the lives of individuals worldwide. The hip joint plays a fundamental role in our daily activities, enabling us to walk, run, and engage in various movements with ease. However, when it becomes damaged or degenerated due to factors such as injury, arthritis, or age-related wear and tear, the resulting pain and limited mobility can significantly impact an individual's well-being. Hip prostheses offer a ray of hope by replacing the damaged joint with an artificial implant, designed to replicate the natural structure and function of the hip. The present work will follow an elderly patient with multiple comorbidities, with a fall trauma resulting in a fracture of the right femoral neck, who underwent an



Austin-Moore type right hip hemiarthroplasty and also a radius fracture treated conservatively, during the rehabilitation program.

**Materials and methods:** An 82-year-old female patient was admitted to our rehabilitation clinic for mechanical pain in the right hip and wrist, functional impotence, moderate locomotor and self-care dysfunction, to undergo specialized rehabilitation treatment. The patient has multiple personal pathological antecedents: recently operated femoral neck fracture (Austin-Moore cervico-cephalic hemiarthroplasty) and distal radius fracture treated conservatively, after a fall trauma, essential arterial hypertension grade III, paroxysmal atrial fibrillation, chronic heart failure class III NYHA, type II diabetes, hypothyroidism, herpes zoster, operated and chemotreated cervical neoplasm, chronic hepatitis B virus infection, grade V hydronephrosis nephrectomy, post-malarial splenectomy. It was evaluated clinically and paraclinically according to the standardized protocols implemented in our clinic but also functionally through evaluation scales.

**Results:** The patient received a personalized and complex neuromuscular rehabilitation program along with an appropriate drug treatment. The overall evolution was favorable in terms of functional progress, with an improvement in the pain symptoms present upon admission to our clinic, despite the presence of the multiple associated comorbidities and psychoemotional decline.

**Conclusions:** This clinical case of neuromuscular rehabilitation represents an exhaustive example that highlights the complex clinical therapeutic-rehabilitation approach, in order to obtain the best results.

**Key words:** hip fracture, hip prostheses, radius fracture, rehabilitation

*Congress Abstract – L88*

## **Incidental discovery of chronic lacunar infarction in the head of the caudate nucleus: pathophysiological considerations and retroactive etiologic diagnosis of a depressive syndrome; case presentation.**

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Neuroimaging studies demonstrated the complex caudate nucleus' interrelationships within topographically organized cortical networks and its strategic role in emotional balance.

The clinical case depicts a 71-year-old female patient with chronic depressive syndrome, orthostatic hypotension, hyperlipidemia, and arthritis. CT cerebral imagery incidentally revealed an old lacunar infarction in the right caudate nucleus, with a diameter of about 6 mm.

The authors hypothesized that the old lacuna was incriminated as the organic substrate for chronic neuropsychiatric illness in an older woman with risk factors for cerebral small vessel disease.

The etiopathological assumption was contextualized in a selective literature review focused on relevant data from recent publications and emphasized the caudate's strategic role in emotional balance and dysthymia.

Unilateral or bilateral small lacunae in the caudate nuclei are associated with a high risk of developing psychiatric complications but not motor deficits after stroke.

Written informed consent was obtained from the patient for the inclusion and use of materials related to the case, respecting the confidentiality of her identity data, and the Bioethical Commission approved the study.

**Keywords:** caudate nucleus, lacunar stroke, incidentaloma, depressive syndrome, case report

## "Hard to kill 3": AIS-C incomplete paraplegia after vertebral metastasis (operated in 2023), in a patient with a carcinogenic predisposition: renal carcinoma (operated in 2021) and frontal ganglioglioma (operated in 2022)

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### Abstract

**Background.** Renal cell carcinoma (RCC) is the most prevalent urogenital cancer. It is a heterogeneous collection of tumors that develop from renal tubular epithelial cells and have the highest mortality rate among genitourinary cancers. Men experience it more frequently than women do. Obesity, hypertension, smoking, and chronic renal disease are only a few known risk factors for RCC.

Advances in imagery techniques improved the rate of diagnosis. RCC can be surgically treated if caught in the early stages of evolution; unfortunately, some cases are recurrence-prone.

Gangliogliomas are rare tumors consisting of a combination of glial and neuronal elements. Few substantial case series exist, due to their limited incidence. Focal seizures, which

are the most typical sign of this type of tumor, signaling the doctor to order a CT or MRI of the brain.

**Case report.** A 55 years-old male with a complex medical history and predisposition at tumoral associations is presented. He underwent a nephrectomy in 2021 for RCC. In 2022

was operated on for a frontal ganglioglioma (clinically revealed after a few episodes of focal seizures), with a favorable cognitive and motor function after surgical tumoral resection.

In February 2023 he underwent a successfully decompressive spinal intervention to remove a T10–T11 intramedullary tumor. The patient was admitted to our Neuromuscular Rehabilitation Clinic with incomplete AIS-C paraplegia and neurogenic bladder.

He had a complex pharmacological approach (prophylactic anticoagulation, antalgic medication, urinary disinfectants, antibiotics, anxiolytics, and antidepressives). A rigorous kinetic-therapeutic program was focused on daily activities (transfer, self-care, and self-hygiene maneuvers).

He contracted an asymptomatic mild form of COVID infection during hospitalization, and the physical therapy was postponed for 10 days.

Despite his severe oncological condition, he had a favorable clinical outcome, with a progressive increase in muscle strength in the lower limbs, reflected by the improvement in motor scores. He was discharged with AIS-D grade paraplegia (motor score was =40/50) and regained voluntary control of the bladder.

Unfortunately, shortly after discharge, he announced a rapid recurrence of complete paraplegia.

**Conclusions:** The paper synthesizes the complex, multidisciplinary tailored rehabilitation program in a patient with a predisposition of multilocal tumoral association (clear renal cell carcinoma, frontal ganglioglioma) with uncertain outcomes, due to the recurrence of the primary renal tumor.

**Keywords:** clear renal cell carcinoma, ganglioglioma, intramedullary tumor, paraplegia, rehabilitation

# A very difficult case of lumbar spondylodiscitis without cord lesions but with marked global disabling / deconditioning consequences and related challenging management and evolution

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## Abstract

**Introduction.** Spondylodiscitis is a type of inflammatory infection that impacts the vertebrae, as well as the adjacent structures and vertebral discs. [1] Occurs at an average incidence rate of seven cases per million individuals, with males being three times more likely to be affected than females.[2] Spondylodiscitis most often occurs in the lumbar spine (60%), followed by the thoracic spine (30%) and the cervical spine (10%). [2] This pathology requires a rehabilitation program specifically tailored to its needs, demanding exceptional dedication from the recovery team.

**Material and methods.** In this study we thoroughly analyzed the evolution of an 74-year-old male patient with multiple comorbidities: high blood pressure, atrial fibrillation, osteoporosis, acute pneumonia with staphylococcus aureus, gout, urinary tract infection with Candida Tropicalis and E. Coli, who was admitted to our Neuromuscular Rehabilitation Clinical Division with locomotor dysfunction and lumbosciatalgia post osteodiscitis L1-L2, L3-L4 with a fused abcess on the sheath of the psoas muscle treated conservatively. During his hospitalization in our department, the patient received a comprehensive regimen of advanced medial and kinesiotherapeutic treatments. The patient underwent evaluation using the following scales: Functional Ambulation Categories (FAC), Life Quality Assessment (QOL), Muscle Power Scale (MRC), Basic Activities of Daily Living (ADL), American Spinal Injury Association (ASIA), modified Ashworth, Spinal Cord Independency Measure (SCIM).

