XVIII Międzynarodowe Dni Rehabilitacji
Postępy i standardy współczesnej rehabilitacji

Supplement

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The use of digital health literacy in physical activation of seniors from the perspective of physiotherapy

Introduction: Digital health literacy provides a set of skills, knowledge and attitudes that a person needs to be able to develop functionally in the information society. Telemedicine in physiotherapy (telerehabilitation) allows for the provision of care remotely via video calls, applications and online platforms, which saves patients time and increases comfort, especially with home exercises, monitoring and group therapies, making rehabilitation more accessible and effective.

Material and Methods: The research method is an analysis of senior activation in terms of the use of telerehabilitation as a tool for treating current movement difficulties, compared to personal contact.

Results: The digital transformation of healthcare means virtual care, remote patient monitoring, the use of artificial intelligence, the analysis of large data sets, the use of smart devices, the creation of a data platform and the use of tools that enable data exchange and storage and tools for remote sensing and data exchange, sharing relevant information within the framework of creating a healthcare ecosystem.

Conclusions: Digital technologies are now an integral part of everyday life and the world's population has never been more connected. Telemedicine in physiotherapy represents a modern trend that combines traditional care with digital tools to improve access to rehabilitation.

The contribution is a partial output of the project KEGA 002KU 4/2025 Digital health literacy of seniors from the perspective of nursing and physiotherapy.

Keywords: Digital health literacy, telerehabilitation, physical activation, senior.

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Effectiveness of physiotherapeutic interventions in professional musicians with pain and musculoskeletal disorders: A systematic review

Introduction: Playing a musical instrument involves performing precise, repetitive movements in strictly defined, often asymmetrical postures. Prolonged daily musical practice and performance-related stress contribute to overload of the musculoskeletal system. The specific body positioning adopted by instrumentalists, together with repetitive, stereotyped movement patterns, leads to non-physiological loading of the musculoskeletal apparatus. The aim of this study is to conduct a systematic review of research evaluating the effects of physiotherapeutic interventions on pain and musculoskeletal disorders in professionally active musicians.

Materials and Methods: The study was conducted as a systematic review in accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. The research question was formulated using the PICO framework. Electronic databases (PubMed, Web of Science, Cochrane Library, Scopus, and PEDro) were searched to identify randomized controlled trials (RCTs) investigating the effects of physiotherapeutic interventions in musicians with pain and musculoskeletal disorders, compared with a control group. A total of 874 articles were identified, of which 38 publications were subjected to a detailed full-text analysis. Ultimately, 6 studies meeting all inclusion criteria were included in the systematic review.

Results: The analyses conducted indicate that physiotherapy interventions in groups of professionally active musicians, compared to control groups, yield positive results in reducing pain and musculoskeletal disorders. Manual therapy, postural strengthening exercises, exercises to relax the playing apparatus, instruction in postural and instrument playing ergonomics, and physical activity were recurring elements of the intervention. The discrepancies in results may result from the use of different tools for assessing the effects of therapy, which do not take into account the specific characteristics of playing a specific musical instrument.

Conclusions: Based on the collected data, it is impossible to indicate a single form of therapy or physiotherapy intervention that yields the best results in reducing pain and musculoskeletal disorders among musicians. It seems important to develop a specific assessment tool that takes into account the nature of instrument playing, which will enable a precise assessment of health status and the appropriate selection of physiotherapy intervention.

Keywords: Pain; Musculoskeletal playing-related disorders; Professional musicians

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Early Developmental Determinants of Motor Coordination and Balance in School-Aged Children

Introduction: Developmental Coordination Disorder (DCD) represents a significant challenge in the physiotherapeutic diagnosis of school-aged children. Identifying early developmental risk factors and understanding compensatory mechanisms in postural control is crucial for designing effective therapeutic strategies. The aim of this study was to evaluate the relationship between birth parameters and both subjective and objective motor performance, as well as to investigate internal biomechanical dependencies in balance control among school-aged children.

Material and Methods: The study included a group of 52 children (mean age 10.2 ± 2.67 years) attending a primary school in Futoma. The research procedure utilized: the DCDQ questionnaire for parental assessment of motor coordination, an original questionnaire regarding the child's perinatal and early developmental history, the Zebris stabilometric platform for objective balance assessment in trials with eyes open and eyes closed.

Results: Analysis revealed that the type of delivery (C-section vs. vaginal delivery), birth weight, and gestational age did not significantly differentiate current levels of coordination and balance ($p > 0.05$). However, a trend toward statistical significance ($p = 0.070$) was observed, indicating a poorer symmetry index in children with a history of muscle tone disorders. A very strong dependency was demonstrated between limb loading asymmetry and lateral control. Loading of the right side strongly correlated with mediolateral sway (Deviation X) both with eyes open ($r = 0.79$) and eyes closed ($r = 0.75$). The symmetry index was significantly associated with the amplitude of lateral sway (r from -0.39 to -0.46). The relationship between subjective parental assessment and objective parameters emerged primarily after the exclusion of vision. A strong negative correlation was noted between the Total DCDQ Score and Deviation X (rho = -0.57). This indicates that children rated as less motorically proficient exhibit significantly greater lateral instability when visual control is removed.

Conclusions:

1. Coordination deficits in the studied children manifest specifically through increased lateral sway amplitude (frontal plane) rather than an increase in the total COP path length.
2. The exclusion of visual control is a key diagnostic element that reveals objective balance deficits correlated with subjective motor difficulties.
3. Early abnormalities in muscle tone may predispose children to persistent limb loading asymmetry, which directly impacts the degradation of stability parameters in school age.

Keywords: DCDQ, Zebris, stabilometry, balance, loading symmetry, muscle tone

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Assessment of physical activity and sedentary behavior in children and adolescents: Polish validation of the CAPAS-Q questionnaire in light of accelerometric measurements

Introduction: Contemporary public health challenges, such as obesity and metabolic disorders, are closely linked to low levels of physical activity (PA) and excessive sedentary behavior (SB) among children and adolescents. Although accelerometry is recognized as the "gold standard" for measurement, its high cost and logistical limitations ensure that questionnaires remain a key tool in population-based studies. The aim of this study was the Polish validation of the multidimensional CAPAS-Q (Children and Adolescents Physical Activity and Sedentary Questionnaire).

Methods: The study included 206 students aged 8–17 from the Podkarpacie region. Participants completed the CAPAS-Q questionnaire twice (with a 7-day interval) and wore an ActiGraph wGT3X-BT accelerometer for 7 days. Reliability, test-retest stability, and criterion validity were analyzed through correlation with objective data.

Results: The questionnaire demonstrated good internal consistency (Cronbach's alpha: 0.67 for PA and 0.75 for SB) and excellent test-retest stability (ICC for most subscales ranged from 0.74 to 0.94). Boys showed significantly higher levels of moderate physical activity (MPA) and met WHO guidelines more frequently (44.6% vs. 19.3% in girls; $p < 0.001$). A clear increase in sedentary behavior with age was observed in both sexes. The highest validity regarding physical activity was found for the "sports and leisure" domain in correlation with MVPA ($r_s = 0.27$), while for sedentary behavior, the correlation with objective data was even stronger at $r_s = 0.41$.

Conclusions: The Polish version of CAPAS-Q is a reliable and stable tool to assess physical activity and sedentary behavior in children and adolescents. This tool allows for the effective identification of behavioral contexts (home, school, leisure time), which is crucial for planning targeted health interventions.

Keywords: accelerometry, physical activity, children, questionnaire, adolescents, validation, sedentary behavior

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Multidisciplinary collaboration as a factor in the effectiveness of rehabilitation for patients with chemotherapy-induced peripheral neuropathy (based on survey results)

Introduction: Chemotherapy-induced peripheral neuropathy (CIPN) is one of the most disabling adverse effects of oncological treatment, affecting up to 68% of patients. Despite the proven effectiveness of physical therapy (PT) in reducing sensory and motor impairments, its integration into oncology care remains limited. The aim of this study was to identify barriers to collaboration between physicians and physical therapists in order to develop effective multidisciplinary strategies.

Methods: An online survey was conducted among physicians (n = 21) and physical therapists (n = 103). The survey assessed knowledge of CIPN pathogenesis, diagnostic approaches, the use of standardized assessment tools, and patterns of interdisciplinary collaboration.

Results: Physicians demonstrated high clinical awareness of sensory symptoms (81%) and the cumulative nature of CIPN (95.2%); however, 100% relied solely on routine clinical examination and did not use validated tools (FACT/GOG-NTX, DN4). A lack of standardized assessment was also observed among physical therapists. Insufficient knowledge of neurotoxicity and CIPN mechanisms among PTs was associated with gaps in undergraduate education. Despite regular patient contact, only 28.6% of physicians consistently referred patients to physical therapy, mainly due to the dominance of a pharmacocentric model and concerns about the safety of physical activity during active treatment. At the same time, 76.2% of physicians reported low effectiveness of pharmacological management. The limited integration of physical therapists into oncology settings and insufficient clinical experience further reinforced these barriers.

Conclusions: The study confirmed the presence of a communication gap between physicians and physical therapists, driven by limited oncology-specific knowledge, the lack of standardized diagnostic tools, and the delayed referral to PT. The development and implementation of unified clinical referral pathways and targeted educational programs for multidisciplinary teams are essential to improve the quality of life of cancer patients.

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Physiotherapy management after surgical treatment of a compression-split fracture of the lateral tibia condyle: A case report

Introduction: Lateral tibial condyle fractures are among the most common injuries that occur in the torsion or compression mechanisms of the knee joint. Surgical treatment (most often stabilization with plates and screws) aims to restore the surface and stability. Postoperative rehabilitation is a key element of therapy, allowing recovery of knee function, muscle strength, and a normal gait pattern. Purpose of the study: To assess the effects of physiotherapy in a patient after surgical treatment of a compression-split fracture of the lateral tibial condyle.

Case description: A 43-year-old patient with significant visual impairment was hit by a car. Hospital examinations, including computed tomography, revealed a fracture of the left lateral tibial condyle with fracture gaps, including the intercondylar prominence with depression of the condylar articular surface and a bucket-handle injury to the lateral meniscus. During surgery, the patient underwent, among other things, fracture stabilization with an LCP plate and K-wires, and suturing of the damaged lateral meniscus. After surgery, the patient underwent home rehabilitation for eight weeks. Initially, anti-edema therapy was provided in the form of lymphatic drainage and kinesiotaping. Scar mobilization, manual therapy, massage, exercises based on the neurophysiological method (PNF), and isometric exercises were also implemented. Self-paced exercises were also recommended. During therapy, the patient learned to walk with two crutches, gradually increasing the load on the lower limb. Gait retraining was also emphasized. After completion of home rehabilitation, the patient continued therapy in an outpatient setting, where physical therapy treatments such as laser biostimulation, magnetic field therapy, cryostimulation, and continued exercises were included. After rehabilitation, she achieved greater muscle strength, increased range of motion in the operated joint, and restored a normal gait pattern.

Conclusions: Postoperative treatment of a lateral tibial condyle fracture is a long-term process that requires comprehensive rehabilitation and an individualized approach. Intensive therapy contributes to faster healing, reduced postoperative inflammation, increased knee joint mobility, reduced swelling, and accelerated recovery.

Keywords: tibial fracture, postoperative physical therapy, physical therapy, knee joint

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Synergistic effect of sleep deficits and chronotype on response adequacy in computer-based tests

Introduction: The aim of this study was to assess the impact of sleep quality, daytime sleepiness, and chronotype on psychomotor performance and response adequacy in computer-based tests. Particular attention was paid to analyzing whether the coexistence of sleep deficits and a specific chronotype (especially evening sleep) could lead to impaired cognitive functioning, as measured by objective measures of reaction time and attention stability.
Material and Method: The study was conducted among 119 students. A self-administered survey and standardized questionnaires were used: the Pittsburgh Sleep Quality Index (PSQI), the Epworth Sleepiness Scale (ESS), and the Morningness–Eveningness Questionnaire (MEQ). Psychomotor performance was assessed using computer-based tests from the SIGMA system. Statistical analysis was performed using Statistica 13.3 software.
Results: In the study group, 39.5% of students demonstrated reduced sleep quality (PSQI > 5), but only 14.3% reported excessive daytime sleepiness. The intermediate chronotype predominated, with nearly a quarter of the participants representing an evening sleeper; no morning sleepers were observed. Mean reaction time was relatively prolonged, and correlation analysis revealed a significant relationship between chronotype and reaction time – evening sleepers reacted more slowly. Analysis of variance confirmed a significant main effect of chronotype: "night sleepers" performed worse, particularly in the morning. Importantly, subjective daytime sleepiness did not significantly influence reaction time, and those reporting sleepiness even exhibited fewer missed stimuli, which may indicate compensatory mechanisms.
Conclusions: Chronotype, especially evening sleeper, is a significant and independent factor impairing psychomotor performance and response adequacy. Subjective assessments of daytime sleepiness do not fully reflect the actual level of cognitive deficits. Sleep deficits in young adults may be masked by compensatory factors (e.g., mobilization or stimulant use), but objective computer-based tests reveal slower reactions and attentional lapses. These results confirm the importance of considering chronotype in assessing cognitive functioning and planning activities requiring rapid reactions.
Keywords: chronotype, reaction time, sleep deficit, SIGMA computer-based tests, PSQI, ESS, MEQ

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The Impact of Lifestyle on the Occurrence of Menopausal Symptoms

Introduction: Menopause is associated with symptoms that can significantly impair women's daily functioning. Their relationship with lifestyle constitutes an important issue in the context of improving quality of life. The aim of the study was to analyze the impact of lifestyle on the occurrence and severity of menopausal symptoms.

Material and Methods: The study included 240 women in the menopausal period. Research was carried out in gynecological outpatient clinics of the Healthcare Center No. 2 in Rzeszów between November 2024 and January 2025, after obtaining approval from the facility's management. The level of statistical significance was established at $p < 0.05$.

Results: The most pronounced symptoms were vasomotor symptoms, mood swings, and difficulties in maintaining normal body weight. Women who followed a health-promoting diet experienced less severe hot flashes ($p = 0.043$) and sweating ($p = 0.003$). Nearly half of the participants (49.2%) did not participate in physical activity, which did not show a statistically significant effect on the severity of menopausal symptoms ($p > 0.05$). Abnormal body weight was associated with increased severity of psychological symptoms, memory disorders, excessive sweating, decreased libido, and reduced skin elasticity ($p < 0.05$). A greater severity of menopausal symptoms was correlated with poorer sleep quality.

Conclusions: An increased severity of vasomotor symptoms was more common among women who did not follow a health-promoting diet. Overweight and obesity during menopause are associated with greater intensity of symptoms, particularly psychological and somatic symptoms. An increased severity of menopausal symptoms is associated with poorer sleep quality.

Keywords: menopausal symptoms, lifestyle, dietary habits, sleep, physical activity, overweight

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KORD program: The role of the physiotherapist in its implementation

Introduction: The aim of this paper is to present the general organizational structure of the KORD program (comprehensive care for premature newborns), with particular emphasis on the role of the physiotherapist in its implementation, and to present standardized tools for assessing psychomotor development used during follow-up visits. The KORD program is implemented in seven centers in Poland, including the Neonatal Clinic with Neonatal Intensive Care Unit at KSW No. 2 in Rzeszów. It covers newborns born less than 33 weeks of gestation and newborns weighing less than 999 grams, regardless of their maturity at birth. The program consists of two modules. Module I covers diagnosis, therapy, and monitoring of neonatal treatment outcomes, while Module II addresses the therapeutic rehabilitation of children with developmental disorders, implemented according to an individually tailored plan in a center or day care setting. Children are included in the program until they are three years old.

Materials and Methods: The study material includes patient data from the KORD database, our own experience from implementing the program at the Neonatal Clinic with the Neonatal Intensive Care Unit, and case reports from two patients.

Results: Assessment of motor development in prematurely born children based on standardized tools and a description of the physiotherapy process within Module II of the KORD program.

Conclusions: The KORD program aims to improve the quality and effectiveness of physiotherapy for prematurely born children by implementing early physiotherapy interventions in the NICU, ensuring comprehensive interventions for their proper development, avoiding long-term complications of prematurity, and correcting any developmental abnormalities in these children compared to children born at term.

Keywords: KORD program, physiotherapy, premature infant

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AI modelling and digital twins in personalised rehabilitation

Introduction: A Digital Twin (DT) is a digital copy of a patient (the entire body or part of it, e.g. the skeletal system, circulatory system or neural networks), supported by artificial intelligence (AI) algorithms. The aim of the study: The aim of this study is to analyze the available possibilities for the application of AI modelling and Digital Twin technology in personalized rehabilitation processes.

Material and Methods: A literature review was conducted on the application of artificial intelligence (AI) and Digital Twin technology in rehabilitation, covering publications issued between 2020 and 2025. The databases [PubMed, Scopus] were searched. Ten studies were included in the final analysis.

Results: Contemporary personalized rehabilitation is based on three main pillars of the use of artificial intelligence (AI) and Digital Twins (DT): predictive modelling focused on forecasting patient progress, adaptive real-time control using advanced sensors (exoskeletons, robots) for immediate exercise correction, and cognitive simulations operating on artificial mental models to understand psychological barriers. Research confirms the exceptionally high technical and clinical parameters of these solutions, including 94.4% accuracy in predicting activities of daily living (ADL) indicators and 96% precision in detecting incorrect compensatory movements.

Conclusions: Digital Twin technology is technically feasible and clinically effective in personalizing rehabilitation, especially in home settings and telerehabilitation.

Keywords: rehabilitation, AI, Digital Twin

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Assessment of postural awareness in riders – does horse riding help maintain correct posture?

Introduction: Postural awareness and core stability are key elements ensuring proper riding seat and rider safety. Horse riding, as a discipline requiring constant adaptation to the animal's movement, can significantly influence neuromuscular control and proprioception.

The aim of the study was to assess the level of postural awareness and lumbo-pelvic-hip complex stability in equestrians, as well as to analyze the relationship between riding experience and the ability to maintain correct posture.

Material and methods: The study included a group of 40 individuals (29 women, 11 men) with an average age of nearly 25 years. The average riding experience was approximately 108 months. An original questionnaire regarding experience and subjective assessment of postural awareness (1-10 scale) was used, along with the single-leg bridge test (T1) and the "bird-dog" test in a quadruped position (assessment of motor control and deep muscles – T2).

Results: A strong positive correlation was demonstrated between riding experience and subjective postural awareness ($r = 0.674$; $p < 0.001$), as well as results of the T1 and T2 stability tests ($p < 0.001$). Individuals declaring higher postural awareness achieved significantly better times in deep muscle endurance tests (correlation with T1b: $r = 0.682$; with T2a: $r = 0.603$; $p < 0.001$). Although the average difference between body sides was approximately 11%, as many as 70% of subjects did not meet the symmetry norm in the T1 test, while 60% of the group maintained the symmetry norm in the T2 (bird-dog) test. 77.5% of respondents claim that horse riding makes them pay more attention to their posture ($p = 0.033$).

Conclusions:

1. Horse riding promotes the development of postural awareness, and the objective ability to stabilize the torso increases with years of training.
2. There is a strong relationship between riding experience and the results of functional core stability tests.
3. Despite high overall fitness, asymmetries within the lumbo-pelvic-hip complex occur in a large portion of riders, indicating the need to supplement training with targeted core stability exercises.

Keywords: horse riding, postural awareness, core stability, bird-dog test

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Quality of life and body image in young women with idiopathic scoliosis: A comparative analysis of surgically and conservatively treated patients

Introduction: Idiopathic scoliosis is a complex deformity that affects both the physical functioning and psychological well-being of patients. The treatment process, regardless of the method used, creates emotional challenges related to acceptance of body image, social limitations, and anxiety about future health. The aim of this study is to compare the quality of acceptance of life and the degree of self-image between individuals following surgical spinal correction and patients undergoing nonsurgical treatment.

Materials and Methods: The study included a group of 60 women with idiopathic scoliosis, aged 12–25 years. The research sample was divided into two equal groups: surgically treated patients (n=30) and patients undergoing conservative treatment (n=30). For the surgical group, the inclusion criterion was a minimum of 6 months since the procedure. To evaluate selected psychosocial and clinical parameters, the standardized SRS-22r questionnaire and the Visual Analogue Scale (VAS) for pain were used.

Results: The treatment method significantly differentiates patients in terms of body image – the surgical group demonstrated a higher level of acceptance of the body, perceived attractiveness, and satisfaction with treatment. Regarding function, pain, and appearance in clothing, the results for both groups were similar. A comparable level of psychological well-being was observed; however, nonsurgically treated patients reported a lower negative impact of the deformity on personal relationships, which may result from the absence of mechanical limitations associated with spinal stabilization.

Conclusion: Surgical treatment significantly enhances the sense of attractiveness and body acceptance. The lack of differences in pain levels and psychological well-being between groups suggests a high capacity for psychological adaptation among young women, regardless of the treatment method applied.

Keywords: idiopathic scoliosis, quality of life, self-image

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Evaluation of the effectiveness of transcranial direct current stimulation (tDCS) in the treatment of upper limb spasticity in stroke patients: A systematic review of the literature

Introduction: Spasticity is a disorder resulting from damage to the upper motor neuron, characterized by increased resting muscle tone and tonic stretch reflex, as well as exaggerated tendon reflexes. The aim of the study was to conduct a systematic review of the literature on the use of transcranial direct current stimulation (tDCS) in the treatment of upper limb spasticity in people after stroke.

Material and Methods: PubMed, Scopus, PEDro, and Web of Science databases were searched using the following keywords: transcranial direct current stimulation, stroke, muscle spasticity, upper limb, and their combinations. Randomized controlled trials published between 2015 and 2025 in English were included, in which the study group consisted of post-stroke patients with upper limb spasticity, and the study used the tDCS intervention as a therapy aimed at reducing upper limb spasticity. The methodological quality of the studies was assessed using Cochrane RoB2. Seven studies were included in the final analysis.

Results: In all the studies analyzed, tDCS therapy was used in combination with other physiotherapy methods, and in the control group a sham tDCS intervention was used, however, the therapeutic protocols used were varied. A clear positive effect of the tDCS intervention on spasticity reduction was found in three studies, and a short-term or equivocal positive effect was found in two studies. Two studies found no relationship between the use of the tDCS intervention and the reduction in spasticity of the upper limb in patients after stroke.

Conclusions: There are indications that the use of tDCS in combination with other rehabilitation interventions may result in a reduction of spasticity, but further scientific evidence is needed in this regard, in particular based on unified research protocols.

Keywords: transcranial direct current stimulation, stroke, muscle spasticity, upper limb

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Application of predefined therapy plans in the rehabilitation process based on the Armeo concept

Introduction: The therapeutic program, implemented according to the Armeo therapy concept (Hocoma) and aimed at improving upper limb function in children with cerebral palsy (CP), is based on robotic training that includes exercises to increase muscle strength, range of motion, and motor skills. The devices used in therapy: Armeo®Power, Armeo®Spring, and Armeo®Senso, differ in their capabilities for guided training, support systems, and active patient engagement.

