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Functional training as a therapeutic approach for chronic low back pain

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Introduction: Chronic pain leads to *functional limitation* and motor control impairnments. The purpose of the work was to determine the effectiveness of applied functional training on the quality and technique of performing functional patterns and the pain level of the subjects.

Material and methods: 24 women in age 20-24 with reported low back pain who took part in research were randomly assigned to two groups. Group 1 (n=12) participated in 12-weeks functional training program, Group 2 (n=12) was the control group, without any form of intervention. At the pre- and post-12-week intervals, a comprehensive assessment of the forward trunk flexion movement technique was conducted in all female participants using the three-dimensional motion analysis system BTS SMART-D. Pain levels were quantified using the VAS Scale. Statistical analysis was performed using Statistica 13.3 (Student's t-test, Wilcoxon signed-rank test, and Mann-Whitney).

Results: In the group of women participating in functional training (Group 1), a statistically significant improvement ($p < 0,05$) was observed in the quality of executing the functional movement pattern of forward trunk flexion: reduction in spinal movement during the initial phase of the motion and a modification in the timing between hip joint flexion and lumbar spine flexion before and after the therapy. The proposed training program significantly decreased pain level from 5,5 to 1,7 ($p < 0,05$). The obtained results were significantly higher compared to the control group ($p < 0,05$), where no significant differences were noted in the second assessment.

Conclusions: The proposed functional training contributed to a reduction in perceived pain level and improvement in the quality of functional movements, providing evidence for the effectiveness of using this form of therapy in the treatment and prevention of lumbar spine pain disorders.

Keywords: lumbar spine, pain, functional training, movement pattern

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Scheuermann's Disease – Epidemiology, Diagnosis, Treatment and Rehabilitation

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Introduction: Scheuermann's Disease, also known as juvenile kyphosis, is characterized by an increased thoracic kyphosis and changes in the shape of vertebral bodies that occur during the growth period of a young individual. Less commonly, it may affect both the thoracic and lumbar spine. It is typically diagnosed in patients aged 12-17, more frequently in boys. The aim of this study is to describe this condition, taking into account the rehabilitation aspect essential in treating this disease.

Material and methods: A literature review related to Scheuermann's Disease was conducted, based on the book "Medical Rehabilitation, Volume 2" by Andrzej Kwolek, and supplemented with scientific articles from the PubMed database. To enhance the search results, terms such as "Scheuermann's Disease," "Juvenile Kyphosis," and "Osteochondrosis" were used.

Results: The article describes Scheuermann's Disease, covering epidemiology, diagnosis, and treatment, with a focus on rehabilitation methods for pediatric patients affected by this condition. The cornerstone of treatment is kinesiotherapy, which may be complemented by physiotherapy and the use of corrective braces. In cases where non-operative treatment fails or the disease is in an advanced stage, surgical intervention is recommended.

Conclusions: A literature review indicates a multifactorial etiology of Scheuermann's Disease, encompassing environmental, metabolic, and genetic factors.

Key words: Scheuermann's Disease, Juvenile Kyphosis, Spinal Pain

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The use of the APPP method in a vertebrogenic patient with verification of heart rate variability

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Introduction: The Autoreflex Prenatal, Postnatal Therapeutic Positions (APPP) method is based on the psychomotor development of a person from prenatal, i.e. sperm movement, to postnatal development to bipedal locomotion. The patient is led into a therapeutic position, during which a conscious isometric activation of the skeletal muscles occurs after a certain period of time. The variability of the heart rate makes it possible to evaluate and verify the activity of sympathetic, parasympathetic and baroreceptor activities. By diagnosing dysfunction of the autonomic nervous system, the potential spectral analysis.

Material and Methods: We chose the case study of a 36-year-old female patient who underwent an examination at a neurological clinic as lumbosciatic syndrome and was subsequently sent for rehabilitation treatment. During the physical therapy examination, muscle imbalance with a significant pathological stereotype of breathing was detected. The APPP method was performed on the patient with verification of input and output heart rate variability.

Results: After intensive rehabilitation and its continuation in the home environment with the use of APPP elements, the patient improved her breathing stereotype and there was a correction of muscle imbalance in the problem area and a change in the activity of the autonomic nervous system.

Conclusions: In APPP there is a so-called physiological stimulation, which through repetition becomes the basis of active movement and neuroplasticity. Breathing in autoreflex positions is a reflex action. The position and its activation sends to the brain a specific stimulus and innate abilities of the patient.

Keywords: Heart rate variability, Physiotherapy, Postnatal positions.

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Relevance of the formation of a system of competences and specialisation programmes for physical therapists in paediatrics

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Ukraine

Introduction: Physical therapy in paediatrics is an independent area of rehabilitation. Most often, physical therapists choose to specialise in this field. Pre-diploma training programmes for physical therapists in Ukraine are mostly focused on working with adults. The purpose of the study is to substantiate the relevance of developing a competency framework and specialisation programmes for physical therapists in paediatrics.

Material and Methods: The study was conducted by questioning 82 physical therapists working in paediatrics. The questionnaire was designed to assess the work experience, areas of clinical activity and level of competence of a physical therapist working in paediatrics. The developed questionnaire consisted of 31 questions.

Results: Analysing the results of the survey, we determined the level of development of the competences of a physical therapist in paediatrics proposed by us. In particular, the competencies include the ability to conduct a patient examination, interpret its results to determine the goals of rehabilitation and appropriate interventions, use a family-centred approach, understand the epidemiology and pathology of childhood diseases and the ability to provide educational and counselling services to caregivers. These competencies were reported by 30.48-46% of respondents at the "experienced" level, and by 13.41-30.48% at the "intermediate" level. It is also worth noting that from 1.21 to 8.53% of the surveyed physical therapists indicated the expert level, i.e. the level at which a specialist is able to demonstrate a deeper understanding of the situation and contributes to the development and dissemination of knowledge through the training and development of others.

Conclusions: According to the respondents the need for specialised and advanced training of such specialists is extremely high. In this view, it is advisable to formulate a system of competences of a physical therapist in paediatrics, which would become the basis for improving university educational programmes, syllabuses and developing specialisation programmes.

Keywords: competence, specialisation, education, programme, physical therapy, paediatrics

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Rehabilitation in Parkinson's disease – prospects and challenges

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Introduction: Parkinson's disease (PD) is one of the most common neurodegenerative diseases in the world. Unfortunately, most current clinical treatments for PD are symptomatic and there is still no optimal cure to stop the progression of the disease. Collective evidence shows that different types of exercise can reduce the risk of Parkinson's disease and have a positive effect on both motor and non-motor symptoms.

Material and methods: A literature search for this review was conducted using PubMed databases and the following keywords: Parkinson's disease, physical exercise, rehabilitation. It was based on the analysis of six of the twenty searched articles.

Results: Exercise increases synaptic strength and affects neurotransmission, thus strengthening functional circuits in Parkinson's disease. Parallel to the benefits in alleviating clinical symptoms is also modulation of brain maintenance and plasticity support systems, including neurogenesis, synaptogenesis, increased metabolism and angiogenesis. Moreover, exercise reduces the risk of other geriatric diseases such as diabetes, hypertension and cardiovascular disease, which may also contribute to PD pathogenesis.

Conclusions: Exercise is increasingly seen as an adjunctive strategy to PD drugs that may elicit short-term but clinically important benefits, particularly for gait and balance. Rehabilitation is largely heterogeneous (stretching, muscle strengthening, balance, postural exercises, occupational therapy, treadmill training) and there is still no consensus on the optimal approach.

Key words: Parkinson disease, rehabilitation, treatment

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Exercise and oxidative stress in type 2 diabetes

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Introduction: Oxidative stress is caused by an imbalance between overproduction of reactive oxygen forms or deficiencies in endogenous and exogenous antioxidant defenses. The presence of reactive forms of oxygen in high concentrations and for a long time is associated with the occurrence of various diseases, including type 2 diabetes. Exercise is an effective means of preventing and treating type 2 diabetes, and is also able to reduce the level of oxidative stress.

Material and methods: A literature search for this review was conducted using PubMed databases and the following keywords: oxidative stress; reactive oxygen forms; type 2 diabetes. It was based on the analysis of five of the seventeen articles searched.

Results: Studies show a positive effect of physical exercise in controlling the development of type 2 diabetes. High-intensity interval training, on the other hand, appears to have a positive effect on oxidative stress levels by increasing endogenous antioxidants. In addition, improvements were observed with respect to markers of lipid profile and physical fitness.

Conclusions: Although diabetic patients are thought to be exposed to oxidative stress due to prolonged exposure to hyperglycaemia, the effect of glycaemic control and cardiovascular complications in diabetes on oxidative stress parameters has not been fully investigated. However, the findings so far confirm the evidence that diabetic patients are susceptible to oxidative stress, and higher blood glucose levels are directly related to lipid peroxidation via free radicals, and exercises such as high-intensity interval training have proven to be very effective in normalizing oxidative stress.

Key words: type 2 diabetes, oxidative stress, physical exercises

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TECAR Therapy – Review of Significant Therapeutic Effects

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Introduction: TECAR therapy is one of the physiotherapeutic treatments which, in practice, is a completely innovative way of using short-wave diathermy - alternating current, which is characterized by a frequency range of radio waves (from 300 kHz to 1 MHz) and offers extraordinary therapeutic potential. Its long electromagnetic wave length (30-300m) allows deep penetration of muscles, tendons and bones. TECAR therapy provides analgesic, anti-inflammatory, regenerative and even wound healing.

Materials and Methods: A search of literature for this review was conducted using PubMed, Google Schoolar and the following keywords: TECAR therapy, manual therapy, muscle disorders. It was based on the analysis of seven of the twenty searched articles.

Results: TECAR therapy, especially in combination with manual therapy, increases joint mobility especially in rigid joints, accelerates tissue repair, improves tissue stability and extensibility, and reduces soft tissue inflammation by reducing pro-inflammatory mediators and improving capillary permeability. In addition, by warming deep tissues, it stimulates vascularity, promotes tissue rest and stimulates lymphatic drainage.

Conclusion: TECAR therapy, due to its high therapeutic efficacy, non-invasive nature and minimal side effects when administered correctly, shows application for both treatment and prophylaxis in various fields of physiotherapy. In combination with manual therapy and high-intensity laser therapy, it offers optimal cooperation in the regeneration process of all muscle diseases.

Key words: TECAR therapy, manual therapy, muscle disorders

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Analysis of gait and static balance of children and adolescents with Juvenile Idiopathic Arthritis

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Introduction: Juvenile Idiopathic Arthritis (JIA) is considered the most frequent arthropathy of developmental age with unknown etiology. It is a group of chronic inflammatory disease of connective tissue with heterogenic clinical picture and course. The purpose of the study was to assess the gait and static balance of JIA children and adolescents in various periods, taking into account process of complex treatment.

Material and methods: The study group consisted of 50 children and adolescents (mean age = 13,2 years) diagnosed with JIA. All patients underwent complex, four-weeks therapy, consisted of both pharmacological and rehabilitation treatment in the Clinical Regional Rehabilitative - Educational Center for Children and Adolescents (County Clinical Hospital no. 2 in Rzeszow, Poland). The patient's evaluation was performed three times: on the day of the beginning and completion of the rehabilitation and 9 months after the second study. Gait analysis was performed using 3-D optoelectronic gait analysis system. Static balance was assessed on AMTI force platform. The control group consisted of 49 healthy children (mean age = 12,6 years).

Results: In the first study gait pattern of JIA children was significantly different than the healthy peers, considering spatio-temporal parameters as well as most of the of the kinematic parameters. Assessment of static balance did not show differences between the groups during double leg stance trial with eyes open. During double leg stance trial with eyes closed JIA children obtained higher amplitude of medio-lateral and anterior-posterior postural sway. After the therapy, the results of double leg stance test with eyes closed and single leg stance tests have improved.

Conclusions:

1. JIA is related with the occurrence of significant gait pattern and static balance disorders.
2. Complex treatment, including rehabilitation, can improve the JIA subjects' gait and static balance.

Keywords: Juvenile idiopathic arthritis, gait, balance

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The preoperative preparation in the care and rehabilitation process of patients undergoing surgical procedures in the area of the pelvic floor

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Introduction: Patients undergoing surgical procedures experience a decline in functional status, followed by a period of convalescence. Improving patients' physical and mental condition, educating them about post-procedure care, and minimizing the risk of postoperative complications is possible through the implementation of appropriate physiotherapeutic interventions. The aim of this study was to broaden the understanding of prehabilitation as a method of preparing patients for procedures within the pelvic floor area and to analyze and compare existing research with medical practice standards.

Materials and methods: A review of literature available in the PubMed database was conducted. Keywords related to prehabilitation, surgical procedures in the pelvic floor area, and rehabilitation were utilized. Publications from the last 5 years, available in Polish and English, were analyzed. Additionally, a review of hospital websites in Poland and the Polish Prehabilitation Society was carried out.

Results: The main challenges of prehabilitation include assessing the patient's condition before surgery, developing a personalized rehabilitation plan, and patient education. The waiting time for surgery is considered a crucial element in the patient's surgical care path, during which each patient actively participates in a prehabilitation program. Pelvic floor muscle exercises are a fundamental, non-invasive conservative intervention in treating urinary incontinence after prostatectomy. Surgery remains the gold standard for treating severe pelvic organ prolapse in women; however, combining methods can effectively improve surgical outcomes.

Conclusions:

1. The preoperative condition of the patient largely determines the risk of postoperative complications after oncological surgery.
2. Prehabilitation in Poland has not yet been implemented as a standard caregiving practice.

Keywords: prehabilitation, physiotherapy, pelvic floor, surgery

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Application of exoskeleton in medicine – rehabilitation of spinal cord injury

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Opiekun pracy: dr n. med. Marcin Wiącek

Introduction: Exoskeletons are external shells that are designed to support the user's muscular strength. Currently, they are mainly used as orthopaedic devices in the rehabilitation process. The use of exoskeletons has obvious benefits - especially for people with mobility limitations. There are also subtle benefits, such as reducing chronic pain by reducing stress on individual joints. Exoskeletons also offer advanced measurements of kinematic and dynamic parameters of limb movement. This not only improves the range of motion, speed, and its fluidity but also provides therapists with valuable information regarding patient performance.
Material and methods: To analyze this topic, the PubMed was searched using the phrase: „[exoskeleton rehabilitation] and [spinal cord injury]". Randomized clinical trials published in English in the last 10 years (15) were then selected. After analyzing abstracts (3) and full texts (12), 7 out of 15 initially selected texts were included in this analysis.
Results: Most studies have shown that exoskeleton support during therapeutic exercises leads to better results than conventional techniques. Some of the studies also showed a positive effect of exoskeleton exercises on the parameters of the respiratory and cardiovascular systems. Research suggests that the use of exoskeletons in combination with conventional exercises may result in better patient functioning compared to conventional therapy alone. A study comparing a classic and biomechanical knee orthosis during walking did not show a statistically significant difference. The research team suggested that the ankle and femur joints should also receive support.
Conclusions: The analyzed studies showed that the use of an exoskeleton can have a positive impact on gait, patient's independence, respiratory efficiency, and the functioning of the cardiovascular system. As a result, the use of exoskeletons contributes to increasing the efficiency of the rehabilitation process, allowing therapists to focus on more specialized aspects of care. Moreover, combining therapy using exoskeletons and classical forms of exercise may bring better results than using these techniques separately. It is worth noting that this topic requires further deepening through clinical research.
Keywords: exoskeleton, spinal cord injury, rehabilitation

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Assessment of the effectiveness of manual therapy for caesarean section scars

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Opiekun pracy: lek. Edyta Stącel

Introduction: Caesarean section (CC) is the most frequently performed gynecological surgery, which involves the extraction of the foetus through an incision in the abdominal cavity and uterine wall. Like any surgical intervention, CC is associated with complications: short-term (e.g. acute pain) as well as long-term (e.g. adhesions). The greatest effectiveness is achieved by combined therapy, which works in multiple directions. The following work will present the current state of knowledge regarding the physiotherapy of scars after CC.
Material and methods: To analyze the above topic, the PubMed database was searched using the phrase: „Manual therapy of caesarean section scar or rehabilitation of cesarean section scar." Then, works published in English between 2018 and 2023 (16 results) regarding manual therapy of the CC scar were selected. After analyzing abstracts (4 works) and full texts (12 works), 3 out of 16 initially selected texts were included in the presented analysis.
Results: Three studies examined the effects of manual therapy on CC scars. The first one assessed the effects of 4 weeks of manual scar therapy using several scales, including VSS, and MSS. The patients underwent 30-minute manual therapy sessions three times a week. This study showed statistically significant improvement in the condition of a scar. In the next study, patients undergo 2 sessions per week for 8 weeks. During a series of treatments, scar manipulation, massage, cupping, dry needling, and taping were performed. The activities resulted in a reduction of pain and itching and, improvement of pigmentation and elasticity. The skin parameters in the scar area also improved. The last analyzed study examined the effects of scar mobilization once a week over 2 weeks. Before and after performing therapeutic activities including the quality of scars, pain characteristics were analyzed. Demonstrated improvement in every category cited.
Conclusions: The results of the above-mentioned studies suggest that manual therapy, including various techniques, and mobilization of scars after cesarean section may have a positive impact on the characteristics of scars and the quality of life of patients. Patients with greater mobility within the CC scar can better fulfil their roles in society.
Key words: manual therapy, rehabilitation of scar after caesarean section, manual therapy of scars

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The use of biofeedback in the therapy of patients with cerebral palsy

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Introduction: Biofeedback is a technique in which an individual receives feedback about his or her physiological state and then learns to consciously control these processes. The use of biofeedback is wide and covers various fields, e.g. medicine. By monitoring various physiological parameters, such as brain activity, stress level, body temperature, muscle tension and heart rate, the patient is able to focus attention on regulating these functions. In practice, this can help improve an individual's mental and physical health.
Material and methods: In order to analyze the above topic, the PubMed database was searched using the phrase: „[biofiedback] and [cerebral palsy]". Randomized clinical trials on biofeedback in cerebral palsy, published in English in the last 10 years (10 results), were then selected. After analyzing the abstracts (7 works) and full texts (3 works), 5 out of 10 initially selected texts were included in the presented analysis.
Results: An experiment combining games with biofeedback, work with a trainer and rehabilitation showed a positive effect on wrist extension and grip strength. Visual feedback during the rehabilitation of children with cerebral palsy had a positive impact on its effects, as resulted in the next analyzed study. Two of analyzed studies focused on the comparison of the classic exercise method, biofeedback and a combination of both methods. Both showed that the best results can be achieved by combining both rehabilitation methods (classic + biofeedback). Another study showed that biofeedback combined with task-based training can have a positive impact on many parameters, including: the ability to maintain balance, relieve spasms, hand function and gait in children with spastic cerebral palsy.
Conclusions: The use of biofeedback in the rehabilitation of patients with cerebral palsy gives the desirable results. The combination of classic therapeutic methods with biofeedbeck is characterized by greater effectiveness of the exercises performed. The topic of biofeedback is still of interest to scientists, so in the coming years we can expect an increasing amount of research in this field of science.
Keywords: biofeedback, cerebral palsy, rehabilitation.

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Rehabilitation in the treatment of lung abscess with pneumonia – case report

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Introduction: the aim of the study is to present the effects of comprehensive rehabilitation for the patient with diagnosed lung abscess and pneumonia. The patient is a 46-year-old man admitted to the Clinical Department of Tuberculosis and Lung Diseases at the University Clinical Hospital in Rzeszów with a lung abscess and pneumonia. The treatment included antibiotics, oxygen therapy, bronchodilators and pulmonary rehabilitation.

Material and methods: in October 2023, a 46-year-old man, not yet under chronic treatment, a cigarette smoker and alcohol abuser. was admitted to the Clinical Department of Tuberculosis and Lung Diseases with symptoms of fever, runny nose, sore throat, cough with expectoration of a large volume of pus, general weakness and chest pain. The patient had several moderate respiratory infections during the last 6 months preceding hospitalization. Lung X-ray revealed signs of right lung abscess and pneumonia. Chest CT showed a lesion resembling a forming abscess of the right lung with thickening of the right lung parenchyma. Bronchoscopically diffuse inflammatory changes of the bronchial mucosa. During hospitalization, antibiotic treatment and oxygen therapy were used, electrolyte deficits were supplemented and the effects of dehydration were eliminated. Additionally, throughout the entire hospitalization period, a pulmonary rehabilitation program was conducted 6 days a week, with particular emphasis on learning effective coughing, bronchial tree toilet techniques and respiratory kinesiotherapy.

Results: the scope of pulmonary rehabilitation included the assessment of respiratory efficiency assessed with the Voldyne 5000 motivational device. Before the rehabilitation program, the volumetric measurement value in the patient was 1250 ml with the individual norm of 2700 ml. After the rehabilitation program, lung capacity increased by 54%. SpO2 improvement was also achieved. At the beginning of rehabilitation it was 87%, and after the program it increased to 94%. On the 10-point Borg scale, the degree of fatigue decreased from 8 before the implementation of the rehabilitation program to 2 after its completion.