**Results.** Despite encountering several episodes of deconditioning and a SARS-COV-2 infection that hindered the process of the rehabilitation program, the patient eventually showed a slow yet positive recovery, resulting in his discharge with favorable locomotor improvement.

**Conclusions.** By acknowledging the combined efforts of both the patient and the recovery team, remarkable outcomes can be attained, leading to a substantial enhancement in the patient's quality of life.

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**Keywords:** lumbar spondylodiscitis, SARS-COV-2 infection, locomotor deficit, neuro-rehabilitation programme

Congress Abstract – L91

# Multiwave Locked System LASER photobiomodulation in the multidisciplinary team approach/ management of a 3<sup>rd</sup> degree burn on the posterior thorax in an 82-year-old woman – a case study

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## Abstract

**Introduction.** Burns are recognized as a significant concern for public health, constituting medical-surgical emergencies. [1] The majority of burn injuries are profoundly disabling, emphasizing the ongoing need for continuous enhancement of therapeutic interventions. [2] Burns adversely affect crucial facets of life and significantly impact quality of life. [3]

**Material and methods.** We present the case of an 82-year-old female patient who was admitted to our Neuromuscular Rehabilitation Clinical Division for psycho-cognitive status assessment (mild reactive cognitive disorders in the context of a post-burn incident: IIa-IIb-III degree flame burns in the occipital, posterior thorax, bilateral arms and sacral regions in January 2023) and mild locomotor and self-care dysfunction. The patient was initially admitted to the Plastic Surgery department within our hospital, where multiple wound irrigations and dressings were performed for the burn injuries, and serial surgical interventions were carried out on both upper limbs. Throughout her admission to our clinic, the patient received a personalized rehabilitation program and underwent a remarkable treatment with Multiwave Locked System LASER on the posterior thoracic region, for a total of 10 sessions. The following scales were used to assess the patient: VSS- Vancouver Scar Scale, VAS-Visual Analogue Scale, 5-D ITCH Scale, according to the model of the American Spinal Injury Association Impairment Scale- AIS- for sensitivity disorders, 3-step scale, ROM – Range of motion, MMT – Manual Muscle Test Scale, The Barthel Index, FIM – Functional Independence Measure scale, ADL, Timed up and go test, Walk Speed, Berg Balance Scale, Six-Minutes Walk Test.

**Results.** Remarkable results were achieved, with a significant reduction in the size of the lesion on the posterior thoracic region after just 10 sessions of Multiwave Locked System LASER, along with an improvement in locomotor and self-care dysfunction.

**Conclusions** An exceptional multidisciplinary collaboration proves advantageous not only for the patient's well-being but also for the development of current therapeutic interventions, contributing to the enrichment of specialized literature.

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**Keywords:** Burns, Multiwave Locked System LASER, Multidisciplinary team, Burn rehabilitation programme

Congress Abstract – L92

# Favorable clinical and rehabilitation outcomes despite impressive imaging findings in a middle-aged man with iterative neurosurgical intervention for pituitary adenoma

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## Abstract:

**Introduction:** Pituitary adenomas are defined as tumors of the anterior part of the pituitary gland, most of them benign and slow growing. The tumors can be microadenomas, smaller than 10 mm, macroadenomas larger than 10 mm or giant tumors larger than 40 mm. Also, there are functional pituitary adenomas which can cause increased secretion of one or more pituitary hormones, and pituitary adenomas that do not secrete hormones but compress the surrounding areas which leads to hormone deficiencies and also may generate neurologic impairments. The paper presents a case report of complex neuromuscular rehabilitation of a patient with pituitary adenoma, with a favorable clinical outcome in contrast to the tumour mass and its recurrence.

**Materials and methods:** We followed the evolution of a 57 years old patient, without significant comorbidities, who was admitted in 2022 in the neurosurgery department presenting balance and coordination disorder, bradyphaly, bradipsia. Imaging investigation found a tumor mass developed sellar and suprasellar, with paramedian cranial extension on the left side, compressing the third ventricle, with a diameter of 7/7cm. Iterative neurosurgical interventions were performed, with favorable evolution. In 2023 the patient was re-admitted to the neurosurgery department presenting suggestive symptomatology confirmed by MRI investigation- tumor formation - pituitary adenoma, and another transsphenoidal surgery was performed. One month later the patient was admitted in our Neuro-Muscular Clinic Division presenting psycho-cognitive status, balance disorder with walking instability and low strength in the distal lower limbs, serious visual disturbances, a small cognitive decline and bradylalia. The patient was assessed clinically and functionally, and specialized program was initialized. During hospitalization the patient had a slow progressive evolution which led to an increase in muscle strength and motor control in the lower limbs, as well as a correction of the balance disorder.

**Results:** After receiving adequate pharmacological treatment and complex rehabilitation program, a favorable evolution followed, with the performance of walking on flat ground and stairs on medium distances without support.

**Conclusions:** Associating a complex clinical and paraclinical approach with a personalized rehabilitation program (including logopedic and kinetotherapeutic sessions) for a patient with psycho-cognitive status post tumoral recurrence of a pituitary adenoma in which iterative neurosurgical interventions were performed, we managed to increase muscle strength in the lower limbs, with an improvement in distal motor control and also a decrease of balance disorder, with an improvement in patient's quality of life .

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**Keywords:** pituitary adenoma, neurosurgery, tumor formation, balance disorder, paraparesis, rehabilitation program, opto-chiasmatic syndrome.

## Congress Abstract – L93

## Long-term case management and outcomes in a young male patient with complete paraplegia post-T3-T4 vertebral osteomyelitis and a previous documented thalamo-mesencephalic hemorrhage

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**Introduction:** Vertebral osteomyelitis is an infection located at the level of the vertebra, with a potentially devastating impact, which requires a prompt diagnosis established as quickly as possible to avoid complications such as neurological impairment, fractures, and chronic pain.

**Material and method:** We reported a case of a 47-year-old male patient with multiple risk factors (high blood pressure, smoking, dyslipidemia, type II diabetes) and a history of right hemiparesis post a thalamo-mesencephalic hemorrhage, admitted to the Neuromuscular Clinic Division of Teaching Emergency Hospital “Bagdasar-Arseni” (TEHBA) Bucharest, for complete paraplegia following a surgically treated vertebral osteomyelitis at T4-T5 level with spinal epidural abscess. Radiological investigations reveal inflammatory changes (spondylodiscitis type) at the T4-T5 vertebral level with the extension in the paravertebral and soft parts of the posterior thoracic area.

During the multiple admissions to the Neuromuscular Clinic Division and the Neurosurgery Clinic Division, the treatment regimen was adjusted, involving a complex combination of antibiotics, and the physical therapy program was modified and adapted to change for each stage of the rehabilitation process.

**Results and discussions:** The patient had an oscillating, long evolution, due to long-term antibiotherapy and the imperative of minimal mobilization periods, which led to favorable results, with the recovery of motor function and the ability to perform his previous daily activities.

**Conclusions:** Proper management in vertebral osteomyelitis cases has a great impact on the evolution of the patient, increasing the quality of life, and preventing future complications. A multidisciplinary approach is essential for this type of complex case in order to achieve significant improvements.

**Keywords:** paraplegia, vertebral osteomyelitis, antibiotherapy

## Congress Abstract – L94

## An original approach using VR/AR for upper limb rehabilitation

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**Introduction.** Researching innovative solutions for medical recovery is a shared concern for both university research centers and the private sector. Virtual reality, defined as a computerized hardware and software system that simulates an environment through images and videos, and augmented reality, which integrates digital elements into the real world using a video camera, are closely related concepts.