Materials and Methods: Five predefined therapeutic programs (PTP) were developed using an analytical approach to the functional problem, using video analysis, assessment of functional level assessment (MACS), degree of paresis, and severity of structural changes. The selection of the program is based on a SMART goal jointly established with the patients and their family. The programs allow for appropriate device selection, support level adjustment, and VR scenario sequencing. Each program includes ten therapeutic sessions, each lasting 45 minutes, characterized by increasing difficulty and patient participation. If rapid functional progress occurs, device changes that encourage greater activity or modifications to scenarios are permitted.

Results: The development of PTPs contributed to optimizing upper-limb rehabilitation within the Armeo environment. A standardized approach based on functional level and therapeutic goals set according to the SMART concept allowed positive outcomes assessed by the GAS scale. The PTP concept enables therapists to make adjustments without disrupting the rehabilitation process.

Conclusions: Integrating PTPs with virtual reality environments and goal-oriented therapy positively impacts upper limb function and patient motivation.

Keywords: cerebral palsy, upper limb, therapy, robotics

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Application of the Armeo therapy concept in children with CP

Introduction: Cerebral palsy (CP) is a developmental disorder that causes impairments in body function and structure, limitations in activity, and influences the ability to participate in life situations, directly affecting the level of functioning. Sensomotor impairments of the upper limb are common in individuals with CP and constitute a significant cause of disability. The basis of treatment for these impairments is intensive therapeutic interventions combined with pharmacotherapy and orthotic treatment within a rehabilitation program.

Materials and Methods: The Armeo (Hocoma) therapy concept is based on robotic training, including exercises that increase muscle strength, range of motion, and motor skills. Rehabilitation relies on the use of appropriately selected robotic orthoses (exoskeletons). Devices used in therapy: Armeo® Power, Armeo® Spring, and Armeo® Senso, differ in their capabilities for guided training, unloading systems, and active patient participation. Their functionality allows therapy to the patient's current goals and functional status. All devices utilize the common software ArmeoControl®, which forms the basis for managing the rehabilitation process, offering a database, therapy plans, assessment methods, exercises, and games.

Results: The Armeo therapy concept is a significant complement to traditional rehabilitation methods and increases the effectiveness of treatment for patients with CP. The software ensures individualization of therapy parameters, adjustable workspace, and progress tracking. Therapy becomes more efficient.

Conclusions: The Armeo therapy concept enhances the intensity and effectiveness of therapy by incorporating self-initiated movements and motivation for training. Limitations of the Armeo method are due to the size of the orthoses, cognitive deficits, and the lack of patient cooperation.

Keywords: Armeo therapy concept, upper limb, therapy, cerebral palsy

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Analysis of the repeatability of spatiotemporal gait parameters assessed on a baroresistive treadmill: a pilot study

Introduction: Precise assessment of gait parameters is crucial in diagnosing locomotor disorders and monitoring therapeutic effects in rehabilitation and sports medicine. Treadmills equipped with pressure sensors allow for non-invasive analysis of force distribution during walking and running. The aim of this study was to verify the test-retest reliability of the h/p/cosmos measurement system equipped with Zebris FDM-THQ sensors in assessing spatiotemporal and kinetic parameters under conditions of repeated measurements on the same day and between consecutive days. The main research hypothesis assumed that the system would demonstrate high reliability for selected spatiotemporal parameters.

Material and Methods: The study included 15 healthy adults (mean age 21 years, mixed gender group, with no history of injuries or locomotor disorders). For the running analysis, 14 participants were included due to technical issues with one participant. Each participant was examined twice on the first day (measurements 1.1 and 1.2, performed in the morning with an interval of approx. 30 minutes) and once on the following day (measurement 2.1, at the same time of day, with no physical activity between sessions other than normal daily living). All tests were performed barefoot to eliminate the influence of footwear on the movement pattern. Participants were tested under two conditions: walking (normalized speed 4 km/h) and running (normalized speed 8 km/h). Measurements were recorded using an h/p/cosmos baroresistive treadmill integrated with a built-in Zebris FDM-THQ measurement platform, which determines spatiotemporal and kinetic parameters. Statistical Analysis: Measurement reliability was assessed using the Intraclass Correlation Coefficient model ICC(3,1) (two-way mixed effects, absolute agreement, single measurement). Two comparisons were conducted: 1.1 vs 1.2: intra-day reliability (measurements on the first day), 1.1 vs 2.1: inter-day reliability (measurements between the first and second day). Additionally, Pearson's correlation coefficient (r) was calculated to assess linear dependence, though not absolute agreement. Results were interpreted according to the following scale: < 0.50 – poor reliability; 0.50–0.75 – moderate; 0.75–0.90 – good; > 0.90 – excellent reliability.

Results: Mean ICC and Pearson's r values indicate moderate reliability of measurements overall. However, maximum ICC values exceeded >0.97 (for walking) and >0.93 (for running), indicating excellent reliability for specific parameters. Comparison of Walking vs. Running: Running demonstrated slightly higher mean intra-day repeatability (1.1 vs 1.2) than walking, with running maintaining a higher level of inter-day reliability (1.1 vs 2.1) compared to walking. Best Parameters (Running): Ground reaction force parameters showed excellent reliability. The mean maximum forefoot load achieved an ICC > 0.93 in both intra-day and inter-day measurements. Best Parameters (Walking): Geometric parameters proved to be the most stable. Foot rotation achieved the highest score in the entire study (ICC = 0.98 intra-day; 0.97 inter-day).

Conclusions:

1. The h/p/cosmos system with the integrated Zebris FDM-THQ platform demonstrates moderate to excellent reliability depending on the specific parameter and type of activity, confirming its utility in assessing gait and running dynamics in clinical research.
2. Kinetic parameters in running achieve the highest repeatability, suggesting their greatest diagnostic value in monitoring patients and athletes.
3. A decline in repeatability was observed in inter-day measurements for both activities, indicating the natural biological variability of walking and running over time.
4. These pilot results provide a solid foundation for conducting a full-scale study with a larger sample size, which will allow for a more precise assessment of the system's reliability in clinical settings.

Keywords: gait, reliability, Zebris FDM-THQ, HP Cosmos, ICC, baroresistive treadmill

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Postoperative cervical spine kinematics in patients treated with single- and multi-level ACDF for degenerative disease

Introduction: This prospective study aimed to investigate the impact of ACDF on functional mobility of the cervical spine, neck, and arm pain, as well as psychological functioning, including depression symptoms, in patients with radiculopathy. We hypothesized that cervical spine mobility, neck, and arm pain as well as psychological functioning, would improve after ACDF of cervical spine. We hypothesized that patients with single-level ACDF of the cervical spine would have a greater improvement in ROM compared to patients undergoing multilevel ACDF of the cervical spine.

Material and methods: The study included 28 women and 31 men (age: 51,2 ± 5,4 years) who underwent single- or multiple-level ACDF for cervical radiculopathy. Preoperative and postoperative evaluation of cervical spine, neck and arm pain, and depressive symptoms were performed.

Results: A marked and statistically robust increase in range of motion was observed, along with a significant decrease in neck and upper limb pain, following ACDF. The study population demonstrated features consistent with moderate depressive symptoms. Individuals treated with multilevel cervical ACDF had more pronounced depressive symptoms prior to surgery and exhibited poorer cervical rotational mobility both before and after the operative intervention.

Conclusions: The results confirm the effectiveness of anterior cervical discectomy and fusion in the treatment of single- and multilevel cervical radiculopathy. However, the mobility of the cervical spine may decrease over time following ACDF, underscoring the need for early postoperative physiotherapy. Additionally, the frequent presence of moderate depressive symptoms before and after surgery supports the inclusion of psychological care in the perioperative management of patients undergoing ACDF.

Keywords: ACDF; Cervical spine kinematics; Cervical radiculopathy; ROM; Postoperative outcomes; Depressive symptoms

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Comprehensive Physiotherapy and Health Education Program for Adults Aged 60+ from the Municipality of Trzebownisko

Introduction: Population ageing is associated with an increased prevalence of spinal pain. Health programs combining physiotherapy and health education can reduce pain intensity and improve health awareness in older adults. This study aimed to assess the effects of a two-week physiotherapy and health education program on spinal pain and knowledge related to health.

Materials and Methods: The study involved 112 participants (79 women, 33 men; mean age 69 years) enrolled in a health program funded by the Trzebownisko Municipality. Each participant received an individual physiotherapeutic assessment before and after the program and completed 6 group exercise sessions, 6 therapeutic massages, and 12 individually tailored physical therapy treatments. The intensity of the cervical (C) and lumbosacral (L–S) spine was evaluated using the Visual Analog Scale (VAS). Health-related knowledge was evaluated using a single-choice 10-item questionnaire administered before and after the program.

Results: A reduction in VAS-C and VAS-L–S scores were observed in all participants. The differences between pain levels were statistically significant ($p < 0.05$). The post-test results showed an increase in correct answers for all knowledge items, with statistically significant differences compared to the pre-test scores ($p < 0.05$).

Conclusions: A comprehensive physiotherapy program combined with health education effectively reduced spinal pain and improved health-related knowledge in adults aged 60 years and older, supporting its role in senior health prevention.

Keywords: older adults, spinal pain, physiotherapy, health education, health program

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The Concept of Structural and Functional Normalization of the Twelve Diaphragms of the Human Body

Introduction: The aim of this study is to present the concept of structural and functional normalization of the twelve-diaphragm system of the human body, based on three fundamental pillars:

1. The existence of structural and functional connections of a tensegrity nature within the human musculoskeletal system, according to the holistic theory of myofascial integration.
2. The appearance of interconnected, flat, membranous structures of connective and muscular tissue in the head, trunk, and upper and lower extremities, acting as functional biomechanical diaphragms.
3. The possibility of normalizing the level of tension and strain in selected structures through mechanical manual therapy, which exerts a tensegrity-based effect on the entire musculoskeletal system rather than just locally.

Materials and Methods: In the normalization concept presented, the following functionally related structures were selected for analysis: 1/ Cranial vault diaphragm (galea aponeurotica and epicranius muscle), 2/ Cranial base diaphragm (suboccipital muscles), 3/ Oral cavity diaphragm (suprahyoid muscles), 4/ Thoracic inlet diaphragm (muscles of the neck and shoulder girdle), 5/ Thoracic outlet diaphragm (diaphragm, transversus thoracis, and transversus abdominis), 6/ Pelvic floor diaphragm (transverse perinei and levator ani), 7/ Axillary fossa diaphragm (muscles of the chest and shoulder girdle), 8/ Cubital fossa diaphragm (anterior joint capsule and related arm/forearm muscles), 9/ Hand diaphragm (palmar aponeurosis and forearm/hand muscles related to the transverse carpal ligament), 10/ Inguinal fossa diaphragm (inguinal ligament and related abdominal/pelvic girdle muscles), 11/ Popliteal fossa diaphragm (posterior joint capsule and related thigh/lower leg muscles), 12/ Foot diaphragm (plantar aponeurosis and muscles of the lower leg and foot). The methodology for studying these connections is based on electromyographic (EMG) assessment of resting muscle tension and algometric assessment of the pressure force required to evoke pain in strained connective tissue structures.

Results: Analysis of the results allows for the determination of precise structural and functional connections within the system and an assessment of the possibility of normalizing tension and strain through mechanical manual therapy.

Conclusions: The findings of this study will be presented in September this year at the 20th Anniversary Autumn Days of Physiotherapy in Nałęczów, organized by the Lublin, Masovian, and Subcarpathian branches of the Polish Society of Physiotherapy.

Keywords: twelve-diaphragm system, structural-functional normalization, tensegrity, myofascial therapy

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The Brain After Hours: The Glymphatic System and Manual Techniques in Modern Migraine Management

Introduction: Migraine is a chronic neurological disorder characterized by recurrent headaches. Currently, the disease is understood as a multifaceted disruption of cerebral metabolic homeostasis, prompting research into its biochemical mechanisms and the efficacy of rehabilitation methods. The glymphatic system, described as a sleep-dependent physiological system for the elimination of neurotoxins, provides a new perspective on migraine pathogenesis. The aim of this study is to present the correlation between glymphatic system dysfunction and the pathogenesis of migraine attacks, and to highlight the role of modern rehabilitation in enhancing cerebral drainage.

Materials and Methods: A literature review was conducted by analyzing research and review articles from the PubMed and Scopus databases published between 2023 and 2025. The search was performed using specific keywords. The inclusion criterion was the relevance of the article to the subject matter of this study.

Results: Analysis of current research demonstrates a correlation between sleep quality and the rate of glymphatic clearance. In individuals with migraine, significant correlations are observed between upper cervical spine dysfunctions and impaired venous and lymphatic outflow from the cranial cavity. Clinical evidence indicates that manual techniques (eg, suboccipital joint decompression, cervical myofascial therapy, and mobilization of the thoracic cage) can actively modulate intracranial pressure and improve the dynamics of cerebrospinal fluid. Furthermore, the implementation of sleep hygiene increases the efficiency of nocturnal brain "cleansing."

Conclusions: Integrating strategies that support the glymphatic system into physiotherapy protocols represents an innovative approach to migraine therapy. This approach not only for pain reduction but also, more importantly, for the enhancement of nervous system regeneration by optimizing glymphatic flow.

Keywords: Glymphatic System, Migraine, Rehabilitation, Sleep

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Kangaroo care as an element of neurodevelopmental care and strengthening family bonds

Introduction: Kangaroo care, or skin-to-skin contact between a newborn and a parent, promotes healthy development, regulating the infant's body temperature, heart rate, breathing, and blood glucose levels. It also supports emotional and neurological development, reduces stress and crying, and improves sleep and apatite. Additionally, kangaroo care strengthens the bond between the infant and parents, promotes breastfeeding, and increases parental competence. The aim of this study is to discuss the role of kangaroo care in supporting healthy newborn development and strengthening the parental bond.

Materials and Methods: This work is a theoretical review and is based on an analysis of the scientific literature on kangaroo care and its impact on newborn development and bonding with parents. The research material included full-text publications from PubMed, Google Scholar, and national medical databases published between 2000 and 2025.

Results: Literature analysis confirms that kangaroo care positively impacts newborn development by stabilizing vital functions, supporting neurological and emotional development, and facilitating adaptation to the extrauterine environment. It also strengthens the bond with parents, increases the newborn's sense of security, builds parental caregiving skills, and promotes the initiation and maintenance of breastfeeding.

Conclusions: Kangaroo care supports the proper development of newborns, stabilizes vital functions, facilitates adaptation to the extrauterine environment, and strengthens the bond with parents, influencing their caregiving skills.

Keywords: kangaroo care, skin-to-skin contact, neurodevelopmental care, newborn, parents

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The impact of vibration therapy on the voice quality in occupational dysphonia

Introduction: Improper habits, excessive muscle tension, hormonal changes, or chronic stress can negatively affect the quality of the sound produced from speech. An increasing number of professions require excellent vocal performance; therefore, specialized treatment and preventive care for voice disorders are becoming essential. **Aim:** The aim of the study was to assess the impact of vibrotherapy on voice quality in women who use their voice professionally.

Materials and Methods: The study group consisted of 77 women with hyperfunctional dysphonia. Therapeutic sessions were conducted three times a week for 30 minutes over a period of six weeks.

Results: A statistically significant difference was demonstrated for the Voice Handicap Index (VHI) in the study group. Analysis of the results of maximum phonation time (MPT) in the study group also showed statistical significance.

Conclusions: Vibration therapy applied had a significant effect on the level of vocal disability measured by VHI in the study group. The phonation time in the MPT assessment was prolonged in the study group.

Keywords: Voice therapy, Vibration, Voice Handicap Index

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Factors that contribute to the quality of life in patients with Parkinson's Disease: A review of the literature

Introduction: Parkinson's disease is a degenerative disorder of the nervous system, which over time leads to a decrease in cognitive and physical functioning. Symptoms progress slowly, causing significant restrictions and a decrease in quality of life. Objective: the aim of this study was to carry out a narrative literature review on the assessment of the quality of life in patients with Parkinson's disease.

Materials and Methods: A review of 40 publications was conducted using Google Scholar, PubMed, Scopus, and Web of Science databases. The analysis included publications between 2015 and 2025. Keywords such as Parkinson's disease, quality of life, depression and physical therapy were identified. The inclusion criteria consisted of randomized studies involving adults with diagnosed Parkinson's disease. Ultimately, articles that evaluated clinical parameters such as quality of life, mobility, pain, activities of daily living, depression, mood, and cognitive impairment were included. Exclusion criteria included articles with incomplete texts, studies without confirmed clinical data, and case studies.

Results: In the review, it was found that the duration of the disease, motor impairments and support from relatives had an impact on the quality of life of patients with Parkinson's disease. However, the in the daily lives most affected areas of the patients were the emotional aspects as the well as cognitive and motor functions.

Conclusions: Parkinson's disease has a significant impact on daily functioning, leading to a dependence on others. The most beneficial factors appeared to be regular physiotherapy that positively impacts all aspects of life. Attention must be paid to psychological support, comprehensive physical therapy that creates support groups, and implementation of rehabilitation programs that help improve quality of life in patients with Parkinson's disease.

Keywords: Parkinson's Disease, quality of life, depression, physiotherapy

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Muscle Strength in ICU Patients Measured by Handgrip Dynamometer and ICU-Acquired Weakness: A Prospective, Single-Center Observational Study

Introduction: ICU-acquired weakness (ICU-AW) is a neuromuscular complication in critically ill patients that impairs muscle function. Inconsistent data on recovery time and factors that determine rehabilitation effectiveness hinder the development of optimal strategies. This study aimed to assess the time to achieve muscle strength above the diagnostic cutoff, to reach the 10th (P10) and 50th (P50) percentiles of muscle strength, and to identify associated factors.

Material and Methods: A prospective single-center observational study was conducted in the Intensive Care Unit of the University Clinical Hospital No. 4 in Lublin. Data from 178 patients who participated in an early physiotherapy program were analyzed. Handgrip strength was assessed using a handgrip dynamometer. The primary end point was time to achieve strength above the ICU-AW cut-off point (11 kg in men, 7 kg in women). Secondary analyses included factors affecting the rate of strength recovery and attainment of P10 and P50.

Results: The mean time to regain strength above the cutoff was 26.84 days. Quartile analysis showed that 25% of the patients reached this value within 5 days, 50% within 13 days, and 75% within 41 days. The recovery rate of strength was affected by ICU length of stay in the ICU (HR = 0.746, $p < 0.001$), duration of sedation (HR = 0.805, $p < 0.001$), duration of mechanical ventilation (HR = 0.860, $p < 0.001$), time to recover consciousness (HR = 0.942, $p = 0.016$), the strength at the first measurement (HR = 1.045, $p = 0.007$) and body weight (HR = 1.041, $p = 0.018$). Probability analysis indicated that 32% of the patients would reach P10 and 9% would reach P50 during stay in the ICU.

Conclusions: Variability in muscle strength recovery among ICU patients underscores the need for individualized rehabilitation. Future studies should focus on optimizing the identified factors and tailoring rehabilitation programs to improve treatment outcomes.

Keywords: intensive care, muscle strength, rehabilitation

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Awareness of students of the Collegium Medicum of the University of Rzeszów about spinal cord injuries and the associated disability

Introduction: According to the World Health Organization, approximately 15 million people worldwide live with spinal cord injury (SCI). The aim of this study was to assess students' level of knowledge regarding the consequences of SCI.
Material and methods: The study included 353 students from the Collegium of Medical Sciences at the University of Rzeszów. The largest group consisted of physiotherapy students, and the research was conducted using a diagnostic survey with a questionnaire.
Results: A higher level of knowledge was observed among students with personal or professional contact with individuals with spinal cord injury and among those in years IV–VI. The highest level of awareness regarding SCI was found among physiotherapy students.
Conclusions: A higher level of knowledge about spinal cord injury was observed among senior students, physiotherapy students, and those with contact with individuals after SCI, highlighting the importance of education and experience.
Keywords: Spinal cord injury, awareness, disability

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Contemporary Challenges in Midwifery Based on the Method of Delivery and the Prognosis of the Biophysical Condition of the Mother and Child

Introduction: The method of birth can influence the reduction of pain experienced by the woman and decrease the extent of perineal tissue injuries. For the newborn, it may be associated with higher Apgar scores. Therefore, the objective of the study was to compare the biophysical condition of mothers-child pairs after horizontal and vertical vaginal deliveries.

Material and Methods: The study included 103 pregnant women who gave birth in the Clinic of Gynecology, Obstetrics and Perinatology of the Provincial Clinical Hospital No. 2 named after Saint Queen Jadwiga in Rzeszów. The research tools included an original questionnaire and an analysis of the biophysical condition of the mother–child pairs during labor and the postpartum period. The collected material was subjected to statistical analysis, with a significance level of $p<0.05$.

Results: Analysis of collected data showed that women who delivered in the horizontal position (47.6%) underwent episiotomy more frequently than those who delivered in the vertical position (4.9%). The influence of the position of the delivery on fetal heart rate abnormalities revealed that in vertical deliveries, disturbances occurred primarily in the first stage of labor, while in horizontal deliveries, abnormalities were more often observed in the second stage or in both stages combined ($p=0.002$). Overall, better neonatal health and higher Apgar scores were observed after vertical deliveries ($p=0.022$).

Conclusions: The introduction and promotion of vertical birthing positions represent a valuable addition to perinatal care, especially in the context of supporting physiological childbirth and ensuring the well-being of both mother and child. Undoubtedly, such intrapartum actions undertaken by midwives will continue to pose a challenge for contemporary midwifery.