Conclusions:

1. The analysis conducted shows the validity of the early use and comprehensive rehabilitation in patients with lung abscess and pneumonia.
2. A significant impact of rehabilitation procedures on increasing the degree of arterial blood oxygen saturation has been proven
3. The rehabilitation program carried out had a significant impact on the patient's degree of fatigue

Keywords: Lung abscess, pneumonia, bronchial tree toilet, pulmonary rehabilitation

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Physiotherapeutic treatment in a patient after chest fenestration using the Clagett method in the treatment of bronchial fistula after pneumonectomy

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Introduction: the aim of the study is to present the effects of early physiotherapy in a patient undergoing pneumonectomy due to pleural empyema and chest fenestration. The patient is a 55-year-old man admitted to the Clinical Department of Thoracic Surgery at the University Clinical Hospital in Rzeszów with pleural empyema with atelectasis and massive right pneumonia. Due to lung gangrene, right pulmonectomy with thoracoplasty and right pleural fenestration were performed. Rehabilitation is integrally integrated with the surgical treatment process and must be implemented early to fulfill its role properly and last until the patient fully recovers.

Material and methods: In February 2022, a 55-year-old man was admitted to the Clinical Department of Thoracic Surgery of the University Clinical Hospital in Rzeszów. Sick with alcohol withdrawal syndrome. The CT scan of the chest revealed a picture of pleural empyema with parenchymal atelectasis and massive inflammation of the right lung. Due to symptoms of systemic infection and multi-organ failure, including respiratory failure, the patient was transferred to the Intensive Care Unit. After achieving stability, the patient with gangrene of the right lung, which was the source of systemic infection, underwent right-sided pulmonectomy with thoracoplasty and right pleural fenestration. During your stay in the clinic, the patient was provided with comprehensive treatment and rehabilitation. The patient was rehabilitated 6 days a week; The following procedures were performed: bronchial toilet, general exercises to improve and relax the chest muscles, and respiratory kinesiotherapy using the Triflo device based on chest correction.

Results: as part of pulmonary rehabilitation, respiratory capacity was assessed using the Voldyne motivational device. The volumetric measurement value after the complex thoracic surgery procedure was 750 ml in the patient, with the individual norm being 2350 ml. The restoration of respiratory function on the day of discharge after a holistic treatment process increased by 31%. At the same time, the functional range of motion of the shoulder-glenohumeral complex improved by 54% according to SFTR standards.

Conclusions:

1. The conducted analysis demonstrates the validity of early and continuous physiotherapy in patients after thoracic fenestration to prevent respiratory disability.
2. Rehabilitation procedures have been shown to have a significant impact on increasing the range of motion in shoulder joints, which has a direct impact on the patient's quality of life.

Keywords: bronchopulmonary fistula, pneumonectomy, fenestration, respiratory disability, pulmonary, physiotherapy

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Assessment of the level of functional dependence and related factors in a group of hospitalized elderly people aged 80 and over in the Podkarpackie Voivodeship

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Introduction: In recent years, there has been a growing demand for care and nursing services among people in the oldest age groups. For several years, work has been carried out in Poland to introduce the concept of functional dependence into legislation, criteria for assessing its degrees and the scope of required support. The aim of the study was to assess the level of functional dependence and factors associated with them in a group of hospitalized elderly people aged 80 and over in the Podkarpackie Voivodeship.

Material and methods: The analysis covered 282 people aged 80 and over hospitalized at the Geriatric Ward of the Hospital in Przeworsk between January 2019 and March 2020. To assess the functional dependence, a categorical set based on the International Classification of Functioning, Disability and Health was used. The relationship between the level of functional dependence and sociodemographic factors, selected parameters of health and motor skills was also assessed. The obtained results were subjected to statistical analysis.

Results: At least the first degree of functional dependence was found in 48,94% of the respondents. It has been shown that a higher risk of dependence is related to the higher age of the subjects, female sex, a greater number of medications taken, a greater number of diseases, lower fat mass in the body, decreased muscle strength of the upper and lower limbs and poorer mobility in the study group. The lower risk of functional dependence was associated with better body balance and better cognitive assessment results in the study group.

Conclusions: A multi-profile assessment of the level of functional dependence and factors related is the basis for the implementation of practical solutions in the field of care services for elderly people after hospitalization.

Keywords: elderly, hospitalization, functional dependence

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Daily life challenges among young adults with MS

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Introduction: Multiple Sclerosis (MS) is the most common inflammatory neurological disease in the young adult population. MS is a chronic, progressive and multi-factorial disease. Although the influence of environmental factors and individual genetic predisposition affect the risk of developing the disease, the cause is still unknown. It is more common among people living in cool and temperate climates. Symptoms of the disease can appear at any age, but MS usually manifests itself in early adulthood. Most often, MS is diagnosed in people aged 30–40, i.e. during the most active professional, social and family life. The symptoms of MS depend on where the inflammation is currently taking place and what structures of the central nervous system will be damaged. The clinical symptoms of MS are visual disturbances, sensory disturbances, paresis, and impaired motor coordination, gait disturbances, fatigue, pain, sphincter dysfunction, problems in the sexual sphere, speech disorders and mental disorders. Exacerbation of the symptoms of the disease reduces the possibility of social contacts and professional activity, which reduces the quality of life. The aim of the study was to analyze the quality of life of young people suffering from multiple sclerosis.

Material and methods: The study included 28 people diagnosed with multiple sclerosis. The Multiple Sclerosis International Quality of Life Questionnaire, MusiQoL was used in the research. Health, environmental, mental and social aspects were studied.

Results: The results show that people with MS have problems with movement, balance, fatigue and mood disorders. Most of the respondents are satisfied with their treatment and can count on the support of their relatives.

Conclusions: Studies have shown that MS significantly affects all aspects of the quality of life in young people affected by the disease.

Keywords: multiple sclerosis, quality of life

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Orthopedic procedures and rehabilitation in the course of Legg-Calvé-Perthes disease and developmental dysplasia of the hip in pediatric patients

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Introduction: Legg-Calvé-Perthes Disease (LCPD) is avascular necrosis of the femoral head, while Developmental Dysplasia of the Hip (DDH) is a deformity resulting from abnormal shaping and maturation of elements of the hip joint. Both in the course of LCPD and DDH, patients require continuation of post-hospitalization treatment, including physiotherapeutic sessions. Our goal is to describe these diseases, taking into account the rehabilitation aspect, which is an essential component of the treatment process in LCPD and DDH.

Material and methods: A literature review on LCPD and DDH was conducted based on the book "Orthopedics and Rehabilitation, by Wiktor Dega, Alfons Senger, Volume II,". Additionally, six scientific articles from the PubMed database were analyzed. To enhance the usefulness of the search results, keywords such as LCPD, Legg-Calvé-Perthes disease, developmental dysplasia of the hip, were identified, with a focus on physiotherapy elements.

Results: The article describes Legg-Calvé-Perthes Disease and Developmental Dysplasia of the Hip, covering epidemiology, diagnosis, as well as the treatment and rehabilitation of children affected by these conditions.

Conclusions: The analyzed literature discusses the epidemiology and diagnosis of Legg-Calvé-Perthes Disease and Developmental Dysplasia of the Hip, emphasizing better treatment outcomes with early disease recognition and the importance of physiotherapy in the therapeutic process.

Keywords: Legg-Calvé-Perthes disease; developmental dysplasia of the hip; physiotherapy

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The effect of dual and triple tasks on functional status elderly people with Parkinson's disease

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Introduction: Parkinson's disease is a disease of the nervous system that more often affects a group of elderly patients and progresses steadily. It manifests itself in a violation of the functionality of the locomotor apparatus, the ability to independently care for oneself, as well as to walk and perform elementary tasks.

Objective: To create and test the effectiveness of a physical therapy program that includes dual and triple tasks for the elderly to influence neuroplasticity.

Material and methods: 10 participants who met all the selection criteria (Parkinson's disease, walking with additional equipment (single cane), age 70 to 85 years, no contraindications to physical therapy, Berg balance test score above 40 points). Sociological methods (survey, anamnesis, observation and data analysis), clinical-instrumental methods (Berg Balance Scale (BBS), Two Minute Walk Test (2MWT) , Timed Up and Go Test (TUG), Geriatric Depression Scale (GDS), Tinetti Test, Mini-mental state examination (MMSE). Initial research led to a 4-week dual- and triple-task physical therapy program.

Results: On the basis of literature analysis and preliminary examination, a physical therapy program was created, which was based on the use of double and triple tasks for the elderly in order to improve the functional state. During the last examination, significant changes in the patients' condition were revealed. According to the results of the BBS test, the score of the participants increased by 40% compared to the initial examination. According to the results of the 2MWT, the distance covered increased by 30%. According to the results of the TUG, the test execution time improved by 45%.

Conclusions: The results of the study showed the reliable effectiveness of developed program, which included double and triple tasks for improving the physical functions of the body aimed at improving balance during walking and household activities.

Key words: Parkinson's disease, double and triple tasks, elderly, rehabilitation program.

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The Difficulty of the Treatment Method in the Treatment of Scoliosis in Pediatric Patients is Crucial

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Background: Scoliosis is a relatively common problem in today's population, occurring mainly in children. This is a lateral curvature of the spine, which can have a different character. Elucidated etiology makes up only 20% of the total number of scoliosis, and up to 80% have an unclear origin, which is why we call them idiopathic scoliosis. There are many methods and techniques to treat it. However, their effectiveness depends on the difficulty of performing simple methods and techniques. The most significant influence affecting effectiveness is the difference in practicing the physiotherapy program in the home and in the outpatient setting. If the conditions for performing treatment methods and techniques are not suitable, their effectiveness decreases quickly, which is associated with a longer recovery period.

Materials and methods: Applied and compared methods in the research sample were the Kaltenborn method, the SM system, the Schroth method and orthotherapy. The subject of observation was a group of 364 pediatric patients who were diagnosed with scoliosis. The group consisted of 227 girls and 137 boys. The age of the monitored file varies from 11 to 16 years. The average age is 14.7 years. The intervention period for patients was six months. At the beginning and at the end of the treatment, an X-ray examination was performed, and control measurements of the spinal mobility were performed every two weeks.

Results: 364 respondents, 227 girls, 137 boys, average age 14.7 years, statistically demonstrated a significant difference in the effectiveness of treatment methods applied in home and outpatient physiotherapeutic treatment.

Conclusion: In our trial, we assume that the difference in the treatment of scoliosis with the selected methods is statistically significant in the comparison between the effectiveness in outpatient and home physiotherapeutic treatment.

Key words: Scoliosis. Pediatric patients. SM system, Kaltenborn method. Schroth's method. Orthotherapy.

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Are there differences in body posture, spine mobility and pain among folk and ballroom dancers?

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Introduction: This study aimed to compare spine curvatures in the sagittal plane, spine mobility, and the intensity and frequency of low back pain among Polish folk and ballroom dancers.

Material and methods: The study involved 19 folk dancers and 15 ballroom dancers aged 18-32 with an average dance experience of 7.7 years. A control group (17 non-dancers) was matched for age and gender to the studied groups. An electronic inclinometer was used to assess spine curvatures; spinal mobility was assessed using Otto's and Schober's tests, and the intensity and frequency of back pain were assessed using an author questionnaire with a VAS scale.

Results: The analysis of the results showed significant differences in the angle of thoracic kyphosis between folk and ballroom dancers (40 vs. 33, p=0.002). The studied groups did not differ in other measurements (p>0.05). The analysis of the relationship between pain intensity and thoracic spine mobility showed a very strong and negative correlation only in the group of non-dancers (R= -0.95, p=0.003).

Conclusions:

– Folk dancers are characterized by a greater angle of thoracic kyphosis compared to ballroom dancers.

– Due to the high prevalence of back pain among dancers, further research on risk factors in this population is recommended.

– People at risk of developing back pain should be encouraged to exercise regularly and incorporate ROM exercises into their daily activities.

Keywords: folk dance, ballroom dance, body posture, spine pain

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Assessment of the impact of surgical treatment of cervical discopathy on the range of motion, muscle strength and quality of life

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Introduction: The purpose of the study is the functional assessment of patients in the preoperative and postoperative treatment of cervical discopathy, with particular emphasis on the mobility of the cervical spine, the strength of the hand muscles and quality of life, including pain.

Material and methods: The study included 160 people (80F and 80M), the mean age of the participants was 55.24 years ± 7.48 years, which formed the experimental group (performed cervical discectomy) and the control group. Each of the experiment participants had a set of functional tests (the range of mobility of the cervical part of the spine and the strength of the hand muscles). All participants completed personal questionnaire, the VAS pain scale and the SF-20 quality of life scale.

Results: A highly statistically significant improvement in the range of mobility of the cervical part of the spine and an increase in the squeezing force of both hands were found in all of the experimental groups. The results of the VAS scale showed a statistically significant reduction in the neck and upper limbs both patients with cervical myelopathy and patients with cervical spine pain syndrome. The research proved that the quality of life of the experimental group improved significantly after cervical discectomy surgery.

Conclusions:

1. Removal of the degenerate intervertebral disc during cervical discectomy removes pressure on the nerve roots, significantly reducing pain in the neck and upper limbs, both in the group of patients with pain syndrome and myelopathy, and significantly improves muscle strength of both hands.
2. Reduced cervical spine, resulting from cervical discectomy, increases the range of mobility of the cervical spine, reduces depressive symptoms and improves the quality of life of patients with cervical pain syndrome and cervical myelopathy.

Key words: discopathy, cervical spine, range of motion, muscle strength

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Caring of pain relief: the role of rehabilitation in improving the quality of life for individuals dealing with migraine

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Introduction: Migraine is a complex neurological disorder that has been the subject of intensive research due to its intricate etiology. In a genetic context, there is evidence of hereditary predispositions to migraines, prompting investigations into the biochemical mechanisms and the effectiveness of rehabilitation in managing this condition. This study aims to delve into the role of the genetic foundation of migraines, analyze its biochemical mechanisms, and explore the impact of selected rehabilitation techniques on the quality of life of patients and the pathogenesis of migraines.

Material and methods: A literature review was conducted through the analysis of research and review articles from the Pubmed/MEDLINE and Embase databases spanning the period 2017-2023. The inclusion criteria were based on the publication year of the article and its alignment with the theme of the study.

Results: The genetic basis of migraine reveals a diversity of genetic polymorphisms, many of which are associated with the serotoninergic pathway, CGRP receptor, and mechanisms related to vascular regulation. Biochemically, the activation of these pathways leads to the release of neuropeptides, initiating inflammatory processes and neuronal hypersensitivity. The introduction of rehabilitation, such as physical exercises, relaxation techniques, or manual therapy, demonstrates the potential to modulate these pathways and provide relief to patients.

Conclusions: A coordinated approach to migraine management, encompassing both genetic analysis and rehabilitative interventions, may result not only in symptom relief but also in influencing the pathogenetic mechanisms of this disorder. The introduction of rehabilitation stands as a pivotal element in comprehensive migraine treatment, impacting both the quality of life for patients and modifying the biochemical foundations of this neurological condition.

Keywords: Migraine, Psychoneuroimmunology, Rehabilitation

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The Respiratory centre in Winsen. The daily task of an interdisciplinary approach

Oliver Dörner

The respiratoy centre in Hospital of Winsen has grown successfuly over the last decade.
In our daily work we see the need and the difficulties in an interdisciplinary approach for the benefit of our patients. Out team of physicians, respiratory therapists, physiotherapists, speech therapists and thoracic surgeons needs routines to optimize the communication in finding the right diagnosis and the best treatment for our patients.

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Immersiotherapy – scuba diving therapy for people with intellectual disabilities and mental illnesses

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Introduction: Presenting the term immersiotherapy through a program „understand the depth" in the rehabilitation of people with intellectual disabilities through immersion, i.e. diving. Immersiotherapy is a combination of the word immersio from the Latin language, i.e. immersion, with the word therapy, literally translating to therapy through immersion. Immersiotherapy is a program involving simultaneous physical and sensory as well as mental and social impact on people with intellectual disabilities. The aim of this program is to launch and improve the development process, as well as to reduce mental and emotional obstacles and to improve functioning in society.

Material and methods: For the research process was used specially developed program of scuba diving training which was described in an instructor's guide by three people: Ewa M. Drucis, Agnieszka Dejna and Piotr Czaczkowski. The exercise methodology was developed on the basis of many activities conducted in water, which was influenced by the participants' behavior and approach, their commitment and physical, physiological and mental capabilities.

Results: Because research is ongoing and the outcome measurement process is complex and multifaceted, there are no concrete results yet. The entire program is in the development and research phase. The results of participants' progress in the program can only be descriptive at this point, supported by theoretical and practical classes.

Conclusions:

1. Immersiotherapy has a large impact on the emotional aspects of the functioning of OzN (people with disabilities).
2. It helps them to function more efficiently in the social aspect - especially in professional work.
3. It affects the OzN's posture and improves lung efficiency.
4. It helps them understand themself in a social context and in functioning in a group.
5. Increases self-esteem and belief in there's own abilities.

Key words: Immersiotherapy, intellectual disability, mental illness, scuba diving

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The clinical application of hyaluronic acid in musculoskeletal rehabilitation

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Introduction: Hyaluronic acid (HA) is a naturally occurring heteropolysaccharide with a high molecular weight. It plays a key role in various biological processes, including wound healing and bone regeneration. HA significantly promotes joint health, reduces pain, aids in injury recovery and supports rehabilitation therapy. HA in combination with physical therapy is highly effective in the rehabilitation of musculoskeletal diseases.

Material and methods: The literature review was performed by analyzing research and review articles from the Pubmed and ScienceDirect databases published over the last 5 years.

Results: Physiotherapy (PT) plays a key role in the non-surgical treatment of osteoarthitis, effectively controlling pain, stiffness and improving patient's quality of life. Numerous clinical trials have identified that the intra-articular injections of HA also appear to be effective in reducing pain. Moreover, the combination of intra-articular (IA) injection with hyaluronic acid (HA) and PT can enhance the effect of the PT alone or HA alone, reducing symptomatology and possibly limiting the osteoarthitis progression.

Conclusions: HA, whether used alone or in conjunction with physical therapy, offers a functional approach. Combined therapies involving HA and physical therapy hold great significance as a promising avenue for addressing musculoskeletal disorders

Key words: Hyaluronic Acid; Physical Therapy; Rehabilitation

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Result of muscle strength measurement using a hand dynamometer as a predictor of patients' ability to stand in the Intensive Care Unit

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Introduction: In the context of critically ill patients in the Intensive Care Unit (ICU), there is a growing interest in evaluating muscle strength as a potential predictor of the ability to stand. ICU-acquired weakness (ICU-AW) often accompanies sepsis, limited patient activity, and medication use. Early rehabilitation is crucial, but limitations related to patient clinical condition and staffing issues may affect its effectiveness. This study presents the results of muscle strength measurements in patients on the first day when measurement with a hand dynamometer was possible, with the main goal of assessing this strength as a predictor of the ability to stand.
Materials and Methods: Muscle strength measurements were conducted on 35 men and 24 women on the first day when patient conditions allowed for the measurement of dominant hand strength. The ICU-AW criterion was set based on cutoff points of <11 kg for men and <7 kg for women. All patients underwent early mobilization, including standing.
Results: The study results showed that 59% of men and 46% of women were diagnosed with ICU-AW. Early mobilization results indicated that 50% of women and 62% of men achieved the ability to walk in place at the time of discharge from the ICU.
Conclusions: Muscle strength measurement on the first available day can be an effective diagnostic tool. Identifying patients with ICU-AW allows for earlier planning of effective rehabilitation. Early mobilization, including walking in place, may prevent prolonged complications and improve the functionality of critically ill patients.
Key words: muscle strength, ICU-AW, early rehabilitation, critically ill patients.

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The role of physical activity and rehabilitation in patients with stroke

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Introduction: Stroke is one of the most common causes of death worldwide, belonging to the group of cardiovascular diseases. It is a clinical syndrome characterized by a sudden disturbance of brain function due to vascular causes and is the main cause of disability. Introducing physical activity into routine rehabilitation care aims to improve quality of life of stroke patients and is crucial in improving patient rehabilitation and preventing secondary stroke. An important aspect of rehabilitation is the prevention of complications of stroke, motivating the patient to try to perform activities of daily living independently, assisting with attempts at mobility, observation while performing exercises prescribed by the physiotherapist, implementing patient self-care and educating the patient as well as the immediate family. In addition to increasing cardiovascular fitness, walking ability and upper limb strength, physical exercise improves cognitive functions, memory and quality of life. By stimulating neuroplasticity, physical activity can support brain regeneration and the return of lost life functions.

Material and methods: The aim of this work is to present an overview of the role of physical training and the possibilities of its use both in the treatment of stroke patients and in prevention. For this purpose, a review of the current literature (both preclinical and clinical studies) was performed in the Medline/Pubmed database, using the following keywords: "physical activity and stroke", "rehabilitation in stroke", "aerobic exercise and stroke".

Results: Based on the collected publications, it was concluded that physical activity is crucial in the rehabilitation of stroke patients.

Conclusions:

– Regular aerobic training leads to an increase in VO2 max, which translates into improved fitness, balance, speed and walking ability of patients and reduces the risk of hospitalization after a stroke.

– The introduction of regular physical activity into rehabilitation care is therefore an important element in the rehabilitation process of stroke patients.