**Objective.** One of the most common approached application solutions for rehabilitation using augmented reality and virtual reality are game-type or type of performing a task in game-type approaches. Patients are more attracted and interested in the recovery process but also brings a beneficial effect in the well-being of the patient. Virtual reality has the advantage of developing solutions with multiple applicability for rehabilitation engineering, an important aspect are the hardware capabilities of the equipment used in the development of rehabilitation solutions so that they can have a very wide range.

**Solution.** In the case of people with reduced mobility, it is important that this equipment is easy to collaborate and integrated in recovery processes, the solution I was chosen for this research brings many benefits first is non-invasive, the patient will not have to hold anything in his hands, or have electronic devices on the body, this will allow it to have a natural behavior that is very important in the structure of the developed application that is based on body movements. Both software specialists and in the field of medical rehabilitation such as physiotherapists were involved and consulted in the realization of the system proposed in this paper, which helped define the requirements of the system but also how they are implemented. Also, the system was extended to an immersive solution using HDM virtual reality glasses, at this stage a series of exercises dedicated to hand recovery was virtualized, starting from the hypothesis that it will be used by patients who have a fairly stable degree of mobility in the upper arms.





3D Vision System  
for arms tracking



HDM for hand tracking

Our solution integrates hardware systems such as the 3D vision camera, Smart watch with software systems that together create an ecosystem for analyzing human movements and virtualize recovery processes in a similar way to video games. Our research part will continue with the testing of the application but also its improvement depending on the feedback received from the people involved in the test.

*Congress Abstract – L95*

## **An intricate evolution, in a complex rehabilitative program of an incomplete AIS/Frankel C paraplegia post thoracal spinal cord injury with intermittent dysphagia due to an ectopic thyroid**

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### **Abstract**

**Introduction:** Traumatic spinal cord injury (SCI) is a serious disorder that has a profound impact on a patient’s physical and psychosocial well-being. Therefore, patients with SCI experience significant impairments in various aspects of their life. The goals of rehabilitation and other treatment approaches in SCI are to improve functional level, decrease secondary morbidity and enhance health-related quality of life. This paper presents a case report of neuromuscular rehabilitation and complex clinical and therapeutic management in a paraplegic patient after SCI due to falling from the same level, with a thoracal vertebral fracture neurosurgical treated, with intermittent dysphagia for which was performed a thoracal CT scan, and was found an ectopic thyroid. **Material and methods:** We followed the evolution of a 70 years old patient, with personal antecedents of arterial hypertension, ischemic heart disease and depressive disorder who suffered a thoracal SCI due to falling from the same height after physical effort causing a comminuted fracture of the L1 vertebral body, which was neurosurgical treated on 24.11.2023. After two weeks, the patient was hospitalized in our Neuromuscular Clinic Division with incomplete AIS/Frankel C paraplegia and neurogenic bladder for the initiation of rehabilitative treatment. In our clinic the patient was assessed functionally using the following scales: 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), Walking Scale for Spinal Cord Injury (WISCI). The patient presented dysphagia and recurrent episodes of vomiting, symptoms which had started prior to the admission, but which required further investigations.

**Results:** During the two hospitalizations in our clinic the patient benefited from an adequate pharmacological treatment (including comorbidities), a complex rehabilitation program, with a favorable evolution, with an increasing score of the evaluated scales and, thus, with a final performance of walking with support (walking frame) on short distance and with help from another person. The patient performed neurogenic bladder management; in present he has sphincters control. Due to digestive symptoms, such as dysphagia and recurrent episodes of vomiting, he underwent a series of investigations and interdisciplinary exams and was diagnosed



with mediastinal ectopic thyroid, which caused esophageal compression, a very rare condition, with few reported cases in the literature. Surgical excision was recommended for both the diagnosis and treatment of this condition, because of its potential for malignancy and compression of the esophagus.

**Conclusions:** Associating a complex clinical and paraclinical approach with a customized rehabilitation program in a patient with AIS/Frankel C paraplegia after thoracic SCI we managed to improve the neuro-locomotor control and sphincter function reeducation, with an improvement in patient's quality of life. On the other side, ectopic thyroid is a rare condition, and its location in the mediastinum is even rarer. Although entirely intrathoracic ectopic thyroids are rare, they must be considered in the differential diagnosis of all mediastinal masses. Because they have the potential to become malignant and to compress mediastinal structures, surgical excision of mediastinal ectopic thyroids is recommended for both diagnosis and treatment.

**Keywords:** paraplegia, neurogenic bladder, rehabilitation program, ectopic thyroid, mediastinal mass

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Congress Abstract – L96

## Clinical and therapeutic challenges in a patient with AIS/Frankel C post-traumatic tetraplegia, on the background of cervical spinal stenosis and associated with prolonged SARS-COV-2 infection

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**Abstract:** Spinal cord injury (SCI) is a medical complex condition, producing major changes in a person's life. It occurs as a result of damage to the spinal cord, compromising all or part of motor, sensory, vegetative and reflex functions. Often, it is the consequence of a polytraumatic context or comes amidst a pre-existing pathological background as spinal stenosis. In light of the novel Coronavirus Disease (Covid-19) pandemic, we must suspect and to know how to detect and treat this virus in vulnerable populations, including persons with SCI.

**Case presentation:** a 51-year-old male, without known pathological history, suffered a cervical spinal cord injury after falling because of an episode of loss of consciousness on 20.01.2023. First, he was treated in the Neurosurgical Department of TEHBA- on 31.01.2023 a C3-C4-C5-C6 laminectomy was performed. Subsequently, the patient was admitted to the Neuromuscular Department of the same hospital with AIS/Frankel C spastic tetraplegia, neurogenic bladder, severe locomotor and self-care dysfunction. He was clinically evaluated according to the standardized protocols applied in our Clinic (MRC, ASIA, ADL, FAC, SCIM, ASH-WORTH scales) also paraclinically (usually blood and urinary analyses) to establish a properly adapted rehabilitation program.

**Discussion:** Although the evolution was favorable at the beginning of the recovery program, the patient's functional outcome was limited due to a suspected urinary infection and to the long time spent in isolation after detected positive at RT-PCR test for SAR-COV-2; as a result, during this period he performed only bedside physiotherapy. Further, the gait was difficult due to motor deficit especially on the left lower limb dorsiflexion.

**Conclusion:** Despite all complications during the hospitalization, at discharge, the patient was able to perform walking between parallel bars with support from the physiotherapist. At present, he requires permanent care from another person, so permanent caregiver is needed and it is recommended to continue the recovery program in a Rehabilitation Unit.

Thus, people with SCI represent a distinct group in terms of their conditions and health risks. They can develop a multitude of physiological changes that not only increase that risk of morbidity, but may also mask the manifestation of an acute illness delaying the diagnosis of Covid-19.

**Key-words:** Spinal cord injury, Postraumatic tetraplegia, SARS-COV-2, Covid-19

*Congress Abstract – L97*

## Multidisciplinary rehabilitative management in a paraplegic woman with traumatic spinal cord transection and orthopedic, skin-related and urological complications.