Keywords: natural childbirth, vertical delivery, mother, child, midwife

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The Impact of Babywearing on the Body Posture of the Carrying Parent

Introduction: Babywearing is a term that describes the practice of carrying an infant or young child using a long piece of fabric (a wrap). Currently, babywearing is becoming an increasingly popular form of childcare, including among women in the postpartum period. From the perspective of midwifery practice, the objective of this paper is to consider the impact of this form of care not only on the development but also on the body of the person who holds the child, particularly with regard to body posture, musculoskeletal load, and postpartum recovery.
Materials and Methods: The material consists of an analysis of scientific literature available in the PubMed database from 2015-2025, including full text articles on the carriage of children both in wraps and in ergonomic baby carriers. The analysis includes the results of observational, review, and biomechanical studies that examine the impact of infant carrying on maternal body posture, trunk stabilization, and the activity of postural muscle activity.
Results: Proper ergonomic babywearing in a wrap promotes an even distribution of the loads that act on the musculoskeletal system of the person carrying the child, supports the activation of deep trunk muscles, and helps maintain physiological curvatures of the spine.
Conclusions: Ergonomic babywear has a beneficial effect on parent body posture and constitutes a safe form of musculoskeletal load. The role of the midwife is to provide education on correct babywear techniques, adapted to the child's age and body weight, as well as ergonomic principles, as an element of preventing overload-related complaints and postural disorders.
Keywords: babywearing, carrying children, body posture, education, midwife

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Use of Physical Therapy in Children Aged 6–12 Years with Legg–Calvé–Perthes Disease

Introduction: Legg–Calvé–Perthes disease (LCPD) is a complex orthopedic condition of childhood that leads to structural changes in the femoral head and can significantly affect motor function and quality of life. Despite the wide application of conservative treatment approaches, the optimization of physical therapy programs for children with this pathology remains an important clinical and scientific challenge.
Aim: To assess the impact of physical therapy on the physical condition and quality of life of children aged 6–12 years with Legg–Calvé–Perthes disease.
Materials and methods: The study involved children aged 6–12 years diagnosed with Legg–Calvé–Perthes disease who underwent rehabilitation in a specialized pediatric rehabilitation setting. The rehabilitation program included individually selected therapeutic exercises based on the functional condition of the children and clinical needs. The assessment methods comprised goniometry, manual muscle testing, the Visual Analog Scale (VAS) for pain assessment, and the Pediatric Quality of Life Inventory (PedsQL). The rehabilitation intervention was conducted over a one-month period with regular supervised sessions.
Results: Following the rehabilitation program, improvements in joint mobility and muscle strength were observed, particularly in movements related to hip flexion and extension. A reduction in pain intensity was observed according to VAS scores. Improvements in quality of life were identified, especially in the domains of physical and emotional functioning, while changes in social and school functioning were less pronounced. Positive tendencies in the functional state of the cardiovascular system were also observed. Overall, the applied physical therapy interventions contributed to favorable functional changes in children with Legg–Calvé–Perthes disease.
Conclusions: The findings indicate that the use of physical therapy supports improvements in functional abilities, pain reduction, and quality of life in children aged 6–12 years with Legg–Calvé–Perthes disease. The applied rehabilitation approaches may be considered a valuable component of comprehensive pediatric rehabilitation programs.
Keywords: Legg–Calvé–Perthes disease, physical therapy, children, rehabilitation, quality of life, musculoskeletal disorders.

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Evaluation of the Effectiveness of Kinesiotaping in the Treatment of Sports Injuries: A Systematic Review

Introduction: Sports injuries, such as joint sprains or ligament damage, are a common problem that leads to pain and functional limitations. Kinesiotaping is a popular method of supporting rehabilitation. It involves the application of elastic tapes intended to improve blood and lymph circulation, reduce pain, and stimulate nerve receptors without restricting the range of motion. Despite its widespread use, the scientific evidence for its effectiveness remains a subject of debate.

Materials and Methods: The aim of this study was a systematic review of the literature on the effects of kinesiotaping on the treatment of sports injuries. Five databases were searched using inclusion criteria covering research articles published after 2000 in Polish or English. Ultimately, 15 articles were included in the analysis and their methodological quality was assessed using the 11-point PEDro scale.

Results: The analysis revealed inconsistent findings. For the ankle and shoulder joints, most studies did not confirm significant improvements in stability or proprioception. In the case of the knee joint, the results were mixed: Some studies indicated pain reduction and improved muscle strength, while others showed no effect. A key observation was the relationship between study quality and results: All studies reporting positive effects were characterized by low methodological quality (4 to 5 PEDro points), whereas high-quality studies (up to 10 points) generally did not demonstrate significant therapeutic benefits.

Conclusions: The effectiveness of kinesiotaping in sports is not unequivocally supported by reliable scientific evidence. The location of the application does not determine its effectiveness. Currently, there is a lack of high-quality studies conducted in large populations that would allow this method to be conclusively recognized as fully clinically effective, and its popularity is based mainly on anecdotal evidence.

Keywords: kinesiotaping, sports injuries, rehabilitation

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Management of Posterior Tibial Tendonitis in a Young Female Tennis Player: A Case Report

Introduction: Epidemiological analyses of injuries in tennis players indicate that the extreme mechanical loads associated with frequent changes of direction, accelerations, decelerations, and jumping contribute to a high incidence of injuries. Although the literature most frequently reports injuries such as ankle sprains and muscle strains, disorders of the posterior tibial tendon also represent an important, though less commonly reported, group of problems in athletes. The aim of this study was to present a comprehensive diagnostic and therapeutic approach that enabled the continuation of sports activity in a young tennis player.

Materials and Methods: The study involved a young female tennis player who sustained a lower limb injury during a tournament match. The patient reported pain in the medial region of the ankle and discomfort during weight-bearing. On the following day, an ultrasound examination was performed, revealing inflammatory changes of the posterior tibial tendon without evidence of tendon rupture. Conservative rehabilitation was implemented, including manual therapy of the foot and ankle, individually tailored strengthening and stabilization exercises, physical therapy modalities, and gradual load progression using an anti-gravity treadmill.

Results: The rehabilitation program led to the restoration of functional foot stability and improved muscular endurance, allowing the patient to return to tennis-specific activities. Upon completion of rehabilitation, the patient returned to full tennis training without pain or recurrence of symptoms.

Conclusions:

1. Early imaging diagnostics using ultrasound enable prompt diagnosis and implementation of targeted conservative treatment.
2. A multimodal therapeutic approach is the most effective strategy for managing posterior tibial tendonitis in athletes, allowing a rapid and safe return to full sports activity.

Keywords: Posterior tibial tendonitis, Tennis injury, Multimodal rehabilitation

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The significance of ankle joint mobility in determining vertical jump height in women practicing jumping sports

Introduction: Jumping ability is a key motor trait determining performance in disciplines such as volleyball, basketball, or handball. One significant factor influencing jump height is the range of motion (ROM) in the ankle joint, which serves as a point of force transfer and power generation during the take-off phase.

Material and Methods: The study included a group of 20 female athletes from the AZS Medical University of Lublin (average age 22.3 years), practicing volleyball (n=6), basketball (n=7), and handball (n=7) at an amateur level. A self-authored questionnaire was utilized. Ankle joint mobility (active and passive) was assessed using the Kinvent K-Move electric goniometer. Vertical jump height (Countermovement Jump - CMJ) was measured using the My Jump 2 application. Statistical analysis was performed using Spearman's rho correlation, with a significance level set at $p < 0.05$.

Results: The average jump height in the study group was 37 cm. The analysis revealed statistically significant correlations between jump height and selected mobility parameters: active plantar flexion with 0° knee flexion (right leg: rho = 0.519, p = 0.019; left leg: rho = 0.693, p = 0.001), passive dorsiflexion with 0° knee flexion (right leg: rho = 0.457, p = 0.043), active plantar flexion with 90° knee flexion (right leg: rho = 0.530, p = 0.016), and passive plantar flexion with 90° knee flexion (left leg: rho = 0.551, p = 0.012).

Conclusions: The range of motion in the ankle joint, particularly plantar flexion and passive dorsiflexion, is a factor that positively influences vertical jump height in women training in jumping sports at an amateur level. The results suggest that incorporating exercises to increase ankle mobility into training programs for these disciplines is justified.

Keywords: ankle joint, jump height, mobility, jumping sports.

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The effect of prehabilitation on the effectiveness of anti-oedema prophylaxis in women after breast cancer treatment

Introduction: The aim of the study was to compare the effectiveness of standard elements of complex anti-oedema therapy with therapy in which prehabilitation was additionally used.

Material and Methods: The study included patients treated for breast cancer at the Breast Cancer Unit at the Specialist Hospital in Brzozów Podkarpacki Oncology Center. The study group included 354 patients with additional prehabilitation, and the control group included 185 patients with only comprehensive anti-oedema therapy. The follow-up time was 10 months. The study used a self-made authorship questionnaire. Every 3 months, a comprehensive 10-day anti-oedema therapy program was performed in each group of patients. The lymphoedema parameters were evaluated.

Results and conclusions: Greater effectiveness of therapy was observed in the study group. Lymphoedema was not observed in any of the patients in the study group. A further continuation of the study on a larger group of subjects and a longer follow-up period is recommended.

Keywords: prehabilitation, breast cancer

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The impact of spa treatment on the motor skills of women with degenerative changes in the knee joints

Introduction: Osteoarthritis is a growing medical and social problem that leads to degenerative changes in joint structures, pain, and limited motor function. The aim of this study is to evaluate the effectiveness of spa treatment in improving motor function of patients with osteoarthritis of the knee joints.

Material and methods: The study included 25 women with knee osteoarthritis and grade II–III cartilage damage. Range of motion was assessed using a goniometer, motor function using a proprietary test, and pain using the Steinbrocker scale. The tests were performed before and after a three-week rehabilitation program that included physical therapy and balneological treatments. Statistical analysis was used to evaluate the selected factors.

Results: An improvement in flexion of 4.6° was observed for the right joints and 5.6 ° for the left knee joints in relation to the initial examination. The Student's t-test for dependent groups showed very high statistical significance of the differences, at $p<0.001$. Analysis of the results of knee joint extension measurements showed an improvement of 0.6° for both right and left knee joints. This difference was statistically significant at $p< 0.01$. When evaluating the results of the motor performance test, i.e. the time taken to complete the prepared course, a reduction of 11.0% on average was found. In the study group, 10 women reported severe pain that interfered with sleep, while in the second study, 4 patients experienced this type of pain. The highest number of people reported severe pain while walking, occurring in 12 patients and after rehabilitation in the final study in 8.

Conclusions: The analysis of the results obtained indicates an improvement in the functional status of patients undergoing spa treatment. The positive effects of rehabilitation also apply to the subjective pain sensations. It is worth conducting the study on a larger group of participants, including men, to confirm the positive effect of spa treatment on osteoarthritis of the knee.

Keywords: osteoarthritis, spa treatment, range of motion, pain

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The use of the International Classification of Functioning, Disability and Health (ICF) in the assessment of functional status in patients with neurological disorders: A systematic review

Introduction: The aim of this study was to present and analyze the use of the International Classification of Functioning, Disability and Health (ICF) in the assessment of functional status in patients with neurological diseases in light of current scientific evidence.

Material and methods: A systematic literature review was conducted in accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. Scientific articles published in the electronic databases PubMed, ScienceDirect, and Scopus were searched. Publications published between January 2015 and December 2025, written in English, were included in the analysis and subsequently assessed based on predefined inclusion and exclusion criteria, which comprised, among others, a population of patients with neurological disorders and the application of the ICF classification for the assessment of functional status.

Results: Five articles addressing the application of the ICF in neurological diseases were included in the final analysis. Data extracted from the publications were organized in a table including the year of publication, study design, sample size, type and scope of the analyzed ICF components and categories, main findings, and authors' conclusions. The analyzed studies indicated variability in the extent of ICF use depending on the specific neurological condition and the study objectives,

Conclusions: The selection of appropriate ICF categories for patient assessment enables a precise and comprehensive description of functional status. The International Classification of Functioning, Disability and Health can be used to assess body functions, activities and participation, as well as the impact of environmental factors in patients with neurological disorders. Despite the growing interest in the ICF in clinical practice, its routine application requires further validation studies, standardization of assessment tools, and implementation efforts.

Keywords: International Classification of Functioning, Disability and Health; functional assessment; neurological disorders, ICF

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Assessment of the effectiveness of preoperative rehabilitation in reducing pain, improving range of motion, and functional performance after total knee arthroplasty: A review of the literature

Introduction: Total knee arthroplasty (TKA) is a common procedure for the treatment of advanced osteoarthritis. Despite the high efficacy of the surgery, recovery of full functional capacity can be prolonged, increasing interest in preoperative preparation. The aim of this paper was to review the literature on the effectiveness of preoperative rehabilitation in reducing pain, improving range of motion, and enhancing functional performance in patients undergoing TKA.

Materials and Methods: A literature review was conducted using the PubMed database, including the following keywords: "preoperative rehabilitation," "total knee arthroplasty," "pain," "range of motion," and "functional performance." The articles retrieved (n = 106) were assessed according to inclusion and exclusion criteria. Ultimately, 17 studies were included in the analysis. The selected studies were analyzed according to the PICO framework and assessed using the PEDro scale.

Results: A total of 925 patients scheduled for TKA were analyzed, with a mean age of 67.4 years. The reviewed studies demonstrated that preoperative rehabilitation was effective in reducing pain and improving knee joint range of motion and functional performance in patients after TKA, with particularly pronounced effects observed within the first 6 weeks after the operation. The methodological quality of the included studies ranged from 3 to 8 points on the PEDro scale.

Conclusions:

1. Preoperative rehabilitation appears to be a beneficial adjunct to standard postoperative rehabilitation in patients after TKA.
2. Cautious interpretation of the results is recommended due to the low methodological quality of the analyzed studies, the lack of standardized assessment tools, and the heterogeneity in the duration of the intervention and sample sizes.

Keywords: preoperative rehabilitation, total knee arthroplasty, pain, range of motion, functional performance

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Incorporating the ICF into practice: The case for primary care physiotherapy in Spain

Introduction: Musculoskeletal conditions are one of the leading causes of disability worldwide. Clinical information on disability can be systematically collected using the International Classification of Functioning, Disability and Health (ICF). Primary care physiotherapy services provide early management of these conditions and prevent long-term disability. Some studies have been conducted in the Spanish National Health System to validate the ICF core set for post-acute musculoskeletal conditions. However, a lack of the aspects of the representation of functioning related to primary healthcare was found. The aim of this study was to develop an ICF core set for the management of musculoskeletal conditions in primary care physiotherapy services in Spain.
Material and Methods: A two-round Delphi study was conducted among Spanish primary care physiotherapists. A list of 156 candidate ICF entities and 14 personal factors derived from preparatory studies was presented to an expert panel. Their relevance was assessed in the first round using a 5-point Likert scale, with a median score of 3.5 as the cut-off point. In the second round, dichotomous questions (yes/no) were proposed to definitively include or exclude the entities selected in the first round in the ICF Core Set. The consensus was defined as 80% agreement.
Results: Twenty-two physiotherapists participated in the survey. Consensus was reached on 56 entities, mainly focusing on the biological aspects of movement and their impact on mobility. These entities were proposed as the basis for an ICF core set for the management of musculoskeletal conditions by primary care physiotherapists.
Conclusions: The resulting ICF core set is adapted to primary care physiotherapy services and has good potential as a reference framework to measure functioning during the assessment of musculoskeletal conditions. This approach can be scaled up and generalized to other clinical settings, and it demonstrates how ICF can be incorporated into clinical practice.
Keywords: ICF, musculoskeletal diseases, physiotherapy, primary health care

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The role of regular physical activity in improving balance and reducing the risk of falls in older adults

Introduction: The aging of the population contributes to the intensification of balance and coordination problems among older adults, making them a significant health and social challenge. Falls are one of the main causes of injury, hospitalization, and loss of independence in this age group, and statistics indicate that one in three people over the age of 65 experiences at least one such incident per year. The aim of the study was to evaluate the impact of physical activity on balance parameters and the risk of falls in seniors. The presented analysis aims to emphasize the importance of physical activity prophylaxis in the care of the aging population.
Material and methods: The study included 30 people aged 65 and older, including 17 women and 13 men, mostly rural residents and retirees. To assess the Tinetti Scale, the Romberg Test and the Timed Up & Go (TUG) Test were used. The level of daily physical activity was measured using the PASE questionnaire. Statistical analysis was performed using Spearman's rank correlation coefficient and the Welch's t-test.
Results: The analysis showed that the majority of participants are characterized by a low risk of falling, however, 13.34% of the subjects were classified as a high-risk group according to the Tinetti Scale. In the case of the Romberg Test with eyes open, a positive result was obtained by 10% of the subjects, while with eyes closed, this percentage increased to 43.34%. The TUG test indicated a risk of falling in 23.34% of people. A strong negative correlation was noted between the Tinetti Scale scores and the TUG test execution time (rho = -0.737; $p < 0.001$), as well as a significant positive correlation between stability and walking speed. Gender did not significantly differentiate the level of performance or declared physical activity of the participants.
Conclusions: The results clearly indicate that a higher level of physical activity correlates with better motor functioning, higher scores in the Tinetti Scale, and shorter TUG test execution times. The high percentage of abnormal results in the Romberg test with closed eyes confirms the weakening of proprioceptive mechanisms in seniors. Regular physical activity is a key element in fall prevention, which justifies the implementation of training programs combining balance and strength exercises.
Keywords: falls, balance, physical activity, elderly, mobility, gait, PASE Questionnaire, TUG Test, Tinetti Scale, Romberg Test.

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Physical Therapy for Elderly Patients with Dementia as a Means of Maintaining Cognitive Functions

Introduction: This research topic is relevant due to the growing number of elderly people with dementia, which poses serious medical and social problems. Deterioration of cognitive function leads to a decline in quality of life, loss of independence, and an increased need for care. In this context, physical therapy is of particular importance as it can slow cognitive decline and improve patients' physical and psycho-emotional state. Investigating the potential of physical therapy could improve rehabilitation approaches for working with elderly people with dementia. This study aims to investigate physical therapy methods for preserving cognitive function in elderly patients with dementia. Research methods will include analysing scientific sources and practical approaches to using aerobic, strength, and cognitive-motor exercises in physical therapy. This will enable us to identify the most effective exercises for people with dementia at different stages of the condition.

Material and methods: A systematic literature search was conducted in PubMed, Scopus and Google Scholar using the keywords 'physical rehabilitation', 'older adults' and 'dementia'. Studies focusing on physical rehabilitation interventions for adults aged 65 years and over with dementia were included. The literature review was conducted in accordance with PRISMA principles.

Results: Several scientists have noted the positive effects of physical exercise during the initial stages of cognitive decline and early dementia progression, before a diagnosis has been made. Researchers are investigating the potential benefits of certain types of exercise for elderly patients with dementia. It has been concluded that physical exercise most significantly affects language skills. It has been established that physical exercise affects brain function, thereby improving cognitive functions, particularly language skills, in elderly patients with dementia. Physical exercise improves memory, attention and the psycho-emotional state of such patients, as well as their overall quality of life. Regular physical exercise positively affects neuroplasticity and blood supply to the brain, thereby stabilising cognitive processes. Physical rehabilitation programmes should be considered as part of a comprehensive approach to preventing and treating cognitive impairment in elderly patients with dementia. Regular aerobic exercise has been shown to improve memory, attention and executive function in older adults. Physical activity positively affects emotional state, reducing anxiety and depressive symptoms. Even moderate physical activity can stabilise the condition of patients with dementia, slow the progression of the disease, and improve their quality of life. Combining physical exercise with cognitive stimulation enhances the therapeutic effect. There is a lack of developed physical therapy programmes for elderly patients with dementia aimed at maintaining cognitive function. Therefore, there is a need to develop a set of physical exercises that take into account the stage of the disease, the patient's level of physical fitness, and their cognitive abilities. We will present several groups of exercises that, in our opinion, can most effectively address the issue of maintaining the cognitive function of these patients. The first group of exercises is aerobic (low-intensity cardio): (1) walking in the fresh air for 20–40 minutes, 4–5 times a week; (2) Nordic walking; (3) moderate cycling on an exercise bike for 15–20 minutes, 3 times a week; (4) swimming or aqua aerobics for 30 minutes, 2–3 times a week. The second group of exercises focuses on coordination and balance. These exercises include: (1) standing on one leg (with or without support); (2) walking along a line; (3) rolling a ball with your feet or hands in different directions; (4) dancing to music (music and movement therapy). These exercises are particularly effective in the early stages of dementia as they activate the cerebral cortex, improving spatial orientation and motor control.

The third group of exercises consists of strength exercises using your own body weight or an expander: (1) raising your arms with light dumbbells (0.5–1 kg); (2) rising onto your toes and doing half-squats near a support; (3) stretching the expander with your hands in front of your chest; and (4) kicking your legs back and to the side while
standing near the back of a chair. These exercises are designed to maintain muscle tone, prevent sarcopenia and stimulate neuromuscular connections. These exercises are recommended for elderly patients with dementia: 2–3 sets of 10–15 repetitions, 2–3 times a week. The fourth group of exercises consists of cognitive-motor exercises: (1) counting steps aloud while walking and naming the days of the week in reverse order; (2) raising a hand when a certain colour or word is named ('movement on signal'); (3) performing simple choreographic sequences to music; (4) walking and talking on the phone; and (5) doing bicep curls while repeating the alphabet backwards. These exercises are designed to activate both physical and cognitive activity simultaneously, stimulating the prefrontal cortex and improving attention and reaction speed. The fifth group of exercises are breathing and relaxation exercises: (1) deep diaphragmatic breathing; (2) breathing in time to music or gentle arm movements; and (3) low-intensity yoga or Tai Chi Chuan. These exercises aim to reduce stress levels, improve brain oxygenation and sta-

bilise the cardiovascular system. Duration: 30–45 minutes, 2–3 times a week. Sessions with elderly patients with dementia should last between 30 and 45 minutes. The recommended structure is as follows: (1) warm-up (5–7 minutes): light walking and joint rotations; (2) main part (20–25 minutes): aerobic, coordination or strength exercises; (3) cognitive integration (5–10 minutes): cognitive-motor exercises and movements to music; (4) completion (5 minutes): breathing exercises and relaxation.

Conclusions:

Physical training is an important preventive factor for dementia, as regular physical activity in old age reduces the risk of its development. The mechanisms of this effect include improved cerebral blood flow and oxygenation, and stimulation of neurogenesis in the hippocampus.

In the early stage of mild dementia, physical exercise can slow the progression of symptoms and improve executive functions, memory, attention and mood. It can also improve sleep, reduce anxiety and increase patients' functional independence.

In the moderate and severe stages of dementia, physical activity helps to maintain residual cognitive function and quality of life. Physical therapy supports neuroplasticity, activates sensorimotor integration, reduces apathy, aggression and anxiety, and prevents hypodynamia, falls and contractures. Therefore, physical therapy has preventive and supportive functions at various stages of dementia. It provides sensorimotor and cognitive stimulation, improves the emotional state, and enhances the quality of life of elderly patients.

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Incidence of low back pain in postpartum women in Slovakia

Introduction: Pelvic girdle pain (PGP) and low back pain (LBP) are among the most common health complaints experienced by women in the postpartum period. To date, no studies have investigated the prevalence of these types of pain in the Slovak Republic. The aim of this study was to compare the occurrence of PGP and LBP in women after vaginal delivery and cesarean section in the Slovak Republic during the year 2024.

Methods: A cross-sectional study was conducted that included 791 women between 12 weeks and one year postpartum. The mean age of the participants was 31.43 years. Data were collected using standardized Slovak versions of the Pelvic Girdle Questionnaire (PGQ) and the Oswestry Disability Index (ODI).

Results and Conclusion: Based on the mode of delivery, the sample was divided into a vaginal delivery group (n = 633) and a cesarean section group (n = 158). Statistically significant differences were found in the prevalence and intensity of spinal pain, as well as the level of disability, with higher values observed in women after the cesarean section. However, the mode of delivery did not significantly affect the occurrence of pelvic girdle pain in the postpartum period. The cesarean section was associated with increased pain intensity and higher disability related to the spine. These findings may be explained by disruption of abdominal wall integrity, increased sensitivity in the cesarean scar area, and the adoption of protective movement patterns after surgery.