Keywords: stroke, rehabilitation, aerobic training, VO2 max

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The effect of hamstring instrument-assisted soft tissue mobilization on the range of motion of dorsiflexion of the foot

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Introduction: Despite the large number of scientific studies devoted to the subject of fascia, we are still unable to determine a clear structure of fascia. However, we do know that the fascial system forms connections. One of these is the superficial posterior fascia, which serves as a continuous structure that connects and protects the entire posterior aspect of the body, extending from the soles of the feet to the top of the head. The purpose of the present study was to evaluate whether it is possible to increase the range of motion of dorsiflexion of the foot by performing instrument therapy not on a segment directly related to this area, but on another segment within the superficial posterior fascia.

Material and methods: The subjects were randomly assigned to a control group (n=30) and a study group (n=30). After giving their consent to participate in the study, they completed a questionnaire that included the International Physical Activity Questionnaire (IPAQ) in the Polish short version and any contraindications to participation in the study. Passive dorsiflexion range of motion of the foot of both lower extremities was then measured. Subsequently, the control group had a brief warm-up and a classical massage intervention to the posterior thigh area of each lower limb. The study group additionally had a soft tissue tool therapy intervention of the posterior thigh area of each lower limb after the massage. After the intervention, range of motion was measured again. In addition, a third measurement of passive range of motion of dorsiflexion of the foot was taken after a minimum of 24 hours.

Results: There was an improvement in the range of motion of dorsiflexion in both the control and study groups, except that the range of motion increased to a greater extent in the study group. The greatest progression of increase in range of motion was noted after 24 hours compared to the measurement taken immediately after the intervention.

Conclusions:

1. Instrument-Assisted Soft Tissue Mobilization of the posterior thigh has an effect on increasing the range of dorsiflexion of the foot.
2. The effect of soft tissue tool therapy lasts a minimum of 24 hours.

Keywords: fascia, dorsiflexion, IASTM, SBL.

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Assessment of the impact of a classic neck and shoulder girdle massage treatment on changes in brain wave activity records in people with cervical spine pain

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Introduction: Massage has a wide range of uses to improve the psychophysical condition. Electroencephalography (EEG) is used as a tool to reflect the state of the brain during massage. The aim of the study was to assess the effect of classic massage of the neck and shoulder girdle on the EEG recording in people with pain in the cervical spine and shoulder girdle.

Material and Methods: The study was conducted at the Medical College of Rzeszow University and the Health Center in Trzciana between January and September 2023. The study group consisted of 30 patients reporting pain in the cervical spine. The control group consisted of 30 people without pain. The study participants underwent EEG recording of the bioelectrical activity of the brain using the EEGDigiTrack Biofeedback device, followed by a 15-minute classic massage of the neck and shoulder girdle, and another recording of the bioelectrical activity of the brain. The obtained results were subjected to statistical analysis.

Results: After the massage treatment, both in the test and control groups, a statistically significant increase in the alpha wave amplitude was found in all analyzed EEG channels when reading with eyes closed. After the massage treatment, in the study group, during measurement with eyes closed, statistically significantly lower results were found for the Delta wave amplitude when measured from the C4 channel, as well as lower Theta wave amplitude values when measured from the F3 and F4 channels. Statistically significant higher results of the Beta1 and Beta2 wave amplitude were also found in the study group with eyes closed during the measurement from the F4 channel, and statistically significant lower results of the Beta1 wave amplitude when measured from the F3 channel with the eyes open.

Conclusions: Massage therapy modulates EEG activity. The use of EEG may be a useful research method for examining the objective effects of massage therapy in people with cervical spine pain.

Keywords: massage, electroencephalography, neck pain

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Multiple sclerosis - contemporary standards of rehabilitation

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Introduction: Despite the numerous types of advanced pharmacotherapy available, patients with multiple sclerosis (MS) often face motor disabilities that significantly limit their independence and affect their quality of life. Rehabilitation is an integral part of MS treatment at every stage of the disease, and its beneficial effects have been demonstrated in numerous studies. The purpose of this study is to present the contemporary therapeutic standards proposed in the comprehensive rehabilitation of patients with MS.

Materials and methods: Publications available in the PubMed database and Google Scholar were used to prepare this paper. During the search of materials, the following keywords were used: rehabilitation, multiple sclerosis, gait disorders, demyelinating diseases. The selection of articles was made after taking into account the criteria: publications from the last 10 years and full free version of the article. Six papers were extracted for analysis.

Results: A patient with multiple sclerosis requires the care of a multidisciplinary team of specialists: a neurologist, rehabilitation therapist, physiotherapist, occupational therapist, psychologist and community nurse. Neuromotor rehabilitation, physical exercise, rhythmic auditory stimulation, and robotic training have shown high effectiveness in treating gait disorders and spasticity. Current methods also include cryotherapy, magnetic stimulation and virtual reality training.

Conclusions:

– Rehabilitation efforts should be tailored to leading neurological, cognitive or speech symptoms.

– Although rehabilitation does not significantly reduce the frequency of casts, it improves not only objective indicators, but also the subjective well-being and self-esteem of patients.

Keywords: neurorehabilitation, multiple sclerosis, gait disorders, spasticity, balance disorders, neurodegenerative diseases.

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Functional solutions in the rehabilitation of femoroacetabular impingement

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Understanding of the occurrence of pain syndromes in the hip area has become quite common and is associated with femoroacetabular impingement (FAI). FAI is characterized by structural changes, pain symptoms during compression tests, and repeated painful contact between the acetabulum and pelvis and the proximal part of the femur. It often leads to characteristic damage to the joint labrum and is one of the etiological factors in the development of juvenile osteoarthritis of the hip joint. In orthopedics, X-rays are used for the initial examination, and for detailed diagnostics, MRI and MRA are used, which can demonstrate pathology of the labrum and cartilage. However, the physiotherapist should assess the amount of flexion in the sagittal plane and the amount of internal rotation in the transverse plane in retroverted hip joint, and similarly the amount of external rotation and extension in the anteverted hip joint. The passive range of motion and the anatomical position of the joint should be correlated with basic locomotion functions such as walking, bending forward or sitting. Due to the fact that many patients complain of pain during flexion and internal rotation movements with adduction is advisable to include these diagnostic elements.

Kew words: hip joint, hip retroversion, femoroacetabular impingement

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The role of scapular movement on rotator cuff tears

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In patients with shoulder girdle complaints, an extremely important element seems to be the assessment of the movement of the scapula during the glenohumeral rhythm, which allows to estimate the motor and muscular efficiency of the shoulder girdle and gleno-humeral joint. Performing a movement test provides the physiotherapist with the essential information. Due to the fact that many patients complain of pain during movement (raising the arm), it is advisable to include this element of diagnostics in a patient with pain in the shoulder joint. From a kinesopathological perspective, movement disorders contribute to the creation of structural changes. This is crucial for all overuse injuries (not related to acute injury). In the scientific literature, we can observe the relationship between the occurrence of scapular dysfunction in patients with pain or pathology of the rotator cuff of the gleno-humeral joint. In disfunction of the scapula rythm, a number of anatomical and biomechanical parameters should be considered: starting position, mobility and dynamic stability of the scapula, concentric phase, eccentric phase and excessive sliding of the humerus (instability).

Keywords: shoulder joint, glenohumeral rhythm, scapular movement

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Relationship between pelvic floor muscle function and morphometry and symptoms of stress urinary incontinence after pelvic floor muscle training

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Introduction: To identify the relationship between the symptoms of stress urinary incontinence, the pelvic floor muscle function and morphometry after Pelvic floor muscle training with stabilization exercises (PFMT)

Material and methods: Patients with urinary incontinence from regional gynecological clinics were recommended for PFMT. Intervention: PFMT with stabilisation for 12 weeks. Outcome measures: SUI symptoms were assessed by the International Consultation on Incontinence Questionnaire (ICIQ-UI SF) Pelvic floor muscle function was evaluated using a Perineometer. Pelvic floor muscle morphometry (PFMM) was evaluated by the size of the urogenital hiatus (HA in cm^2) at rest (R), at contraction (C) and during the Valsalva manoeuvre (V) by 3D/4D USG.

Results: The sample consisted of 68/86 included women (79 %), three women did not complete the study due to low adherence. Mean age of the women: 40.4 ± 9.1 years, duration of SUI: 23.5 ± 22.8 months. Average number of childbirths: 1.7 ± 0.7, mean child weight: 3620.6 ± 550.3 g. Number of incontinence episodes/week: 8.7± 6.1, average number of pads per day: 1.2 ± 1.3, average ICIQ-UI SF score: 9.8 ± 3.1 points. Muscle tone: normal, pelvic organ prolapse was not present, mild correlation between the ICIQ-UI SF score and pelvic floor muscle function by the MvC (r=-0.236) or duration of contraction (r=-0.326).The correlation between the ICIQ-UI SF score and the PERFECT scheme was statistically significant ($p < 0.01$).A mild to moderate negative correlation: the performance (r = -0.237), endurance (r = -0.370), number of MvC repetitions (r = -0.406) and the number of fast MvCs (r = -0.338). Correlation for the ICIQ-UI SF score and pelvic floor muscle morphometry according to 3D/4D ultrasound: The statistically significant ($p < 0.01$) moderate correlation was for the urogenital hiatal area during rest (r = 0.453), contraction (r = 0.533) and the Valsalva manoeuvre (r = 0.442).

Conclusions: Pelvic floor muscle training with stabilization exercises for 12 weeks confirmed significant correlation between reduction of SUI symptoms and improvement of pelvic floor muscle function and pelvic floor muscle morphometry.

Keywords: pelvic floor muscle morphometry, function

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Motives and Effects of Practicing Yoga in Health Prevention

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Introduction: Contemporary lifestyle is characterized by a multitude of factors predisposing to the development of civilization-related diseases. The main threats include a predominant sedentary lifestyle, haste, stress, an unbalanced (often too rich) diet, and a deficit of physical activity relative to biological needs. An increasing number of people seek preventive measures in the form of various activities tailored to individual needs. One such form is the practice of yoga. The static nature of the exercises, stimulation primarily of deep muscles, deep breathing, increased awareness of one's own body, and stress reduction are the main advantages of this form of exercise. The aim was to examine the motives and effects of practicing yoga. The analysis focused on the relationships between perceived effects and the duration of yoga practice, the frequency, and the time allocated to one practice session.

Material and methods: 59 adults over 20 years old were examined, with an average age of 39 years. Among the participants, there were 52 women (88%) and 7 men (12%). The selection of participants was purposeful – these were individuals practicing yoga. The study area was the Silesian conurbation. The research tool was an author-designed questionnaire. Data were collected regarding the duration, frequency of exercises, motives, types of positions, and effects of practicing yoga.

Results: Among the participants, those practicing yoga for at least 2 years predominated (49.2%). Participants most commonly practiced 2-3 times a week (47.5%), with a duration of one exercise session being 45-60 minutes (44%). The main motive for practicing yoga among the participants was the need to reduce daily stress levels (27%). The most frequently indicated effect was the reduction or complete elimination of pain (92%), development of flexibility (25%).

Conclusions: The need to reduce stress and overall improvement in the quality of life are the main motives for practicing yoga. Yoga effectively contributes to the reduction of perceived pain symptoms, increases the sense of flexibility, and a feeling of greater freedom of movement. Practicing yoga can be an effective preventive measure for individuals leading a sedentary lifestyle and experiencing stress.

Keywords: yoga, motives, effects, prevention, pain

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Effect of the Neurac concept in patients after implantation of total endoprosthesis hip joint during Spa treatment

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Introduction: The Neurac concept originated in Norway. It is a therapeutic concept that focuses on restoring functional movement patterns through intensive neuromuscular stimulation. An integral part of this concept is diagnosis with the Neurac test and therapy in the Redcord Workstation Profesional suspension system. The aim of the present study was to evaluate the effect of the Neurac concept during spa treatment on neuromuscular coordination and range of motion in patients after total hip arthroplasty implantation.

Material and Methods: 30 patients aged 52 to 87 years who underwent total hip arthroplasty were recruited. Patients underwent spa treatment of 3 to 4 weeks duration. During the spa treatment, the patients underwent between 54 and 72 treatments, including individual neuromuscular activation in the Redcord Workstation Profesional suspension apparatus. Patients underwent an entrance and exit examination, which included the Neurac test, which we used to identify weak links in the biomechanical chains.

Results: We observed statistically significant improvement in the five core items of the Neurac test, and in the overall test score ($p<0.001$).

Conclusion: The results confirm the beneficial effect of the Neurac concept in patients after total hip arthroplasty implantation, which was part of the spa treatment.

Keywords: Neurac concept, spa treatment, total hip arthroplasty, hip joint

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Prevalence of anxiety and depressive disorders in patients after cerebrovascular accidents

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Introduction: Stroke affects approximately 15 million people per year worldwide globally, stroke is the second leading cause of morbidity and mortality. Anxiety and depression after sudden stroke are among the most common medical complications. It can fundamentally affect treatment and rehabilitation care. The consequences affect personal, family, professional and social life. The aim of the study was to analyze the prevalence of anxiety and depressive disorders in patients after sudden stroke hospitalized in selected departments of the Eastern Slovakia region.

Material and methods: The average length of hospitalization of these patients was 21 days (5– 28). We investigated the prevalence of anxiety disorders, depression and emotional distress using a standardized questionnaire, the Hospital Anxiety and Depression Scale.

Results: Data analysis confirms a high prevalence of anxiety in the HADS-A subscale and depression in the HADS-D subscale during the early hospitalization phase. It demonstrates a pathological prevalence of anxiety in 37%, depression in 36%, emotional distress in 36%, and a severe rate of combined pathological values of the anxiety subscale and depression subscale in 27%. Statistical analysis of the data confirmed the existence of a strong positive correlation between the anxiety and depression indices.

Conclusion: the results indicate a high prevalence of anxiety and depression during the hospitalization period, which should be taken into account in the provision of health care. The findings suggest that patients also struggle with anxiety and depression conditions, which negatively affects their overall treatment. Screening for anxiety and depression should be an important part of the comprehensive treatment of patients with this diagnosis in the first weeks of hospitalisation. This work was supported by the grant KEGA 010UPJŠ-4/2021 Implementation of multimedia technologies in the teaching of preventive interventions in medical and non-medical fields.

Keywords: anxiety, depression, screening, cerebrovascular accidents

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Rehabilitation in the course of achondroplasia – Surgical and non-surgical methods

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Introduction: Achondroplasia is a genetically conditioned disorder with complications affecting the musculoskeletal system, including gait disturbances, limb axis deviations, joint degeneration, scoliosis, and vertebral deformities.
Materials and Methods: A literature review on achondroplasia was conducted based on scientific articles in English from PubMed and Google Scholar databases. To enhance the relevance of the materials, keywords such as „physiotherapy," „rehabilitation," „surgical approach," and „limb lengthening" were identified, focusing on achondroplasia within the time frame of 2019-2023. Twelve articles were subjected to analysis.

Results: The literature indicates that in the treatment of advanced musculoskeletal disorders surgical intervention (surgical limb lengthening, scoliosis correction, or joint endoprosthesis) is essential. Non-surgically, neurophysiological methods, traditional exercises, physiotherapy, or pharmacotherapy can be employed. Psychological support should be provided at every stage of treatment.
Conclusions: The analyzed literature suggests that depending on the severity of achondroplasia, individually tailored surgical and non-surgical methods are used in treatment. Physiotherapeutic procedures are implemented based on the patient's expectations.
Keywords: Achondroplasia, rehabilitation, bones.

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Therapeutic techniques in the rehabilitation of patients with osteopetrosis

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Introduction: Osteopetrosis or bone marbling, is a rare bone disease that is genetically determined. The disease is characterised by increased density of the bones. Increased absorption of calcium and phosphorus, cause the bones to become denser and more prone to fracture. Symptoms of the disease include bone pain, multiple non-traumatic fractures of long bones, cranial nerve palsy, osteoarthritis of the jaw and degeneration of the hip joint.

Materials and methods: A literature review on osteopetrosis was carried out, relying on scientific papers in English in the Google Scholar database. The following keywords were searched: ,,rehabilitation", ,,osteopetrosis", ,,marble bone disease" with the timeframe 2008-2023. 6 articles were analysed.

Results: The analysed literature indicates that rehabilitation and surgical methods have a key role in the treatment of osteopetrosis patients of all age groups and include: e.g. for fractures bioptrom, crutch gait marking, weight-bearing of the affected limb and pain relief treatment including heat therapy, cryotherapy, sollux, bioptrom, iontophoresis with NSAIDs and magnetotherapy.

Conclusions: In patients with osteopetrosis, it is important to rehabilitate as soon as possible due to the symptoms of the disease and the treatment methods used, as well as to prevent infections.

Keywords: osteopetrosis, physical therapy, rehabilitation, bone marbling

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Case study of a patient after tape-loop revision and rehabilitation of the acromioclavicular joint following an e-scooter accident

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Introduction: Electric scooters have been known in Poland for years and have become a daily means of transportation for many people, leading to injuries caused by falls and collisions that require orthopedic treatment. Patients immediately after acromioclavicular joint injury are treated with methods mimicking ligament tension; however, in case of ligament damage, the approach changes. The aim of the analysis was to describe the individual rehabilitation process after tape-loop revision of the acromioclavicular joint following an overload injury.

Materials and Methods: The documentation of a 41-year-old patient admitted to the Adult Orthopedics Department of KSWII in Rzeszow in 2023 was analyzed. The patient underwent revision and rehabilitation due to an overload injury of the acromioclavicular joint.

Results: The patient, after early rehabilitation (4 weeks of improvement, 6 weeks post-reoperation) of the acromioclavicular joint, achieved full mobility of the wrist and fingers, as well as the elbow joint. Passive abduction up to 90^0, active abduction up to 60^0. Compared to the postoperative period, the change in pain symptoms on the VAS scale decreased from 8 to 3 at rest and from 8 to 5 during movement.

Conclusions: Thanks to effective surgical treatment and rehabilitation, the patient has a chance to regain full range of motion in the acromioclavicular joint.

Keywords: revision, acromioclavicular, rehabilitation, e-scooters.

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The contribution of associate professor Janina Sikorska-Tomaszewska to the development of rehabilitation in Poland in 1948–1978

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The authors, based on the analysis of archival materials from the private collections of the Janina Sikorska-Tomaszewska family, the Files of the Orthopedic and Rehabilitation Hospital named after Wiktor Dega in Poznań, articles from daily press and few publications present the activity of Janina Sikorska-Tomaszewska, dr hab of Medical Sciences (1911–1998) for the development of rehabilitation in Poland in the years 1948–1978.

Janina Sikorska-Tomaszewska, dr hab of Medical Sciences, for 30 years was the closest supporter of an outstanding orthopedist and creator of rehabilitation in Poland, prof. W. Dega. In 1948, she organized and managed the Therapeutic Rehabilitation Department, which was the first rehabilitation department in Europe and the second in the world. She took an active part in designing and building a modern Rehabilitation Clinic, which she headed from 1961. It was the first rehabilitation department not only in Poland but also in the world. She was a manager of the center for staff training (doctors, physiotherapists, nurses, occupational therapists) much demanded for the new, developing medical specialty. She conducted intensive scientific work, which was broadly expressed in numerous publications. The Polish-American scientific cooperation was majorly possible due to her efforts. She transposed many methods in the field of physical culture to rehabilitation. Her extensive organizational, educational and scientific activity in the early years of rehabilitation development in our country made a significant contribution to the establishment of the Polish rehabilitation school. Above all doubt, doc. Tomaszewska belongs to the pantheon of rehabilitation founders in Poland.

Keywords: history of medicine, rehabilitation, orthopedics.

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Intensive Neurophysiological Rehabilitation System for children with cerebral palsy: a quasi-randomized controlled trial

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Introduction: Recent research indicates that intensive rehabilitation tends to be effective for children with cerebral palsy (CP). Intensive Neurophysiological Rehabilitation System (INRS) or the Kozyavkin Method is a multi-component approach that combines various interventions and addresses different functional goals. This study aimed to examine the effectiveness of the INRS treatment in children with bilateral CP.

Material and methods: In this quasi-randomized controlled study, 48 children with spastic bilateral CP (age 5–12 years, GMFCS Levels I-IV, MACS Levels I-IV) were assigned to an experimental or control group in order they have been enrolled. The experimental group underwent INRS treatment in the tertiary care facility for about four hours daily for ten days and continued routine home treatment for four weeks. After the first evaluation, participants from the control group stayed on the waiting list for four weeks receiving home treatment and then starting the INRS treatment. Thereby, all participants were assessed three times. The primary outcome measure was a Gross Motor Function Measure 66 Item Set (GMFM-66). The secondary outcome measures included the Jebsen-Taylor Hand Function test, Box and Blocks test, ABILHAND-Kids Questionnaire, Self-care and Mobility domain of the Pediatric Evaluation of Disability Inventory (PEDI), and passive range of motion during dorsiflexion of the foot.

Results: There was a statistically significant increase in the GMFM score after the INRS treatment in both the experimental group (mean difference (MD) 2.0, $P < 0.01$) and control group (MD 1.5, $P < 0.05$), with a large size effect (partial eta squared ($\eta 2$) = 0.21 and $\eta 2$ = 0.14). The mean difference between groups during the first study period was 2.89 points ($p < 0.01$) in the GMFM-66 score with a medium effect size ($\eta 2$ = 0.12). Statistically significant superiority of the INRS treatment over home treatment was also obtained by Jebsen-Taylor Hand Function test and the Box and Blocks test in both dominant and non-dominant hands.

Conclusions: The study indicates that the INRS treatment can be beneficial for improving both gross motor functions and hand function in children with bilateral CP. Further longitudinal studies are required to evaluate the effects of the INRS treatment on the participation level of children with CP.