Băilă Mihai, Andreea Trandafir, Ciobanu Ilinca, Muțescu Răzvan, Gelu Onose

**Introduction.** Traumatic spinal cord injuries (SCI) lead to severe impairments or even complete loss of basic voluntary and autonomic functions and thus to complications. **CASE PRESENTATION:** A 41 year old woman was admitted in the Neuromuscular Rehabilitation Clinic Division of the Teaching Emergency Hospital "Bagdasar-Arseni" in Bucharest, after suffering a polytrauma with thoracoabdominal and spinal injuries and multiple peripheral fractures and being surgically treated (neurosurgical, orthopedic, general surgery). During successive admissions, the patient presented recurrent soft tissue hematomas, a grade II sacral pressure sore, lithiasis and hydronephrosis, requiring specific interventions.

**Conclusion.** Complications after SCI are an important cause of morbidity and increased rates of rehospitalization and may also have an impact on survival and the development of chronic disabling health conditions.

**Keywords:** Traumatic spinal cord injury, Complications, Hydronephrosis, Pressure Injury, Soft Tissue Hematoma.

*Congress Abstract – L98*

## Rehabilitation of spine deformities in adolescents - in the family doctor's practice

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The spinal deformities that are commonly detected in the adolescent years has a significant impact on public health. In recent years, additional risk factors have been identified such as the modern lifestyle, sedentary lifestyle, online school during the Covid 19 pandemic. The spinal deformities that are commonly detected in the teenagers are scoliosis - with the special form adolescent idiopathic scoliosis and kyphosis - the special form Scheuermann kyphosis. The risk for spinal deformity among teenagers whose parents had a spinal deformity is higher in most situations. The family physician usually monitors both parents and children. Considering this, the family physician performs targeted screening on teenagers whose parents suffer from a spinal deformity, due to their genetic predisposition. Teenagers with spinal deformities without further limitations or pain have to be treated according to the indication guidelines. Kinetotherapy alone or in combination with medical massage, orthopaedic approaches, are approach to correct of posture, improve and maintain flexibility, to reduce the pain, the pulmonary dysfunction. Adolescents and adults with restrictive ventilation disorders can only be addressed in specialized centres for rehabilitation of breathing. The role of the family physician is to identify spinal deformities early, to intervene through physical therapy in order to correct the posture and reduce complications.

**Keywords:** spinal deformities, rehabilitation, adolescent, family physician

Congress Abstract – L99

## Femoral head aseptic necrosis (Osteonecrosis) after femoral neck fracture

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**Abstract:** Femoral head osteonecrosis is a public health condition, mainly affecting patients under 50 years of age, as well as a major social and economic challenge. The pathophysiological mechanism is not fully understood, nor is there any consensus in this regard, however some theories are more prevalent among recent studies and findings. The prevalence of this condition has surged along with the increasing use of corticotherapy, chemotherapy and other immunosuppressive agents, such as those used in the management of organ transplantation, but also likely due to improved diagnostic techniques.

The occurrence of aseptic necrosis of the femoral head (ANFH) after femoral neck fractures has a well established pathophysiological mechanism, which is impaired circulation to the femoral head due to the arrested blood flow of the ascending cervical arteries surrounding the femoral neck, which are branches of the extracapsular ring at the basis of the femoral head, representing the main vascular source of the femoral head. The incidence of ANFH in young patients who suffered a femoral neck fracture is approximately 23%, which brings about an important increase in medical costs, thus posing a significant socio-economic burden. The aim of this paper is reviewing the classification of femoral neck fractures, including the available treatment methods, the predictive factors for the development of ANFH subsequent to femoral neck fractures as well as appropriate treatment methods which reduce the risk of ANFH.

**Keywords:** osteonecrosis, fracture, femoral neck, treatment, predictive factors

Congress Abstract – L100

## Cardiovascular Rehabilitation in Romania, which way?

Carmen Mihaela Suceveanu

Cardiovascular diseases are the leading cause of death, morbidity, disability and reduced health-related quality of life, as well as economic burden worldwide. EU data from EUROSTAT puts Romania between the countries with the highest level of death through cardiovascular diseases (56.4%), which is the leading cause of global mortality.

With increasing numbers of people living longer with symptomatic disease, the effectiveness and accesability of secondary prevention and rehabilitation health services have never been more important.

In the field of cardiovascular prevention and rehabilitation, Romania has built up experience since 1960, but there are only 6 centers for cardiac rehabilitation: Cluj-Napoca, Iași, Tg. Mureș, Timișoara, Bucharest and Covasna, as well as a few private centers.

The Covasna Hospital for Cardiovascular Rehabilitation has 705 beds and a multidisciplinary team that utilizes classical elements of a Cardiovascular Rehabilitation programme combined with the effects of natural factors available in Covasna (CO<sub>2</sub> mineral waters and mofetta) which have good results on cardiovascular risk factors and cardiovascular diseases.

There are significant gaps in real world delivery of secondary prevention and cardiac rehabilitation (CR).

Barriers to CR access are disseminated at the society/health system level, clinician level, programme level, as well as the patient level. For the future, solutions for Romania, following European guidelines recommendations include: CR supported publicly through national universal coverage policy, national clinical guidelines mandating provisions to CR, promotion of potential economic benefits of CR to healthcare providers, funding and training of increased healthcare capacity, use of streamlined automated CR referral systems, incorporate CR as part of training curriculum, provision of home based CR programmes +/- mobile health technologies/apps, provision of affordable models of CR, integration of CR protocols, accesible CR models, public education on benefits of CR. A multidisciplinary team is the key to realise this objectives.

For Romania, an important element must be added to the programme: natural factors offered by the Romanian health resorts that have a cardiovascular profile and use special natural factors. At national level a national strategy for CR has been designed.

**Key words:** cardiac rehabilitation, Romania, natural factors, actionable solutions

*Congress Abstract – L102*

## Cardiac Rehabilitation for heart failure patients

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Cardiac rehabilitation has had a spectacular evolution in the last decades, from a simple monitoring of the patients resumption of physical activity, to a multidisciplinary approach that focuses both on patient education, on the individualization of physical exercises, the modification of cardiovascular risk factors and not finally, increasing the quality of life of patients.

Recent data demonstrate a significant benefit of cardiac rehabilitation in patients with heart failure, with important effects in reducing mortality, increasing exercise capacity and improving symptoms.

Despite the proven benefits and the guidelines indications, cardiac rehabilitation is still underutilized, especially for patients with heart failure. This is more likely due to the lack of awareness and the low adherence of patients, as well as the fear of initiating a rehabilitation program for this category of fragile patients.

Heart failure guidelines consider exercise-based rehabilitation as a key pillar of heart failure management alongside drug and medical device provision.

In order to increase the patients adherence to rehabilitation programs, health care services should offer heart failure patients a choice of rehabilitation modes, including home rehabilitation, supported by digital technology, alongside traditional programmes, or combinations of hybrid models.

*Congress Abstract – L103*

## Cardiac rehabilitation - a new interventional domain approached by the neuro-muscular Clinic Division together with Cardiology Clinic Division of the Emergency Teaching Hospital (THEBA)

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**Introduction:** Cardiovascular diseases exhibit a high incidence and prevalence among the population, representing a major global cause of mortality. (1,2) Frequently, cardiac pathologies result in disability for patients, impacting their quality of life by hindering the independent performance of essential daily activities. Personalized cardiac rehabilitation programs require the collaboration of a multidisciplinary team comprising cardiology and medical recovery specialists. Practically, cardiac rehabilitation is a crucial component of secondary prevention for cardiovascular diseases. (2) This paper highlights the essential need to establish a national cardiac rehabilitation program and simultaneously to present our initial efforts in this direction, including the development and implementation of the first cardiovascular rehabilitation protocol at “Bagdasar Arseni” Clinical Emergency Hospital.