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Physical activity as a determinant of healthy aging in seniors

Introduction: The main objective of the study was to analyze the impact of physical activity and of chronic diseases on healthy aging among seniors in urban and rural areas.
Material and methods: We conducted the study in two towns and two villages. A total of 103 respondents participated in the study. We used the Healthy Aging Assessment tool to collect data. Statistical data processing was performed using SPSS 18. Descriptive and inductive statistics were used to evaluate the data obtained.
Results: Physical activity has a significant impact on healthy aging in seniors living in rural areas (p=0.016**) and in cities (p=0.027**). The chronic disease and medical care subscale achieved statistical significance in both groups studied: seniors living in cities (p=0.001**) and seniors living in rural areas (p=0.004**).
Conclusions: Physical activity also correlated positively with other areas affecting healthy aging, such as balance and falls, chronic diseases, optimism, and adaptation. Many authors have identified significant differences between physical activity and the reduction of cardiovascular disease, diabetes, and mental illness risk in seniors in urban and rural areas.
Keywords: Physical activity, seniors, healthy aging, chronic diseases.

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Neurophysiological mechanism of trigger point formation

Introduction: The neurophysiological mechanism of trigger point formation is a protective reflex of the neuromuscular system, in which the muscle enters a local permanent contraction controlled by the central nervous system. A trigger point is a functional "muscle splint" that the body creates in response to overload, instability, pain or stress. The body creates it when a segment is unstable (joint, spine), or there is a risk of micro-damage to the tissue, or the nervous system perceives something as a threat (including psychological). Then the muscle tenses to limit movement and increase control.

Mechanism: 1. Triggering stimulus (afferent phase) - A trigger point begins to form during mechanical overload, microtrauma, prolonged static position or stress, while nociceptors (Aδ and C fibers) in the muscle and fascia are activated. 2. Central protective reflex - The signal goes to the posterior horns of the spinal cord (spinal reflex arcs) and higher centers (brain stem, limbic system). There is an increase in the excitability of α-motor neurons, a decrease in inhibition (GABA, glycine). The muscle receives the command to remain contracted. 3. Motor unit in "lock-mode" - In a specific place in the muscle, some motor units remain permanently active and a local contraction node (taut band) is formed. Not the whole muscle, but a microsegment. 4. Ischemia and energy crisis - Persistent contraction causes reduced blood flow, ↓ oxygen, ↓ ATP without which actin and myosin cannot be disconnected and the contraction cannot be released, thus creating a local energy trap. 5. Chemical sensitization - Bradykinin, prostaglandins, substance P, CGRP, and lactate accumulate in the ischemic area. Nociceptors become hypersensitive and pain occurs even with a small stimulus. 6. Maintenance reflex circle – A vicious circle is created: pain → increased muscle tone → ischemia → chemical sensitization → even greater pain. The CNS evaluates the area as still at risk. 7. Referred pain - In the spinal cord, there is: convergence of afferent inputs (muscle – skin – joint), incorrect mapping in the somatosensory cortex. Pain is felt elsewhere than the source. Trigger point as a manifestation of central regulation disorder A trigger point does not arise primarily in the muscle, but as an output of altered postural-respiratory regulation of the CNS. The muscle is only a "recording point".

Approaches: 1. DNS (Dynamic Neuromuscular Stabilization) – relationship to trigger point. In DNS: stability = central coordination + breath; if the deep stabilization system (HSSP) fails, the CNS: increases the tone of the superficial muscles and creates a protective local overload. Trigger point = compensation for the missing centration. Typical pattern: weak diaphragm → hypertonicity of the neck, trapezius, paravertebral muscles → trigger points The CNS "locks" the segment that it cannot stabilize. 2. Vojta's reflex locomotion – relationship to trigger point Vojta works with innate motor programs and activation via central afferentation Trigger point arises when: these programs are suppressed or unavailable CNS switches to alternative (protective) strategies. Trigger point = fixed pathological pattern. Why Vojta works is because strong afferentation → "overwhelms" the pathological reflex circuit → CNS adjusts the muscle output. Trigger point can be released without direct work on it. 3. Bobath concept (NDT) – relation to trigger point. Bobath says that the problem is in the regulation of tone, not in the muscle and hypertonus is a protective reaction of the CNS. Trigger point = local form of pathological tone. Therapy: inhibition of pathological reflexes, facilitation of normal movement, work with the entire movement pattern If the quality of movement changes, the trigger point loses its meaning. 4. Breathing – the key to everything. Neurophysiological basis: The diaphragm is: a respiratory muscle, a postural muscle and a strong afferent organ for the CNS If breathing is shallow, upper and sympathetically activated, the CNS remains in a threat mode. Relationship to trigger point: poor diaphragm function → overload of auxiliary respiratory muscles → trigger points in the neck, trapezius, intercostals. Proper breathing: reduces sympathetic, increases vagal tone, allows the CNS to turn off protection

Conclusion: The common denominator of all approaches is DNS, Vojta, Bobath and breathing. Trigger point disappears when the CNS stops perceiving the threat. Trigger point is a local manifestation of the global protective setting of the nervous system.

Keywords: trigger point, pain, movement stereotype, protection

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Multidisciplinary Bio-Psycho-Socially Oriented Rehabilitation Model for Patients with Parkinson's Disease

Introduction: Parkinson's disease is a chronic, progressive neurodegenerative disorder affecting motor, cognitive, and psychosocial functions. Management requires a multidisciplinary, bio-psycho-social approach, integrating physiotherapy, occupational therapy, and behavioral interventions to optimize mobility, functional independence, adherence, and quality of life. Objective: To present a multidisciplinary, bio-psycho-socially oriented rehabilitation model for patients with Parkinson's disease, highlighting the synergistic integration of physiotherapy, occupational therapy, and behavioral strategies.

Material and methods: The model assigns specific roles to each professional: physiotherapists focus on motor function, balance, and gait; occupational therapists address ADL, fine motor skills, and environmental adaptations; behavioral interventions led by physiotherapists support adherence, exercise regularity, and movement adaptation. Interdisciplinary collaboration involves neurologists, physiotherapists, occupational therapists, psychologists, speech therapists, nurses, and social workers to develop personalized rehabilitation plans.

Results: Implementation of the model improves motor and functional performance, enhances adherence and self-efficacy, and positively impacts psychosocial well-being.

Conclusion: A multidisciplinary, bio-psycho-socially oriented rehabilitation model effectively supports motor, functional, and psychosocial aspects of Parkinson's disease. Integrating physiotherapy, occupational therapy, and behavioral interventions enhances patient adherence, self-efficacy, and quality of life.

Keywords: Parkinson's disease; multidisciplinary rehabilitation; bio-psycho-social model; physiotherapy; occupational therapy; behavioral interventions; adherence

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Quality of life of people with cystic fibrosis in the acute stage

Introduction: Cystic fibrosis (CF) is an autosomal recessive genetic disorder that affects mainly the lungs and digestive system and for which there is currently no cure. The life expectancy of people with cystic fibrosis is increasing, so optimizing health-related quality of life is becoming increasingly important. Objective: To analyze the quality of life of people aged 18-25 with cystic fibrosis using the CFQ-R 14+ quality of life questionnaire.

Materials and methods: The study involved 20 people (10 of each sex) aged 21.15±2.11 years with cystic fibrosis.

Results and Discussion: According to Quittner A. (2010), the CFQ-R questionnaire is the 'gold standard' indicator of quality of life for people with CF and the most widely used tool in research related to CF. According to the scale, 'Physical condition' was scored at 51.11±14.34 points, indicating that in this category of patients it differs significantly from healthy peers, which is associated with the severity of the disease, complications that arise in patients (especially on the part of the respiratory system) and concomitant pathologies. The block of questions that assess the 'treatment burden on quality of life' scored 28.88 ±15.9 points, indicating that the treatment process has the greatest impact on quality of life. This is due to the fact that patients spend a lot of time on treatment and rehabilitation, which requires additional costs (both in terms of time and money), which significantly affects quality of life. The block of questions related to the assessment of 'social status' averaged 62.28±27.03 points, demonstrating its strong impact on quality of life. One of the reasons that reduces the social status and role of people with CF in society is the fear that society may misinterpret their symptoms, such as coughing, frequent shortness of breath, or sputum production. The questions about weight gain problems were rated on an average of 43.34±26.71 points. This indicator is related to food intake and body mass index, which affects its perception. The indicator for this block of questions varies greatly and is worse in patients with severe intestinal CF. The emotional state is a constantly changing criterion strongly influenced by the severity of the disease, social status, the burden of treatment, and vitality. Emotional experiences due to thinness are related to the perception of one's appearance.

Conclusion: When assessing the quality of life of people aged 18-25 with cystic fibrosis using the CFQ-R 14+ questionnaire, it was found that all blocks are interrelated and, in one way or another, affect the quality of life of these individuals. The most problematic criteria that affect quality of life are 'burden of treatment' and 'perception of one's body and health' scores, which are associated with frequent exacerbations, especially of the respiratory and digestive systems, as well as with the progression of the disease.

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Assessment of changes in pain, anxiety, and fatigue levels during the rehabilitation of outpatients

Introduction: It is widely known that the rehabilitation process can temporarily increase pain and cause fatigue. The purpose of the study was to determine whether and at what point pain and fatigue intensify.

Material and methods: The study included 74 outpatients undergoing rehabilitation from April to December 2025 at the 'Medyk' Medical Center in Rzeszów, aged 16-88 years. Daily, as well as 2 weeks and 1 month after the end of rehabilitation, the patient indicated the level of pain, anxiety related to their health condition, and fatigue related to attending rehabilitation, on the NRS scale from 0 to 10.

Results: The highest intensity of pain occurred on the third day of treatment, and then gradually decreased each subsequent day, stopping at the lowest level after 2 weeks and still one month after rehabilitation. The level of anxiety about their health condition was low throughout the rehabilitation period with a downward trend but without significant changes. Fatigue gradually increased, reaching the highest level on the 10th day of rehabilitation. A decrease in fatigue was observed between the fifth and sixth days due to the weekend break in therapy. A significant influence of age on the level of perceived pain and fatigue was also demonstrated. From the 8th day of rehabilitation, the level of pain in older patients was significantly higher than in younger individuals. A significantly higher level of fatigue was observed in older patients at the end of the treatment week.

Conclusions: Due to the observed exacerbation of pain during rehabilitation, it seems reasonable to start the rehabilitation process gently. Due to the observed fatigue, it would be worth considering breaks in rehabilitation procedure.

Keywords: pain, fatigue, outpatient physiotherapy, NRS scale.

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The effect of Pilates on quality of life, functional status, and mobility of the lumbar spine in patients with chronic back pain: A literature review

Introduction: Chronic low back pain is a complex of long-term and recurrent pain symptoms with multifactorial etiology. The aim of this study was to analyze the literature to assess the impact of Pilates on quality of life, functional status, and mobility of the lumbar spine in patients with chronic low back pain.

Materials and Methods: A literature review was conducted using the PubMed database, including keywords: Pilates, pain, physiotherapy, and quality of life. The resulting articles (n = 22) were evaluated using inclusion and exclusion criteria. Six studies were included in the review, assessed using the PEDro scale, and the results were then synthesized. The studies were analyzed using the PICO framework.

Results: The study included 444 participants with chronic low back pain, with an average age of 43.14 years. The analyzed articles assessed the impact of Pilates on quality of life (SF-36, EQ-5D-3L), functional status (Oswestry Index, RMDQ, QBPDS, PSFS), pain level (VAS, Qucher), and spinal mobility (finger-to-floor test, sit-and-reach test).

Conclusions:

1. The use of Pilates in individuals with chronic back pain improves quality of life and lumbar mobility. It also contributes to pain reduction and improves functional status.
2. The lack of consistency in the research tools used and the selection of participants complicates comparisons between studies and leads to the need for improved standardization of the methodology to enhance the credibility of the results.

Keywords: Pilates, pain, physiotherapy, quality of life

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The Importance of the 6-Minute Walk Test in Predicting Myocardial Performance in Elderly Patients

Introduction: The 6-Minute Walk Test (6MWT) is a widely used test to measure patients' physical fitness and assess the effectiveness of treatment and rehabilitation Due to its simplicity, safety, and low cost, this test is commonly used to assess the health of elderly people.

Materials and Methods: The medical records of 143 patients hospitalized for cardiac reasons were analyzed. The 6MWT results were evaluated to predict myocardial performance, as measured by left ventricular ejection fraction (EFLV). Inclusion criteria: age 80 years or older, echocardiography, and 6MWT performed during a single hospitalization. Exclusion criteria: atrial fibrillation, pacemaker rhythm, and severe valvular heart disease.

Results: No complications were observed after 6MWT. The average increase in the double product corresponding to 1 meter of walking (the ratio of the double product to the walking distance) was found to negatively correlate with the EFLV values. ($R = -0.18$, $p < 0.03$). A weaker, yet positive correlation was observed between EFLV and walking distance. Additionally, a correlation was found between BMI, blood hemoglobin level, and walking distance.

Conclusions: The best 6MWT parameter reflecting myocardial function in elderly patients appears to be the average increase in the double product corresponding to one meter of walking. To a lesser extent, myocardial function in such patients can be inferred based on the measurement of the walking distance.

Keywords: ejection fraction, walking test, double product

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The effect of spinal manipulation on heart rate variability in children with cerebral palsy: A pilot study

Introduction: The purpose of this pilot study was to investigate the effects of spinal manipulation (SM), applied within the framework of Professor Kozyavkin's Method, on heart rate variability (HRV) in children with cerebral palsy (CP). HRV is a non-invasive marker of autonomic nervous system function and overall adaptive capacity. Reduced HRV has been associated with impaired autonomic regulation, which is commonly observed in children with CP, particularly in cases with greater motor dysfunction.

Materials and methods: Seven children with CP aged 4–18 years participated in a two-week rehabilitation program based on the Kozyavkin Methods. HRV was evaluated six times in three stages of the course — at the beginning, in the middle, and end of rehabilitation. During each session, two HRV recordings were obtained: before and after SM. In total, 42 recordings were analyzed, resulting in 21 paired measurements.

Results: The results demonstrated statistically significant changes in all HRV parameters. The median SDNN, reflecting the overall variability of heart rate, increased from 59.9 to 67.3 ms ($p < 0.01$). RMSSD, primarily associated with parasympathetic activity, increased from 67.0 to 82.2 ms ($p < 0.01$). The LF/HF ratio decreased from 0.73 to 0.69 ($p < 0.05$), indicating a shift toward enhanced vagal activity. A slight but statistically significant reduction in mean heart rate was also observed ($p < 0.05$).

Conclusions: These findings suggest that spinal manipulation can improve autonomic regulation and enhance parasympathetic activity in children with CP. HRV appears to be a useful objective biomarker to assess the effectiveness of neurorehabilitation interventions. Further large-scale randomized controlled studies are needed to confirm these results and explore the long-term effects of SM on functional rehabilitation outcomes.

Keywords: spinal manipulation; heart rate variability; cerebral palsy; autonomic nervous system

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Physiotherapy in the Management of Phantom Limb Pain: A Literature Review

Introduction: Phantom limb pain (PLP) refers to pain perceived in an amputated body segment and remains a significant clinical and rehabilitation challenge. Objective: Review current evidence on physiotherapeutic methods and the role of physiotherapy in the treatment of PLP in post-amputation patients.
Materials and Methods: A literature search was conducted in PubMed, ScienceDirect, Scopus, and Google Scholar (2020–2025). Systematic reviews and randomized clinical trials addressing the diagnosis and treatment of PLP were included. Particular attention was paid to studies combining physiotherapeutic approaches (e.g. mirror therapy, transcranial electrical stimulation, phantom exercises).
Results: Physiotherapy is an important component of PLP management and can reduce pain intensity and improve quality of life. Mirror therapy is the most consistently supported intervention, while the greatest benefits are reported when multiple techniques are combined.
Conclusions: PLP is a complex condition that requires multidisciplinary care and multimodal therapy. Current evidence mainly concerns short-term outcomes, indicating the need for more research on long-term effectiveness.
Keywords: phantom limb pain, physiotherapy, amputation

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The Type of Electrotherapy and the Effectiveness of Comprehensive Physiotherapy in Patients with Neck Pain

Introduction: Neck pain (NP) is a widespread issue posing serious health and social challenges, and the question of which physiotherapy approaches are most effective remains unresolved. Therefore, the aim of this study was to evaluate the effectiveness of therapeutic exercise combined with phototherapy and electrotherapy in patients with NP.

Material and Methods: The study included 100 patients with NP, who were then randomly assigned to 4 groups. All groups received therapeutic exercise and phototherapy as standard therapeutic procedures. Additionally, each group underwent electrotherapy (LF TENS, HF TENS, Träbert currents, or placebo TENS), which served as the differentiating factor. Patients were assessed before treatment, after treatment, and after a 6-month follow-up period. The assessment included biomechanical evaluation of the trapezius muscle (Myoton PRO), pain assessment (VAS scale), and evaluation of cervical range of motion (linear measurement).

Results: In the analysis of short-term effects, statistically significant positive changes were observed in five assessed parameters in the LF TENS group, six in the HF TENS group, seven in the Träbert currents (TC) group, and three in the PLACEBO group. In the analysis of long-term effects, significant positive changes were noted in five parameters in the LF TENS group, seven in the HF TENS group, two in the TC group, and three in the PLACEBO group.

Conclusions:

1. LF TENS and HF TENS, when used in combination with other physiotherapy components, demonstrate comparable short-term and long-term effects in the treatment of neck pain.
2. Träbert currents (TC) appear to provide only short-term effects.
3. A comprehensive physiotherapy program including therapeutic exercise, phototherapy, and electrotherapy used in patients with neck pain appears to be a safe therapeutic approach, as side effects occurred only in isolated cases.

Keywords: neck pain, physiotherapy, electrotherapy, TENS, Träbert current.

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An Assessment of Young People's Awareness of the Impact of Stress on Human Body Functioning and the Role of Physiotherapy in Stress Management

Introduction: Stress has a significant impact on the human organism, both positive and negative. While short-term stress can be motivating, long-term stress is demotivating and can have serious consequences that negatively affect many aspects of physical and mental health. The aim of the study was to assess young people's awareness of the impact of stress on the functioning of the human body and to evaluate their knowledge and use of physiotherapeutic methods to cope with stress.

Materials and Methods: The survey was conducted among 40 participants aged 17–21 (mean age: 19). The study was pilot in nature. Two questionnaires were administered before and after educational workshops, which addressed knowledge about the effects of stress on the body as well as awareness and application of stress management methods.

Results: The study showed that all respondents experience daily stress. Most of participants (75%) reported feeling stress very often, with 67% describing it as demotivating stress. A proportion of the study group (37%) reported being unable to cope with stress, despite the fact that 72% declared knowing stress management techniques. After educational workshops, awareness of the impact of stress on the body increased to 87%. Half of the respondents expressed willingness to use the presented physiotherapeutic stress management techniques in their daily lives.

Conclusion: Physiotherapeutic interventions that aim to increase knowledge about stress management have positive effects and support the development of health-promoting attitudes and behaviors among young people. The issues addressed in this pilot study are of significant social relevance and provide a basis for more extensive research in this area.

Keywords: Stress, stress prevention, physiotherapy in stress management, health-promoting education

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The use of acupuncture and pinotherapy in alternative rehabilitation after Achilles tendon injuries

Introduction: The Achilles tendon is a structure frequently susceptible to injury. It affects both athletes and less physically active individuals. Tendon injuries include overuse, tearing, or rupture. In each case, physiotherapy plays a significant role. Acupuncture as defined by Traditional Chinese Medicine (TCM) and pin and arm therapy can provide additional support.

Material and Methods: Patients were divided into two groups. The first group consisted of patients from the Rehabilitation Department at the NTM Holy Family Specialist Hospital, and the second group consisted of private patients. In both groups, therapy was performed approximately six weeks after surgical Achilles tendon repair. The same number of treatments were administered in both cases, i.e., 15 sessions over three weeks. To assess the functionality of the Achilles tendon, a toe-stand test was performed at the first and last visit.

Results: A faster return to walking function was observed in the hospital patient group, while in the private patient group, reduced tenderness in the soft tissues, normal mobility of the postoperative scar and the Achilles tendon itself were observed. Pain sensation during walking, according to the VAS scale, was similar in both groups. After therapy, patients achieved an improvement in range of motion compared to the healthy lower limb in the toe-stand test, by 75% with traditional physiotherapy and by 50% with acupuncture and pinotherapy, respectively.

Conclusions:

1. Achilles tendon physiotherapy, encompassing physical therapy, soft tissue therapy, and kinesiotherapy, provides a comprehensive path to regaining mobility and walking function.
2. Instrumental therapies and acupuncture can be used alongside traditional physiotherapy due to their similar levels of effectiveness.

Keywords: Achilles tendon, instrumental therapy, soft tissue therapy, acupuncture, pinotherapy, physiotherapy in orthopedics

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Comprehensive ACL Reconstruction with Extra-Articular ALL Tenodesis and Meniscal Repair in a Young Football Player: A Case Report

Introduction: Anterior cruciate ligament (ACL) rupture is one of the most common injuries among young athletes and is associated with a high risk of rotational instability and secondary intra-articular damage. The aim of this report is to present the case of a 20-year-old football player who underwent intra-articular ACL reconstruction combined with extra-articular anterolateral ligament (ALL) tenodesis and repair of both menisci, with a particular focus on clinical and rehabilitation aspects.

Materials and Methods: The patient, a 20-year-old football player, reported episodes of the right knee "giving way" and intermittent effusion following a rotational injury while running and passing the ball. Physical examination revealed a positive anterior drawer test, positive Lachman test, and positive meniscal tests. During arthroscopy, hypertrophy and synovial inflammation were observed, along with grade II chondromalacia of the medial femoral and tibial condyles. Degenerative, multi-directional flap tears were identified in the posterior horn of the medial meniscus, as well as a grade I root-related tear of the lateral meniscus. In October 2025, the patient underwent ACL reconstruction, extra-articular ALL tenodesis, and simultaneous repair of both menisci.

Results: Rehabilitation initially focused on reducing joint swelling, restoring full extension, and improving quadriceps strength. At four weeks postoperatively, partial weight-bearing of 30% body weight was initiated and gradually increased until crutches were discontinued at ten weeks. Currently, the patient has regained full knee range of motion, fully and correctly loads the operated limb, and is systematically rebuilding muscle strength in preparation for return to sport.

Conclusions:

Simultaneous ACL and ALL reconstruction in young athletes can effectively improve rotational stability of the knee and reduce the risk of graft re-injury.

The complex nature of the surgical procedure necessitates an individually tailored physiotherapy protocol that balances protection of healing meniscal structures with the need for early restoration of full knee extension.