Keywords: INRS, rehabilitation, cerebral palsy

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Sensory integration in children on the autism spectrum – a review of the literature

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Introduction: Autism is a neurodevelopmental disorder that occurs during childhood. Autism spectrum disorders are characterized by difficulties in social interaction, communication and repetitive, stereotyped and limiting behaviors. Despite research, the pathogenesis of autism is still unknown. It is a disorder involving multiple levels. Children on the autism spectrum often exhibit specific motor impairments. Difficulties such as co-motion, balance problems and difficulty imitating movements are present. Children with autistic disorders are characterized by poor postural control and weaker interest in social cognition. The purpose of this article was to evaluate the effectiveness of using sensory integration with children on the autism spectrum.

Materials and method: The Pubmed database, Science Direct and Google Scholar search engine were searched. The review included papers published in the years: 2018-2023. The basis of the searches was the keywords: autism spectrum disorder, Sensory, Multisensory integration. Necessary criteria for inclusion in the study were: age of patients from 6 to 12 years old, clinical diagnosis of ASD, ability to understand and follow simple commands, informed completion of written consent from the caregiver, and voluntariness of children to participate in the study. Patients who at the time of the study were using medications that interfere with motor function, with past head injuries, genetic diseases or congenital defects, with major sensory deficits such as hearing or vision loss, among others, were not eligible for the study. During the literature analysis, case reports and letters to the editor were rejected. Five articles were considered for final evaluation.

Results: In the first publication analyzed, visual-motor integration performance was examined using at least one occupational therapy session. The Beery-Buktenica Visual Motor Integration Development Test and the Brief Sensory Profile were used for pre- and post-assessment. It was shown, a statistical improvement in visual motor scores in children on the autism spectrum. The next article examined the effect of sensory integration on balance. In this test, four different situations were considered from a standing position, taking into account surfaces such as hard/soft and the use of the visual organ such as eyes open/closed. Using the Biodex m-CTSIB device, the sway index was measured. It was observed that children with ASD mostly rely on visual stimuli to maintain balance. In another article, based on questionnaires for parents and teachers, it was proven that awareness and knowledge of sensory disorders is needed in school facilities. It was also shown that the introduction of teacher training can increase the ability to teach children on the autism spectrum. Another article evaluated the effect of stepping exercises on motor skills in children with ASD. The subjects participated in sessions twice a week for a period of 9 weeks. The classes were conducted with well-trained instructors and lasted 30 minutes. The use of this method led to improvements in sensory integration, balance and postural control. In a recent publication, based on the results, it was concluded that square step exercises (SSE) are an interesting method in the therapy of children diagnosed with autism. The SSE method is simple and repetitive, making it easy to understand for children with ASD.

Conclusions:

1. The results of the articles analyzed show that the introduction of sensory integration into the treatment of children on the autism spectrum can contribute to better therapy results. However, it should be remembered that IS therapy will not cause the miracle of "recovery" from sensory processing disorders. However, it will make it easier for the child to function in the reality around them.
2. There is a need for further research with similar methodology. However, the results presented here provide a favorable perspective on the use of sensory integration in children on the autism spectrum.

Keywords: Autism spectrum disorder, Sensory, Multisensory integration

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What therapeutic options 21st century medicine has in the fight against rheumatoid arthritis

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Introduction: Rheumatoid arthritis (RA) is a chronic systemic connective tissue disease characterized by symmetrical joint inflammation, systemic symptoms and extra-articular changes. Lack of treatment can lead to functional impairment and premature death. This paper presents the pharmacological and physiotherapeutic management of RA.
Material and methods: Review of symptoms, laboratory and imaging studies of RA. Analysis of the effectiveness of pharmacological and physiotherapeutic interventions based on recent studies.
Results: Effects of physical activity on reducing inflammatory mediators and improving joint function. Effects of aerobic and resistance exercise programs in patients with RA. Benefits of systemic cryotherapy and use of orthoses. Presentation of the results of studies on tofacitinib compared to methotrexate.
Conclusions:
– Physical activity is an important component of therapy in patients with rheumatoid arthritis (RA).
– Exercise programs, especially aerobic and resistance exercise, can significantly improve joint function in RA patients.
– Tofacitinib has shown greater efficacy than methotrexate in reducing RA symptoms.
– The combination of physical activity and pharmacotherapy, especially with tofacitinib, may be an effective approach in the management of RA.
– RA therapy should include both pharmacological and physiotherapeutic aspects to comprehensively improve patients' quality of life.
Keywords: RA, tofacitinib, acitivity RZS, metotreksat

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Application of TECAR therapy in spasticity and muscle pains

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Introduction: TECAR therapy, based on high-frequency radio waves and alternating current, is an innovative physiotherapeutic method. Its action involves the generation of radio waves, causing a resistance effect, which results in deep tissue heating and stimulation of regeneration. This therapy is gaining popularity in the treatment of bone diseases, muscle and ligament injuries, as well as in the reduction of pain and swelling.

Materials and Methods: The study involved a randomized, controlled, double-blind clinical trial. Participants with chronic stroke were treated with TECAR with manual therapy. Data analysis included assessment of neuromuscular properties, passive range of motion and Ashworth scale. A myotonometer, dynamometer and inclinometer were used for measurements.

Results: A single session of TECAR therapy with manual therapy immediately reduced gastrocnemius muscle tension in post-stroke patients. A significant reduction in the Modified Ashworth Scale (MAS) score in the context of dorsiflexion of the foot, an improvement in ankle joint range of motion and an increase in the PROM of the gastrocnemius calf muscle were observed. No significant changes were observed in MAS scores for knee and hip flexion.

Conclusions:

– A single session of TECAR therapy with manual therapy immediately reduces gastrocnemius muscle tension in post-stroke patients.

– TECAR therapy shows effectiveness in improving the range of motion of the ankle joint.

– Manual therapy combined with TECAR can influence the biomechanical components of spastic hypertonia.

– The results highlight the potential use of TECAR therapy in the recovery process of post-stroke patients.

– TECAR therapy appears to be more effective in reducing musculoskeletal pain compared to the control group.

– Potential use of TECAR therapy as an adjunct in the treatment of joint pain in the areas of medicine, physiotherapy, orthopedics and rheumatology.

Key words: TECAR, stroke, paresis

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Evaluation of physical activity levels and eating behaviors of high school students

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Introduction: This study aimed to compare time spent on physical activity, sedentary, and eating behaviors between high school-aged girls and boys.

Material and methods: The study included 197 adolescents (126 girls, 71 boys) aged 16 to 17. The study procedure included an author's questionnaire. The questions concerned basic demographic data, time spent on physical activity in summer and winter, time spent in a sitting position, and frequency of consumption of various products.

Results: Analysis of the results showed significant differences in levels of physical activity in summer ($p=0.007$) and winter ($p=0.008$), as well as in spent time in a sitting position ($p=0.009$). Compared to girls, boys spent more time on physical activity in summer (10 h vs. 7 h), in winter (5 h vs. 4 h) and spent less time in a sitting position (9 h vs. 10 h). Adolescents also differed in the frequency of consumption of meat ($p<0.0001$), fast food ($p=0.032$), and soft drinks ($p=0.035$). Girls were more likely than boys to report they never or rarely eat meat (25.40% vs. 8.45%), eat fast food (94.44% vs. 83.10%), and consume soft drinks (80.16% vs. 63.38%).

Conclusions:

1. Due to the health-promoting value of physical activity and the negative effects of sedentary behavior, it is recommended to engage in regular physical activity, especially in the group of adolescent girls.
2. To maintain proper development, adolescents should be encouraged to eat full-fledged and balanced meals.

Keywords: physical activity, eating habits, adolescence.

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Physical activity level and injury incidence among American football players

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Introduction: The study aimed to determine which parts of the musculoskeletal system are most often injured and under what circumstances, and to analyze whether there is a relationship between the level of physical activity and the risk of injury among players training American football.

Material and methods: The study included a group of 40 players of the Rzeszow Rockets American Football Team. The study used a self-administered questionnaire containing questions about basic personal data and information on past injuries. The International Physical Activity Questionnaire (IPAQ) was used to assess the level of physical activity.

Results: In the study group, 32 (80%) players sustained injuries during their team affiliation. The most common type of injury was joint injuries (81.3%), the rarest were head injuries and other injuries (6.3%). More than half of the players (65.6%) suffered an injury during the match. 7 players (21.9%) reported 1 injury sustained during team affiliation, 2 to 5 injuries were reported by 21 players (65.6%), and more than 6 injuries were reported by 3 players (9.4%). A high level of physical activity is presented by 22 players (55%), while a sufficient level is presented by 17 players (42.5%). In addition, there was a positive moderate correlation (R=0.28) between the level of physical activity and the incidence of injuries in the study group.

Conclusions:

1. Injuries are common among the studied group of American football players, and the incidence of injuries may be related to the level of physical activity they present. To understand more precisely the relationship between physical activity and injuries among American football players, further research is needed.
2. It is also recommended that research be conducted to develop injury prevention strategies among this population of athletes.

Keywords: American football, injuries, physical activity.

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The role of the piriformis muscle in vascular and nerve entrapment

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Introduction: Up to 84% of people experience low back pain during their lifetime. It is therefore a major social problem and a challenge for physiotherapy. Disruption of muscle tone in the hip and lower spine is one of the primary causes of pain and degenerative changes.

Results: One of the key structures in this area, besides the sacrotuberous ligament, is the piriformis muscle, along with the nerves and arteries that run in its area. Which, in turn, may be the cause of abnormalities in the tension and function of other anatomical structures, such as the iliopsoas muscle, the sciatic and obturator nerves or the femoral artery.

Conclusion: An in-depth anatomical analysis of the structural relationships between the muscles, vessels and nerves in this area will allow us to better understand the causes of these complaints and develop more effective physiotherapy.

Keywords: piriformis muscle, low back pain, sacrotuberous ligament.

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Physiotherapeutic treatment of pleural diseases

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Introduction: Presentation of forms of kinesiotherapy and massage techniques supporting the recovery of patients with pleural diseases

Material and methods: literature review in the field of pulmonary physiotherapy.

Results: Pleural diseases constitute a diverse group of diseases with both cancerous and non-cancer etiology. The clinical symptoms include shortness of breath and chest pain. Fluid accumulation may be a consequence of nonspecific or tuberculous pneumonia, lung abscess, systemic connective tissue diseases, circulatory failure, primary pleural cancer or extrathoracic cancer metastases, etc. This causes pressure on the lung parenchyma, reducing its aeration and may lead to limited chest mobility and changes in the breathing pattern. Remaining fluid in the pleural cavity may lead to the formation of adhesions, which worsens the prognosis for complete recovery. Patients with pleural diseases usually require multidisciplinary treatment, in which physiotherapy plays a key role. After fluid evacuation, it is necessary to urgently implement an exercise protocol to expand and improve lung aeration, improve thoracic mobility and reduce the risk of organization of effusion and formation of permanent adhesions. Physiotherapeutic treatment includes the use of postural positions and breathing exercises of the chest muscles to increase lung volume and support the breathing process. Some massage techniques in the chest, supra- and inter-scapular areas play an equally important role. The techniques mentioned are: tapping, vibration and shaking. The purpose of their use is to remove secretions and reduce coughing.

Conclusions: In respiratory physiotherapy, it is important to educate the patient and his family, provide the patient with positioning positions, lists of breathing exercises to be performed systematically at home, and learn the necessary massage techniques.

Key words: pulmonary physiotherapy, rehabilitation, pleural diseases.

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Kinesiophobia and changes in the quality of play after injury in American football players

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Introduction: The purpose of this study was to determine the prevalence of post-traumatic kinesiophobia and its consequences on the level of quality of play after returning to sports, as well as to determine the impact of injury on the various components of life among American Football players.

Material and methods: The study involved 32 players of the Rzeszow Rockets team who suffered injuries. The research tool was a questionnaire consisting of questions about basic personal data, post-traumatic kinesiophobia, and the consequences of injuries experienced by the players.

Results: More than half of the athletes (53.1%) experienced kinesiophobia and reported negative changes in the quality of play after returning to sports. Weakened muscle strength was present in one in three athletes, as was a decrease in speed developed during running (31.3% of athletes) and increased fatigability (31.3% of athletes). Almost all athletes (90.6%) declared that the injury hurt their overall physical activity, slightly fewer of them (78.1%) reported that the injury had affected their occupational work, and one in four athletes (25%) reported problems in performing daily activities.

Conclusions:

1. Kinesiophobia is a significant problem among athletes returning to sports after an injury and may significantly delay the process of rehabilitation and return to full sports form. Therefore, attention should be paid to the possible need to provide athletes with psychological support to overcome fears related to movement.
2. An injury can result in a potential deterioration in the level of physical activity and overall health of American soccer players. The impact of the injury on careers, performance of daily duties and leisure time underscores its significant social and life consequences.

Keywords: American football, kinesiophobia, consequences of injuries.

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The relationship between the stomatognathic system and posture – an analysis of the literature

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Introduction: Postural defects are one of the challenges of physiotherapy and rehabilitation. The key to rehabilitation seems to be accurate diagnosis, detecting the cause, which is the foundation of the pathology and pulls a series of changes beyond physiology. An important, and often overlooked, is the stomatognathic system, whose strains can project changes throughout the musculoskeletal system. The purpose of this study is to review articles demonstrating the relationship between the stomatognathic system and posture.

Material and methods: The PubMed database was used to search for articles using keywords. The keywords used were: stomatognathic system, body posture, temporomandibular joint, crossbite.

Results: Some studies show many correlations occurring between the stomatognathic system and body posture. Interference with the jaw or mandible ended up changing parameters such as range of motion in the cervical spine, lower limb loading, center of pressure of the feet, curvature of the spine - especially in the frontal and sagittal planes, as well as visual field and head alignment or patency of the upper airway. Some researchers found that there were no strict correlations between jaw position and posture or the other parameters mentioned above.

Conclusions: This paper is an example of how closely interconnected seemingly independent structures in the human body are. Disorders in the jaw and mandibular sphere can project to the rest of the musculoskeletal system. Similarly, disorders of the posture and musculoskeletal system can result in pathology in the craniofacial region, which carries a number of consequences as pathologies of the systems located there. It may be worth including the stomatognathic system in the physiotherapeutic diagnosis of postural defects.

Keywords: stomatognathic system, body posture, temporomandibular joint, crossbite.

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Improvement of the functioning of patients with degenerative changes in the hip and knee joints after cd-34+ stem cell administration and physiotherapy

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Introduction: Osteoarthritis is a serious medical problem. From year to year, more and more people suffer from it. There are many treatments for this condition. One of them is the possibility of administering CD-34+ stem cells. An inseparable therapeutic element immediately after surgery is complex physiotherapy. Objective: To evaluate the effectiveness of treatment of patients with chonodromalization and articular cartilage injuries with CD-34+ stem cells.

Material and methods: The work is a report of the research project conducted by the Medical Magnus Clinic in Łódź, consisting in the administration of CD-34+ stem cells together with physiotherapy carried out from the moment of cell administration and continued for a period of 2 years. The project is conducted from December 2020 to December 2023.

Results: Based on the preliminary observations of the conducted studies, we found the effectiveness of the described therapy. After the procedure involving the administration of CD 34+ stem cells, specialized physiotherapy should be used as soon as possible. It is largely aimed at accelerating convalescence, and thus improving the general efficiency of the operated patient.

Conclusions: CD 34+ cells are safe for the body, they do not show any side effects in combination with physiotherapy affects: improvement of the gait stereotype, reduction of pain, increase in muscle mass strength, increase in the comfort of life of the patient.

Keywords: Degenerative disease, chonodromalation, articular cartilage injuries, CD-34+ stem cells, physiotherapy.

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Current trends in physiotherapy of cubital tunnel syndrome

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Introduction: Cubital syndrome belongs to a group of compression diseases of the nervous system called neuropathies. The term compression syndrome is used in connection with the compression of peripheral nerves of extremities in natural narrow anatomical spaces where the nerve fibre is compressed by adjacent and less pliable tissues. Ulnar nerve compression is usually caused by pathological ligament proliferation, inflammation, edema, abnormal tendon spacing, mechanical overload, joint blockages, bone fractures, endocrine and metabolic diseases. In the physiotherapy of cubital syndrome, it is important to focus on the actual cause of the nerve compression. The most sensitive tissue in this area is the peripheral nerve. When treating cubital syndrome, the physiotherapy procedures are aimed at eliminating the cause of the disease, therefore we treat all structures around the narrow space in elbow that caused the compression. Current trends and the development of new technologies bring modern methods of treating entrapment neuropathies, which also include cubital syndrome.

Keywords: Cubital Syndrome, Compression, Ulnar nerve, Physiotherapy

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Assessment of body posture of physically active and inactive secondary school students

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Introduction: Posture defects in children and adolescents are a common social problem. The occurrence of postural defects affects the entire body, so prevention is important, early detection of the defect and prevention of its further development. The aim of the study is to determine the frequency of posture defects among high school students who practice and do not engage in physical activity.

Material and methods: The research material consisted of 127 respondents (65 girls and 62 boys) aged 14-16, of whom 58 were physically active (25 girls and 33 boys). This constituted 45.7% of the surveyed students of Zespoł Szkół Budowlanych im. Wojska Polskiego in Legnica. The research tool was an observation questionnaire used in the body posture scoring method according to Kasperczyk. A plantoconturograph was used to identify foot defects.

Results: Research has shown that body posture defects were observed in less than half of the surveyed students. It was also shown that physically active children constituted a smaller percentage of those examined with deviations from the correct body posture. The most common defects occurring in students were: head protraction, shoulder asymmetry, bulging abdomen, increased lordosis, and lateral curvature of the spine.

Conclusions: It was observed that adolescents who participated in three physical education lessons per week as well as extracurricular sports activities had fewer deviations from correct body posture.

Keywords: postural defects, youth, physical activity.

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The use of cpap therapy in comprehensive rehabilitation of post-covid patients

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Introduction: COVID-19 is a major cause of morbidity and mortality worldwide. This disease leads to severe respiratory and cardiovascular complications, including myocarditis. The mechanisms and extent of myocardial involvement in individuals who have recovered from COVID-19 remain unclear. Signs of inflammatory myocardial disease persist in many patients who have survived the coronavirus infection. Such patients require prolonged treatment and rehabilitation to restore the cardiorespiratory system. During the post-hospitalization rehabilitation period, the use of CPAP therapy has been proposed, which is recommended not only for the treatment of sleep apnea but has also shown a positive effect in the treatment of chronic obstructive pulmonary disease. However, we found no data on the application of CPAP therapy for myocarditis rehabilitation, and the impact of CPAP therapy on heart function has not been studied. Therefore, the aim of this study was to monitor the rehabilitation dynamics following the illness under the influence of CPAP therapy.

Materials and methods: Clinical Case. A 64-year-old patient, after recovering from COVID-19, was diagnosed with ventricular extrasystole (VES) (frequent monomorphic). Holter monitoring revealed 5200 VES per day and moderate mitral valve insufficiency. Among the patient's underlying conditions, second-degree obesity, multinodular goiter, impaired glucose tolerance, and chronic nocturnal hypoxemia were diagnosed. The patient was recommended pharmacological treatment according to the treatment protocol, along with a prescribed diet. The post-COVID rehabilitation program included breathing exercises, as well as physical activity, which involved dosaged movements such as swimming and walking. The dosage of physical activity was determined based on the adequacy criteria according to various system indicators. In addition to the main physical rehabilitation program, CPAP therapy was recommended. The rehabilitation period lasted for 3 months.

Results: Upon reexamination, improvements in lipid and carbohydrate profiles were observed. The parameters of the lipid profile were normalized (decrease in cholesterol concentration, decrease in the level of low-density lipoproteins, increase in the level of high-density lipoproteins, decrease in the level of triglycerides, $p < 0.05$).The patient's glucose tolerance increased (NOMA index decreased, $p < 0.05$). The likelihood of extrasystole occurrences also likely decreased ($p < 0.05$). Holter ECG monitoring showed that the reduction in ventricular extrasystoles was more pronounced during the night than during the day. Since all parameters of the cardiorespiratory system are interrelated, it is evident that the improvement in respiratory function enhanced the condition of the myocardium and the cardiac conduction system. If the improvement in all parameters in the patient at the end of the rehabilitation period can be explained by the influence of medications and diet, the reduction in the number of extrasystoles during sleep can be attributed solely to CPAP therapy.

Conclusions: Therefore, a more detailed study of the impact of CPAP therapy on the treatment of heart diseases is necessary for better rehabilitation of patients with cardiac disorders.