**Materials and methods:** We developed a Cardiovascular Rehabilitation protocol through the collaboration between the Cardiology Clinical Division and the Neuro-Muscular Clinical Division, which gained approval from the Board of Directors of “Bagdasar Arseni” Clinical Emergency Hospital, Bucharest. Eligible patients will be assessed within the Cardiology Clinical Division of “Bagdasar-Arseni” Clinical Emergency Hospital and admitted to the program if presented with: NYHA class II-IV heart failure; acute myocardial infarction, with or without ST-segment elevation, at least one week after the onset with permissive exercise testing; stable angina and borderline significant coronary lesions post permissive exercise testing; post-cardiac surgery at three weeks with permissive exercise testing; Leriche Fontaine II-III grade arteriopathy and chronic venolymphatic insufficiency. Eligible patients will receive rehabilitation treatment through continuous inpatient or outpatient care for up to 25 days, followed by 4 weeks of tele-rehabilitation. In 2017, our Neuro-Muscular Rehabilitation Clinic was invited by the Cardiovascular Clinic of SCUBA - as part of the UMFC team - to

participate in a European Union international project, funded by the Horizon 2020 project: Virtual Coaching Activities for Rehabilitation in the Call of the Elderly: H2020 -SC1-2016-2017; Funding agreement number: 769807. Essentially, the vCare project aimed at developing a system of virtual coaches for personalized rehabilitation programs and home care methods, representing a foundational step towards introducing the concept of tele-rehabilitation at a national level. (3)

**Results:** We procured and operated two ergometric bicycles equipped with sensors, providing medical staff and physiotherapists with the appropriate training for the appropriate utilization and the application of pertinent rehabilitation treatments. As a very recent initiative, we successfully recruited the first eligible patient who completed the 25-day cardiac rehabilitation program with a favorable outcome. We are planning to expand our study by including additional eligible individuals and publishing the subsequent results.

**Conclusions:** This Cardiovascular Rehabilitation protocol represents an initial step towards establishing a comprehensive National Cardiac Rehabilitation Program, aiming at aligning with other European countries that recognize the necessity of such a protocol, offering substantial benefits for the quality of life of cardiovascular patients and simultaneously mitigating costs. Cardiovascular diseases constitute a "significant socio-economic burden affecting the healthcare system."

**Keywords:** cardiac rehabilitation, National Program, tele-rehabilitation, cardiovascular rehabilitation

Congress Abstract – L104

## The new Therapeutics classes of drugs for Diabetes mellitus - the impact on cardiovascular recovery

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Cardiac rehabilitation is an established non-pharmacological therapy that has improved outcomes in patients with cardiovascular disease.

European Society of Cardiology (2021), American College of Cardiology and American Heart Association (2017) guidelines recommend it as equivalent (Class 1, Level A) to pharmacotherapy.

Recently, there has been a breakthrough in antidiabetic therapeutics, as novel anti-diabetic classes have consistently shown cardiovascular benefits. Some of these agents have also improved Heart failure status and decreased cardiovascular and all-cause mortality.

The advantages of these drugs are assumed to result not only from their anti-diabetic effect but also from additional mechanisms.

These classes consist of the sodium-glucose cotransporter-2 inhibitors (SGLT-2i) and the glucagon-like-peptide-1 receptor agonists (GLP-1RA).

Additionally to their primary action of augment insulin secretion, GLP-1RA reduces appetite, leading to weight loss. Thus, the GLP-1RA pathway has become a focus for developing pharmacological agents to treat diabetes as well as obesity. Liraglutide was the first to be FDA (Food and Drug Administration) approved as a weight loss medication.

Regarding Sodium-glucose cotransporter-2 inhibitors (SGLT2i), non-randomized observational studies found significant reduction in weight. In skeletal muscle, SGLT2 inhibitors improve muscle endurance capacity in experimental models. The evident reduction in bodyweight and the improvement on muscle endurance capacity might also influence exercise tolerance favorably.

To conclude, there is strong evidence that the advantages provided by novel antidiabetic medications go beyond glycemic control to include cardiovascular disease risk reduction and have additional benefits on cardiac rehabilitation.

Thus, it is crucial for the cardiac rehabilitation team to be aware of the properties of these agents, given the great benefits beyond glycemic control.

## Congress Abstract – L105

## Possible complications associated with cardiac rehabilitation programs in patients with high cardiovascular risk

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**Objectives:** Despite the multiple benefits demonstrated in studies, physical exercise in cardiovascular disease patients is not without risks. This study aims to gather information from the specialized literature on complications in the clinical practice of cardiac rehabilitation programs and to profile the patients with increased cardiovascular risk for complications.

**Material and Methods:** In order to achieve the proposed objectives we used the PubMed medical database to collect all relevant studies that reported complications associated with cardiac rehabilitation programs. We evaluated all studies since 2000, regardless of region, using the following keywords: "cardiac rehabilitation", "complications of cardiac recovery", "safety of cardiac recovery programs" and combinations of these words. The impact of cardiovascular risk factors and negative prognostic factors are discussed regarding the patient's profile at risk of complications during physical exertion.

**Results:** The literature is quite poor in reporting complications of cardiac rehabilitation programs. The lack of information in the medical research space is primarily due to the careful monitoring of these patients and the avoidance of situations that could lead to complications. However, a large study conducted in France in 2006 evaluated 25,420 patients and reported 20 severe complications. Out of the 20 events, 5 were during the ECG stress test and 15 during the cardiac rehabilitation program. Of the patients who experienced complications during the cardiac recovery program, 8 had chest pain (7 angina pectoris and 1 pericarditis), 4 had ventricular arrhythmias, 1 had cardiac tamponade, 1 had acute heart failure and 1 had cardiac arrest. All patients were treated emergently and no deaths were reported.

**Conclusions:** Despite the possible complications that may occur during cardiac rehabilitation programs, the enrollment of cardiovascular patients in such programs is considered safe and is associated with an improvement in the social and functional status of the patient. Regarding patients with high cardiovascular risk, it is difficult to predict which patients will have severe complications with physical exercise and careful enrollment and close monitoring is recommended.

**Keywords:** cardiac recovery, preventive cardiology, complications of cardiac recovery programs.

## Congress Abstract – L106

## Studies regarding influences of ethanol on hypoxemic stress in neuroblastoma cells

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**Introduction:** Studies were conducted on the effect of hypoxic stress (also present in spinal cord injury) on neuronal cell cultures treated for a long time with ethanol (trying to reproduce chronic alcoholism).

We will present the behavior (at the level of molecular biology) after hypoxic stress of neural cells subacutely exposed to ethanol in order to perform a comparative analysis between the results of the two types of experiment.

**Materials and methods:** We performed subacute treatments with ethanol in neural cell cultures. We will appreciate gene expression and protein synthesis in the case of experimentally induced hypoxic stress.

**Results and conclusions:** We will investigate if the changes in hypoxic stress are similar in the case of subacute ethanolic treatment, compared to the chronic one, in order to highlight potential influences in the process of posttraumatic neuromuscular recovery.

Congress Abstract – L107

# Ledderhose Disease: a synthetic overview of a rare medical condition and the role of physical therapy in a clinical case presentation

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## Abstract:

**Introduction:** Ledderhose disease is a rare, benign condition that affects the plantar aponeurosis, causing its thickening and the appearance of nodules on the soles. Nodules are usually painless in the first stages, but they can grow and cause discomfort or pain through inflammatory and irritating phenomena. Also called plantar fibromatosis, this condition is part of a series of diseases characterized by hyperproliferation of fibrous connective tissue, along with Dupuytren's contracture (palmar fibromatosis).