Keywords: football, ACL reconstruction, ALL tenodesis, rehabilitation

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Review of the most commonly used physiotherapeutic methods in cervical spine pain syndromes: A literature analysis

Introduction: Cervical spine pain syndromes are among the most common musculoskeletal disorders. They lead to reduced functional capacity, lower quality of life, and increased occupational absenteeism. The aim of the study: The purpose of this work was to conduct a narrative review of the scientific literature evaluating the effectiveness of physiotherapeutic methods used in the treatment of cervical spine pain syndromes.
Material and Methods: An analysis of the national and international literature on the physiological management of cervical spine pain syndromes was performed. The review included publications that describe the use of manual therapy, therapeutic exercises, and selected physical therapy treatments. The studies covered assessments of pain intensity and functional capacity of the patients.
Results: The analysis of available research indicates that the greatest effectiveness in reducing pain and improving cervical spine is demonstrated by combined therapy-based physiotherapy programs, which links manual techniques with individually selected therapeutic exercises.
Conclusions The selection of physiotherapeutic methods should be adapted to the clinical condition of the patient and the nature of the pain. Based on the literature analysis, it was found that physiotherapy programs based on combined therapy show the highest therapeutic effectiveness. Further scientific research is necessary to allow for a definitive assessment of the effectiveness of individual physiotherapeutic methods in cervical spine pain syndromes.
Keywords: cervical spine pain, physiotherapy, physiotherapeutic methods.

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The impact of mild traumatic brain injury on the physical and psycho-emotional state of military personnel

Traumatic brain injury is one of the most common and serious injuries in combatants today. Military personnel are among those at the highest risk for traumatic brain injury. Although symptoms of concussion and other forms of TBI usually resolve within a few weeks, 10–15% of people may develop long-term symptoms.

The aim of the study: to assess the impact of mild traumatic brain injury on the physical and psycho-emotional state of military personnel

Research methods: Analysis of scientific and methodological literature. Sociological methods.

Medical and biological methods. Methods of mathematical statistics

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Reliability of Wearable Inertial Sensors for Gait Analysis in a Quasi-Real-World Environment

Introduction: Advances in technology have led to the development of portable, low-cost, and wearable inertial sensors that enable gait evaluation in real-world settings during daily activities. Although wearable sensors represent a promising alternative for traditional gait analysis systems, their measurement reliability—particularly under unsupervised and realistic conditions—has not yet been sufficiently established. The purpose of this study was to determine the intra- and inter-rater reliability of inertial sensors for gait analysis conducted in a quasi-real-world setting.

Material and methods: A total of 98 healthy adults (52% women), aged 19 to 33 years, participated in this reliability assessment. Each participant completed two gait measurements at their self-selected walking speed, performed by two independent raters who evaluated selected spatiotemporal gait variables. Reliability was quantified using intraclass correlation coefficients (ICC), while agreement and bias were examined using Bland–Altman analysis.

Results: The ICC results demonstrated excellent or near-excellent reliability for walking speed, cadence, and stride length across raters (ICC = 0.932–0.941, 0.950–0.957, and 0.916–0.938, respectively), as well as across repeated measurements (ICC = 0.916–0.928, 0.934–0.938, and 0.888–0.906, respectively). Bland–Altman analyses indicated negligible systematic bias in both inter- and intra-rater comparisons, with differences remaining below 0.038 km/h for walking speed, 0.283 steps/min for cadence, and 0.827 cm for stride length.

Conclusion: These findings indicate that the evaluated inertial sensors provide reliable measurements of walking speed, cadence, and stride length in gait assessments conducted under quasi-real-world conditions. Future research should extend this approach to more complex walking scenarios, including variable routes, directional changes, turning movements, uneven or slippery surfaces, and outdoor environments.

Keywords: gait, reliability, sensors, wearable devices

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Evaluation of the Reliability and Repeatability of Hemoencephalography (HEG) Measurements in a Biofeedback Setting

Introduction: Hemoencephalography (HEG) is a non-invasive method for assessing cerebral hemodynamic activity and is increasingly used in neurorehabilitation and neurofeedback research. To apply HEG as a diagnostic and therapeutic tool, its reliability of measurement reliability must be established. The aim of this study was to evaluate the inter-rater agreement and test–retest reliability of HEG biofeedback measurements.

Materials and Methods: Twenty-five healthy adults (mean age approximately 24 years) participated in the study. Each participant was examined twice, and measurements were performed independently by three examiners. Three parameters of the HEG signal were analyzed: HEG Mean, HEG Max, and HEG Min. The reliability and accuracy were evaluated using intraclass correlation coefficients (ICC), Bland–Altman analysis, standard error of measurement (SEM) and minimal detectable change (MDC95).

Results: Inter-rater agreement for all HEG parameters was good, with ICC values ranging from 0.65 to 0.70. The reliability was also moderate to good (ICC = 0.65–0.71), indicating acceptable temporal stability of the measurements. The highest measurement accuracy (lowest SEM and MDC95 values) was observed for examiner 1 and examiner 3, while examiner 2 showed slightly greater variability. The minimal detectable change (MDC%) for the HEG Mean ranged from 26.3% to 32.3%, indicating an acceptable level of measurement error.

Conclusions: The HEG biofeedback system provides stable and repeatable measurements of cerebral hemodynamic activity. Good inter-rater agreement and acceptable measurement error values indicate that HEG can be considered a reliable tool for assessing hemodynamic changes in basic research conditions as well as in clinical and training applications.

Keywords: hemoencephalography (HEG); biofeedback; measurement reliability; test–retest reliability; inter-rater agreement

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Dynamic Postural Control and Lower Limb Muscle Strength in Wushu Athletes with Chronic Ankle Instability (CAI)

Introduction: Chronic ankle instability (CAI) is a common consequence of lateral ankle sprains. It is estimated that approximately 40% of individuals who sustain a primary sprain will develop long-term ankle dysfunction. Wushu, originating from China, is a widely practiced martial art with a high incidence of lower limb injuries, estimated at 10,294 injuries per 1,000 athletes.

Materials and Methods: The study included 20 male Wushu-Sanda athletes. The participants were divided into two groups: Group G1 (mean age 21.4±2.79 years) consisting of 10 athletes with CAI of the right ankle, and Group G2 (mean age 21.00±2.66 years) comprising 10 athletes without CAI. Dynamic postural control was assessed using the Star Excursion Balance Test (SEBT). The isokinetic strength of the knee flexors and extensors of the right leg was evaluated using the Biodex System 4 Pro. Sociodemographic data was collected via a custom questionnaire.

Results: Analysis of normalized SEBT results for the right lower limb revealed significantly higher values in all tested directions for Group G2 compared to Group G1 ($p < 0.001$). The most significant difference between the groups was observed in average power (APR) during extension at an angular velocity of 60°/s, where Group G2 achieved significantly higher values than Group G1 (256.13±14.07 W vs 156.13±14.07 W; $p < 0.001$).

Conclusions: Group G2 demonstrated significantly better dynamic stability and greater potential for generating average power in the right knee joint compared to Group G1. The study also indicated a significant relationship between the level of postural control and the risk of developing CAI.

Keywords: CAI, Wushu, Biodex System 4 Pro, SEBT

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Assessment of the Level of Support Needs: Characteristics of the Issue

Introduction: The assessment of the level of support needs constitutes a key element of the new support benefit. It involves evaluating the actual level of independence of a person with a disability in everyday functioning across 32 tasks. Points are awarded for the ability to independently perform activities such as eating, personal hygiene, mobility, communication, and cognitive activities, depending on the type and frequency of assistance required. The aim of this study is to analyze and characterize the support needs assessment system, evaluate daily activities, demonstrate its independence from the formal degree of disability, and determine adequate financial and practical support tailored to real individual needs.

Discussion: The study discusses how the assessment team evaluates functional capacity, understood as the ability to perform activities in several areas, including mobility, movement, personal hygiene, meal preparation and consumption, acquisition of new skills, use of technology, household management, building relationships, making choices and decisions, and coping within the social environment. The team assigns scores ranging from 0 to 4 based on the actual level of functional capacity in the physical, somatic, intellectual, and psychological domains. The higher the score obtained by the assessed individual, the greater the level of dependence and the need for assistance.

Conclusion: The process of assessing support needs is crucial for access to the support benefit and is based on an objective functional assessment rather than solely on the possession of a disability certificate. It requires the submission of a formal application along with a self-assessment questionnaire, and the decision is issued for a specified period by a specialized authority. This process enables the individualization of support.

Keywords: support needs, disability, functional capacity, support benefit, scoring system, types of support

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Analysis of the degree of unloading of the lower limb during assisted walking with one crutch

Introduction: Gait assisted by a single crutch is a commonly used rehabilitation method for partial offloading of the lower limb. The literature highlights the difficulties in achieving optimal offloading and the consequences of improper crutch use. The aim of this study was to determine the actual offloading of the lower limb during walking with a single crutch. It was hypothesized that this offloading does not exceed 50% of body weight. Specific objectives and research questions were established, which allowed for a comprehensive assessment of the effectiveness of this form of support, including a comparison of static and dynamic conditions and the influence of factors such as gender and previous experience with crutches.

Material and Methods: The study was conducted on a group of 142 healthy individuals aged 18–30, some of whom had previous experience with crutches. The Zebris FDM S platform was used to measure the pressure forces exerted on the feet and the orthopedic crutch. Static (standing for 20 seconds) and dynamic (walking across a platform) conditions were assessed, analyzing both the load values and their distribution in the forefoot and hindfoot.

Results: The study showed that the average level of lower limb unloading during single-crutch walking was approximately 37%, while in static conditions it increased to 64%. No significant differences in unloading were found based on gender or previous experience. However, asymmetries in load distribution and a higher load on the hindfoot were observed, which may indicate the stabilization strategy used by the subjects.

Conclusions: single-crutch can be effective in cases of moderate limb load limitations, but in situations requiring greater support, the use of two crutches is worth considering.

Keywords: lower limb unloading, single-crutch, gait

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Features of testing hand functions by a physical therapist in patients with systemic sclerosis

Introduction: Systemic sclerosis is an autoimmune disease with characteristic changes in the skin, musculoskeletal system, internal and widespread vasospastic disorders such as Raynaud's syndrome and progressive fibrosis. Hand motor functions are impaired due to arthritis, joint contractures, tenosynovitis, acroosteolysis, and calcinosis.

Material and Methods: As a result of the analysis of literary sources, the following methods were selected to test brushes' functions in patients with systemic scleroderma: HAMIS, Duruöz Hand Index, HFI. The HAMIS test consists of nine tasks, which are an integral part of the usual daily activities. Each exercise is rated on a scale from 0 to 3 points. The maximum total score is 27 points for each hand. Always need to test both hands. The Duruöz Hand Index (DHI) is a special questionnaire that serves to assess the functionality of a hand. Patients evaluate their ability on a scale of 0 to 5. DHI was found to be reliable and valid in people with rheumatoid arthritis, scleroderma, osteoarthritis, stroke, injuries, diabetes and hemodialysis patients. The Hand Functional Index (HFI) is the first of nine sections of the Keitel Function Test (KFT) test. Estimates of both hands are added to obtain a general score (index). It ranges from 4 to 42 points. The highest score shows a bad function.

Results: The test methods HAMIS, Duruöz Hand Index, HFI are widely used in the practice of physical therapists and ergotherapists in many countries of the world, most of which are valid.

Conclusion: These tools help professionals to develop rehabilitation-friendly programs for patients.

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The impact of physical activity on the prevalence of urinary incontinence in women

Introduction: Between 25 and 45% of women and 20% of men struggle with urinary incontinence, leading to complete or partial emptying of the bladder. Due to the intimate nature of the problem, the topic is often marginalized, which can lead to its escalation and, as a consequence, to health complications. The purpose of the study was to determine the impact of physical activity on the frequency of urinary incontinence incidents in women and to examine whether their knowledge, attitude, and practice on incontinence is related to the occurrence and severity of this dysfunction.

Materials and methods. The study group consisted of 171 women from all over Poland. An electronic questionnaire was used for the study, consisting of four parts: sociodemographic data, a section on physical activity, the KAP (Knowledge, Attitude, Practice) questionnaire, and the ICIQ-SF (International Consultation on Incontinence Questionnaire-Urinary Incontinence Short Form) questionnaire.

Results: The incidence of severe NTM was significantly lower in women who did not restrict their training (3.18%) than in women who did (28.57%); $p < 0.001$. The intensity of training was also statistically significant ($p < 0.05$) – at 'low frequency', as many as 60% of women experienced severe NTM. Chi-square test analysis also showed a significant relationship between the level of knowledge about NTM and variables such as age, education, number and type of births, and menopause.

Conclusions: Regarding episodes of urinary incontinence, the duration of the training session was significant. Women whose training lasted more than 60 minutes experienced NTM less frequently than those whose sessions lasted 30-60 minutes. Other variables, such as type of physical activity, overall training frequency, or reported fatigue levels, did not show significant correlations.

Keywords: incontinence, ICIQ-SF questionnaire, KAP questionnaire

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Co-occurrence of kinesiophobia, central sensitization, and chronic pain in Post-COVID syndrome: A literature review

Introduction: Post-COVID-19 syndrome is associated with chronic pain characterized by nociplastic features, resulting from impaired stimulus processing in the central nervous system (central sensitization). A significant factor influencing the functional status of patients is kinesiophobia, the fear of movement – which leads to avoidance of activity and exacerbation of disability. The aim was to conduct a narrative literature review to evaluate the clinical profile of patients with post-COVID-19 syndrome who experience chronic pain, with a particular focus on the interactions between kinesiophobia, central sensitization, and symptom severity, as well as to evaluate the effectiveness of therapeutic interventions.
Materials and Methods: A literature review was performed using medical databases (e.g., PubMed, ResearchGate), analyzing publications from 2020–2025. The analysis included randomized controlled trials, cross-sectional, and observational studies involving adults after SARS-CoV-2 infection. Tools such as the Tampa Scale for Kinesiophobia (TSK), Central Sensitization Inventory (CSI), and Pain Catastrophizing Scale (PCS) were utilized.
Results: Post-COVID patients are characterized by significantly higher levels of kinesiophobia, central sensitization, catastrophizing, and sleep disturbances. The level of kinesiophobia strongly correlates with catastrophizing and sensitization symptoms, whereas it shows no direct correlation with the intensity of pain itself, indicating the dominant role of cognitive factors.
Keywords: kinesiophobia, post-COVID syndrome, central sensitization, chronic pain

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Pilot Evaluation of Postural System Characteristics in Relation to Muscle Imbalance in Children

Introduction: Muscle imbalance is considered a significant predisposing factor for the development of postural disorders already in childhood. The preschool and early school-age period is characterized by intensive development of the postural system, during which functional deviations in posture may manifest. **Aim:** The aim of this pilot study was to preliminarily determine the prevalence of faulty posture in preschool and early school-aged children within the framework of the APVV-24-0251 project "Consequences of muscle imbalance on the postural system of preschool and early school-aged children.

Materials and Methods: The pilot study included 56 children with a mean age of 6.83 years, including 31 girls (55.4%) and 24 boys (42.9%). Posture was assessed using the Wolanski method. Selected segments of the postural system were analyzed: head, shoulders, scapulae, chest, pelvis, cervical hyperlordosis, thoracic hyperkyphosis, lumbar hyperlordosis, and foot arch. The results were processed using descriptive statistics (arithmetic mean).

Results: The mean scores of the assessed segments were as follows: head 0.41 (±0.079); shoulders 1.11 (±0.492); scapulae 1.05 (±0.553); chest 0.09 (±0.287); pelvis 0.45 (±0.569); cervical hyperlordosis 0.29 (±0.529); thoracic hyperkyphosis 0.21 (±0.414); lumbar hyperlordosis 0.07 (±0.259); foot arch 0.73 (±0.617). Based on the overall posture assessment, 26 children (46.4%) demonstrated excellent posture, 24 children (42.9%) good posture, 5 children (8.9%) poor posture, and 1 child (1.8%) very poor posture.

Conclusion: The results of the pilot study indicate the presence of postural deviations in 6 children (10.7%) with poor to very poor posture, with the highest degree of deviations observed in the shoulder and scapular regions and in the foot arch. The obtained data confirm the need for systematic monitoring of children's posture and provide a basis for the implementation of the main research focusing on the relationship between muscle imbalance and the postural system of children.

Keywords: faulty posture; early school age; prevalence; project.

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The influence of the relative age effect on the neuromuscular parameters of the countermovement jump in children based on force plate measurements: A review of the literature

Introduction: In youth sports, the most commonly used system to group athletes is based on chronological age, which applies in most sports disciplines. This system facilitates standardization of competitions, but it generates the relative age effect (RAE), manifested as a developmental advantage of children born in the first quarter of the year. This leads to disparities in the selection and sporting success of young people from the first qualification period, which are inconsistent with the natural distribution of births in the population. The aim of this review was to analyze how RAE may influence the assessment of neuromuscular performance in children, evaluated using objective motor tests conducted on force plates.

Material and Methods: The review was carried out based on scientific literature published between 2020 and 2025 in the PubMed, Google Scholar, and Scopus databases. The search included the following keywords: relative age effect, countermovement jump, and force plate. The inclusion criteria were as follows: English language, clinical studies, and meta-analyses.

Results: Three studies were included, comprising a total of 554 young athletes. Analysis of study results showed that countermovement jump (CMJ) performance is significantly correlated with biological and chronological age, which can considerably affect the chances of success and further selection. Furthermore, the presence of RAE was confirmed among young athletes whose birth distribution significantly deviated from a uniform pattern.

Conclusions: The literature review confirms that the effect of relative age influences not only athlete representation of athletes in sport but also objective neuromuscular indicators, such as the parameters obtained in the CMJ test. The results indicate the need to consider biological age when interpreting the results of diagnostic tests conducted on force plates.

Keywords: relative age effect, CMJ, young athletes

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Innovative solutions in education and healthcare based on personal experiences

Introduction: The aim of this work is to present innovative solutions used in education and healthcare based on personal experiences. The pandemic and the technological development associated with it, especially the spread of remote methods and forms of communication, have made turning to new solutions in education and healthcare a necessity. Along with these changes, there has been significant progress in robotics and the application of artificial intelligence (AI).
Material and Methods: The driving force of (AI) in healthcare is machine learning and its advanced form; deep learning. These algorithms, based on complex structures called neural networks, "learn" from data, independently identifying patterns and drawing conclusions.
Results: Today, the use of (AI) in healthcare is becoming a reality. Artificial intelligence is revolutionizing nearly every aspect of modern medicine and healthcare. (AI) can analyze complex research results, design next-generation drugs, and provide essential support to medical staff, especially doctors during surgery.
Keywords: education, healthcare, innovative solutions

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Community, support, independence: Care and housing centers as a new form of support for persons with disabilities within the social welfare system

Introduction: The Care and Housing Centers represent a new form of support for adults with disabilities within the Polish social welfare system. Their functioning is embedded in the deinstitutionalization process of social services and the implementation of the independent living. The aim of this paper is to present the role of Care and Housing Centers as a modern form of support, based on the example of the Care and Housing Centre in Rzeszów.

Material and Methods: The analysis covered applicable legal regulations and policy documents, in particular the program "Care and Housing Centers" – Module II: Operation of the Centre. The analysis was supplemented with practical experience resulting from the organization and day-to-day functioning of the Care and Housing Centre in Rzeszów.

Results: The analysis indicates that Care and Housing Centers effectively complement existing forms of support for persons with disabilities. The example of the Rzeszów demonstrates that combining care, rehabilitation and activation services within both daycare and residential models promotes the independence and their inclusion in local community life.

Conclusions: Care and Housing Centers constitute an important element of modern social policy for persons with disabilities. The experience of the Care and Housing Center in Rzeszów confirms the legitimacy of further development of this form of support as an alternative to institutional solutions.

Keywords: care and housing centers, disability, independent living, deinstitutionalization

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Physical Activity as a Component of Psychosocial Functioning in Penitentiary Isolation

Introduction: Physical activity (PA) under conditions of penitentiary isolation constitutes an important component of interventions that support the maintenance of psychophysical health. The aim of this study was to assess the motives for undertaking PA among individuals in penitentiary isolation.
Materials and methods: The study included 140 incarcerated individuals from a semi-open (n = 90) and a closed prison (n = 50). The research sample comprised 94 participants (67.1%) who declared engaging in PA during imprisonment. The study was conducted using the Inventory of Physical Activity Objectives (IPAO), designed to assess the motivational function of physical activity goals.
Results: Incarcerated individuals engaged in physical activity on average of 14.5 times per month. The most frequently declared form of PA was gym training (98.9%), followed by team sports (30.9%) and running (21.3%). The average monthly time devoted to PA per person was gym training - 13 h 53 min, team sports - 8 h 7 min and running - 9 h 4 min. The goals indicated most frequently for undertaking PA were concern for health, improvement of physical fitness, and enhancement of well-being. Analysis of IPAO results revealed a low motivational value of physical activity, a low level of time organization and low persistence in action, accompanied by a moderate level of motivational conflict and goal multidimensionality.
Conclusions: The results obtained confirm that PA constitutes an important element of functioning among persons deprived of liberty, fulfilling various psychosocial and health-related functions; however, its potential is not fully utilized.
Keywords: physical activity, prison, IPA

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Assessment of balance, coordination, and flexibility in folk dancers and gymnasts com-pared to physically inactive children

Introduction: Dance is a comprehensive form of physical activity that combines artistic expression with the development of physical fitness. Various dance styles, through differences in movement dynamics and range, influence balance, neuromuscular coordination, and flexibility, which are crucial for proper posture and motor development in children.
Aim: The aim of the study was to evaluate balance, neuromuscular coordination, and flexibility in folk dancers and gymnasts and to compare the results with those of physically inactive children.
Materials and Methods: The study involved 90 children aged 7–14 years, divided into three groups of 30 participants: folk dancers, acrobatic gymnasts, and physically inactive children. Inclusion criteria included good health status, parental consent, and absence of conditions that affect test results. A minimum of two years of training experience was required for the dancers. Assessments were performed using a Zebris stabilometric platform, the Witty SEM system, and the Sit and Reach test. Statistical analysis was performed using Statistica 13.3 software ($p<0.05$).
Results: Significant differences in coordination and flexibility were observed between the groups ($p\leq0.001$). Gymnasts achieved the best results, dancers showed intermediate performance, and inactive children obtained the lowest scores. In balance assessment, physically inactive children demonstrated significantly poorer postural stability compared to both active groups.
Conclusions: Acrobatic gymnasts had the highest levels of balance, coordination, and flexibility. Folk dance positively influences motor development in children, although to a lesser extent than gymnastics. Physical inactivity is associated with significantly poorer motor performance.
Keywords: balance, dance, coordination, flexibility

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Physical activity as part of nonpharmacological treatment of polycystic ovary syndrome (PCOS): A review of current research

Introduction: Polycystic ovary syndrome (PCOS) is one of the most common endocrine disorders in women of reproductive age. This disease is associated with insulin resistance, metabolic disorders, an abnormal lipid profile, and increased cardiovascular risk. Women with PCOS also often have reduced physical fitness and lower tolerance to intense exercise. Current guidelines emphasize the role of physical activity as an important component of the non-pharmacological treatment of PCOS. The aim of this study was to analyze the impact of physical activity on exercise capacity and metabolic parameters in women with PCOS.