Keywords: rehabilitation, COVID, myocarditis, ventricular extrasystole

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Effect of intra-abdominal pressure on postural stability in deep squat

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Introduction: The current dynamic development of sports causes increased demands on the athlete's movement system. Results and performance are often more important than the health aspect, regeneration and relaxation, which has a negative impact on the athlete's movement system. The aim of our study was to find out how deep squatting in sports affects the emergence of postural deviations in active athletes.
Material and methods: 1 athlete was included in our research, who has been actively performing powerlifting in the Slovak powerlifting team for more than 5 years. We investigated the effect of deep squatting on the occurrence of deviations from the norm of leg pressure load distribution, CoP, and compared it with each other when diaphragmatic breathing was involved and maximum intra-abdominal pressure was created. To diagnose the postural system, we used the instrumented diagnostic technique, the FreeStep barometric platform.
Results: We found that in the athlete during static measurement, the load on the lower limbs is unequal in the L/L direction and also his CoP is decentralized. When applying intra-abdominal pressure, the shift of the center of gravity significantly approached the norm and the distribution of the load in the latero/lateral direction reached a tolerable deviation. The CoP oscillation values in the dynamic measurement of the movement stereotype of the deep squat in were significantly outside the tolerable deviations both in the length of the path and in the area of the ellipse. When intra-abdominal pressure was included, the measured values were smaller in the length of the measured oscillation path, which almost approached the norm, but when measuring the area of the ellipse, the measured values worsened even more.
Conclusion: In conclusion, we can state that the creation of intra-abdominal pressure and correct diaphragmatic breathing has a significant effect on stabilizing the posture both in standing and in the movement stereotype of a deep squat.
Keywords: Deep squat. Posture. Congestion. Sport

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Use of multifocal contact lenses in therapy of myopia

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Introduction: Myopia is one of the most common eye refractive errors in the world and is characterized by the focusing of the image in front of the retina, resulting in blurred distance vision. It tends to progress gradually, especially in small children and teenagers. It may cause headaches, learning difficulties, or poorer contact with peers. Slowing down its progression is a big challenge for ophthalmologists and parents. Implementing actions aimed at stabilizing this refractive error is not only an attempt to improve visual acuity, but also protects against possible complications such as retinal detachment, macular degeneration or open-angle glaucoma, the increased risk of which is characteristic of myopia. Soft multifocal contact lenses (SMCL) used as optical correction for children and adolescents are designed to allow full correction of the refractive error in the central part of the retina, with simultaneous peripheral myopic defocusing, thanks to a slight addition of optical power on the periphery of the optical zone of the lens, as it is in SMCL designs intended for people with presbyopia.

Material and methods: The aim of this study was to present the importance of multifocal contact lenses and the possibility of their use in the therapy of patients with progressive myopia. A review of scientific articles available in the Medline/Pubmed and Google Scholar databases as well as published studies at ClinicalTrials.gov was performed using the following keywords: *myopia progression; mutifocal contact lenses, bifocal contact lenses; clinical trial*.

Results: Based on the collected publications, it was concluded that the use of multifocal contact lenses is an effective therapy for myopia, if treatment is introduced early and is used on a long-term basis.

Conclusions: Multifocal lenses can improve visual acuity and reduce the likelihood of developing a number of eye diseases.

Keywords: myopia, multifocal lenses, bifocal lenses

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Evaluation of the effectiveness of technology and exoskeletons in the rehabilitation of people with cerebral palsy: analysis of muscle strength and functional status

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Introduction: The purpose of our study is to conduct a detailed evaluation of the impact of technology-assisted rehabilitation on the muscle strength and functional capabilities of children with cerebral palsy. The study analyzed the progress of patients undergoing technology-assisted therapy not only on physical aspects, such as improvement of muscle strength, but also on the assessment of functional capabilities.

Material and Methods: Eight children with cerebral palsy were evaluated. The group was divided according to the Gross Motor Function Classification System (GMFCS) classification: I- 0, II- 5, III- 3 Patients' ages 12- 20 years (mean 15.4). Patients were subjected to a homogeneous technology-assisted rehabilitation program. They began with a warm-up on a stationary bicycle. This was followed by strength training with elastic resistance on the JUPITER and TELKO, body weight transfer training on the AFLA and GAMMA platform, gait re-education in an exoskeleton with functional electrostimulation, and training on the Zebris treadmill. Assessment was performed using functional tests: Gross Motor Function Measure (GMFM-88), 6 Minute Walking Test (6MWT) and UP&GO. Inclusion criteria:

- cerebral palsy
- height greater than, equal to 150
- ability to follow instructions
- symmetry of the length of the lower limbs
- ability to follow commands
- spasticity less than 4 on the Ashworth scale
- no treatment with surgery or botulinum toxin in the last 6 months

Exclusion criteria:

- bone mineral density disorders
- dislocation of the hip joints
- fixed contractures in the joints of the lower extremities

Results: In the isometric test, the results were as follows:

- comparing 48 parameters in the test before and after rehabilitation, 28 parameters worsened 20 improved,
- out of 36 parameters at the observation time, that is, about 4 weeks before the study for the study immediately before rehabilitation, 15 parameters worsened and 21 improved.

In functional tests marked improvement in the results obtained in the final examination. Patients at the GMFCS II level had slightly smaller changes in the GMFM test than those with GMFCS III.

Conclusions: After analyzing the results of functional tests and the isometric test of the extensor muscles, we obtain an improvement in the functional status of most patients. The improvement in muscle strength in the isometric test is seen in two patients at the GMFM III functional level, who are in the intellectual norm and highly motivated. In addition, we see an increase in strength during the observation time without technology-assisted rehabilitation, but the changes are slightly smaller.

Keywords: gait re-education, functional assessment

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Comparison of gait stereotype in women with degenerative changes of the hip joint and healthy women using the MoKA system

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Introduction: The gait stereotype changes in people with degenerative changes in the lower limb joints. It may be influenced by structural changes within the joint, as well as pain. Currently, commonly used gait analysis methods have limitations resulting from the use of cameras. These tests are carried out over a short distance (up to 10 meters) or using a treadmill (forced walking pace). The MoKA system, without affecting the patient's motor skills, allows the examination of gait stereotype in a non-laboratory environment. The aim of the study was to compare the gait stereotype of healthy people and people with diagnosed degenerative changes in the hip joint in a non-laboratory environment.

Material and methods: 19 women were examined. 10 active, healthy women aged 60 to 77 years (average: 67.6 years; SD: 2.26) participating in the University of the Second Age of the Medical University of Silesia and 9 women qualified for hip arthroplasty aged 60 to 78 years (average: 67.67 years; SD:6). UP&GO and 6MWT (6-minute walking test) tests were performed using the MoKA system to analyze the biomechanical parameters of gait.

Results: The results of the group of healthy people were on average higher in the distance covered in the 6MWT, and significantly lower in the time needed to perform the UP&GO test. The average pelvic tilt throughout the study was also greater in sick people despite their slower movement speed. A difference in pelvic movements in the frontal plane was also noted.

Conclusions: 1) Gait stereotype disturbance in people with hip joint degeneration is noticeable compared to active people.

2) The MoKA system is an adequate and accurate measurement tool in the analysis of patient gait parameters.

Keywords: MoKA, gait analysis, joint degeneration

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Assessment of quality of life in a population of patients after allogeneic hematopoietic stem cell transplantation – initial study

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Introduction: Allo-HSCT is a medical procedure used to treat a variety of haematological diseases, such as leukaemia, lymphoma, and some genetic diseases. It is associated with significant risks and complications that affect the quality of life of patients. The aim of the study was to assess the impact of allogeneic hematopoietic stem cell transplantation on the quality of life of patients in the early period after transplantation.

Materials and methods: The study involved 45 patients who underwent allogeneic hematopoietic stem cell transplantation at the Bone Marrow Transplantation Department of the University Hospital in Cracow. Each patient assessed his quality of life on the first day after transplantation and one month after the procedure. The quality of life assessment questionnaire - FACT-BMT - was used.

Results: The group of patients included 22 women (49%) and 23 men (51%). The average age in the group was 43 years. The results were subjected to statistical analysis. Women and patients under 43 years of age rated their quality of life worse both on the first day and one month after transplantation. Which was statistically significant.

Conclusions: In each analysed case, a deterioration in the quality of life was noted one month after the transplantation procedure compared to the assessment on the first day. Women rated their quality of life worse than men, both on the first day and one month after the transplantation procedure. Patients under 43 years old assessed their quality of life as worse compared to patients over 43 years old, both on the first day and one month after the transplantation procedure.

Key words: quality of life, allogeneic hematopoietic stem cell transplantation, FACT-BMT

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Assessment of external and internal compliance of the Luna EMG robot as a tool for assessing upper limb proprioception in people after stroke

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Introduction: The aim of the study was to assess the external and internal compliance of the Luna EMG multifunctional robot as a tool for assessing upper limb proprioception in people after stroke.

Material and methods: The study was conducted among people in the late phase after stroke. A total of 126 respondents participated in the study, including 78 women and 48 men. The median age recorded was nearly 60 years. Proprioception measurements were performed using the Luna EMG diagnostic and rehabilitation robot to assess the left and right upper limb. The study was conducted by 2 researchers, twice, 2 weeks apart. The results were compared between the researchers and the studies.

Results: High compliance of the measurements performed for the right hand was confirmed by the interclass correlation coefficients ICC (0.996-0.998) and for the left hand ICC (0.994-0.999) as well as Pearson's linear correlation, which in all cases, both when examining the compliance between the studies and between the researchers, was recorded at a very high level. level (r=1.00) for the right and left hand.

Conclusions: Measurements performed by the multifunctional Luna EMG robot demonstrate high internal and external compliance in the assessment of proprioceptive sense of the upper limb in people after stroke. Studies have shown that the diagnostic and rehabilitation robot is a reliable tool in assessing upper limb proprioception in people after stroke.

Keywords: Luna EMG diagnostic and rehabilitation robot, proprioception, rehabilitation, upper limb

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Cytological diagnosis of pleural fluid

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Introduction: Presentation of methods for fluid cytodiagnosis in pleural diseases.
Material and methods: Presentation and discussion of the various methods used in the pathological diagnosis of pleural fluid, such as cytological examination of smears paraffin cytoblocks and immunohistochemical tests.
Discussion of diagnostic difficulties and pitfalls.
Detailed analysis and presentation of cases of patients with fluid in the pleural effusion
of various causes using cytodiagnostic and immunohistochemical methods.
Results: Thanks to the use of appropriate diagnostic methods, it was possible to properly assess the examined fluids microscopically and to make a diagnosis by a pathologist.
Conclusions: Regardless of the nature, pleural disease is characterized by similar clinical and radiological manifestations. The symptoms most frequently reported by patients are chest pain and shortness of breath. Imaging studies (X-ray and CT scan of the chest) usually show fluid in the pleural cavity and/or pleural thickening and/or nodular mass. Pleural fluid most often accumulates due to cancer or non-cancerous causes. Cytological diagnostics plays a key role in making a pathological diagnosis. The result of cytological examination can be verified by histopathological examination of tissue material. One of the most difficult tasks in the cytodiagnosis of pleural fluid is the diagnosis of mesothelioma, which requires differentiation from the much more frequent cancer metastases to the pleura and reactive mesothelial hyperplasia in the course of non-cancerous diseases.
3-4 Keywords: pleura, fluid, cytological diagnosis

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Idiopathic toe walking in children

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Introduction: Idiopathic toe walking (ITW) is a condition of unknown etiology that affects 2% of healthy children before the age of 6 and 41% of children with neuropsychiatric diagnoses or developmental delays. ITW is more common in boys, and the most common symptoms of idiopathic toe walking include tightness in the gastrocnemius and soleus muscles, limited active and passive range of motion in dorsiflexion at the ankle joint, shortening of the Achilles tendon and significant anterior pelvic tilt.

Materials and Methods: The study is of a review nature. The literature review was conducted using the PubMed NCBI and other relevant materials related to the topic of the study.

Results: Risk factors for idiopathic toe walking include disorders of muscle tone development and sensory integration disorders (tactile, proprioceptive and processing disorders). Based on kinetic and kinematic parameters, a classification system has been created, which distinguishes three levels of severity in ITW: mild, moderate, and severe. Depending on the severity, conservative treatment is recommended (stretching, orthoses, serial casting, TBX-A injections) or surgical (Achilles tendon lengthening).

Conclusions:

1. Walking on tiptoes in children over the age of 2 can be a concerning symptom that may be caused by various factors such as mild diparesis, autism, ADHD, Charcot neuropathy, or unknown etiology.
2. Indeed, there is a lack of sufficient clinical studies that have clearly determined the most effective treatment method for idiopathic toe walking.

Keywords: idiopathic toe-walking, Achilles tendon

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The assessment of the relationship between stress level and body composition in young adults

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Introduction: Early adulthood is characterized by fluctuations in body weight, body fat, muscle mass and overall body composition. Additionally, young adults often struggle with increasing stressors resulting from academic demands, career ambitions and other psychosocial conditions. The study aimed to assess differences in the body composition of young adults with different intensities of perceived stress.

Material and methods: The study involved 100 young adults (50 women and 50 men) aged between 18 and 35 years. The study procedures included the assessment of the intensity of perceived stress (PSS-10) and analysis of body composition (InBody 770).

Results: No significant differences were found in the intensity of perceived stress between women and men. It was found that body weight and BMI differ depending on the level of perceived stress in both women ($p<0.05$) and men ($p<0.05$). It was shown that men and women with low levels of stress were characterized by lower body fat percentage and visceral fat volume and higher amounts of lean body mass, total water content and muscle mass ($p<0.05$). No significant differences were observed in the content of bone minerals, intra- and extracellular water content depending on the intensity of perceived stress ($p>0.05$).

Conclusions:

1. Healthcare professionals should consider stress as a potential factor that may contribute to weight gain and changes in body composition, regardless of gender.
2. Incorporating stress-reducing techniques in daily life can be helpful for both men and women in improving body composition and overall health.

Keywords: body composition, stress, young adults

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The frame running as a form of functional therapy-case report

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Introduction: The frame running is an adaptive athletics discipline intended specifically for people with mobility disabilities, balance and coordination disorders. The participants exercise on a three-wheeled frame without pedals, with a saddle and support for the front of the chest, so people with central stabilization disorders can also exercise. The athletes move by vigorously pushing their feet off the ground. The aim of this study was to present the effects of participation in weekly Frame Running training for a period of 12 months.
Material and methods: The described frame running training participant is an 11-year-old boy diagnosed with Down syndrome, who has been training regularly for a year, once a week. The boy regularly attends rehabilitation sessions. For diagnostic purposes, ranges of motion were measured using a goniometer in the hip, knee and ankle joints. Additionally, the study was extended to include measurements of spine curvatures in the sagittal plane using an inclinometer. The player was examined before the first training session and after 12 months.
Results: As a result of yearly participation in training, the patient's range of motion increased in the examined joints. According to the collected measurements, the values of spine curvature in the sagittal plane also changed, lumbar lordosis and thoracic kyphosis increased.
Conclusions:
1. Training using three-wheeled frames can be an effective complement to the rehabilitation process of patients with musculoskeletal disabilities, increasing the range of motion in joints and influencing the shape of spine curvatures.
2. In order to draw pragmatic conclusions and long-term effects of participation in frame running classes, it is recommended to continue research in this area.
Keywords: frame running, sport, disability

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Genetic basis of autism spectrum disorders: New rehabilitation therapies on the horizon

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Introduction: Autism, classified as a neurodevelopmental disorder, is characterized by difficulties in social interactions, communication and, in some cases, impediments to independent functioning. With the progress of scientific studies, the genetic basis of this disorder is becoming explored in greater depth, taking into account both hereditary and epigenetic factors. Psychoeducational and cognitive-behavioral rehabilitation programs are important tools to support the development of autonomy and independence for individuals on the autism spectrum. This paper also focuses on modern methods of rehabilitation for autistic patients, with an emphasis on the use of robots.

Material and methods: Analysis of the literature focused on the topic of rehabilitation of patients on the autism spectrum, modern approaches to rehabilitation and therapies aimed at this group of patients. The sources of information used to compile the paper came from PubMed and Google Scholar databases.

Results: Robot-assisted rehabilitation and therapy for autism has been gaining popularity in recent years, and pediatric autism is a particularly promising area of research. Reports to date on the effectiveness of robot-assisted rehabilitation of patients on the autism spectrum include various aspects, such as communication, recognition and understanding of emotions, and developing sensitivity to physical contact.

Conclusions: Rehabilitation of patients with autism spectrum disorder is a complex, time-consuming and multifaceted process. There is a belief that the earlier the rehabilitation process begins, the better the chances of adapting the child to everyday life and developing independent functioning skills.
Keywords: Rehabilitation, autism spectrum, modern rehabilitation methods.

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The role of nutrition in the treatment and rehabilitation of post-stroke patients

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Introduction: After a stroke, malnutrition and dysphagia are frequently present, where malnutrition can be caused by limited food intake. Adequate nutrition is important for patients' recovery after stroke, but the clinical picture and response to rehabilitation vary, as does the impact of individual factors on the process. The high prevalence of malnutrition among post-stroke patients can significantly affect their physical and cognitive function, highlighting the need for focused nutritional care in the rehabilitation process.
Material and Methods: The analyzed literature focuses on the rehabilitation of post-stroke patients, the importance and significance of a proper diet in such patients during rehabilitation. Publications available in the Pub Med database and Google Scholar were used to prepare the paper.
Results: There are various causes of malnutrition in post-stroke patients. These are - dysphagia, depression, inability to eat independently, lack of appetite, weakness, physical limitations and others. It is important to note that during post-stroke rehabilitation there are such nutrient requirements - protein >1.2 g/kg/d, energy 30-35 kcal, macro nutrients, fiber. It counts that every post-stroke patient must be monitored within 48h in terms of the risk of malnutrition.
Conclusions: Correct diet in post-stroke patients is an extremely important issue. Beginning with the fact that we need to check whether the patient has the ability to feed himself, and whether there is a risk of malnutrition, and if so, special conditions should be created as soon as possible to ensure that the patient receives the necessary amount of energy and nutrients.
Keywords: Rehabilitation, post-stroke patient diet, post-stroke rehabilitation

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Experience of the Work of the Center for Prevention and Treatment of Childhood Obesity in Ukraine

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Introduction: The issue of prevention and treatment of obesity in children is important and complex. The prevention and treatment of childhood obesity should include a comprehensive approach, involving many specialists. The purpose of this work is to familiarize with the experience of organizing the work of such a medical center in Ukraine.

Material and Methods: In Ukraine, a center for the diagnosis, prevention, and treatment of children aged 11-18 years with excessive body weight and obesity was established at the "Edem Resort" clinic. This center has a unique approach to preventing obesity by simultaneously studying the main causes contributing to obesity, including determining the physiological characteristics, hormonal regulation, and metabolism of the child, the social characteristics of the family, their nutritional and behavioral responses, social influences. The basis of the center's work is the integration of a comprehensive analysis of the child's metabolism features with systemic science and an interdisciplinary approach to childhood obesity. The 3 daily program consists of a comprehensive assessment of health status, nutritional behavior, laboratory screening of metabolic programming factors (53 parameters), analysis of body composition (56 parameters), comprehensive diagnostics of the content of minerals, vitamins, and heavy metals in combination with SPA rest. During the 14-day program, a comprehensive preliminary examination is conducted, an individualized dietary menu selection for the child, correction of nutritional behavior and physical activity, lifestyle, psychological motivation of the child to program optimal health parameters, application of modern fitness methods, physiotherapy, individualized recommendations. During the 21-day program, an in-depth nutraceutical audit is additionally conducted, correction of nutritional provision, determination of health status characteristics, development of an individual plan for correcting identified metabolic disorders, social and nutritional behavior, physical activity.

Conclusions: The establishment of such a center has proven its high efficiency in diagnosing, preventing, and treating various forms of childhood obesity.

Keywords: children, excessive body weight, obesity, prevention, treatment.

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Innovative gait reeducation of patients from 0 to 5 on the FAC scale as a standard in modern rehabilitation

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Introduction of modern robotic devices enabling the complete gait reeducation process and improvement of patients falling within the range of 0 to 5 on the Functional Ambulation Category (FAC) scale. Discussion on the functionality of four innovative technologies:

1. R-Gait Robot, which allows achieving the most natural walking pattern. An advantage is the easy patient setup by a single therapist.
2. R-Force Anti-gravity Treadmill, capable of unloading the patient up to 100% of their body weight, facilitating rapid therapy and lower limb loading.
3. Walker View - a treadmill with the Smart Gravity unloading system and a 3D camera, enabling detailed analysis of the patient's gait, assessment of joint mobility, and the implementation of proper therapy.
4. SpeedUp Treadmill with a 3D camera and SCX system, serving as a device in the final phase of patient improvement, where training is conducted without external unloading.

Keywords: Gait reeducation, FAC Scale, Innovations, Robotics

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Case presentation of a 13-year-old polytrauma patient and examples of possible rehabilitation methods

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Introduction: A 13-year-old patient was admitted to hospital with a diagnosis of multiple trauma following a motocross accident. The patient suffered a fracture of the parietal bone with indentation, multiple head wounds, vertebral fractures at the C6-C7 and Th4-Th5 levels, open fractures of the bones of the right and left forearms and wounds of both knee joints.
Materials and methods: Analysis of patient records following surgical and rehabilitative treatment of multisite injuries related to a motor vehicle accident.
Results: Thanks to successful surgical treatment and rehabilitation, the patient has gained full range of movement in the joints of the upper and lower limbs. No neurological deficits were found after the brain injury. However, the patient still reports complaints of cervical and thoracic spine pain.
Conclusions: The case of the 13-year-old described here demonstrates that in patients with a multisite injury in a serious clinical condition, a return to complete function can be achieved with the right choice of surgical treatment and effective rehabilitation. However, rehabilitation of the cervical and thoracic spine is still needed. Patients with such injuries can be successfully treated with physical therapy or rehabilitation with mobilisation of the upper limbs in turn, then the lower limbs, crutch walking, limb relieving or individual exercises.
Keywords: polytrauma, rehabilitation, motocross

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Rehabilitation of cognitive functions in neurological patients - neuropsychological rehabilitation after stroke

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Introduction: The aim of this study is to analyze literature regarding the significance of cognitive function rehabilitation in neurological patients who have experienced a stroke. Cognitive deficits in these patients significantly impact their quality of life. The implementation of neuropsychological rehabilitation serves as an effective strategy enabling a return to independence through improvement in both cognitive and emotional states.