**Materials and methods:** This paper presents the case of a 66-year-old patient, known to have Lederhose disease diagnosed in 2003, Dupuytren's contracture of bilateral hands, osteopenia, invasive ductal carcinoma surgically treated and followed by chemotherapy and radiotherapy (2018). The patient came to our clinic for pain at the both plantar level (the left side more painful than the right side), paresthesia "in the sock" of the lower limbs and walking difficulties. At the clinical objective exam, we found bilateral flatfoot, Dupuytren retraction of the bilateral palmar aponeurosis, significantly reduced muscle strength in lower limbs, plantar synovial cysts that were detected by MRI examination. The physiotherapy treatment plan was established in order to reduce the symptoms, decrease the inflammatory process and to improve the walking pattern.

The patient was dynamically evaluated using the following scales: quality of life assessment (QOL), pain measurement scale, visual analogue scale VAS, FAC International scale, Activities of daily living Scale (ADL), muscle strength assessment - MRC.

**Results:** Taking into account the associated oncological pathology, we were limited in physiotherapy procedures prescriptions, however, the patient benefited from an individualized rehabilitation program specific to the pathology with a favorable evolution. The program included physical therapy sessions aimed at stretching, toning and increasing muscle strength for the plantar and palmar muscle groups, paraffin applications, TENS and deep oscillation.

**Conclusions:** The interdisciplinary therapeutic approach, in a patient with oncological pathology, complicated with degenerative diseases, culminating in a specific rehabilitation program, determines the increasing of the locomotor impairments with a significant improvement of the patient's quality of life.

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**Keywords:** rehabilitation program, Ledderhose disease, plantar fibrosis, rare disease



Congress Abstract – L108

## Favorable outcomes in a challenging and difficult rehabilitative program of a young patient with severe traumatic brain injury in a polytraumatic context by car accident – case report

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**Introduction:** Major trauma still represents one of the leading causes of death in the first four decades of life<sup>[1]</sup>. Traumatic brain injury (TBI) encompasses a group of heterogeneous manifestations of a disease process with high neurologic morbidity and, for severe TBI, high probability of mortality and poor neurologic outcomes<sup>[2]</sup>. After the acute and subacute treatment, many of these injuries require intense nursing and rehabilitation treatment in order to improve the patient’s future quality of life<sup>[3]</sup>.

**Materials and methods:** With the permission of the THEBA Ethics Committee, this paper presents a case of a 21-year-old female patient with a severe polytrauma due to a car accident (car passenger), occurred on April 30, 2021, who suffered a severe TBI, a thoracic and an abdominal traumatism and a left tibial fracture. The patient was hospitalized in the Intensive Care Unit of the Emergency University Hospital in Bucharest, in a severe condition, being orotracheal intubated and tracheostomized. After clinical, hemodynamic stabilization and specific paraclinical investigations, she was surgically treated with: left frontal-temporo-parieto-occipital decompressive craniectomy, left tibial fracture orthopedic stabilization, and an endoscopic percutaneous gastrostomy was performed. After three months, on August 23, 2021, the patient was transferred to THEBA and admitted in our Neuromuscular Rehabilitation Department, with minimally conscious state (Glasgow Coma Scale = 10 points), psycho-cognitive status and marked psychomotor agitation, spastic tetraparesis, pain and severe functional impairments in the knees and ankles bilaterally, second degree sacral pressure sore and severe deficiency of self-care and locomotion. She initially followed a rehabilitation nursing program and continued with a recovery therapy according to clinical stages. The patient was functionally assessed using the following scales: Medical Research Council (MRC) Scale for Muscle Strength, Functional Independence Measure (FIM), Life Quality Assessment (QOL), FAC International Scale, Independence Assessment Scale in Daily Activities (ADL/IADL).

**Results:** Although the patient’s evolution was very slow, after multiple admissions in our clinic and in other rehabilitation clinics over the years, she had favourable outcomes with an increase in the scores of the evaluated scales at discharge. In our clinic, she benefited from a complex neuro-muscular rehabilitative program including pharmaceutical treatment, botulinum toxin injection, physical therapy (kinesiotherapy), physiotherapy, occupational therapy, psychotherapy and speech therapy. The patient’s final performance in our clinic was maintaining the position in the wheelchair, participating in carrying out the transfers and sustaining orthostatism for a short period of time with significant help from another person.

**Conclusion:** The multidisciplinary team approach with the addition of complex nursing measures and a personalized rehabilitative program for a young patient with polytrauma caused by a car accident established neuro-locomotor improvements which led to an increase in patient’s quality of life.

**Key words:** neuro-muscular rehabilitation, polytrauma, traumatic brain injury

Congress Abstract – L109

# A complex case of favorable neuromuscular evolution in a patient with left hemiplegia after relapsed fronto-parietal meningioma and a very large umbilical hernia

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## Abstract:

**Introduction:** Meningioma is the most common benign brain tumor of the central nervous system. Meningiomas are slow-growing, extra-axial tumors that start in the dura mater. Imagistically, meningiomas are described as having a broad base of implantation at the level of the dura, which may result in adjacent hyperostosis. Most meningiomas are considered surgically cured if the lesion can be completely removed. They are most often located in the brain crest or sphenoid bone and may show calcification of the lesion. Treatment is indicated for lesions that produce symptoms but cannot be satisfactorily controlled medically or for those that demonstrate continued significant growth on serial imaging studies. The paper presents a case report of complex neuromuscular rehabilitation of a patient with fronto-parietal recurrent meningioma who had a favorable clinical outcome in contrast to the tumor mass and its recurrence, of hemiplegia and of missing bone flap.

**Materials and methods:** We followed the evolution of a 52 years old female patient, with multiple comorbidities: HTAE stage .II, obesity, dyslipidemia, large umbilical hernia, hepatic cytolysis syndrome, organic depression. The primary meningioma was diagnosed in 2017, operated and resulted in missing decompressive flap and secondary epilepsy. In 2023, the meningioma recur and following surgery the patient presented with left hemiparesis, with significant motor deficit and severe self-care dysfunction. In March 2023 the patient is admitted to the Neuromuscular Recovery Clinic of SCUBA for specialized treatment. The patient underwent interdisciplinary general surgery consultation for the repair of the abdominal parietal defect, surgery was postponed due to neurological problems and complexity of the intervention. For the clinical-functional assessment of the patient's motor deficit and the degree to which it affects her quality of life, we used the MRC, ROM, ADL, IADL, QOL scales.

**Results:** After receiving adequate treatment and complex rehabilitation program, a favorable evolution was observed, with the performance of walking on flat ground with the help of walking frame, despite the fact that massive umbilical hernia and organic depression influenced the patient's adherence. It was also observed an increase in the scores in the scales assessing functionality.

**Conclusions:** This clinical case of neuromuscular recovery is a comprehensive example highlighting the complex multidisciplinary approach in our clinic. The particularity of the case is the recurrence of bilateral fronto-parietal meningioma, its size, secondary comitial seizures, missing decompressive volvulus, large umbilical hernia as well as the multiple comorbidities of the patient and the low initial compliance due to the organic depression syndrome.