Materials and methods: A review of four scientific studies published between 2018 and 2024, available in the Google Scholar and PubMed databases, was conducted. The analysis included studies involving women aged 18–40 with PCOS diagnosed according to the Rotterdam criteria. Aerobic, resistance, and mixed training interventions were included, as well as a meta-analysis comparing different forms of physical activity. VO_2max, insulin sensitivity, lipid profile, body weight, and cardiovascular parameters were among the parameters assessed.

Results: The results indicate that women with PCOS have reduced aerobic capacity compared to healthy women. However, regular physical activity leads to a significant improvement in insulin sensitivity, an increase in VO_2max, an improvement in the lipid profile, and a reduction in blood pressure, regardless of the type of training. The meta-analysis confirmed the beneficial effects of aerobic, interval, and resistance training on metabolic and hormonal parameters.

Conclusions: In summary, despite reduced exercise tolerance in women with PCOS, regular, individually tailored physical activity brings significant health benefits and should be a key component of PCOS therapy.

Keywords: polycystic ovary syndrome (PCOS), physical activity, insulin resistance, aerobic capacity, non-pharmacological treatment.

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Application of the "Spiral" movement correction suit in children with cerebral palsy in comprehensive rehabilitation using the Kozyavkin Method

Introduction: In cerebral palsy, pathological development of motor functions is accompanied by impaired muscle activity during movement. In searching for new approaches to the rehabilitation of patients with motor disorders and their motor re-education, we decided to apply the achievements of integrative anatomy and physiology related to muscle spirals. Muscle spirals support the axial skeleton, dynamically stabilize head position, maintain physiological spinal curvatures, participate in respiratory movements of the chest, and ensure postural stability and limb movements. The formation of muscle spirals in humans occurs in parallel with the development of motor functions. The principle of muscle spiral action has been implemented in the specially designed movement correction suit "Spiral". The suit provides additional external forces that correct limb movements and body posture, activate the flow of "correct" proprioceptive information, and thus influence the motor functions of children with cerebral palsy. The aim of this study was to investigate to what extent the use of the "Spiral" movement correction suit affects motor functions in children, as assessed by the Gross Motor Function scale.

Materials and Methods: The "Spiral" movement correction suit is a system of elastic rods that are spirally attached to the trunk and limbs and then fixed to special supporting elements such as a vest, shorts, knee pads, elbow pads, semigloves, and shoes. The entire external surface of the supporting elements is made of a special material suitable for attaching the rods. The absence of rigid components in the supporting elements significantly expands the range of possible physiotherapy exercises. The study was carried out at the Elita Rehabilitation Center in Lviv prior to the start of a two-week rehabilitation course. Two groups were formed. Group 1 consisted of 12 children aged 5–16 years with cerebral palsy: spastic diplegia (5), tetraparesis (4), and hemiparesis (3). These children were assessed using the GMFCS before and after the rehabilitation cycle. In addition to the main rehabilitation program, the children participated in the "Spiral" movement correction suit program for 1 hour daily, which included physiotherapy, mechanotherapy, treadmill gait training, and computer-based play therapy. Group 2 included 11 children aged 6–14 years (spastic diplegia – 2, spastic tetraparesis – 3, hemiparesis – 4) who received only the standard rehabilitation program.

Results: The study demonstrated an improvement in GMFCS scores in all patients, with increases ranging from 2 to 29 points. Patients in Group 1 with spastic diplegia and hemiparesis showed a greater improvement (10–29 points) compared to Group 2 (6–20 points). In children with spastic tetraparesis, the improvement ranged from 2 to 8 points on the GMFCS scale, regardless of the group.

Conclusions: The use of the "Spiral" movement correction suit as part of comprehensive rehabilitation improves motor functions in patients with cerebral palsy. The effectiveness is higher in patients with spastic diplegia and hemiparesis. In addition, more detailed studies are required.

Keywords: "Spiral" movement correction suit; cerebral palsy; muscle spirals

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The Influence of School Habits and External Loading on Trunk Asymmetry in Children

Introduction: Asymmetry in children and adolescents is most commonly idiopathic, meaning its etiology remains unclear or unknown. It often begins in infancy; a lack of rehabilitation during this period, combined with school habits and external loading, leads to functional or structural changes. In such cases, high-quality physiotherapeutic diagnostics are crucial for the early detection of defects and the implementation of therapy. **Aim:** The aim of the study was to evaluate the impact of school habits and external loading on trunk asymmetry in children.

Material and Methods: The study group consisted of 52 children, including 25 girls (48.08%) and 27 boys (51.92%). The mean age of the participants was 10.2 years (SD=2.67). The research was conducted at the Primary School in Futoma, following the consent of the management, parents, and children. For each participant, a subjective examination (medical history, study positions, and school habits) and an objective examination were performed. The latter included: assessment of the Angle of Trunk Rotation (ATR) using a scoliometer and balance assessment using the Zebris stabilometric platform. Statistical analysis was performed using Statistica 13.3 software. The level of statistical significance for all analyses was set at $\alpha = 0.05$.

Results: Asymmetry in the range of 4°–6° was found in 16% of girls, while no such results were recorded in boys ($p = 0.051$). The problem of backpack overload affected the majority of the participants – 64.7% of the children carried a backpack exceeding 10% of their body weight. Analysis of factors influencing the symmetry index revealed that in the eyes-open trial, declared "slouching" was a significant differentiating factor ($H = 8.75$; $p = 0.013$). The highest level of asymmetry was recorded in the group of children who were unable to determine whether they slouched (answer: "I don't know"; $Me = 1.6$), which may indicate impaired body awareness (proprioception) in this subgroup.

Conclusions: The high prevalence of backpack overloading indicates a necessity for educating parents and school staff regarding the prevention of external loads. Habitual poor posture is reflected in objective parameters of balance and load distribution. The highest level of asymmetry in children lacking awareness of their own posture indicates deficits in proprioception. Developing deep sensation (proprioception) and postural self-correction should be key elements of therapy and prevention. Regular scoliometric screening is essential to detect changes at the functional stage before they become permanent structural changes.

Keywords: ATR, backpack, balance, scoliosis, scoliometer, Zebris

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Effectiveness of robotic interventions in orthopedic rehabilitation: A literature review

Introduction: The development of robotic technologies in orthopedic rehabilitation opens new opportunities to support patients in regaining functional independence. The use of robots can enhance exercise repeatability, patient engagement, and therapeutic effectiveness.

Objectives: The aim of this study was to evaluate the effectiveness of robotic interventions in improving functional outcomes among adult patients undergoing orthopedic rehabilitation.

Materials and Methods: Six studies (three randomized controlled trials, two systematic reviews/meta-analyses, and one narrative review) were analyzed, including patients after joint replacement, wrist injuries, and ankle trauma. Various devices were assessed, such as WRISTBOT, Hunova®, Hybrid Assistive Limb (HAL), exoskeletons, and ankle rehabilitation systems.

Results: Most studies demonstrated statistically significant benefits in joint range of motion, muscle strength, balance, gait, and pain reduction (e.g., $p < 0.001$ for range of motion after TKA; $p = 0.0039$ for balance). One study reported shorter hospitalization (9 vs 13 days) and lower treatment costs. In addition, improvements in patient satisfaction, repeatability of treatment, and safety were observed.

Conclusions: Robotic interventions in orthopedic rehabilitation can substantially support the recovery process, providing both functional and organizational benefits. However, further studies are needed to confirm long-term effectiveness and cost-efficiency.

Keywords: orthopedic rehabilitation, robotics, exoskeleton, therapy effectiveness, TKA

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Strength as an effect of neural adaption, not only hypertrophy

Introduction: Traditionally, increased muscle strength has been primarily associated with increased muscle cross-sectional area through hypertrophy. However, the nervous system plays a key role in force generation and modulation, particularly in response to short-term and specific strength training. The purpose of this review is to discuss some variations in neural adaptation mechanisms responsible for increased muscle strength and to present their significance in the context of various resistance training models.

Material and methods: This review is based on the analysis of experimental studies, systematic reviews, and meta-analyses, published in English over the past 10 years, that examined neuromuscular adaptations to strength training. Studies comparing untrained and trained individuals and various forms of strength training were included.

Results: The analyzed studies indicate that after just a few weeks of strength training, a significant increase in strength is observed without a statistically significant increase in muscle mass. This phenomenon is associated with improved motor unit synchronization, increased motor unit recruitment, and firing rate. Studies on cross-education (the contralateral effect of strength training) confirm the existence of central adaptations independent of local muscle changes. Long-term training leads to further, specific neural adaptations, dependent on the nature of the training stimulus.

Conclusions: Muscle strength is largely determined by neural adaptations. Understanding these mechanisms is crucial for optimizing training programs, rehabilitation, and interpreting strength changes not directly related to hypertrophy.

Keywords: strength, neural adaptation, hipertrophy

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Urological physiotherapy of a patient after radical prostatectomy: A case report

Introduction: Prostate cancer is the most common malignancy in men and the second leading cause of death from the disease. Radical prostatectomy (RP) can cause side effects, such as urinary incontinence (UI). Due to their anatomical location and functional importance, the pelvic floor muscles (PFM) play a crucial role in restoring urinary continence following RP. The aim of this study was to describe the physiotherapeutic treatment of urinary incontinence that occurs after radical prostatectomy.

Material and Method: A 65-year-old man underwent a radical prostatectomy and presented with UI and nocturia. For physiotherapy purposes, a medical history was taken and a functional ultrasound examination was performed to assess the function of the PFMs. The next step was a digital rectal examination to assess any pain, muscle activity during voluntary contraction, and cough reflex. Additionally, surface electromyography (EMG) with a rectal probe and a voiding diary were used. During 2-month therapy, with the physician's consent and the patient's informed consent, MDM electrostimulation was used. Another therapeutic procedure used to improve muscle function during each visit was EMG Biofeedback-guided MDM training. Phasic contractions required a 1-second contraction, and tonic contractions required a 5-second contraction. In addition, the patient was educated on daily ergonomics and proper toileting practices.

Results: As a result of therapy, the patient experienced significant improvement in micturition control, eliminating the need for a pad and being able to sleep through the night without getting up to use the toilet. He noted fewer voids and an increased urine output.

Conclusions: Urological physiotherapy affects pelvic floor muscle function, restoring continence after RP.

Keywords: urological physiotherapy, pelvic floor muscle training, radical prostatectomy

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Psychological and organizational factors protecting against occupational burnout among physiotherapists: A systematic review

Introduction: The aim of this systematic review was to identify and systematize psychological and organizational factors that protect against occupational burnout among physiotherapists.

Materials and Methods: A systematic review of the literature was conducted in accordance with the PRISMA guidelines, including publications from 2010 to 2025. The PubMed, Scopus, Cochrane Library, and EBSCO databases were searched using predefined keywords related to occupational burnout and protective factors. After the removal of duplicates and screening based on titles and abstracts, eight studies meeting the inclusion criteria were included in the final analysis. Methodological quality was assessed using the AXIS tool.

Results: The analysis demonstrated that the most significant psychological protective factors included high levels of psychological resilience, self-efficacy, emotional regulation skills, and adaptive stress-coping strategies. Job satisfaction and a sense of meaning at work were also identified as important protective resources. Among organizational factors, social support within the team, positive relationships with supervisors, a supportive organizational climate, and a manageable workload played a key protective role. Additionally, clear role delineation, a sense of autonomy, and opportunities for professional development were associated with a reduced risk of occupational burnout.

Conclusions: Occupational burnout among physiotherapists is a multifactorial phenomenon, and effective prevention strategies should address both the strengthening of individual psychological resources and the development of a supportive organizational environment. Interventions targeting these areas may substantially reduce the risk of occupational burnout.

Keywords: physiotherapists, occupational burnout, protective factors, psychological resilience, psychosocial support

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Assessment of quality of life, well-being and sleep in computer gamers

Introduction: Currently, due to the widespread availability of electronic devices, people are spending more and more time passively. This has a huge impact on health, sleep, and well-being, causing significant deficits. This state of affairs requires taking action to increase control over entertainment devices in order to improve people's quality of life. The aim of the study was to assess the impact of long-term computer use on quality of life, well-being, and sleep in computer gamers.

Materials and Methods: The study was conducted remotely using questionnaires that evaluated computer gamers on various variables. 122 men with an average age of 25 years participated in the study. The PSQI questionnaire was used to assess sleep quality, WHOQOL-BREF quality of life, the WHO-5 well-being questionnaire and the GAS Brief and IGD-20 questionnaires for gaming-related disorders. A proprietary survey questionnaire was used to collect basic data on gamers.

Results: Long-term use of computer games was found to negatively impact gamers' sleep quality, well-being, and quality of life. The study results show that the greater the number of hours spent gaming, the more frequently a decline in psychophysical health parameters was observed. Symptoms of gaming addiction were also observed in some participants, as confirmed by the diagnostic tools used. Poor sleep quality was correlated with poorer well-being and lower quality of life scores in all WHOQOL-BREF domains.

Conclusions: Among the computer gamers studied, almost half experienced problems with sleep quality and insomnia. One in six participants reported problems with addiction, decreased quality of life, and pain.

Keywords: computer gamers, quality of life, sleep quality, well-being, gaming addiction

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Kinesiophobia in Multiple Sclerosis: Associations with Age, Anxiety, and Physical Activity

Introduction: Multiple sclerosis (MS) is a chronic immune-mediated disease of the central nervous system characterized by inflammation, demyelination, gliosis, and neuroaxonal loss. This study aimed to evaluate factors associated with kinesiophobia (fear of movement) in patients with multiple sclerosis, including disability, fatigue, anxiety, depression, physical activity, and quality of life.

Material and methods: A cross-sectional study was conducted in Prešov between March 2021 and March 2024 enrolling 148 patients with MS (105 women and 43 men; mean age 42.21±9.84 years; range 21-71). Disability was assessed using the Expanded Disability Status Scale (EDSS) (median [IQR] 4.00 [2.50]; range 1-6). Kinesiophobia was measured using the Tampa Scale for Kinesiophobia, physical activity with the Godin Leisure-Time Exercise Questionnaire, and health-related quality of life with the Short Form-36 Health Survey. Fatigue was evaluated using the Modified Fatigue Impact Scale, while depressive and anxiety symptoms were assessed using the Zung Self-Rating Depression Scale and the Beck Anxiety Inventory.

Results: In the final adjusted model, higher anxiety levels (β=0.252, 95% CI: 0.053 to 0.331), lower physical activity (β=-0.353, 95% CI: -0.208 to -0.086), and older age (β=0.205, 95% CI: 0.022 to 0.258) emerged as significant independent predictors of kinesiophobia in MS patients.

Conclusions: These findings highlight kinesiophobia as a clinically relevant problem in MS. Its severity is strongly influenced by anxiety, as well as reduced physical activity and older age, underscoring the need for integrated behavioral and rehabilitative approaches.

Keywords: Anxiety, Depression, Fatigue, Multiple Sclerosis, Pain, Quality of Life

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Evaluation of the Effectiveness of Super Inductive Stimulation (SIS BTL) in Reducing Pain in the Treatment of Tennis Elbow

Introduction: Tennis elbow (lateral epicondylitis of the humerus) is a common musculoskeletal disorder that leads to chronic pain and functional limitations of the upper limb. Despite the widespread use of physiotherapeutic methods, there are no clear guidelines that define the most effective treatment strategy. In recent years, Super Inductive Stimulation (SIS) has gained increasing interest; however, scientific evidence regarding its effectiveness remains limited.

Materials and Methods: The study included 34 patients diagnosed with tennis elbow confirmed by ultrasonographic examination, who were randomly assigned to a control group (n = 14) or an experimental group (n = 19). Both groups underwent a two-week rehabilitation program consisting of therapeutic exercises, ultrasound therapy, cryotherapy in the form of ice cube self-massage, and high-intensity laser therapy (HIL). The experimental group additionally received Super Inductive Stimulation (SIS) using a high-intensity electromagnetic field. Evaluations were performed before and after the intervention using the numerical rating scale (NRS), the Patient-Rated Tennis Elbow Evaluation (PRTEE) questionnaire and provocative tests (Cozen's, Maudsley's, Mill's, Selfie's, and Thomsen's maneuver).

Results: A statistically significant reduction in pain intensity was observed in both groups following the intervention. The experimental group demonstrated a statistically significant greater reduction in pain during three of the five provocative tests compared to the control group. No significant differences were observed between groups in the NRS and PRTEE scores.

Conclusions: Super Inductive Stimulation may be an effective adjunct to standard physiotherapy in the treatment of tennis elbow. Further studies are recommended involving larger sample sizes and longer follow-up periods to better evaluate the effects of this modality on musculoskeletal disorders.

Keywords: lateral epicondylitis, Super Inductive Stimulation, pain management, musculoskeletal disorders, PRTEE questionnaire

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Hydrokinesotherapy for patients with transtibial and transfemoral amputation

Introduction: Due to the war in Ukraine, lower limb amputation is currently a common injury. Analysing data from A.V. Shvets (2022) for 2014-2021, among military personnel participating in the Anti-Terrorist Operation (ATO), 66.10% of the total number of people with amputations had amputations of one lower limb. According to data from S.O. Guryev (2021), among a sample of wounded persons with limb injuries related to the anti-terrorist operation in eastern Ukraine, 6.44% sustained transtibial amputations and 1.09% sustained transfemoral amputations. In order to improve the functional status and quality of life of patients with amputations, the use of hydrokinesotherapy by physical therapists may be the optimal option. The advantages of using this method are due to the physical properties of water: buoyancy, temperature, hydrostatic pressure, density and viscosity. These features are important for people with amputated limbs, as they allow them to perform physical exercises with reduced stress on the joints and minimal risk of overload, which are crucial for restoring mobility and functional independence. The aim of this study is to describe and substantiate the effect of hydrokinesitherapy on patients with transtibial and transfemoral amputation.

Materials and Methods: Six patients aged 18-50 who underwent amputation within 1-6 months will participate in the study. The programme will last 4 weeks with sessions held 3 times a week for 30 minutes. The following clinical instruments will be used during the examination: manual muscle testing (MMT) to assess muscle strength, measurement of oedema by measuring limb circumference, the Berg Balance Scale to assess patients' balance before and after hydrokinesitherapy sessions, the American Mobility Scale AMPPRO and AMPnoPRO to assess the functional status of people with lower limb amputation with and without a prosthesis, a visual analogue scale (VAS) to assess pain, and the Hospital Anxiety and Depression Scale (HADS). Physical therapy measures will be aimed at: improving lower limb muscle strength, improving balance and mobility, reducing swelling, reducing pain in the limbs, and reducing anxiety levels.
Results: Expected results include increased muscle strength in the lower extremities, improved functional mobility, improved balance, and reduced pain and anxiety.
Keywords: hydrokinesotherapy, amputation, balance, muscle strength

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The Effectiveness of Inspiratory Muscle Training in the Management of Patients with Long-term COVID-19

Introduction: In some individuals, persistent symptoms following COVID-19 include dyspnea and reduced exercise tolerance. Increased load on the inspiratory muscles, as observed in chronic respiratory diseases, may be due to reduced inspiratory muscle strength, as well as unfavorable changes in airway resistance and chest wall mechanics. Inspiratory muscle training may improve respiratory muscle strength, exercise capacity, and structural and functional parameters of the diaphragm, particularly in individuals with reduced inspiratory muscle strength, suggesting the potential usefulness of this intervention.
Materials and Methods: This study is a review of the literature based on the analysis of experimental studies, systematic reviews, and meta-analyses published over the last 5 years. Publications evaluating the effects of inspiratory muscle training on persistent symptoms after COVID-19 were included.
Results: Identified studies indicate that respiratory muscle training was associated with improvements in respiratory muscle strength and aerobic capacity, which can translate into clinically meaningful improvements in dyspnea questionnaire scores. Compared to control groups, participants who received training demonstrated significant increases in inspiratory muscle strength, increased diaphragm thickness, and longer distance covered in the 6-minute walk test.
Conclusions: Inspiratory muscle training can improve exercise tolerance and selected parameters of respiratory function in patients after COVID-19. Therefore, it may represent a useful rehabilitation strategy, including home-based programs, as part of comprehensive rehabilitation for patients with persistent symptoms.
Keywords: physiotherapy, long-term COVID, inspiratory muscle training

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Referral of female patients to urogynecological physiotherapy in medical practice – frequency, indications, availability, and barriers: A cross-sectional study

Introduction: Urogynecological physiotherapy is a significant element in the management of pelvic floor dysfunction. However, in medical practice, its utilization depends on the frequency of patient referrals, knowledge of indications, and availability of services. Data on these aspects among physicians remain limited.

Materials and Methods: A cross-sectional study was conducted using an original anonymous questionnaire. The study was carried out among physicians between November 5 and December 31, 2025. Analysis was performed using descriptive statistical methods.

Results: The questionnaire was completed by 102 physicians; 94.0% were women, and the most common age group was 31-40 years (61.8%). Knowledge of the concept of urogynecological physiotherapy was declared by 89.2% of respondents. A lack of patient referrals was reported by 49.0%, while 36.3% referred a few patients per year, and 10.8% at least once a month. The availability of services in their workplace was most often rated as negligible (45.1%) or difficult to assess due to lack of familiarity (29.4%), and in their region as limited (57.8%). Among those not referring patients, the most frequently cited reasons were patients not reporting problems that are indications (51.7%), insufficient knowledge (18.4%), and not considering this form of management (13.8%). The most common indications for referral were urinary incontinence (75.0%), pelvic pain (48.2%), and the pregnancy and postpartum period (44.6%). Regarding future practice, respondents most frequently declared that they would consider referral for urinary incontinence (97.0%), pelvic pain (91.1%), and pelvic organ prolapse (89.1%).

Conclusions: Despite the high acceptance of the role of urogynecological physiotherapy in the treatment of pelvic floor disorders, the practice of referral by physicians remains limited. The main barriers are the perceived low availability of services and the gaps in knowledge and organizational awareness. The results indicate the need for educational initiatives and improved access to urogynecological physiotherapy within the healthcare system.

Keywords: urogynecological physiotherapy, healthcare accessibility, physiotherapy

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Assessment of the impact of community rehabilitation on pain levels in the elderly: A systematic review

Introduction: Pain-related complaints constitute a significant health problem in the older adult population, substantially affecting functional capacity and quality of life. Previous systematic reviews of randomized controlled trials have not sufficiently addressed the impact of home-based rehabilitation on the subjective assessment of pain intensity. The aim of this study was to evaluate the effectiveness of home-based rehabilitation in reducing pain-related symptoms in older adults.