Material and methods: The analyzed literature focuses on methods related to the rehabilitation process of patients with cognitive impairments following a stroke, such as attention disorders, memory deficits, and agnosia.

Result: Analyzed literature reports have revealed that cognitive function deficits in patients after a stroke are common, even reaching percentages as high as 31%. While motor and sensory disturbances dominate after a stroke, the impact on cognitive functions, intellect, and awareness cannot be underestimated, significantly complicating the rehabilitation process. Sources indicate numerous benefits arising from an individualized approach to cognitive function rehabilitation, where therapy is precisely tailored to the specific condition of each patient post-stroke.

Conclusions:

– Early rehabilitation plays a crucial role in the treatment of post-stroke patients.

– Neuropsychological rehabilitation of cognitive functions in patients proves to be an effective strategy for regaining independence by improving both cognitive and emotional states.

– The choice of specific interventions depends on the size and location of the stroke, as well as the symptoms associated with it.

Keywords: neuropsychology, stroke, cognitive function disorders

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The impact of deep massage on spinal mobility in people with low back pain

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Introduction: Back pain is one of the more common musculoskeletal complaints. There are few reports in the current literature evaluating the effects of deep massage on LBP. The study aimed to confirm that deep tissue massage has a beneficial impact on the mobility, flexibility, and pain reduction in individuals with lower back pain compared to a healthy control group.

Material and methods: 60 people between the ages of 40 and 60 took part in the study. They were divided into two groups. The study group consisted of people with existing LBP, and the control group consisted of people without existing pain. Half of each group were women. Subjects in the study and control groups were evaluated twice before and after a series of 10 deep back tissue massage treatments with the following tools: the Schober test, the toe-to-floor test, the V sit and reach test, the VAS scale and the author's test of the number of lunges in 1 minute.

Results: In both groups, deep tissue massage contributed to a reduction in pain ($p<0.001$), improvement in V sit and reach test scores ($p<0.001$). Better effects were observed in the study group ($p<0.001$). The number of lunges per minute also increased ($p<0.001$) with no significant differences in the two groups ($p=0.122$). In the case of the toe-floor test ($p<0.001$) and the Schober test for flexion ($p<0.001$), as well as upright ($p=0.003$), improvement was observed only in the study group. Better results for women than for men were observed for the Schober test in the flexion direction ($p=0.021$) and the V sit and reach test ($p=0.003$).

Conclusions: Deep tissue massage significantly reduced spinal pain, and significantly affected flexibility, mobility, as well as spinal mobility. In addition, better results were observed in women in terms of flexibility, as well as spinal mobility.

Keywords: deep tissue massage, mobility, sacral pain.

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The perspective of using the "Ola" development support device in sensory integration therapy

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Introduction: The aim of the work is to present the structure and operation of the innovative "Ola development support device" and the possibility of its use in the therapy of children with sensory integration disorders.
Material and methods: In the analyzed sample, all children had disorders (14 children - 93.3% of the study group) or severe disorders (1 child - 6.7% of the study group) in the field of sensory integration processes. Assessment of sensory integration function carried out using selected Southern California tests, Clinical Observation tests and analysis of information from the Child Sensory Development Questionnaire. The study was conducted at the beginning and at the end of a cycle of exposure to experiences related to therapy using a newly developed device (once a week for 2 months).
Results: The results of the repeated study indicate changes (either in the quantitative or qualitative aspect) of the analyzed functions towards their improvement.
Conclusions: The "Ola" development support device is an easy-to-use machine that provides sensory stimulation that is very important for the correctness of the integration process: tactile, vestibular and proprioceptive stimulation.
Keywords: sensory integration, therapy, development support.

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Case report: Effects of cardiac rehabilitation after full-thickness anterior wall myocardial infarction in a 42-year-old man.

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Introduction: Myocardial infarction is one of the leading causes of death and physical disability worldwide. It often affects elderly patients; however, increasing attention is being focused on the prevalence of myocardial infarction in young people (<45 years of age) as it is a significant cause of morbidity and mortality in this age group. The development of cardiac rehabilitation in patients after myocardial infarction improves their health, helps them to reintegrate into social life and return to functionality. However, this requires the intervention of a multidisciplinary team.

Material and methods: A 42-year-old man suffered a STEMI myocardial infarction of the anterolateral wall. He had angioplasty of the anterior interventricular branch with drug stent implantation. The procedure was successful, without complications. The patient was diagnosed with post-myocardial infarction heart failure with a left ventricular ejection fraction (LV EF) of 35% and hypercholesterolaemia. Echocardiography showed regional left ventricular wall dysfunction in the anterior wall and interventricular septum. The patient was transferred to the Cardiac Rehabilitation Unit after 11 days in good condition. The following physiotherapy was administered during his stay: morning gymnastics, general group exercises, interval training on a cycloergometer with a load of up to 100 watts, Model B cardiac rehabilitation and psychotherapy. After 32 days, the patient was discharged home. At the Discharge EF LV 42%, improvement in overall physical function and exercise tolerance. The patient continued the recommended physical activity and low-fat diet on an outpatient basis. Three years after the cardiovascular incident, the patient reports very good exercise tolerance and no cardiovascular complaints.

Results: Massive left ventricular anterolateral wall infarction led to post-myocardial infarction heart failure with reduced left ventricular ejection fraction and regional wall dysfunction. The comprehensive cardiac rehabilitation undertaken resulted in an increase in left ventricular ejection fraction and an overall improvement in physical performance.

Conclusions: Cardiac rehabilitation is an integral part of the care of patients following myocardial infarction. It should be carried out by a specialist cardiac team immediately after the acute phase of myocardial infarction and should include individualised programmes to optimise the patient's physical, mental, social and emotional state.

Keywords: case report, myocardial infarction, cardiac rehabilitation

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The impact of prehabilitation in patients before planned heart transplantation on their postoperative health status

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Introduction: Frailty is particularly prevalent among heart transplantation candidates. It is characterised by reduced aerobic capacity, reduced exercise tolerance and, in advanced stages, malnutrition and sarcopenia. The debilitation causes a vicious circle leading to avoidance of physical activity, which in turn further worsens functional capacity and leads to a reduced quality of life As a result, patients undergoing heart transplantation are in a very poor functional state which negatively affects postoperative morbidity and mortality. Prehabilitation has become an innovative method. It includes a programme aimed at improving the patient's physical functioning, nutritional and psychological status and optimising the treatment of existing comorbidities. This reduces the incidence and severity of post-operative complications and accelerates recovery from surgery.

Material and methods: A cohort study involving 46 heart transplant candidates between 2017 and 2021 was conducted. Patients participated in an exercise session consisting of one-hour sessions of individualised, supervised moderate-to-high intensity interval training and resistance training in the hospital gym twice a week for 8 weeks. After completing the first 8 weeks while waiting for a heart transplant, patients followed a maintenance programme consisting of one session per week of supervised physical training and were encouraged to maintain physical activity at home.

Results: Patients included in the prehabilitation programme showed reduced postoperative mechanical ventilation, intensive care unit stay and total time of hospitalisation. Additionally, reduced hospital readmissions within the first 30 days and reduced mortality at 30 days, 3 months and 1 year were observed

Conclusions: Heart transplantation is an aggressive operation that presents enormous physiological stress to the patient with both immediate and long-term consequences. There is a strong relationship between preoperative functional status and postoperative results. A prehabilitation programme before heart transplantation improves postoperative outcomes by reducing postoperative complications.

Keywords: heart transplantation, prehabilitation, postoperative complications.

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The impact of a 5-minute massage session on calf muscle passive mechanical and contraction properties in young adults

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Introduction: Abnormalities in the muscle contraction and passive mechanical properties may lead to the musculoskeletal disorders. Massage may be a useful tool for preventing or coping these kinds of changes. Unfortunately, the impact of massage on the muscle contraction and mechanical properties is still not fully understood and requires further research. The main objective of the study was to examine the impact of a 5-minute massage session on the muscle contraction and passive mechanical properties in healthy young adults.

Material and methods: Participants (19-24 years old) were randomly divided into two groups: an intervention group (n=40) and a control group (n=40). The intervention group received a 5-minute massage targeting the lateral and medial gastrocnemius muscles (LGCM and MGCM, respectively). The control group did not undergo any intervention. Muscle contraction properties were assessed using Tensiomyography (TMG), measurements including: maximal displacement (Dm), delay time (Td), and contraction time (Tc). Passive mechanical properties, i.e. oscillation frequency (F) and dynamic stiffness (S) were analysed using MyotonPro device.

Results: The results of two-way ANOVA showed significant ($p<0.05$) time×group interaction effects, with greater changes in the intervention group compared to the control group in the LGCM for Dm (%diff= 56.7, $\eta p^2= 0.41$), Td (%diff= 3.63, $\eta p^2= 0.02$), Tc (%diff= 13.38, $\eta p^2= 0.1$), F (%diff= 5.55, $\eta p^2= 0.07$) and in the MGCM for Dm (%diff= -14.34, $\eta p^2= 0.06$), F (%diff= -7.53, $\eta p^2= 0.12$). No difference ($p>0.05$) was noticed in other variables.

Conclusions: A 5-minute massage session impacts the muscle passive mechanical and contraction properties in the gastrocnemius muscle. The size and direction of changes may differ between the lateral and medial gastrocnemius muscles and may depend on additional factors, e.g. the geometry of massaged structures.

Keywords: soft tissue, musculoskeletal manipulations

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Use of hyperbaric oxygen therapy in rheumatic diseases: rheumatoid arthritis (RA) and fibromyalgia

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Introduction: Hyperbaric oxygen therapy (HBOT) involves breathing pure oxygen under increased pressure, and its origins date back to the 17th century, although it was not until the 1930s that it was developed extensively. Initially, HBOT was used mainly to treat complications of divers' decompression sickness, and successively for many other conditions such as CO poisoning, sudden deafness, wound healing and burns. The purpose of this study is to present the mechanism of action, application, contraindications and side effects of hyperbaric oxygen therapy in the treatment of rheumatoid arthritis (RA) and fibromyalgia.

Materials and methods: The paper includes a review of the literature and articles published over the past 20 years in the scientific databases: Pubmed, Google Scholar and ScienceDirect. The review was done using keywords.

Results: HBOT mobilizes stem cells and activates thousands of genes, which reduces inflammation (reduced production of oxidative stress markers, e.g. TNF-alpha, IL-1beta) and stimulates angiogenesis (increased production of angiogenesis stimulators, e.g. EGF). HBOT in RA reduces the severity of pain and swelling in the knee and hand joints, additionally slows the process of joint destruction. On the other hand, in fibromyalgia, it leads to a reduction in the number of painful pressure points and a significant increase in the number of painful pressure points.

Conclusion:

– HBOT is effective and safe in RA and fibromyalgia and allows for dose reduction of anti-inflammatory drugs.

– HBOT should be used only under the supervision of qualified medical personnel due to contraindications and side effects.

Key words: hyperbaric oxygen therapy (HBOT), rheumatoid arthritis (RA), fibromyalgia syndrome (FMS), musculoskeletal disorders (MSDs)

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The importance of ultrasonography in rehabilitation after knee arthroplasty with high risk a deep venous thrombosis (DVT)

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Introduction: Deep Vein Thrombosis (DVT) is a fatal complication of knee arthroplasty. An assembly of physical exercices with early mobilization and stocking support prevent DVT. Doppler Ultrasonography permit to exclude DVT. Also ultrasounds exams are helpful in DVT rehabilitation to control the deep vein thrombosis in lower limbs. The aim of our study was to examinate the role of early mobilization, physical exercises, pharmacological prophylaxis, ultrasonography DVT control after knee arthroplasty.

Material and methods: Caprini Score for DVT Risk Calculator and D-dimer levels were examinated admission and after 4 weeks of rehabilitation. Ultrasounds exams were performed using Hitachi Arietta Ultrasound. Early mobilization and an assembly of physical exercises with stockings support were applied to prevent postoperative DVT.

Results: the early mobilization, physical exercices with compression stockings and pharmacological treatment reduces D-dimer levels after knee arthroplasty. Ultrasonography was useful to control the vein thrombosis in lower limbs.

Conclusions: D-dimer cannot be used to exclude DVT without ultrasound confirmation. Ultrasonography allowed to differentiate new, active from old thrombosis in deep inferior limbs veins. Also Ultrasounds with D-dimer levels allowed to control DVT after knee arthroplasty. Pharmacological prophylaxis with assembly of physical exercices with early mobilization reduced the risk of DVT after knee arthroplasty. DVT confirmed by ultrasounds pictures permited to apply curative dose of anticoagulant. The role of pre-rehabilitation with physical exercices in patients with high risk of DVT may be very helpful in the future.

Keywords: Deep Vein Thrombosis, knee arthroplasty, ultrasonography

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The use of oculography in neurorehabilitation

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Introduction: Developments in technology are providing new tools with the help of which the effectiveness of therapy is being significantly improved. One such tool is oculography (from eye tracking). This is a technology that allows tracking eye movement and analyzing a patient's visual behavior. This technology, has great potential in neurorehabilitation as both a diagnostic and therapeutic tool.

Material and methods: Eye tracking makes it possible to follow the patient's gaze, its fixation points, the direction of the eyeballs' following, and makes it possible to examine whether the patient covers the entire monitor screen with his or her eyes or only a selected area. Thanks to these properties, oculography is a therapeutic tool in the rehabilitation of a patient with side skip syndrome (a study by Kerkhoff et al.). In addition, it is an assistive technology for communication with the environment in patients with locked-in syndrome.

Results: After 3-week therapy with oculography, patients with left-sided skipping showed significant improvement in left-sided perception during reading. On the other hand, in patients with infantile cerebral palsy, paralyzed and suffering from locked-in syndrome, the use of eye tracker grids enables communication with family, caregivers or teachers.

Conclusions: Therapy with oculography allows:

– improving the perception of the midsection in patients with bias skipping syndrome

– expression of emotions and physiological needs in patients with MPD and locked-in syndrome

Research is currently underway on the use of oculography in the early diagnosis of autism and mental illness.

Keywords: oculography, fixation, autism, bias skipping syndrome

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Diagnostic and therapeutic management of RSI syndromes

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Introduction: In recent years, the incidence of chronic upper limb pain syndromes has been increasing year after year. This is directly related to the use of cell phones, tablets or long hours of computer work. Pain syndromes of this nature are collectively referred to as diseases due to repetitive strain injury - RSI. An epidemiological assessment conducted in the UK shows that 10-20% of the general population experience shoulder pain lasting at least one week a month, 5-10% experience pain in the elbow joint area, and 5-15% reported hand pain.

Material and methods: Analysis of available studies from the Pubmed database published between 2019 and 2023 searched using the keywords: "Repetitive strain injury", "Repetitive strain injury diagnosis", "Repetitive strain injury treatments". In the end, 3 studies were used for analysis.

Results: The pathomechanism of RSI is still not fully understood, but researchers rely on two theories. The first is that the biomechanics of the joint is disrupted due to the superimposition of mechanical microtrauma; the second is related to oxidative stress and abnormalities in the functioning of the nervous system. Based on the second theory, αlipoic acid and honokiol, which have neuroprotective effects, have been applied. In addition, prevention based on the use of so-called thumb gymnastics - massage of the muscles of the glenoid - is very important in treatment.

Conclusions:

– In the initial period of the disease, we are talking about up to 48 hours, the management according to the acronym RICE is fundamental.

– Studies show that supplementation with α-lipoic acid and honokiol can significantly reduce pain and contribute to faster recovery of RSI patients.

Key words: RSI syndrome, prevention, α-lipoic acid, honokiol

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Relationships of body build and physical activity with the physical fitness of high school students

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Introduction: Physical fitness determines resourcefulness, i.e. the ability to effectively solve various tasks facing a person and, therefore, to cope with various situations. The aim of this study was the relationships of body build and physical activity with the physical fitness of high school students.
Material and methods: The research covered 194 students (104 women and 90 men) aged 16-18, attending randomly selected high schools in the Rzeszów district. The research tool was the author's survey and "Eurofit". The Mann-Whitney U test, Pearson Chi-square test, and Spearman's rank correlation were used in the analyses.
Results: Statistically significant relationships were found between the preferred forms of physical activity ($p=0.041$, $p=0.008$) and the subjective assessment of one's own physical fitness ($p=0.015$) and the sex of the respondents. There were statistically significant sex-related differences in the Sit-and-Reach ($p<0.001$), Standing Broad Jump ($p<0.001$), Hand Grip ($p<0.001$), Sit-Ups ($p<0.001$), and Bent Arm Hang ($p< 0.001$), Shuttle Run ($p<0.001$) and Endurance Shuttle Run ($p<0.001$). In both groups, there were statistically significant relationships between the subjective assessment of one's own physical fitness and the results of physical fitness tests ($p<0.05$).
Conclusions: Women chose dancing more frequently and considered their physical fitness to be average, while men preferred team sports and assessed their physical fitness as very good. Women are characterized by greater flexibility, and men by greater explosive strength of lower limbs, static strength, strength endurance of trunk muscles, speed and agility, and cardiorespiratory endurance. In both groups, the higher the subjective assessment of one's own physical fitness, the better the results of individual physical fitness tests.
Key words: Eurofit, motor skills, women, men.

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Application of Dynamic Neuromuscular Stabilization to Non-specific Low Back Pain

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Background: Low back pain (LBP) is one of the most common musculosceletal disorders and the leading causes of patient´s global disability. Most LBP is classified as nonspecific, because the pain source cannot be precisely established in 85–90% of caseA lifetime prevalence of low back pain is reported to be as high as 84%, and the prevalence of chronic low back pain is about 23%, with 11–12% of the population being disabled by low back pain. Patients with low back pain (LBP) have poorly coordinated neuromuscular control, which may alter the normal postural stability of the spine. Altered movement control may occur at any stage of LBP. Stability is achieved not only by abdominal muscles, spine extensors and gluteals, but it is accomplished by precise coordination of these muscles and intra-abdominal pressure by the central nervous system. The primary role of the core stability muscles is to raise the intra-abdominal pressure and to increase the tension in the thoracolumbar fascia. Postural core instability is associated with poor dynamic balance control and a high risk of injury or fall.

Materials and Methods: The applied method in the research sample was dynamic neuromuscular stabilization (DNS). Patients were randomly selected for the research sample. The subject of monitoring was a group of 40 respondents who showed very intense limitations in selected areas of life at the beginning of treatment. The group consisted of 33 women and 7 men. The age of the monitored group ranges from 20 to 51 years. The average age is 26.5 years. The intervention period for the patients was eight weeks with a frequency of exercise three times a week. The patients were evaluated with three questionnaires at the beginning and at the end of the intervention. We used three rating scales as a measurement tool. The first is the ODI, the second is the McGill Pain Questionnaire, and the third is the Visual Analogue Pain Scale. Dynamic neuromuscular stabilization is a rehabilitative approach to optimize the movement system based upon the scientific principles of developmental kinesiology.

Results: 40 respondents, 33 women, 7 men, the average age 26.5 years, showed statistically significant reduction of pain intensity from average 1.53 to 0.3.

Conclusion: In our trial we assume that the dynamic neuromuscular stabilization exercise has an impact on a statistically significant reduction of pain intensity and impact on improving quality of life in patients with low back pain.

Keywords: Dynamic neuromuscular stabilization, Low back pain, Rehabilitation.

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Efficacy of high-intensity laser therapy in patients with knee osteoarthritis

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Introduction: Osteoarthritis of the knee (KOA) is one of the most common musculoskeletal disorders causing pain and functional impairment. When treating knee osteoarthritis, rehabilitation exercises are often combined with high-intensity laser therapy (HILT). HILT is a promising treatment option that can penetrate deeper tissues-it is considered a non-invasive, safe and effective method of pain management.
Material and Methods: The paper includes a literature review of articles published in the last 15 years in the scientific databases Pubmed, Google Scholar and ScienceDirect. The review was conducted using the keywords: "laser therapy", "knee osteoarthritis".

Results: All studies showed a positive effect of high-intensity laser therapy on pain associated with knee osteoarthritis. HILT combined with exercise was more effective than placebo or lower-intensity laser in relieving pain in KOA patients.
Conclusions:
HILT may be a promising and recommended method for relieving pain associated with knee osteoarthritis. HILT shows effectiveness, especially when combined with exercise
Keywords: "laser therapy", "knee osteoarthritis", "high intensity"

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Falls and their consequences in patients diagnosed with Parkinson's disease.

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Introduction: Parkinson's disease is a chronic, progressive degenerative disease of the CNS black matter leading to balance disorders that result in numerous falls and related injuries.

Material and Methods: The study included 100 patients diagnosed with Parkinson's disease (44 women and 56 men). The study group consisted of patients whose disease severity was assessed according to the Hoehn & Yahra Scale I (n=16), II (n=58), III (n=14), IV (n=10), V (n=2). The tool that was used for the study was a survey questionnaire consisting of a metric section, respondents were asked in turn about balance disorders, incidence of falls (frequency, place of occurrence and circumstances), injuries suffered and their consequences. The aim of the study was to assess the incidence of falls and their consequences in patients with PD.