**Key words:** hemiparesis, meningioma, decompressive flap, umbilical hernia, depressive syndrome.

## Congress Abstract – L110

## Debut particularities of a patient presenting thoracal osteomyelitis and pulmonary empi following the surgical treatment of Schwannoma -case report

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**Introduction:** Osteomyelitis is a bone inflammatory state most commonly caused by infection. Usually a bacterial pathogens enters the skeleton , which is notoriously difficult to treat, in part because of the widespread antimicrobial resistance of the etiologic agent and the difficulty of detecting the exact pathogen. A standard approach to diagnosing osteomyelitis is based on clinical suspicion. Usually symptomatic presentation includes persistent fever , pain associated frequently with other local clinical signs over the area of the infection ( swelling, warmth and redness) and fatigue. Osteolytic lesions around the bone involved are described as "rat bite" and can help with the diagnosis. Sometimes osteomyelitis causes no signs and symptoms or these are hard to distinguish from other problems as in the present case, increasing the difficulty degree of the diagnostic process.

**Materials and methods:** This paper presents the case of an 83 year-old woman which was previously diagnosed and surgically treated for a schwannoma of the right lung. After being discharged, the patient developed sudden pain in the thoracic and lumbar region of the spine associated with progressive development of a locomotor dysfunction: AIS Frankel C Th12 Paraplegia . After several investigations the diagnosis was clear, she was suffering from T8-T9 Osteomyelitis associated with both anterior and posterior epiduritis.

**Results and discussions.** The patient followed a complex rehabilitation program in our clinic with favorable outcomes , although the progress was slow, mainly due to delayed care.

**Conclusions:** Osteomyelitis can be a real rehabilitation challenge regarding the debut, the diagnosis, the complexity of the risk factors involved and the long term treatment. Therefore the outcome and the quality of life of patients depend both on prompt diagnosis and on the efficient treatment, followed by an appropriate rehabilitation program.

**Keywords:** neuro- rehabilitation, schwannoma, osteomyelitis , paraplegia

## Congress Abstract – L111

## Photobiomodulation with LASER MLS (Multiwave Locked System) therapy, alternative use of alginate and hydrogel dressings and supportive pharmacological interventions in the treatment of a patient with severe neurological injury and stage IV pressure injury – a case study.

Mihai Băilă, Andreea Trandafir, Ilinca Ciobanu, Gelu Onose

**Introduction.** Pressure injuries generate difficulties in providing optimal care in the long run and are associated with poor healing rates and increased recurrences after surgical treatment.

**Case presentation:** A patient with persistent post-anoxic vegetative state following resuscitation from cardiac arrest and severe neurological sequelae (including severe dysphagia and respiratory dysfunction requiring gastroenteric tube feeding and tracheostomy), having a grade IV sacral pressure sore, was successively admitted in the Neuromuscular Rehabilitation Clinic Division of the Teaching Emergency Hospital "Bagdasar-Arseni" in Bucharest, between January and May 2023. The treatment consisted of: depressurization of the affected area, use of wound dressings depending on the wound characteristics (alginate or hydrogel) and LASER Multi-Wave Locked System (MLS) photobiomodulation: 5 sessions (in January) and 10 sessions (in February): intensity 50%, energy density=4 J/cm<sup>2</sup>, 1500 Hz, duration automatically set by the device. The wound surface

was measured using digital planimetry with a landmark and a D-SLR camera, at the admission and after 4, 7 and 9 weeks of care. Image analysis was performed using ImageJ software.

**Results:** Evolution of the wound surface was stationary after 4 weeks from the initial presentation (12 cm<sup>2</sup>). A reduction of the surface area was observed at 7 weeks (~17%) and 9 weeks (~55%).

**Conclusion:** This case presentation supplies data regarding the use of LASER Multiwave locked system (MLS) irradiation in the treatment of a grade IV pressure injury, as an adjuvant therapy to conventional interventions, the use of contemporary wound dressings within a protocol that takes into account the characteristics and healing stage of the pressure injury and supportive nutritional and pharmacological interventions.

**Keywords:** Pressure injury, Photobiomodulation, Wound dressings, LASER MLS, Multiwave Locked System LASER

*Congress Abstract – L112*

## Challenges in rehabilitation of a tetraplegic patient involving urinary lithiasis - case report

Larisa Ionita, Roxana Bistriceanu, Andrei Razvan Lupascu , Magdalena Lapadat, Gelu Onose

**Introduction:** Bladder stones are solid calculi that are primarily found in the urinary bladder. The incidence of the disease in Eastern European countries is relatively higher as they tend to be found more often in developing countries due primarily to dietary factors. The primary cause of bladder calculi is urinary stasis, but those can also form in healthy individuals. If stones originating from the kidney are small enough, they can pass through the ureters and the urethra, as in the present case.

**Materials and methods:** This paper presents the case of a 21 year-old man who was diagnosed with C7 AIS Frankel A spastic tetraplegia after accidentally taken a fall from ~ 4 m in October 2019. He suffered a traumatic cervical spine injury with comminuted fracture of C7 which was surgically treated in November 2019 associated of course with neurogenic bladder. Since 2019 he suffered not one, but two episodes of urinary lithiasis, which were both treated surgically, the first in 2022 and the second in 2023. The second bladder stone migrated and the CT showed a radiopaque image of approximately 16/25/12 mm in the penian part of the urethra, but with no clinical manifestations, signs or symptoms .

**Results and discussions:** Urinary lithiasis may not present any particular symptoms, or there may not be any symptoms at all. They are usually associated with various types of incomplete bladder emptying problems, most commonly neurogenic bladder.

**Conclusions:** Since the signs and symptoms of bladder stones are relatively vague, a definitive diagnosis is not typically made without cystoscopy or imaging. Therefore patients with motor disfunctions associating neurogenic bladder should be periodically investigated for prompt diagnosis and efficient treatment, followed by an appropriate rehabilitation program.

**Keywords:** neuro - rehabilitation, urinary lithiasis+ , tetraplegia

*Congress Abstract – L113*

## Rare tumoral etiologies involving two patients presenting plasmacytic plasmacytoma, respectively Ewing's tumor

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**Introduction:** Rare tumors have proven to be a challenging clinical pathology involved in the development of paraplegia. Both plasmacytoma and Ewing's tumor represent uncommon pathologies, referring to the bones or the soft tissue; the tumor mass located at the spinal level damage the bone tissue, thus leading to neurological dysfunction.

**Material and methods:** We reported two female- cases.

The first case refers to a 55-year-old patient admitted to the Neuromuscular Clinic Division of Teaching Emergency Hospital “Bagdasar-Arseni” (TEHBA) Bucharest, for incomplete paraplegia following thoracic spine pain and sustained physical effort during 6 months, succeeded by a suddenly installed motor deficit. Following some radiological investigations, a T3 level vertebral tumor with epidural extension and medullary compression was detected. Surgery was performed at the Neurosurgery Clinic Division of TEHBA, and tumor ablation and vertebral reconstruction were performed. The histopathological examination provides the definitive diagnosis: plasmacytic myeloma.

The second case reported was about a 62-year-old patient previously known with Ewing's sarcoma at the T10 level of the spine, admitted to TEHBA for incomplete paraplegia. After examination, it is concluded the recurrence of the subdural tumor at the level T9-T10 and the appearance of a new subdural tumor at the T7 level. After the neurosurgical team performed a complete macroscopic subdural tumor ablation at the T7, T9-T10 levels, the patient was admitted to the Neuromuscular Clinic Division.

Both patients benefited from a customized, complex rehabilitation program.

**Result and discussion:** Following the rehabilitation nursing and the personalized neuro-muscular kinesiotherapy program, the subjects' evolution was favorable, significantly improving their physical and mental state.