Materials and Methods: The systematic review was conducted in accordance with the PRISMA guidelines. Two independent reviewers searched the PubMed, PEDro, Cochrane Library, Google Scholar, and Epistemonikos databases to identify randomized controlled trials investigating home-based rehabilitation. The search strategy initially used the keyword "home-based rehabilitation", yielding 13,025 records, and was subsequently refined by adding the term "pain", resulting in 94 publications. Full-text articles were assessed after the removal of duplicates and protocols of planned studies. Ultimately, seven studies were included, and their methodological quality was evaluated using the PEDro scale. Pain intensity outcomes were analyzed using the Visual Analogue Scale (VAS) and the Numerical Rating Scale (NRS).

Results: The included studies addressed a wide range of clinical conditions managed with home-based rehabilitation. Therapeutic programs were individualized, tailored to patients' needs, and comprised multicomponent interventions based on progressive exercise and patient education. Most studies demonstrated a statistically significant reduction in pain intensity following home-based rehabilitation. Some authors also reported potential benefits associated with the use of technology as a form of biofeedback in the home setting. No statistically significant differences in pain reduction were observed between ambulatory rehabilitation programs and home-based rehabilitation.

Conclusions: Individualized home-based rehabilitation programs significantly reduce pain intensity in both postoperative patients and individuals with chronic pain. The analyzed evidence indicates that home-based rehabilitation in older adults is effective, well tolerated, and potentially associated with lower healthcare system costs.

Keywords: older adults, home-based rehabilitation, pain, domiciliary rehabilitation

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Experience with the Use of the APPP® Concept in Post-Stroke Rehabilitation – A Case Study

Introduction: The concept of autoreflexive prenatal and postnatal therapeutic positions (APPP®) is based on principles of psychomotor development and integrates reflex locomotion with consciously controlled kinesiotherapy. Objective: The aim of this case study was to evaluate the effect of standard rehabilitation treatment supplemented with the APPP® concept on activities of daily living, spasticity, and gross motor function in a patient with chronic stroke.

Materials and Methods: A rehabilitation intervention using APPP® therapeutic positions was applied in a patient more than one year after a hemorrhagic stroke with right-sided hemiparesis. Selected functional and qualitative parameters were assessed.

Results: Following the rehabilitation intervention, an improvement in the Barthel Index score was observed, shifting from a moderate to a mild level of dependency. A reduction in spasticity of the right hemiparesis according to the Ashworth Scale was recorded, along with improvements in static balance, mobility of the right knee joint, and gait pattern using two forearm crutches. Additionally, improvement in fine motor skills of the right hand and resolution of pain in the right shoulder region were noted.

Conclusion: Post-therapy improvements were observed in the monitored parameters, indicating the applicability of the APPP® concept as a complementary approach to standard post-stroke rehabilitation.

Keywords: APPP®, rehabilitation, stroke, activities of daily living, mobility

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Virtual reality in the rehabilitation of patients with multiple sclerosis – a literature review

Introduction: Modern technologies like virtual reality (VR) are increasingly used in multiple sclerosis (MS) rehabilitation, offering benefits through increased motivation and biofeedback.

Aim of the study: To review scientific literature regarding VR use in MS rehabilitation and evaluate its effectiveness.

Material and methods: A review of PubMed, Scopus, Web of Science, and Google Scholar (2020–2025) was conducted. Keywords: virtual reality, motor functions, cognitive functions, multiple sclerosis. Inclusion criteria: randomized controlled trials and VR interventions in MS patients improving motor/cognitive functions or quality of life. Case studies and systematic reviews were excluded.

Results: VR significantly improves balance, postural control, quality of life, and cognitive functions. VR training stimulates neuroplasticity and affects gait parameters by increasing patient engagement through biofeedback.

Conclusions: Modern technologies allow for therapy intensification unattainable by traditional methods. Personalized training focused on specific neurological deficits is key. Due to a lack of global evidence in every field, more extensive analyses are required.

Keywords: multiple sclerosis, virtual reality, neurorehabilitation

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Development of children, adolescents, and young adults with cerebral palsy according to ICF, beyond body structure and function: A research review

Introduction: The application of the International Classification of Functioning, Disability and Health (ICF) Core Sets enables the standardization of assessment and the identification of functional profiles in individuals with cerebral palsy (CP). This study aims to identify development determinants in children (0-12 years), adolescents (13-17 years) and young adults (18-35 yrs) with CP in relation to the ICF components of activity and participation, while considering relevant contextual factors.

Materials and methods: Studies addressing the development of the age groups with CP were included. A search for eligible studies was carried out in the MEDLINE, CINAHL, and PubMed databases, published between 2019-2025. Crucial key words: CP, participation, activity, and development. The findings of the included studies were classified according to the ICF components.

Results: 12 studies involving a total of 1,905 individuals with CP were included. Children constituted the largest study group, followed by adolescents, and young adults being the least represented. Most studies (83.3%; n=10) addressed more than one ICF component. Participation was examined in all studies (100%; n=12), activity (41.6%; n=5) and environmental factors (33%; n=4). Personal factors were addressed the least frequently (8.3%; n=1).

Conclusions: The findings demonstrate considerable variability in activity and participation among individuals with CP. Studies that focused on children predominantly addressed participation in family, school, and recreational activities. In adolescence, greater emphasis was placed on peer relationships and social participation. In young adults, the focus was primarily on independence, including education and employment. Contextual factors, such as the environment, family support, healthcare services, and accessibility, including assistive devices and technologies, play a critical role in enhancing independence and promoting social participation.

Keywords: CP, ICF, participation

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The Use of Virtual Reality in Physiotherapy for Patients with Chronic Low Back Pain: A Review of Current Evidence

Introduction: Chronic low back pain is one of the most common clinical problems in physiotherapy and significantly affects functional capacity and quality of life. The effectiveness is often limited, particularly in the presence of psychosocial factors such as kinesiophobia and pain catastrophizing. Recently, virtual reality (VR) has gained increasing attention as a supportive tool in physiotherapy. **Aim:** The aim of this study was to present current evidence on the use of virtual reality in physiotherapy for patients with chronic low back pain.
Materials and Methods: A narrative review of the literature was conducted using the PubMed, Scopus, Web of Science. Publications from 2020–2025 involving adult patients with chronic low back pain were analyzed.
Results: The reviewed studies indicate that VR-based interventions may lead to short-term pain reduction and moderate functional improvement. Some studies also reported reduced kinesiophobia and increased patient engagement.
Conclusions: Virtual reality appears to be a promising adjunct to standard physiotherapy for patients with chronic low back pain, particularly as part of a hybrid therapeutic approach.
Keywords: chronic low back pain, virtual reality, physiotherapy

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Contemporary approach to the diagnosis, surgical treatment, and rehabilitation of anterior cruciate ligament injuries

Introduction: Anterior cruciate ligament (ACL) injuries are among the most common and clinically burdensome knee injuries in physically active individuals. Despite significant advances in diagnostic imaging, surgical techniques, and rehabilitation strategies, long-term treatment outcomes remain unsatisfactory, and the risk of re-injury remains high. The aim of this study was to present and critically discuss contemporary approaches to the diagnosis, surgical treatment, and rehabilitation of ACL injuries, with particular emphasis on the limitations of current clinical standards.

Materials and Methods: This study is a narrative review. The literature search was conducted using the PubMed/MEDLINE, Scopus, and Web of Science databases, covering publications from 2015 to 2025. Original studies, randomized controlled trials, systematic reviews, meta-analyses, and clinical practice guidelines related to ACL injury management were included.

Results: Clinical examination remains the cornerstone of ACL injury diagnosis, while magnetic resonance imaging enables structural assessment of the ligament but does not fully reflect functional knee stability. Anatomical reconstruction of the ACL represents the standard of care; however, there is no clear evidence supporting the superiority of a specific graft type. In rehabilitation, criterion-based approaches, neuromuscular training, and movement quality control are of key importance. Psychological factors also play an important role in return-to-activity outcomes.

Conclusions: Management of ACL injuries requires a comprehensive and individualized approach integrating accurate diagnosis, surgical treatment, and functional rehabilitation.

Keywords: anterior cruciate ligament injury, rehabilitation, return to sport, neuromuscular control

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University of Rzeszów, Student Scientific Club Fascinations with Body Posture "Habitus"

The impact of body posture parameters on the severity of gastrointestinal symptoms in individuals aged 18–29 years

Introduction: Spinal curvatures play a key role in maintaining proper posture and shock absorption. Their disturbances may cause biomechanical changes, pain, and indirectly influence the function of the digestive system. Gastrointestinal complaints have a multifactorial etiology. This study aimed to assess the relationship between spinal sagittal curvatures, trunk rotation, and gastrointestinal symptoms in young adults.

Material and Methods: The study involved 118 students aged 18 to 29 years. Spinal curvatures were measured with an inclinometer, trunk rotation with a Bunnell scoliometer, and gastrointestinal complaints were assessed using a 15-item GSRS-based questionnaire. Statistical analysis included the Mann–Whitney U test, chi-square test with Yates' correction, and Spearman's rank correlation.

Results: 55.9% of the participants reported no or minimal gastrointestinal symptoms, 42.4% mild symptoms by 42.4%, and moderate symptoms by 1.7%. No significant correlations were found between spinal parameters and gastrointestinal complaints. Reduced lumbar lordosis was the most common postural deviation (70.3%), followed by reduced thoracic kyphosis (30.5%) and decreased sacral inclination (27.1%). Trunk rotation greater than 4° occurred in 16.1% of the participants.

Conclusions: The results did not confirm frequent gastrointestinal complaints, significant postural disorders, or associations between them. More research in populations with more severe gastrointestinal symptoms, focusing on a holistic approach to posture and digestive system.

Keywords: posture, spinal curvatures, gastrointestinal complaints, GSRS

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The use of robotics in upper limb neurorehabilitation after stroke: A case study

Introduction: The aim of this paper is to present and evaluate the use of Alex robot in the rehabilitation of the upper limb in a patient following a severe ischemic stroke. The case study aims to investigate the impact of intensive robot-assisted training including bilateral exercises and virtual reality games, on the motor function of the paretic limb.

Material and Methods: A 64-year-old patient in the subacute phase after a severe ischemic stroke with right-sided hemiparesis participated in the study. As part of a comprehensive rehabilitation program, a 9-day intervention using the Alex robot was implemented. Daily, one-hour sessions included passive movements, bilateral training, and task-oriented virtual reality games. Changes in upper limb function were assessed using clinical scales, including the Fugl-Meyer Assessment (FMA), as well as measurements of range of motion and muscle strength.

Results: At the end of the therapy, a slight but measurable improvement in the range of motion of the shoulder joint and supination of the forearm was observed. An increase in muscle strength was also noted in key flexor muscle groups. The most significant outcome was the emergence of initial volitional movements within the flexor synergy pattern, confirmed by the Fugl-Meyer Assessment.

Conclusions: Robot-assisted therapy, when integrated with traditional rehabilitation, is a valuable treatment method for patients with severe upper limb paresis after a stroke. Its main advantage is the ability to deliver intensive training with a high number of repetitions, which is crucial for neuroplasticity. The combination of bilateral training with virtual reality and gamification can initiate the recovery process by providing sensorimotor stimuli and encouraging the emergence of voluntary movements.

Keywords: Ischemic Stroke, Neurorehabilitation, Robotic Rehabilitation, Upper Extremity, Neuroplasticity, Virtual Reality

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Developmental Epileptic Encephalopathy and Rehabilitation

Introduction: Developmental epileptic encephalopathies are a group of severe epileptic syndromes that manifest primarily in patients of developmental age. They are diverse in terms of etiopathogenesis. A significant symptom is epileptic seizures, which are difficult to control with standard antiseizure medications. Abnormal bioelectrical brain function leads to developmental regression. Comorbid motor, cognitive, and speech development disorders occur. The aim of this study is to demonstrate the importance of rehabilitation in the treatment of patients with developmental epileptic encephalopathy.

Method: A review of the literature demonstrated that rehabilitation, along with treatment aimed at reducing/eliminating seizure frequency, is an essential component of multidisciplinary therapy.

Results: Rehabilitation is based on an individual approach and includes stimulation of: motor development led by a physiotherapist (kinesiotherapy, physical therapy, massage), cognitive development led by a psychologist and pedagogue, speech development led by a speech therapist, and self-care activities led by an occupational therapist. During rehabilitation, it is important to avoid factors that trigger seizures. It is also crucial to remove architectural and environmental barriers, and to determine the location and method of education. Proper nutrition is also an important aspect.

Conclusion: Rehabilitation plays an important role in supporting motor, cognitive, and speech development in patients with developmental epileptic encephalopathy.

Keywords: developmental epileptic encephalopathy, rehabilitation

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The Impact of Regular Physical Activity on Mental Health in People Under 18 Years of Age

Introduction: The World Health Organization defines health as a state of complete physical, mental, and social well-being, emphasizing the key role of mental health in overall human functioning. It is shaped by the complex interaction of biological, social, economic, and environmental factors, and therefore requires an interdisciplinary approach. Research indicates that appropriately planned physical activity can have a beneficial effect on the mental health of children and adolescents, constituting an important element of prevention and mental health support. The purpose of this review is to assess evidence on the relationship between physical activity and mental health in people under 18 years of age.

Materials and Methods: The review was conducted in accordance with the PRISMA guidelines. The search was conducted in December 2025. PubMed and Scopus databases were searched for randomized controlled trials that assessed the impact of physical activity on mental health in people under the age of 18. Ten articles meeting the inclusion criteria were included in the review.

Results: Most of the study participants were between the ages of 10 and 18. Various methods of physical activity, such as high intensity interval training, neuromuscular training, plyometric training, and spontaneous physical activity, may affect mental health in people under 18 years of age.

Keywords: Sport, mental health, physical activity

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Small Steps, Big Progress – Rehabilitation of Children with Cerebral Palsy

Introduction: Cerebral palsy (CP) is one of the most common causes of permanent motor disability in children. The rehabilitation process is long-term and requires an individualized approach that takes into account the abilities and needs of both the child and his family. Increasing emphasis is placed on achieving functional goals through small-scale therapeutic interventions.

Materials and Methods: This study is a descriptive and narrative review. It is based on an analysis of articles retrieved from the PubMed and Google Scholar databases.

Results: The application of strategies based on small achievable goals combined with regular therapy leads to gradual improvements in the functioning of children with cerebral palsy. Increases in independence in activities of daily living, improved postural control, and greater involvement of the child in therapy were observed. The inclusion of play-based elements and caregiver education was found to be of significant importance.

Conclusions: Rehabilitation of children with cerebral palsy should focus on small therapeutic steps that, over time, result in meaningful functional improvements. Regularity, individualization of therapy, and cooperation with the family are key elements of an effective rehabilitation process.

Keywords: cerebral palsy, pediatric rehabilitation, functional therapy, early intervention

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Assessment of the spine in the frontal and transverse planes in people with intellectual development disorders

Introduction: Most of the latest scientific reports concern the spine formation in children and adolescents within the intellectual norm, while in people with intellectual development disorders (IDD) mobility and stability are most often examined. **Aim:** The objective of the study is to assess body posture in the frontal and transverse planes in people with mild and moderate intellectual development disorders. **Material and method:** The study was conducted at the UNICEF Special School in Rzeszów. 159 people with mild and moderate IDD were qualified, including 80 women and 79 men aged 10-23. The control group (CG) consisted of 159 people and was consistent with the age and sex of the study group. The Mora 4G CQ Elektronik System device was used to assess body posture. Statistical analyses were performed using the following tests: Mann-Whitney U, t-test, Spearman's rank correlation coefficient and Pearson's linear correlation.

Results: Women with IDD had statistically significantly higher values of the posterior trunk symmetry index (p=0.000) as well as right-sided trunk flexion (p=0.001), right shoulder elevation (p=0.033), posterior deviation of the inferior scapular angle on the right side (p=0.037), right-sided pelvic rotation (p=0.044), and right rib hump or lumbar ridge (p=0.025). Men with IDD had higher values of the posterior trunk symmetry index (p=0.000).

Conclusions: People with mild to moderate IDD are characterized by increased trunk asymmetry in the frontal plane.

Keywords: intellectual disability, trunk asymmetry, scoliosis

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The Role of Ocular Occlusion in the Motor Reeducation Process of a Post Stroke Patient with Diplopia: A Case Study

Introduction: Double vision, called diplopia, is one of the common consequences of stroke. This disturbance significantly affects the patient's ability to maintain postural stability, maintain balance, and move safely within their environment. Aim of the study: The aim of this study was to present the impact of ocular occlusion on the outcomes of a rehabilitation program in a patient suffering from poststroke diplopia.

Material and Methods: A clinical case of a 67-year-old man was analyzed, in whom secondary diplopia developed following an ischemic stroke located in the right cerebral hemisphere. The patient's rehabilitation program combined neurophysiologically based therapy, balanceoriented exercises, and gait pattern reeducation. The intervention primarily consisted of applying occlusion to the right eye using an eye patch for a period of six weeks, both during supervised rehabilitation sessions and throughout daily ambulation.

Results: The application of ocular occlusion resulted in a marked reduction in the patient's fear of falling, which was correlated with an objective improvement in postural control. Clinical observations also demonstrated increased independence in ambulation, while beneficial changes in gait parameters were confirmed by improvements in the Tinetti Performance-Oriented Mobility Assessment and the Timed Up and Go test.

Conclusions: It was demonstrated that unilateral ocular occlusion constituted an effective, although temporary, adjunctive method supporting the motor rehabilitation process in the analyzed patient with poststroke diplopia. However, to draw definitive conclusions, further research involving a larger cohort of stroke patients is required.

Keywords: stroke, rehabilitation, diplopia

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Assessment of the Impact of Rehabilitation in a Patient with Parkinson's Disease on Gait and Balance Function: A Case Study

Introduction: The aim of this study was to evaluate the effect of a comprehensive rehabilitation program on gait function, balance, and lower limb muscle strength in a patient with Parkinson's disease.

Material and Methods: A 67-year-old patient diagnosed with idiopathic Parkinson's disease, classified as stage II according to the Hoehn and Yahr scale, was analyzed. Functional evaluation was performed twice: prior to the initiation of therapy and after completion of a 6-week rehabilitation program. The assessment included the Timed Up and Go Test, the 10-Meter Walk Test, Berg Balance Scale, and the evaluation of muscle strength using the Lovett scale for the hip and knee extensors of the lower limbs. Additionally, the range of motion in the ankle joint was assessed. The rehabilitation program comprised exercises aimed at postural stabilization, balance training, and gait reeducation. Therapy was supplemented with visual and auditory cue techniques and proprioceptive neuromuscular facilitation methods.

Results: Upon completion of the rehabilitation program, favorable changes were observed in all analyzed functional domains. The strength of the muscle groups and the range of dorsiflexion in the ankle joint improved. Additionally, performance in the Timed Up and Go Test, the 10-Meter Walk Test, and the Berg Balance Scale showed marked improvement, confirming enhanced postural stability.

Conclusion: A multidirectional rehabilitation approach resulted in a marked improvement in gait and postural stability. It can be concluded that balance training combined with PNF techniques and gait reeducation positively influences the quality and efficiency of locomotion. Further research should be extended to a larger cohort of individuals with Parkinson's disease.

Keywords: Parkinson's disease, rehabilitation, gait, balance

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Pilates – a returning trend or an evidence-based method of educational kinesitherapy?

Introduction: Introduction: The Pilates method (originally called "Contrology"), which evolved from early clinical and artistic practices, is now being analyzed in terms of biomechanics and neurophysiology. This study aims to verify its effectiveness in the EBM paradigm. This system, through the activation of central stabilization and optimization of motor control, is a fully-fledged method of kinesitherapy. It is highly effective in the treatment of spinal pain syndromes and in neurological and geriatric rehabilitation.

Material and Methods: A review of the literature from 2015 to 2025 was performed using the PubMed, Google Scholar, and Clinical Trials. Mainly meta-analyses and randomized controlled clinical trials were analyzed. Comparisons were made based on the effect of Pilates on pain intensity, functional disability, muscle strength, flexibility, and balance in different groups of patients.

Results: The analyzed data show that the Pilates method is comparable in effectiveness to other forms of active therapeutic exercise in reducing pain and improving function in patients with nonspecific low back pain (LBP). The studies also confirm the positive effect of the method on improving walking and balance parameters in patients with multiple sclerosis (MS) and Parkinson's disease. In the geriatric patient group, a significant reduction in the risk of falls was observed through improved proprioception and the strength of the muscles that stabilize the torso.

Conclusions: Pilates is not just a trend, but a form of kinesitherapy supported by EBM. The therapeutic key is the re-education of breathing and postural patterns, optimizing functional efficiency. This method is recommended for musculoskeletal rehabilitation and the prevention of lifestyle diseases and requires specialist supervision to ensure precision and safety.

Keywords: Pilates, kinesitherapy, core stabilization, EBM

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Effects of Buerger's exercise on d-dimers level in patients after hip arthroplasty

Introduction: D-dimer assays are commonly used in clinical practice to exclude a diagnosis of deep vein thrombosis with ultrasound examinations. Deep Vein Thrombosis (DVT) is a fatal complication of hip arthroplasty. Ultrasound examinations are helpful in DVT rehabilitation to control deep vein thrombosis in lower extremities. The aim of our study was to examine the role of Buerger's exercise on d-dimer levels after hip arthroplasty.

Material and methods: the study included 52 patients after hip arthroplasty, mean age was 69 years, min.44, max.89, M:F 1:2; with BMI, median 32,65, SD ± 4,08. 28 patients performed Buerger's exercise and a control group of 26 patients - isometric exercises. D-dimer levels were examined at admission and after 4 weeks of rehabilitation. Ultrasound examinations were performed using Hitachi Arietta Ultrasound.

Results: Analysis of the results showed a statistically significant decrease ($p<0,01$) in the levels in patients with Buerger's exercises and in the control group ($p<0,03$). The study did not show any difference in the type of exercise on d-dimers levels. We found correlations at admission: between BMI and d-dimer level (Corr 0,36), in women BMI and d-dimer level (Corr. 0,43), and in men BMI and d-dimer (Corr. 0,17). In the ultrasonography study: 13 % (n=7) patients with old thrombosis, 22% (n=12) patients with inefficient perforators were found.

Conclusions: Buerger's exercise and isometric exercise reduced the risk of DVT after hip arthroplasty. This study confirmed the significant impact of exercises on the levels of d-dimers after hip arthroplasty. The D-dimer cannot be used to exclude DVT without ultrasound confirmation.

Keywords: D-dimers, Buerger's exercise, hip arthroplasty, ultrasonography

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The effect of rehabilitation after hip and knee arthroplasty on plasma levels selected IL-8

Introduction: Osteoarthritis (OA) is the most common joint disorder and one of the leading causes of disability in patients. Its pathogenesis is associated with obesity and metabolic syndrome through systemic mechanisms. Diabetes has been described as an independent risk factor for OA. Besides other processes, the pathogenesis of diabetes involves the essential role of cytokines, particularly the IL-8 family cytokines.

Material and Methods: A total 30 candidates with osteoarthritis after hip and knee arthroplasty will be included in the study. They will be divided into two subgroups: 15 with diabetes II and 15 without diabetes. Patients with a known chronic inflammatory disease will be excluded. The patients will begin a general rehabilitation protocol after arthroplasty. Blood samples for IL-8 will be collected on the first day and the last day of rehabilitation. Il-8 parameters will be quantified using Elisa available kits. Statistical analysis will be performed using the Statistica data analysis software system.