Results: The study found that there is no relationship between the number of injuries sustained in the past 5 years and the clinical severity of PD. There is a correlation between the number of injuries sustained in the last 5 years in patients with PD and the occurrence of falls ($p < 0.001$). 75% of respondents experienced a minimum of1 injury in the past 5 years, more often women than men. The occurrence of falls increases the risk of injury. Respondents most often suffered injuries in the form of lacerations (18.6%) or fractures 13.6%. Most injuries occurred in the right hand (n=32) and head (n=12). Respondents indicated falling backward and forward most often. The largest number of backward, forward and right-handed falls suffered from 1 to 3 injuries in the past 5 years, while left-handed falls suffered from 4 to 6 injuries. The highest number of injuries (10 or more) were suffered by men falling to the right.

Conclusions:

1.The occurrence of balance disorders and falls was related to the severity of Parkinson's disease.

2.Balance disorders and the occurrence of directional falls are strong predictors of injury incidence.

Keywords: falls, injury, Parkinson's disease

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Analysis of the effectiveness of a novel scoliosis therapy in children and adolescents using a standing scoliosis therapy device with a biological feedback mechanism-preliminary report

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Introduction: The purpose of this study was to evaluate the effectiveness of the treatment method for scoliosis in children and adolescents using a standing scoliosis therapy device with a biological feedback mechanism.

Material and methods: Forty-five children who were diagnosed with scoliosis on the basis of spine X-ray and clinical examination were enrolled in the study. The results of 32 children who completed the study according to the protocol were considered for statistical analysis. The subjects were divided into three groups: SkolioMaster, Skol-As and FITS, who exercised according to the chosen methodology for each group. The study group was the "SkolioMaster" group, in which patients exercised in a prototype scoliosis therapy device in a standing position. Each patient was clinically evaluated by a physician specialist in medical rehabilitation and had diagnostic tests performed before and after the 6-month exercise session according to the protocol for each study group. Clinical postural evaluation included anthropometric measurements, podoscopic examination, assessment of spinal curvature in the sagittal plane, measurement of thoracic kyphosis angle and lumbar lordosis, assessment of posture in the frontal plane, and assessment of trunk rotation angle (ATR). Diagnostic tests included X-ray of the spine in anteroposterior projection, 3D scan of the patient's body, assessment of load distribution on a stabilometer platform. The results were statistically analyzed.

Results: After 6 months of therapy, a statistically significant reduction in the main curvature arc was obtained in the group treated with the biofeedback standing scoliosis rehabilitation device.

Conclusions: The study demonstrated the effectiveness of the "SkolioMaster" standing scoliosis therapy device in the reduction of the main curvature. Limitations of the study are the small study group and the short observation period (6 months) . It is necessary to further study the effectiveness of the device on a larger number of children for a longer period of time in accordance with SOSORT recommendations for clinical trials.

Keywords: scoliosis, rehabilitation, biofeedback therapy

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Non-obvious cause of myopathy in developmental age - a case report

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Introduction: Myopathy refers to a set of symptoms resulting from muscle damage. Myopathies are a very large group of diseases with a wide variety of causes, course and prognosis, and may be genetic or acquired in nature. One of the rare causes of acquired myopathies in children may be hyperthyroidism. Ophthalmic manifestations of hyperthyroidism include apparent exophthalmos of the eyeballs and widening of the palpebral eyelid crevice. In the course of myopathy, on the other hand, drooping of the eyelids is a common symptom. The present study presents a case of a child with ocular disorders and features of myopathy in the course of undiagnosed hyperthyrotoxicosis.
Material and methods: A girl aged 2 years and 9 months with an unremarkable perinatal history and normal psychomotor development was referred for neurological diagnosis due to drooping of the eyelid of the left eye confirmed by ophthalmologic examination. Eyelid drooping was episodic, occurring at different times of the day, but asymmetry of the eyelid crevices persisted consistently throughout the day. The girl did not report physiological needs, the mother of the child reported passing of stool of varying consistency up to five times a day. On physical examination on admission, she was hyperactive, impatient, with apparent attention deficits, elevated heart rate of about 130/min. The abnormalities observed on neurological examination were: right eyelid spiracle slightly widened, eyeball protruded forward, left eyelid spiracle narrower, muscle strength visibly weakened especially in the muscles of the iliac girdle, decreased muscle tone, deep reflexes in the upper extremities vivid, symmetrical, in the lower extremities mediocrely expressed. The gait was clumsy, on a widened base. The Gowers' sign was observed, in the supine position she had problems with lifting her head or raising the lower limbs above base level.
Results: The following deviations from norm were found in laboratory tests: TSH < 0.008uIU/ml, fT3>20pg/ml, fT4>6.0mg/dl. In view of the clinical and laboratory features of hyperthyroidism, the girl was transferred to the 2nd Department of Pediatrics, Endocrinology and Pediatric Diabetology for further treatment.
Conclusions: Thyrotoxicosis may be a rare cause of myopathy, so a child with hypotonia should have thyroid function screening tests. The finding of thyrotoxicosis obliges to limit the scope of rehabilitation.
Keywords: myopathy, thyrotoxicosis, ophthalmopathy

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Change in psychophysical performance in patients after lumbar discectomy depending on the postoperative rehabilitation program

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Introduction: Lumbar discectomy, a frequently used procedure in the treatment of radiculopathy caused by discopathy, remains the subject of scientific research aimed at evaluating the effectiveness of postoperative procedures. It is important to highlight the lack of detailed scientific data regarding the impact of rehabilitation programs on improving the functional capacity of patients after surgery. The purpose of this study is to analyze the impact of various rehabilitation programs on the change in psychophysical performance of patients undergoing lumbar discectomy.

Materials and Methods: The study involved 30 patients treated for lumbar discectomy in the Department of Neurosurgery, following a rehabilitation program that included standard physiotherapeutic procedures (physiotherapy, elements of manual therapy, and home exercises). The control group consisted of 30 patients who underwent a rehabilitation program without elements of manual therapy. The randomization process was conducted using MATLAB software (MathWorks, Inc. 2018, Massachusetts) with the RARtool add-on. The study utilized a stabilometric platform as well as SF 36, RMDQ, Oswestry scales, and VAS questionnaires.

Results: The analysis of the results showed statistically significant differences in the improvement of quality of life and functioning in both groups ($p<0.001$), measured by SF36, RMDQ, and Oswestry scales, after rehabilitation. Participants in the study group noted a significant improvement in balance in the following parameters: area circulum ($p< 0.0213$), average lateral deviation X ($p< 0.013$), maximum lateral deviation speed ($p<0.012$), and maximum forward deviation speed ($p<0.0011$).

Conclusions:

The application of both proprietary postoperative rehabilitation methods brought significant benefits in terms of improving the psychophysical parameters of patients. The inclusion of manual therapy as an element of the rehabilitation program significantly reduced pain in the lumbar area compared to traditional rehabilitation methods.

Keywords: lumbar discectomy, manual therapy, functional capacity

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Ethnomedicine - a relic of the past or a path to a modern treatment method?

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Introduction: Traditional medical knowledge and practice known from ethnomedicine and ancient medicine is a special form of knowledge and skills that have developed over the centuries and are based on the transmission of information between generations. The transfer of medical knowledge was generally local and limited to a specific family, tribe, local population or members of a guild (LKS - local knowledge system). Due to the lack of access to professionals and pharmaceuticals, local medical systems have developed specific medical practices and more or less effective remedial skills in maintaining health. Traditional medical knowledge and practice is based on the use of raw materials of natural origin in medicine, i.e. medicinal plants, animal substances and raw materials of inanimate nature, e.g. peloids or minerals. Nowadays, verification of knowledge and practices known from traditional medical systems is one of the strategies in the process of searching for new therapies, medicinal substances or drugs.

Material and methods: In order to prepare the study, the state of research, archival documentation and available studies and ego-documents were analyzed, information on the topic was synthetically organized and updated.

Results: Nowadays, due to the pressure related to unusual challenges in health care, such as the increase in antibiotic resistance or the spread of microorganisms due to climate change, there is an increased interest of researchers in innovative ways of searching for therapeutic agents. In addition to research using methods based on advanced molecular biology techniques, there is a return to traditional medicinal recipes handed down for generations and their renewed revision, taking into account the generally accepted research protocol. For this reason, ethnomedicine currently occupies an important place in the strategy of searching for new methods of treating diseases or bioactive and medicinal compounds. The query aims to familiarize contemporary recipients with the rapidly developing directions of research belonging to the ethnomedical selection in the search for new therapies and drugs.

Keywords: ethnomedicine, historical sources, new therapies, new drugs.

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Functional assessment of patients after hip and knee arthroplasty - preliminary studies

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Introduction: Osteoarthritis is one of the main causes of pain and functional disorders in society, often affects the performance of everyday activities. The treatment usually consist of physiotherapy and pharmacotherapy, while in advanced changes, surgical treatment is needed. The common method to assess the effectiveness of treatments is the physical examination by standardized scales of quality of life, assessment of pain and functioning. More recently advances in objective assessment tools have been included such as DIERS formetric III 4D, myotometry or bioimpedance. The aim of the study is to evaluate the functional assessment of patients after hip and knee arthroplasty performed due to osteoarthritis.

Materials and methods: Twenty-four patients qualified for the study, divided into two groups: group K (n=12) - patients who underwent knee arthroplasty, group H (n=12) - patients who underwent hip arthroplasty. Information related to patient symptoms and functional status was collected using Author's questionnaire, VAS scale, WOMAC scale and Tinetti scale. In addition, circumferences of the lower limbs were measured, bioimpedance was measured by the BCM Fresenius Medical Care device, muscles stiffness and flexibility was measured by MyotonPRO and the distribution of the center of gravity was measured with DIERS formetric III 4D device. The examination was carried out three times: before the surgery, on the 8th-10th day after the surgery and one month after discharge from the hospital.

Results: The assessment of pain, functioning level, balance and the risk of falls showed statistical differences between the examination after the procedure and the examination one month after discharge. The assessment of muscles tension and stiffness showed significant changes in all tested muscles. In the assessment of the load on the lower limbs, significant changes were found in the value of the average pressure on the ground.

Conclusions: Hip and knee arthroplasty clearly improves the functioning of patients, reduces the intensity of pain and the risk of falls. In addition, changes in muscle tone and stiffness were demonstrated before and after the arthroplasty of the lower limbs.

Keywords: osteoarthritis, arthroplasty, DIERS, Myoton, bioimpedance

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The main periods of recovery after a stroke

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Introduction: Vascular diseases of the brain, in particular acute disturbance of cerebral circulation, occupy one of the first places and are the main medical and social problem. According to statistics, about 6 million people after suffering an ischemic stroke remain with stable functional limitations of life activities, the basis of which are motor and cognitive disorders. Recovery after a stroke, the household independence of the patient, which determines the leading role of motor rehabilitation in the early recovery period. It is important to take into account comorbidity in patients, and the risk of post-stroke cognitive disorders or exacerbation of previously existing cognitive deficits, which complicate the recovery process.

Results: In the rehabilitation recovery after a stroke, the main periods are distinguished: the most acute period - the first 7 days; acute period - up to 21 days; early recovery period - up to 6 months; late recovery period - up to 2 years; the residual period is more than 2 years after the stroke. During the entire period of recovery after a stroke, a multidisciplinary team works, which includes specialists for the best rehabilitation result: physical therapist, occupational therapist, speech therapist, medical psychologist.

Conclusions: The most important period is the first 7 days from the onset of the disease - the most acute phase. It is during this period that it is important to properly organize a rehabilitation program using physical therapy. In the acute period of a stroke, for the purpose of physical restoration of movements, positional treatment, passive and active movements, breathing exercises, muscle relaxation exercises, exercises to preserve and increase the amplitude of the range of motion in the joints, and exercises to improve coordination are used. The tasks of the early recovery period are to prevent a repeat stroke and restore movement disorders as much as possible. The greatest attention is paid to the restoration of movements of the affected limbs, the work with cognitive disorders continues: the restoration of speech, reading, thinking, emotional-volitional sphere. During this period, active movements are gradually added, first with the healthy and then with the affected limb. The main task of the late recovery period is: prevention of repeated stroke and restoration of lost functions: motor and household skills. For this, the following are used: climate therapy, dietetics, kinesiotherapy, massage, psychotherapy; include classes with a speech therapist and a psychologist. In the period of residual phenomena, the prevention of a repeated case of acute cerebrovascular accident and the complete recovery of the patient's physical and mental state continues.

Keywords: ischemic stroke, kinesiotherapy, massage, physiotherapy.

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Is electrostimulation therapy a chance for people with facial nerve paresis/ paralysis?

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Introduction: Paresis/paralysis of the facial nerve may occur in both its central and peripheral sections. The most common causes include strokes, demyelinating diseases, proliferative processes in the head and neck, and infections of viral and bacterial etiology. A large percentage of paresis/paralysis is also idiopathic. Due to the enormous physical and mental discomfort for the patient, rehabilitation is recommended in all cases (except for cancer). The aim of this review article is to try to answer the question whether electrostimulation of the nerve actually gives patients a chance to partially or completely regain the function of the muscles responsible for facial expressions.

Material and methods: 51 articles from the PubMed database containing the terms "electrostimulation" and "facial nerve" were analyzed. Eight of them from the period from February 2020 to January 2023 were selected for the final study, the topics of which were most closely related to the subject of the work. The articles described cases of the use of electrostimulation in patients with idiopathic, postoperative and posttraumatic paresis, as well as those in the course of herpes zoster.

Results: Among the analyzed articles, several were found clearly indicating the positive impact of electrostimulation therapy on restoring the proper function of the facial nerve. The remaining articles noted that there were insufficient numbers of patients who had received this therapy to draw firm conclusions. However, some studies have shown a positive correlation between the initial condition of the VII nerve in rehabilitated patients and the degree of paresis after the procedures. The analyzed material did not contain any studies indicating a significant risk of side effects of this therapy.

Conclusions: 1. Currently, there are still not enough studies clearly demonstrating the effectiveness of electrostimulation on the regeneration of the facial nerve. 2. It seems that electrical stimulation of the VIIth nerve can and should be used in the treatment of its dysfunction in a large number of patients.

Key words: facial nerve, paresis, paralysis, electrostimulation

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The problem of fatigue in Parkinson's disease - a pilot study

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Introduction: The process of fatigue is a common and serious problem in CNS diseases, and contributes to the disability of patients, who face motor and non-motor symptoms on a daily basis, which include fatigue, depression and sleep disorders, among others. This project is concerned with assessing the level of fatigue in Parkinson's disease and investigating factors affecting it.

Material and methods: Twenty-five patients diagnosed with Parkinson's disease participated in the pilot study (women: n=12; men: n=13). The study group consisted of PD patients with disease stage according to Hoehn-Yahra: III (n=56%), IV (n= 44%); aged 45 to 83 years (Me=69); disease duration 0 to 33 years (Me=7.00). The tool that was used for the study was a survey questionnaire supplemented with the Fatigue Scale (PFS-16).

Results: Analyses showed that gender, age and disease duration were not modifiers of fatigue levels (no correlation). Among the subjects, 88% confirmed that they had difficulty sleeping through the night, and 76% had problems with excessive daytime sleepiness. However, there were no differences regarding fatigue (PFS-16) - due to the level of these disorders and the level of fatigue on the PFS-16 scale (p=0.2045; p=0.9265). The level of disease progression (p=0.0283) and the level of performance in PD patients (p=0.0147) appeared to be a factor affecting fatigue.

Conclusions:

– The incidence of fatigue was associated with the degree of PD.

– The fitness level of patients can strongly affect the level of fatigue.

There is a need for further research on the determinants of fatigue in neurological patients - in the direction of improving quality of life.

Keywords: fatigue, neurological disease, quality of life

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Body composition and spasticity in children with spastic diplegia

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Introduction: Children with cerebral palsy and Gross Motor Function Classification System (GMFCS) levels I and II cannot maintain the standing position as long as typically developing children, what can cause changes of their body composition. The objective of this study was to identify the correlation between body composition and the degree of spasticity in the muscles of the lower limbs in children with cerebral palsy, with spastic diplegia.

Material and methods: The study included a group of 59 independently walking children aged 8 to 16 with spastic diplegia. The control group included 59 children without central movement disorders. The research included: 1) assessment of body composition and its components using the TANITA MC-780 S MA scale; 2) assessment of the degree of spasticity according to the modified Ashworth scale; 3) calculations of BMI indices in accordance with the recommendations of the World Health Organization (WHO) and BMI OLAF developed by the Children's Memorial Health Institute in Warsaw.

Results: The most severe spasticity, both in the right and left lower limbs, was observed in the extensors of the ankle joint. In turn, the mildest spasticity was observed in the group of flexors of the knee joint of the right and left lower limbs. The greater the degree of spasticity in the muscles of the lower limbs, the greater the deficit in fat-free mass and muscle mass in the lower limbs.

Conclusions: Children with CP have deficits in terms of muscle mass. This deficit of muscle tissue depends on the degree of spasticity of the proximal muscle groups of the lower limbs.

Keywords: body composition, spasticity, cerebral palsy

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Cardiopulmonary function in children with mild and moderate idiopathic scoliosis

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Introduction: A review of research results on the physical capacity of children with idiopathic scoliosis shows that they are not clear and sometimes even contradictory. Currently, the most reliable and method directly assessing the cardiorespiratory function is the cardiopulmonary exercise testing (CPET) and maximum oxygen uptake (VO2max) is considered to be the gold standard in assessing oxygen capacity. The objective of this research project is to assess the cardiopulmonary function using CPET of children with idiopathic scoliosis, as well as to determine the relationship between the degree of primary spinal curvature (Cobb angle) and physical capacity of children with mild and moderate idiopathic scoliosis. It was hypothesized that children with scoliosis have lower physical performance than their healthy peers. It was also assumed that the physical capacity of children with scoliosis depends on the value of Cobb's angle and the angle of rotation of the primary spinal curvature.

Material and methods: The study included a group of 92 children aged 8 to 16 with wild and moderate idiopathic scoliosis. The control group included 94 heathy peers. The research consisted of 2 parts: 1) analysis of medical documentation and 2) CPET. Based on the analysis of medical records and X-ray of the spine, the following indicis were calculated: 1) Cobb angle; 2) Risser test and 3) Raimondi test 4) type of scoliosis by King-Moe. A Cortex "Breath by Breath" MetaLyzer 3B-R3 and a Lode Corival cycloergometer were used to perform the CPEF, based on the Godfrey ramp-type exercise protocol.

Results: There were no differences in oxygen consumption (VO2/kg) in children from the test and control groups. However, children in the study group were characterized by a lower value of Respiratory Exchange Ratio (RER). There was no relationship between cardiorespiratory indicators and the Cobbe angle value.

Conclusions: The study should be extended to a representative group of children with severe scoliosis.

Keywords: idiopathic scoliosis, cardiopulmonary exercise testing, MetaLyzer 3B

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Septic arthritis of the hip in children

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Introduction: Septic arthritis, also known as suppurative or septic arthritis (SA), is a pathology that, in the absence of rapid diagnosis and implementation of appropriate therapeutic procedures, can lead to serious consequences such as degradation of joint cartilage, damage to intra-articular structures and bone surfaces, and even fibrous joint stiffness (ankylosis). Symptoms include fever, poor overall health, and limited movement in the affected joint, particularly internal rotation. This literature review explores the issues of septic arthritis of the hip in children, including its course, treatment methods, and the use of rehabilitation techniques to prevent potential complications.

Materials and methods: A review of the literature related to the etiopathogenesis, diagnosis, treatment methods, and rehabilitation techniques used in septic hip arthritis in children was conducted - textbooks, journals, and PubMeD NCBI databases were reviewed.

Results: Diagnosis involves imaging studies, primarily ultrasound (US), as well as laboratory tests. It is mandatory to collect biological material for bacteriological examination, for example, by puncturing the affected joint. Treatment requires arthrotomy and intravenous antibiotic therapy.

Conclusions:

In most cases, secondary deformative changes occur, evaluated, for example, by X-ray. The Hunk classification is useful for assessing the advancement of these changes and determining the therapeutic procedures.

Keywords: joint, puncture, children, deformities

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The importance of the rehabilitation team in the effectiveness of rehabilitation – a case study

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LNA Sante Origin Otwock

Introduction: the aim of the study was to show how an interdisciplinary approach to the patient affects his recovery. Material and Methods: The study (11/12/2021) used the method of studying an individual clinical case using research techniques: interview, observation, analysis of medical documentation and functional tests (including GCS-9 points, Barthel 0 points, FIM 16/126 points). The description covers a 20-year-old patient rehabilitated at LNA Sante Origin after a craniocerebral injury resulting from a traffic accident, pulmonary contusion, femur fracture, quadriplegia, PEG, tracheostomy tube. The patient underwent individual neurorehabilitation using IBITA Bobath neurophysiological methods and, at a later stage, PNF.

Results: The patient achieved significant improvement in his functional status. Tests after 6 months (when discharged home) GCS – 15 points Barthel – 100/100 points FIM Index – 120/126 Trunk Control Test – 100/100, Assessment Siting Scale – 20/20 points.

Conclusions: The case report allows for the assessment of the effectiveness of the interdisciplinary team in the rehabilitation process. The relationship between each team member allowed for positive therapeutic successes.