**Conclusions:** The importance of differential diagnosis regarding rare pathologies is proven in the establishment of a prompt and correct diagnosis that leads to the initiation of appropriate treatment, but also to the prevention of future possible complications.

**Keywords:** Ewing's tumor, plasmacytoma, paraplegia

*Congress Abstract – L114*

## An odd case of idiopathic polymyositis with anti-SRP antibodies, complicated with sagittal, transverse and sigmoid sinus thrombosis

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**Introduction:** Immune mediated necrotizing myositis is a rare type of immune-mediated inflammatory myopathy (1,2) with an incidence of 8,3 per million person years (3) with severe prognosis, being very resistant to treatment (1,2,4). Systemic inflammation promotes cerebral venous thrombosis onset (5).

**Material and methods:** We present the case of a 46-years old Chinese female, without any known prior pathology, that was referred to the Rheumatology Department for symmetrical, proximal muscle weakness of the limbs, dysphagia for solid food and weight loss (5 kg within 2 months). Symptoms started suddenly, 2 months prior and gradually worsened. The pathologic clinical examination revealed: itchy erythematous plaques on the posterior thoraco-lumbar region, signs of muscle weakness (unable to climb the stairs, to stand up from a chair, to perform abduction of the arms, decreased muscular strength on Muscle Power Scale (MRC): 3/5 MRC on both upper and lower limbs, proximal. Laboratory workup showed significant inflammatory syndrome, severe muscle and hepatic cytolysis syndrome, positivity for thyroid-specific autoantibodies but with normal thyroid function. The in-depth examination for systemic rheumatic causes of arthritis revealed positivity for antinuclear antibodies (more specific: SS-A, Ro-52, SS-B) and myositis antibodies (SRP, Ro-52, SAE1, PM-Scl, MDA5). The CT scan of the thoracic, abdominal and pelvis showed fibrosis of the lungs, hepatic hypertrophy, and enlarged uterus. Transvaginal ultrasound uncovered adenomyosis of the uterus. The positive diagnosis is idiopathic polymyositis with anti-SRP antibodies, more specifically immune-mediated necrotizing myopathy. Differential diagnosis included: dermatomyositis, toxic/infectious myositis, hypothyroidism, neuromuscular diseases (Eaton-Lambert syndrome, myasthenia gravis, lateral amyotrophic sclerosis), rhabdomyolysis (1,2). The initial treatment was made with glucocorticoids (pulse therapy followed by oral therapy) and immunosuppressants (Mycophenolate Mofetil – stopped because of severe dyspepsia of the patient and myelosuppression). After five days of pulse-therapy, the patient developed muscle weakness and paresthesia

of the left side of the body and the cerebral CT scan revealed sagittal, transverse and sigmoid sinus thrombosis and the thrombophilia screening uncovered only the positivity of the lupus anticoagulant.

**Results:** The patient was treated with anticoagulants (low molecular weight heparin and afterwards Vitamin K antagonist), low doses oral glucocorticoids and immunosuppressant (Methotrexate), without any other adverse event.

**Conclusion:** In the presence of the lupus anticoagulant, even though the antiphospholipid syndrome is not confirmed, the only anticoagulant therapy that has proven its efficacy is the Vitamin K antagonist (6). Cerebral venous thrombosis is a rare form of stroke and one of the most important risk factors is systemic inflammation. Immune inflammatory myopathies – like polymyositis and immune-mediated necrotizing myopathy create significant inflammatory status that lead to hypercoagulability and endothelial injury, that exposes collagen and tissue factors, promoting further platelet aggregation(4,5).

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Congress Abstract – L115

## Vasile Popp, among the founders of Romanian medical writing. Current coordinates and meanings of the work

Dorin-Gheorghe Triff

The current medical topics presented in the first medical work in Romanian "The mineral waters of Arpătac, Bodoc and Covasna", published in 1821, are presented, detailing compared to aspects related to the author's recommendations regarding the duration of use and the type of water, the description of the waters minerals and diseases that can be treated with them.

This recommendations stand as actuality landmarks, alongside the first medical work printed in Romanian and the first comparative ethnographic work in Romanian folklore, considered to be pioneering in the European space as well, and which supports the Romanian origin of funeral customs among the Romanian population, as well as the first bibliographic work with list of old books printed in Romanian.

The whole work shows the figure of the Illuminist scholar, representative and supporter of the cultural values of the European space, of the idea of the unity of the Romanian people on both sides of the Carpathian arc, devoted to the values of his nation.

210 years after the work "Elegy of medicine" addressed to the Faculty of Medicine of the University of Vienna, the artistic values and moral and spiritual guiding principles of the author are revealed.

Vasile Popp (1789-1842), physician, ethnographer, bibliographer, doctor of medicine and philosophy, with professional activity related to the towns of Târgu Mureș, Cluj, Brașov, Făgăraș, Sibiu, Iași, Zlatna and Vienna, represents an emblematic figure of Romanian personalities within of the European Enlightenment, a path-breaking personality, devoted to the values of his nation and of remarkable topicality, exemplifying his creed, career and work.

**Keywords:** balneology, medical writer, ethnographer, bibliographer, European Enlightenment

Congress Abstract – L116

## GCT of knee treated with modular prosthesis - case presentation

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**Abstract:** The giant cell tumor is an aggressive benign tumor with metastatic potential, most often within the lungs in 2-3% of patients. It makes about 5% of total bone tumors and about 15% of total benign bone tumors. The maximum incidence comes between 30 and 40 years of age, most frequently affecting the long bones epiphysis (distal femur, proximal tibia and distal radius). We report the case of a 50-year-old female, with no previous medical history, admitted in the emergency department (ED) for significant pain and functional impairment of the left knee. Clinical examination and imaging tests established the diagnosis of distal femoral tumor. The patient underwent surgical segmental resection of the tumor within oncological limits and subsequent arthroplasty with cemented modular tumoral prosthesis was performed. Even the GCT is a benign tumor it has an aggressive behavior and malignancy potential with an important impact on quality of life. Due to localization this type of tumor can quickly become clinically manifest which permitted early diagnosis and a less invasive surgical technique.

**Keywords:** GCT, resection, tumoral prosthesis, aseptic loosening

Congress Abstract – L117

## Personalised surgical treatment for misalignment of the extensor apparatus

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**Abstract:** The misalignment of the extensor apparatus is a frequent condition among young individuals, impacting day-to-day activities and quality of life. Without early diagnosis and adequate treatment, this disorder can lead to increased patellofemoral intraarticular pressure, with subsequent patellofemoral pain syndrome, sometimes even causing patellofemoral osteoarthritis.

One of the causes of patellofemoral pain syndrome is attributed to the patellar maltracking which causes increased intraarticular pressure between the lateral femoral condyle and the patella, affecting the joint cartilage at this level. Neglecting this condition may lead to patellar dislocation, which occurs on average in 5,8/100000 cases in the general population, with a higher rate of occurrence for the age group 10-17 years (29/100000). The risk factors include young age (under 18 years), trochlear dysplasia, tibial tuberosity to trochlear groove distance (TT-TG) greater than 20 mm, as well as patella alata. There are several surgical techniques currently available for improving these risk factors, however there is no personalised device adapted to the pathophysiological attributes of each patient. The aim of this study is the development and implementation of a personalised osteotomy and tibial tuberosity fixation device, which is the preferred treatment of the misalignment of the extensor apparatus.

**Keywords:** misalignment, extensor apparatus, personalised, device, study



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