Key words: Neurorehabilitation, interdisciplinarity, cerebrocranial injury

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Prevalence of work-related hands disorders of physiotherapists

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Introduction: This study examines the prevalence of hand and wrist symptoms and diagnosed disorders in physiotherapists in Slovakia. The aim was to identify risk factors such as workplace type, number of patients treated per day, and years of clinical practice and to determine preferred methods of treatment.

Material and methods: The group of 107 physiotherapists (28 men and 79 women) participated in the study. All participants completed a questionnaire created for the purpose. It contained demographic data, years of clinical practice, and the questions to determine the presence of various symptoms and injuries to the hand and wrist due to a long-lasting overuse of the hand musculoskeletal system.

Results: Twelve (11.2%) physiotherapists of the observed group did not show any symptoms of functional impairment, and 32 (29.9%) were without any specific hand or wrist disorders. The results confirmed a significant prevalence of symptoms of functional impairment (ø 2.4) and disorders (ø 1.3) with an increased risk in the physiotherapists working in a combined type of workplace (out-patient physical therapy and hospital facilities). The most frequently reported symptoms were hand pain (70%) and reduced muscle strength (45.7%). The most frequently reported diagnosed disorder was hand tendonitis (26.2%). The results confirmed the statistically significant correlation ($\alpha = 0.05$) between the years of clinical practice and the number of identified symptoms and disorders ($p<0.001$) as well as between the number of patients treated per day and the number of symptoms ($p=0.007$). Hand immobilization (28.6%) and manual therapy (24.4%) were preferred methods of treatment. Surgical intervention was required in 2.2% of hand injuries.

Conclusions: In physiotherapists, long-term performance of manual techniques indicates the development of musculoskeletal disorders of the hand and wrist.

Key words: Hand disorders. Physiotherapist. Wrist disorders

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Assessment of patient knowledge concerning preventive measures for low back pain syndrome

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Introduction: Low back pain syndrome is a common problem. Prevention plays an important role in this topic. The aim of the study was to assess the knowledge about preventive measures in patients with low back pain syndrome.

Material and methods: The study group consisted of 110 patients hospitalized in the neurology department at the Independent Public Healthcare Facility in Przeworsk, diagnosed with law back pain syndrome. The study utilized an author-designed questionnaire based on literature analysis, comprising 40 questions. Research tools included the VAS scale, Jackson-Moskowitz scale, and Oswestry Disability Index (ODI).

Results: A significant number of patients is aware of the importance of adhering to ergonomic work practices and the positive impact of physical activity on pain symptoms. However, the majority of respondents do not implement these principles in their daily lives. The main factor influencing this situation, as stated by patients, is a lack of time. The assessment of patients' knowledge about the condition depends on the number of experienced incidents. Each subsequent occurrence of a painful incident mostly leads to increased self-control by the patient and expanding knowledge about the condition.

Conclusions: There is a substantial need for patient education regarding a practical approach to ergonomics and physical activity principles in low back pain syndrome, despite a good level of knowledge on the subject.

Key words: prevention, low back pain, knowledge

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Massage for shoulder rotator cuff dysfunction

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Introduction: With age and the increase in uniform activity among the population, the percentage of individuals experiencing shoulder rotator cuff disorders is on the rise. The growing popularity of alternative treatment methods suggests that patients are increasingly inclined towards natural and less invasive approaches to health restoration, including the use of massage. Therefore, the study and development of massage techniques are relevant tasks, especially in the context of shoulder rotator cuff disorders.

Materials and Methods: Analysis and synthesis of professional scientific and medical literature regarding the application of massage in cases of shoulder rotator cuff injuries.

Results: The role of massage as a physical therapy modality in shoulder rotator cuff disorders includes:

Stimulation of Blood Circulation: Massage promotes improved blood circulation in the rotator cuff area, facilitating the delivery of oxygen and nutrients to tissues and accelerating the removal of toxins. Increased blood flow contributes to reducing inflammation and supports faster tissue recovery.

Muscle Relaxation: It acts to reduce muscle tension and enhance flexibility. Massage aids in restoring the muscular balance of the shoulder rotator cuff.

Pain Reduction: Massage can influence pain receptors, contributing to a decrease in shoulder pain. This can alleviate discomfort and improve the patient's quality of life.

Improvement of Mobility: Massage incorporates various techniques aimed at enhancing joint mobility and can assist in restoring the normal range of motion in the shoulder.

Massage for the shoulder rotator cuff should be targeted at the muscles that comprise this muscle group. The rotator cuff consists of four muscles responsible for the movements and stabilization of the shoulder joint. These muscles include:

Supraspinatus Muscle: Responsible for lifting the arm upward.

Infraspinatus Muscle: Facilitates the external rotation of the shoulder.

Teres Minor Muscle: Responsible for moving the arm outward and pressing the arm to the body.

Subscapularis Muscle: Facilitates the internal rotation of the arm.

During the massage of the shoulder rotator cuff, various techniques can be employed to relax these muscles, enhance blood circulation in the area, and promote overall muscle balance. It is crucial to consider the individual characteristics of the patient and the degree of traumatic damage to the rotator cuff when selecting massage techniques. It's important to note that massage can be used both independently and in combination with other physical therapy methods.

Conclusions: Therefore, the highlighted relevance of massage in the context of shoulder rotator cuff disorders emphasizes its significance in influencing physical recovery and improving the quality of life for patients. It underscores the role of massage among the methods of physical therapy.

Key words: physical therapy, physical therapy modalities, role of massage, massage techniques.

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Imaging changes in magnetic resonance imaging in a patient with B-cell lymphoma after cyclophosphamide, vincristine and prednisone (COP) therapy

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Introduction: The aim of this study is to present the case of a pediatric patient diagnosed with B-cell lymphoma and changes in magnetic resonance imaging before and after combination therapy with cyclophosphamide, vincristine, and prednisone.

Material and methods: A 14-year-old pediatric patient was referred for magnetic resonance imaging (MRI) to investigate a suspicious lymphadenopathy in the neck, which was visualized during an ultrasound examination. The initial MRI revealed a pathological structure with irregular borders. Additionally, the patient had enlarged lymph nodes in groups IIa and IIb. The examination did not provide a definitive diagnosis, necessitating further histopathological testing. The patient was diagnosed with B-cell lymphoma localized in the lymph nodes of the neck and Waldeyer's ring. She underwent treatment with cyclophosphamide, vincristine, and prednisone.

Results: Imaging allowed to determine regression of tumor mass and absence of diffusion restriction features. Additionally, lymph node packages IIa and IIb were no longer enlarged.

Conclusions:

1. Magnetic resonance imaging is a safe and reliable tool for monitoring the effectiveness of treatment for hematologic changes.
2. MRI with the use of various sequences allows for the evaluation of the degree of regression of the changes.

Key words: B-cell lymphoma, COP, MRI

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Fatigue levels and burden on informal caregivers of people with neurological disease

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Introduction: Informal carers of people with neurological diseases experience a variety of problems and a wide range of responsibilities associated with their role. Experiencing the physical, mental or economic burden of care is known as carer burden. In turn, an imbalance between work time resulting from excess or long duration of work and rest is referred to as fatigue.

The aim of the study was to assess the occurrence of fatigue levels and the burden on informal caregivers of people with neurological disease.

Material and methods: A total of 179 informal carers were studied (F: n=157; M: n=22). Patients were diagnosed with one of three neurological diseases: Parkinson's disease (n=64), Alzheimer's disease (n=64) and post-stroke status (n=51). The research instrument was a questionnaire, which consisted of a caregiver and patient metric, the Barthel Scale, the Fatigue Assessment Scale (FAS) and the Caregiver Burden Scale (CB Scale).

Results: Moderate fatigue (x=27.36, SD=6.46) and medium levels of burden (x=2.75, SD=0.62) were reported among caregivers. Further analysis of between-group comparisons (disease type as a grouping variable) showed no statistically significant differences in fatigue (Chi2=3.35; p=0.1871) and carer burden (Chi2=2.94; p=0.2298). There was no correlation between duration of care and FAS scale score achieved (r=0.199) and the patient's level of independence and fatigue (r=-0.175) and burden (r=-0.172).

Conclusions: Research suggests that carers of people with neurological conditions are exposed to fatigue and strain due to their role. The duration of full-time care and the patient's level of independence are not related to the study variables.

Keywords: Caregiver Burden Scale, Fatigue Assessment Scale, informal caregiver, neurological disease

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Assessment of the impact of rehabilitation using Functional Proprioceptive Stimulation on balance and functional efficiency in patients after stroke – a pilot study

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Introduction: The aim of the study was to assess the impact of rehabilitation using Functional Proprioceptive Stimulation on balance and functional efficiency.
in patients after stroke.
Material and methods: The pilot study included a group of 28 patients after a stroke undergoing rehabilitation (1 hour of individual therapy, 1 hour of upright positioning and 30 minutes of Functional Proprioceptive Stimulation 5 days a week during 1 month) at the Donum Corde Rehabilitation Center. The control group received the same rehabilitation dimension and Functional Proprioceptive Stimulation - placebo. To assess the effects, the Berg Balance Scale (BBS), ADL scale, IADL scale, Trunk Control Test, ICF categorical set, reaching test (FR) and postural stability assessment using the Alfa platform were used. The study was carried out twice - before the start and after the completion of the rehabilitation program.
Results: The conducted research showed significant differences between the average results of the assessment of balance, daily activities, postural control and functional efficiency after rehabilitation. Balance and functional efficiency improved significantly in the study group compared to the control group ($p>0.05$).
Conclusions: Supplementing standard physiotherapy with Functional Proprioceptive Stimulation may contribute to faster motor recovery and accelerate the return of independence in activities of daily living in stroke patients.
Key words: stroke, motor activity, Proprioceptive Feedback

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Development of the Polish Version of the ICF Core Set to the assessment of patients with chronic musculoskeletal disorders

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Introduction: A biopsychosocial model for assessing the functioning of patients with musculoskeletal diseases is essential for planning health services for this patient group. For this purpose, the International Classification of Functioning, Disability and Health (ICF) and the 'core sets' created on its basis are used. The aim of this study was to validate and evaluate the effectiveness of using the ICF classification in the assessment of patients with musculoskeletal problems.
Material and methods: A group of 528 people of working age with musculoskeletal conditions receiving outpatient rehabilitation in south-eastern Poland were included in the study. The ICF Core Set for Patients with Musculoskeletal Conditions was used in the study. The WHODAS 2.0 questionnaire was used to assess disability and the WHOQOL-BREF questionnaire was used to assess quality of life.
Results: In testing for significance of change at the level of ICF Core Set for Patients with Musculoskeletal Conditions using the test-retest method, no significant differences were found for any category. There was a statistically significant correlation between the WHODAS 2.0 questionnaire total score and ICF categories, as well as a statistically significant negative correlation between quality-of-life assessment and ICF codes for function, activity and participation and environmental factors.
Conclusions: The study confirms the effectiveness of the use and feasibility of implementing the ICF Core Set for Patients with Musculoskeletal Conditions in clinical settings in Poland. The ICF Core Set evaluated is compatible with commonly used questionnaires for the clinical assessment of health status and quality of life.
Key words: International Classification of Functioning, Disability and Health, Musculoskeletal Diseases, Disability Evaluation, Quality of life

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Prevalence of obesity in children and adolescents with intellectual disabilities

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Introduction: Children and adolescents with intellectual disabilities (ID) are more likely to have problems related to body mass than typically developing pediatric population. Compared to the great number of studies focusing on children and adolescents without ID, evidence regarding body composition among young populations with ID is scarce. Therefore, the aim of this study was to evaluate the prevalence rate of body composition disorders among school-aged children and adolescents with ID in the Podkarpacie region.
Material and methods: A cross-sectional study of 461 students aged 4–18 years was conducted in special education institutions in southeastern Poland. Body mass index (BMI) was assessed. Based on BMI values, the BMI percentile of each participants was calculated using Polish age- and sex-specific BMI charts. The physical measurements included also waist circumference (WC) and body fat percentage (BFP) which was estimated using bioelectrical impedance analysis. Analysis was performed to evaluate the prevalence of overweight and obesity, excess adiposity, and abdominal obesity (AO).
Results: The overall prevalence of overweight and obesity based BMI was 28,2% and 17,4%, respectively. Obesity was diagnosed more often in girls (24,1%) compared to boys (13,7%). The prevalence of excess adiposity (BFP ≥ 95th percentile) was 25,6% (37,6% among girls and 19,1% among boys). Prevalence of AO (WC ≥ 90th percentile) was 39,5%, higher in girls compared to boys (49,3% vs. 34,1%, respectively).
Conclusions: Results indicated that the prevalence of obesity among school-aged children and adolescents with ID was remarkably high. Obesity was diagnosed more often in girls. Therefore, future research should focus on reducing and preventing obesity of this population in Poland.
Key words: intellectual disabilities, pediatric population, body composition, obesity.

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Pleural Effusion – A Multidisciplinary Issue through the Eyes of a Thoracic Surgeon

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Introduction: The pleural cavity is a paired space in the chest between the parietal pleura and the visceral pleura, physiologically filled with a small amount of fluid. In the course of various underlying conditions, such as pneumonia, tumors, trauma, or organ failure, there may be an excessive accumulation of fluid in this space. This condition leads to the development of numerous respiratory symptoms and, in extreme cases, can pose a threat to the patient's life. The aim of this article is to present and analyze various therapeutic methods, with a particular focus on thoracic surgical interventions.
Materials and Methods: Our clinic annually receives hundreds of patients with pleural effusion under its care. The stage of the disease and its cause often determine the preferred treatment method, and the approach may change depending on the treatment stage. Therapeutic methods include pharmacological agents, respiratory rehabilitation, pleural puncture, chest tube drainage, video-assisted thoracoscopy, chemical and mechanical pleurodesis, decortication, and others. This article analyzes these methods in terms of their possibilities and limitations.

Results: Each therapeutic method for pleural effusion has its pros and cons. Although surgical methods yield rapid results after their application, the patient's management should not be limited exclusively to them. Often, the spectacular therapeutic effects come with consequences for the patient, such as pain, local complications, and the inability to function independently in the postoperative period.
Conclusions: The care of patients with pleural effusion requires collaboration among various specialists, and therapeutic methods complement each other, with their significance changing throughout the course of the disease. The thoracic surgeon's approach to treatment depends on the patient's condition and the underlying disease. Regardless of the scenario, respiratory rehabilitation is an extremely important tool that can act on both the cause and symptoms of the disease, as well as support recovery after thoracic surgical procedures and treat their complications.
Key words: pleural effusion, thoracic surgery, rehabilitation

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Proposal for the use of resistance inspiratory training in Polish intensive care unit patients

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Introduction: inspiratory muscle training (IMT) is a non-pharmacological, non-invasive therapeutic method that can be part of the physiotherapy process for intensive care unit (ICU) patients. The effectiveness of IMT is determined by the methodology and the type of device used in the training process. The aim of this presentation is to introduce the methodology of IMT and the possibility of practical implications of IMT in Polish ICU units.

Material and methods: Available articles containing the IMT methodology were reviewed and the most commonly used exercise protocols were selected.

Results: IMT protocols may vary depending on the equipment used. Close cooperation with the patient is necessary to start IMT. The initial load value is between 30 and 50 % of the patient's maximum inspiratory pressure. The literature recommends 4 series of 6-8 resisted inspirations and 1-2 sessions per day.

Conclusions: It appears that the inclusion of IMT, provided appropriate exercise loads and frequencies are applied, in the early rehabilitation process may benefit ICU patients by increasing respiratory muscle strength and improving patients' quality of life. The development of a standardised IMT protocol requires further research.

Key words: inspiratory muscle training; physiotherapy, intensive care unit (ICU)

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„Start to Move As Soon As Possible" protocol in intensive care unit

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Introduction: The aim of the presentation is to demonstrate the "Start to Move As Soon As Possible UZ Leuven" (STM ASAP) protocol for physiotherapists working with patients in intensive care units (ICU) as a tool to facilitate implementing of early rehabilitation. Early rehabilitation in the ICU significantly improves functional outcome and helps to minimize the risk of complications, including ICU acquired muscle weakness. There is a variety of the exercise protocols for early rehabilitation interventions for adults treated in the ICU, including the STM ASAP protocol.

Material and methods: UZ Leuven's Start to Move As Soon As Possible (STM ASAP) protocol was selected for presentation as one of the models for evaluation and physiotherapy of ICU patients. It has been applied clinically since 2011 and a study of Hoffman et.al. published in 2020 on 121 adult ICU patients demonstrated its clinical feasibility.

Results: Combining elements of already known assessment tools (S5Q, RASS scale, MRC scale, Berg scale) into a coherent STM ASAP facilitates a rapid assessment of the feasibility of implementing early rehabilitation, its safety (only 3% adverse event rate) and the satisfaction of most patients (92%) with physiotherapy.

Conclusions: Promoting a simple and logical tool, the STM ASAP protocol, could improve the work of ICU rehabilitation staff and increase the possibility of shortening of patients' stay in the ICU, as well as the chance of avoiding complications.

Key words: intensive care units (ICU), early rehabilitation, protocol STM ASAP

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Physical activity as an essential element of people's improvement with Stein-Leventhal syndrome

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Introduction: Stein-Leventhal syndrome, also called polycystic ovary syndrome, is one of the most common endocrine and metabolic diseases in women of reproductive age. The etiology of this disease remains unclear, suggesting an epigenetic and environmental basis, including the influence of diet and lifestyle.

Material and method: The study was conducted at the turn of 2021 and 2022 on a group of 146 women diagnosed with Stein-Leventhal syndrome. The study used the author's survey and the WHOQOL-BREF quality of life questionnaire (WHO, 2020). The obtained results were statistically processed, assuming the significance level of $p<0.05$.

Results: The physical activity of the surveyed women turned out to be average (44.5%) and low (37.7%). For 8.9% of respondents, activity is at a very good level and the average duration is 60 minutes ($p=0.870$). The assessment of the life situation resulting from the disease and the therapy used was rated by the respondents on average at 3.57 ± 0.85 points on a five-point scale. On a scale of 100 points the respondents rated the environmental domain the highest (61.9 points), followed by the social (61.5 points), the physical (57.8 points) and the psychological (56.8 points).

Conclusions: Physical activity, despite its impact on metabolism and normalization of body weight, does not significantly affect the quality of life of women with Stein-Leventhal syndrome. However, it turned out that high quality of life in one area is accompanied by high quality of life in other areas, significantly positively correlating them with each other.

Key words: Stein-Leventhal syndrome, physical activity, quality of life

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Lymphatic drainage and the body's membrane systems – importance in therapy on the basis of recent scientific reports

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Introduction: A common therapeutic problem encountered in the work of a physiotherapist is lymphedema. Properly conducted physiotherapy is the primary form of treatment that gives tangible benefits in terms of the patient's recovery. Lymphedema is one of the most common disorders of the lymphatic system. Excessive amounts of interstitial, protein-rich fluid accumulate in the intercellular spaces; the ratio between the amount of fluid supplied to the tissues and the amount drained from them. The result of this state of affairs is the formation of a characteristic plastic structure. Accumulation of fluid in the intercellular space leads to swelling, not painful, over time, the swelling hardens leading to, "elephantiasis" and significant swelling of the tissue, creating a significant health and medical problem.

Material and methods: The purpose of this paper is to propose a therapeutic procedure that is a component of manual therapy, deep tissue massage and lymphatic drainage based on the tensegrity of structures interacting with each other. The work presents a holistic view of the issue of lymphatic drainage, showing the correlations between the various tissue systems, i.e. the lymphatic system, fascia, muscle tissue and internal organs. The means of verifying the effectiveness of the therapeutic procedure are the achieved functional changes in tissues, occurring as a result of therapy in a 69-year-old patient. The work is a preliminary proposal for therapeutic management of lymphedema, with measurable and lasting results in restoring the optimal state of structural homeostasis of the lymphatic system.

Results: The only objective way to determine the effectiveness of the therapy is a linear measurement of the neck circumference made with a centimeter tape (5 cm above the spinous process of C7). The measurement was made before the start of therapy, after each subsequent treatment and after the end of therapy. The parameters obtained were:

- measurement before therapy: 47 cm
- measurement after the 1st treatment: 43 cm
- measurement after 2nd treatment: 41 cm
- measurement after 3rd treatment: 39.5 cm

Other elements of the effectiveness of the therapy, such as change in tone of voice, improvement in articulation of speech, ability to swallow food, are subjective elements. The patient already reported a marked improvement in her condition after the first treatment. After the second treatment, she stated that speech articulation and swallowing ability were fully restored.

Conclusions: The patient presented after previous therapy at rehabilitation facilities, which did not yield the expected results, relying solely on traditional lymphatic drainage. In order to improve the effectiveness of the therapy, areas of tissue restriction were identified within:

- musculo-fascial bands
- the system of transverse membranes of the body in the trunk area
- tissues affecting impairment of the inspiratory phase of the thorax were identified
- tensegrity connections of the above-mentioned areas were determined
- therapeutic techniques to normalize tissue tensions and restrictions were proposed
- performed lymphatic drainage with adherence to lymphatic rhythm
- recommended exercises performed by the patient at home to maintain the effects of manual work
- anti-edema prophylaxis was recommended

Therapeutic management in accordance with the above-mentioned guidelines resulted in rapid therapeutic effects

Key words: lymphedema, lymph, drainage