Results: Since rehabilitation reduces pain and improves patient performance, it may be presumed that diabetic patients with osteoarthritis after hip and knee arthroplasty may particularly benefit from rehabilitation. It is important to reveal the molecular background of this phenomenon and find out whether rehabilitation regiment applied to surgical patients may influence the level of IL-8.

Conclusions: The clinical impact of the project is the beneficial effect of rehabilitation in patients with OA and diabetes II. Furthermore, this research will be a novel study of Il-8 in rehabilitation after hip and knee arthroplasty. The role of rehabilitation on inflammatory system is still unknown. Conclusions may be used in clinical hospitals to improve the health of patients, especially those with additional complications, such as type II diabetes.

Keywords: Osteoarthritis, knee and hip arthroplasty, interleukin Il-8

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Functional Recovery Beyond Motor Improvement: A Pilot Study in Post-Stroke Patients

Introduction: The aim of this study was to evaluate the effect of early versus delayed neurorehabilitation in patients after ischemic stroke on functional motor, cognitive, and psychosocial status, and to analyze the impact of associated comorbidities on rehabilitation outcomes.

Material and Methods: The study included 46 patients after ischemic stroke, with a mean age of 63 years. Functional status was assessed using the Functional Independence Measure + Functional Assessment Measure (FIM+FAM). The patients were divided into two groups: an early rehabilitation group (rehabilitation initiated within 32 hours after hospitalization, n = 25) and a delayed rehabilitation group (rehabilitation initiated approximately 72–96 hours after hospitalization, n = 21). Assessments were performed at baseline, after 4 weeks and at a 3-month follow-up. Statistical analysis included the Shapiro–Wilk test, the independent samples t-test, Mann–Whitney U test, and Kruskal–Wallis test ($\alpha = 0.05$).

Results: Patients who started rehabilitation earlier achieved significantly better discharge and follow-up FIM+FAM scores (discharge $p = 0.012$; follow-up $p < 0.001$). The most pronounced improvements were observed in the motor domain and basic activities of daily living (ADL). The effect of associated comorbidities on discharge FIM+FAM scores was not statistically significant ($p=0.051$), although a trend toward lower scores with a higher number of comorbidities was observed.

Conclusions: Early neurorehabilitation after stroke has a positive effect on the functional status in both the short- and medium-term. These findings support the early initiation of comprehensive multidisciplinary rehabilitation and the importance of addressing the psychosocial aspects of recovery.

Keywords: stroke, FIM+FAM, neurorehabilitation

This study was conducted within the framework of the project: Nanovic Institute for European Studies at the Keough School of Global Affairs, University of Notre Dame.

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Postural Deviations in Children: Implications for Early Identification and Prevention

Introduction: The purpose of this study was to identify the body segments that most strongly influence the development of pathological posture in children by integrating statistical approaches based on frequency and causality.

Material and methods: Children aged 5 to 8 years were examined using Wolanski's methodology. The postural status was classified into categories A–D (B, C, and D pathological). First, a Segment Severity Index (SSI) was calculated from frequency data to quantify the prevalence and severity of segmental impairments. Second, the direct relationship between segmental malalignment and pathological posture was analyzed using chi-square tests and odds ratios (OR). Finally, a multivariate logistic regression model was used to identify independent predictors of pathological posture.

Results: The highest SSI values were observed in the shoulders, scapulae and head, indicating a high prevalence of visible segmental impairments. However, association analysis revealed that pathological posture was most strongly linked to pelvic malalignment (OR ≈ 3.1, $p < 0.001$) and lumbar spine malalignment (OR ≈ 3.4, $p < 0.001$). The alignment of the thoracine spine showed a moderate association (OR 2.1, $p < 0.01$), while shoulders and scapulae demonstrated only secondary effects. In the multivariate model, pelvic and lumbar spine alignment remained the only independent predictors of pathological posture.

Conclusions: Segments with the highest frequency of impairment are not necessarily the primary determinants of pathological posture. The alignment of the pelvic and lumbar spine plays a decisive causal role in the development of postural disorders in children aged 5 to 8 years. Preventive programs should focus primarily on pelvic stabilization and axial spinal control rather than solely on visually apparent upper-body deviations.

Keywords: posture disorders, segment deviation, prevention.
The study was conducted within the project: APVV-24-0251.

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Prehabilitation Before Total Hip Arthroplasty: The Impact of Adherence to a Preoperative Physiotherapy Program on Length of Hospital Stay and Strength and Myotonometry Outcomes: A Pilot Study

Introduction: Assessing exercise-based prehabilitation before total hip arthroplasty can support optimization of patient preparation and postoperative care. This study aimed to analyze the association between adherence to the exercise program and changes in clinical and biomechanical outcomes, as well as length of hospital stay (LOS).

Materials and Methods: A single-center pilot observational study was conducted at the Department of Orthopedics and Traumatology, Medical University of Lublin, in adult patients with hip osteoarthritis scheduled for elective total hip arthroplasty. The intervention consisted of strengthening and stretching exercises. Functional evaluations were performed at several perioperative time points and included measurements using dynamometry, the MyotonPRO device, functional tests and the 10-meter walk test (10MWT), as well as the Hip disability and Osteoarthritis Outcome Score (HOOS) questionnaire.

Results: Forty-one patients were included. Higher adherence was significantly associated with a greater improvement in muscle strength measured by digital dynamometry: flexors $\beta = 0.388$ per 10 percentage points (95% CI: 0.093 to 0.683, $p = 0.010$), adductors $\beta = 0.322$ (95% CI: 0.058 to 0.585, $p = 0.017$) and abductors $\beta = 0.546$ (95% CI: 0.050 to 1.041, $p = 0.031$). In myotonometry, adherence was associated with changes in the adductors' F parameter (a marker of resting muscle tone), $\beta = 0.279$ per 10 percentage points (95% CI: 0.036 to 0.521, $p = 0.024$). Higher adherence was associated with shorter LOS, $\beta = -0.122$ days per +10 percentage points (95% CI: −0.176 to −0.068, $p = 0.000010$).

Conclusions: Adherence to pre-habilitation was associated with improved strength of selected muscle groups and favorable changes in a myotonometric parameter, while 10MWT performance depended more strongly on age and BMI.

Keywords: prehabilitation, adherence, dynamometry.

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Use of Physical Therapy with IASTM Techniques and Functional Training in Improving Hand Function in Children with Spastic Hemiparesis

Introduction: Spastic hemiparesis in children leads to significant impairments in upper limb function, limiting independence and participation in activities of daily living. Disorders of hand motor control, coordination, and precision significantly affect a child's quality of life and social functioning. Therefore, the search for effective physiotherapeutic approaches, including modern methods that combine various therapeutic techniques, remains an important clinical challenge. The aim of this study was to assess the impact of physical therapy using IASTM techniques and functional training on improving hand function in children with spastic hemiparesis.

Materials and methods: The study included children with spastic hemiparesis who participated in an outpatient physical therapy program. The rehabilitation program consisted of individually tailored instrument-assisted soft tissue mobilization (IASTM) techniques and functional exercises aimed at improving grasp, motor coordination, and motor control of the upper limb. The assessment process included selected functional tests of the upper limbs, clinical observation, and tools that allow evaluation of functional performance and quality of movement. Therapy sessions were carried out systematically, taking into account the psychophysical abilities of the children.

Results: After completion of the rehabilitation program, improvements in hand function were observed, including greater precision of movement, better grip control, and greater independence in daily living. Positive changes in movement coordination and smoothness of upper limb movements were also noted. The results obtained indicate a beneficial effect of combining IASTM techniques with functional training on improving hand function in children with spastic hemiparesis.

Conclusions: The use of physical therapy that incorporates IASTM techniques and functional training contributes to improved hand function, increased independence, and enhanced quality of daily activities in children with spastic hemiparesis. The combination of these therapeutic approaches may constitute an important element of comprehensive pediatric rehabilitation.

Keywords: spastic hemiparesis, physical therapy, IASTM, functional training, hand function, children, rehabilitation

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Unilateral Spatial Neglect in Post-Stroke Patients: A Review of Physiotherapeutic Interventions

Introduction: Unilateral spatial neglect is a common consequence of stroke and substantially reduces functional independence, therefore it requires targeted neurological rehabilitation that integrates both motor and cognitive interventions.

Materials and Methods: This study is a review of the narrative literature including contemporary publications on unilateral spatial neglect in post-stroke patients and physiotherapeutic and neurorehabilitation methods used in this clinical condition.

Results: The literature indicates that the most effective approaches to reduce neglect symptoms and improving activities of daily living are interventions that combine motor and cognitive components. The methods with the strongest evidence include visuospatial scanning training, prism adaptation, cognitive rehabilitation, and transcranial magnetic stimulation. Neurodevelopmental approaches, including NDT-Bobath and proprioceptive neuromuscular facilitation (PNF), as well as constraint-induced movement therapy (CIMT), may support activation of the neglected side, particularly when combined with spatial attention training. Sensory stimulation techniques appear mainly as adjunctive interventions, and their effects may be short-lived.

Conclusions: In the treatment of unilateral spatial neglect, the highest effectiveness is observed for combined rehabilitation programs integrating neurological physiotherapy with cognitive interventions. Early initiation of therapy and systematic environmental stimulation contribute to better functional outcomes. Individualization of the therapeutic approach and interdisciplinary collaboration are also key determinants of rehabilitation effectiveness.

Keywords: stroke, unilateral spatial neglect, physiotherapy

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Anteroposterior curvatures of the spine and their relationship with physical fitness and Body Mass Index in 10-year-old children

Introduction: The aim of this study was to analyze the sagittal spinal curvatures and their associations with physical fitness and body mass index (BMI) in 10-year-old girls and boys.

Material and Methods: The study included fourth-grade students attending randomly selected schools in the Podkarpackie Voivodeship (Poland). The Baseline Bubble inclinometer and EUROFIT European Test of Physical Fitness were applied as the research tool of choice. The data were analyzed based on the Student's t-test for independent variables or Mann Whitney U test, Pearson or Spearman correlation and Chi-square test.

Results: Statistically significant sex-related differences were observed in thoracic kyphosis ($p=0.020$), standing long jump performance ($p=0.008$), and handgrip strength ($p<0.001$). The highest proportion of the children had increased thoracic kyphosis and decreased lumbar lordosis. The most common type of posture was the balanced type. The prevalence of abnormalities in the curvatures and types of sagittal spinal posture types was independent of sex ($p>0.05$). Statistically significant associations were observed between sagittal spinal curvatures and physical fitness.

Conclusions: Ten-year-old boys exhibited greater thoracic kyphosis and better results in standing long jump and handgrip strength than girls. In both sexes, greater sagittal spinal curvature was associated with poorer results on flexibility tests, trunk and upper extremities, and endurance, while simultaneously being linked to better performance in tests assessing movement speed, balance, static strength, and running ability. These results confirm the complex and varied nature of the relationships between body posture and physical fitness in school-age children. In addition, higher body mass index (BMI) values were associated with greater sagittal spinal curvature and poorer performance on most physical fitness tests, indicating a significant impact of body mass on posture and physical fitness in children.

Key words: posture, spine curvatures, physical fitness, motor activity, body mass index, child

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Comparative analysis of plantographic parameters in adolescents and young adults (13–23 years) with mild-to-moderate intellectual disability from the Podkarpackie Province versus typically developing peers

Introduction: Plantography provides a quantitative assessment of selected morphological features of the foot, including arch characteristics and toe alignment. Individuals with intellectual disability (ID) may present musculoskeletal differences, which supports the rationale for comparing their foot parameters with those of age-matched peers. This study aimed to compare plantographic parameters in individuals aged 13–23 years with mild and moderate ID and those in a control group.

Material and Methods: The study included 200 participants aged 13–23 years: a study group with ID (N=100; 50 females and 50 males) and a control group (N=100; 50 females and 50 males). Anthropometric measures were collected, and plantographic indices and angles reflecting longitudinal and transverse arch morphology as well as the alignment of the hallux and the fifth toe were analysed. Normality of distribution was assessed using the Shapiro–Wilk test. Between-group comparisons were performed using Student's *t*-test or the Mann–Whitney *U* test, as appropriate. Categorical variables were analysed with the chi-square test, and associations were examined using Spearman's rank correlation coefficient. Statistical significance was set at $p<0.05$.

Results: In the ID group, significant sex-related differences were observed for age and height, whereas in the control group they were found for height and body mass. Females with ID had significantly higher BMI than females in the control group ($p=0.015$). Across most analyses, no significant associations were identified between sex and arch-related indices (including the KY, Clarke's, and Wejsflog indices). Between-group differences were primarily related to fifth toe alignment: higher varus angle values were more frequently observed in the control group in both females and males ($p<0.05$). In males, additional significant differences were noted for foot length asymmetry and the hallux angle of the left foot ($p<0.05$).

Conclusions: Individuals with ID aged 13–23 years differ from their peers in selected plantographic parameters, mainly those related to fifth toe alignment and asymmetry. Longitudinal and transverse arch measures were comparable between groups, and the observed differences may have limited clinical relevance.

Keywords: plantography; intellectual disability; Clarke's index

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Modern technologies in comprehensive rehabilitation of patients with Guillain-Barré syndrome (GBS): A case study

Introduction: The aim of the study was to describe the effects of a 7-month rehabilitation program using modern technologies on the functioning of a patient with severe Guillain-Barré syndrome (GBS).
Materials and Methods: A 34-year-old patient with severe GBS, who experienced quadriplegia and respiratory failure in the acute phase of the disease. After stabilizing his general condition, the patient underwent rehabilitation that included conventional physiotherapy and therapy using modern technologies (RoboGait, ERIGO table, Vibromoov, ArmeoPower, exoskeleton). Functional assessment was performed before and after 7 months using: Trunk Control Test (TCT), Barthel Index, Lovett Test, GBS Disability Score, WHOQOL-BREF, Fugl–Meyer scale, Box and Blocks Test, and Jamar Plus dynamometer.
Results: After 7 months of rehabilitation, an increase in trunk control was observed in the TCT from 0p. to 87p., an increase in muscle strength assessed in the Lovett Test from 0–1 to 3–5 in most muscle groups, and an improvement in limb function on the Fugl–Meyer scale from 24p. to 86p. There was an increase in manual dexterity in the Box and Blocks test (29p.) and an increase in grip strength measured with a dynamometer. There was also an improvement in independence, expressed by an increase in the Barthel Index from 20 to 60p., and an improvement in the patient's quality of life as assessed by the WHOQOL-BREF questionnaire (all domains).
Conclusions: The presented case study shows that traditional physiotherapy supplemented with modern methods enables a significant improvement in motor functions, increases the patient's level of independence, and contributes to the optimization of the prognosis and quality of life in patients with Guillain-Barré syndrome. Due to the rarity of the disease, further observation of people with GBS and analysis of the effects of their rehabilitation are necessary.
Keywords: Guillain-Barré syndrome, modern technologies, functional assessment.

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The Relationship Between Muscle Imbalance and Functional Disorders of the Musculoskeletal System

Introduction: Muscle imbalance refers to an inequality in strength, activity, or length between muscle groups and may negatively affect movement quality and overall musculoskeletal function. It is considered a significant factor contributing to the development and persistence of functional disorders, pain, and reduced physical performance. The aim of this paper is to analyze the relationship between muscle imbalance and functional disorders of the musculoskeletal system based on current scientific evidence.

Materials and Methods: The paper is based on a review of relevant studies focusing on the assessment of muscle balance, postural deviations, and their impact on movement biomechanics.

Results: The findings indicate that long-term muscle imbalance may lead to altered movement patterns, overload of specific anatomical structures, and an increased risk of pain syndromes, particularly in the spine and major joints. Furthermore, the importance of physiotherapeutic assessment and targeted interventions aimed at restoring muscle balance is emphasized.

Conclusion: In conclusion, early identification and correction of muscle imbalance represent key components in the prevention and management of functional musculoskeletal disorders and play a crucial role in effective physiotherapy practice.

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Anal sphincter rupture – a physiotherapeutic problem. A narrative review

Introduction: Rupture or weakening of the external anal sphincter muscle causes fecal incontinence associated with urgency or diarrhea. Damage to the internal anal sphincter muscle or the anal vascular cushions can lead to a poor seal and impaired anal reflex, which can cause passive incontinence or fecal leakage. The aim of this study was to systematize knowledge about the physiotherapy of anal sphincter ruptures based on current available scientific literature.

Materials and Methods: The methodology was based on a review of databases such as Science Direct, PubMed, and Google Scholar, using keywords such as anal sphincter injury and physiotherapy. The final analysis included 16 foreign publications, of which 5 studies scored 6 to 8 on the PEDro scale.

Results: Mathe et al. (2016) found that early pelvic floor muscle physical therapy reduced gas and fecal leakage and urinary incontinence during exercise. Studies by Brusciano et al. (2020) and Parker et al. (2018) demonstrated significant improvement in fecal incontinence symptoms after the use of external magnetic stimulation and biofeedback therapy. Studies by Ussing et al. (2019) and Bargen et al. (2021) confirmed the effectiveness of supervised pelvic floor muscle training and biofeedback in the treatment of fecal incontinence.

Conclusions:

1. The use of physiotherapy for anal sphincter tears has a positive effect on the regeneration of damaged structures.
2. Physiotherapeutic methods include: pelvic floor muscle training, functional magnetic stimulation, biofeedback therapy, posterior peroneal nerve stimulation, electrical stimulation of the anal sphincter, and sacral neuromodulation.
3. The most effective physiotherapy for anal sphincter tears is a combination of pelvic floor muscle training (PFME) with biofeedback.
4. Female gender predisposes to a greater degree to anal sphincter tears.

Keywords: self anal sphincter injury, physiotherapy

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Physiotherapy treatment of a patient with multiple sclerosis: A case report

Introduction: Evaluation of the effects of rehabilitation in a patient with multiple sclerosis and its impact on improving functional capacity and quality of life.

Material and method: The study involved a 49-year-old woman with secondary progressive multiple sclerosis. The patient underwent a three-week rehabilitation program. The range of motion of the upper and lower limbs, the presence of the Babinski reflex, and superficial and deep sensation were assessed. Lower limb function was assessed using the 7.5 m (25 ft) gait speed test, and upper limb function was assessed using the 9-Hole Peg Test (9-HPT). Balance was assessed using the Romberg test. Disability was assessed using the Rankin Scale and the Expanded Disability Status Scale (EDSS). The Barthel scale was used to assess the patient's mobility and independence. Measurements were taken twice: before and after rehabilitation.

Results: The applied rehabilitation program improved all assessed parameters after completion of rehabilitation, including balance, functional capacity of the upper and lower limbs and level of independence in daily activities.

Conclusions: The study demonstrated the effectiveness of rehabilitation, with the inclusion of biofeedback additionally supported the effectiveness of the therapy.

Keywords: multiple sclerosis, rehabilitation

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Analysis of the effects of animal-assisted therapy and neuromotor physiotherapy on stress regulation

Introduction: Mood disorders, anxiety disorders, and post-traumatic stress disorder are associated with dysregulation of the hypothalamic–pituitary–adrenal axis, impaired autonomic nervous system function, and reduced neuroplasticity. Animal-assisted therapy (AAT) and neuromotor physiotherapy with a sensory–proprioceptive profile and moderate-intensity aerobic exercise represent natural interventions capable of modulating stress responses and emotion regulation. The aim of this study was to analyze the neurobiological mechanisms underlying AAT and neuromotor physiotherapy as adjunctive interventions in psychiatric care.
Material and methods: A narrative literature review was conducted using PubMed, Scopus, and Web of Science databases for publications from 2012 to 2025. Meta-analyses, systematic reviews, and clinical studies addressing AAT and neuromotor physiotherapy, including proprioceptive training, balance exercises, and moderate-intensity aerobic activity, in patients with depression, anxiety disorders, and PTSD were included. Data on stress biomarkers (cortisol, heart rate variability), neuroplasticity markers (brain-derived neurotrophic factor), and serotonergic and dopaminergic systems were analyzed.
Results: AAT is associated with reduced HPA axis activity, increased oxytocin release, and improved autonomic regulation. Neuromotor physiotherapy contributes to increased BDNF expression, enhanced sensorimotor integration, and modulation of monoaminergic neurotransmission. The available evidence suggests potential synergistic effects of these interventions on stress regulation.
Conclusions: Animal-assisted therapy and neuromotor physiotherapy constitute complementary interventions supporting the treatment of affective and anxiety disorders through modulation of stress pathways, autonomic regulation, and neuroplasticity.
Keywords: animal-assisted therapy; neuromotor physiotherapy; stress regulation; neuroplasticity

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Analysis of International Experience in the Use of Telerehabilitation in Physical Therapy of Patients after Breast-Conserving Cancer Treatment

Introduction: After breast-conserving cancer treatment, patients often experience persistent musculoskeletal impairments, including pain, restricted shoulder joint mobility, reduced muscle strength, and decreased endurance of the upper limb. These impairments lead to difficulties in performing activities of daily living and limit occupational, family, and social participation, which substantiates the need for early, staged, and continuous physical therapy following completion of oncological treatment. International rehabilitation and oncological guidelines consider rehabilitation an integral component of the patient pathway during the survivorship phase. In this context, telerehabilitation is gaining importance as a tool for delivering rehabilitation interventions outside inpatient settings. In Ukraine, the relevance of telerehabilitation is further emphasized by unequal access to rehabilitation services, workforce and resource limitations, and the need to ensure continuity of care, particularly under conditions of martial law. Aim. The aim of the study was to analyze international experience and clinical guidelines regarding the use of telerehabilitation in physical therapy for patients after breast-conserving cancer treatment and to determine their practical implications for the medical rehabilitation system in Ukraine, taking into account the impact on impaired functions, activity, and participation.

Materials and methods: An analytical review of international guidelines issued by the World Health Organization (Rehabilitation 2030 initiative), the NCCN (Breast Cancer, Survivorship), and the ESMO (Clinical Practice Guidelines), as well as national regulatory documents of the Ministry of Health of Ukraine governing telemedicine and rehabilitation services, was conducted. In addition, studies and systematic reviews published between 2018 and 2024 addressing telerehabilitation interventions in physical therapy for patients after breast-conserving cancer treatment were analyzed.

Results: The analysis of World Health Organization documents confirmed that rehabilitation is defined as a core health service that should be integrated across all stages of healthcare delivery, ensuring continuity and overcoming accessibility barriers. Within this systemic framework, telerehabilitation is regarded as a tool for maintaining continuity of rehabilitation care and supporting functional recovery in outpatient settings.

NCCN survivorship recommendations emphasize the safety and appropriateness of regular physical activity for most patients after completion of treatment, as well as the need for systematic monitoring of functional complications, particularly lymphedema, with early referral to rehabilitation interventions. These provisions form the basis for implementing telerehabilitation programs that include remote supervision of therapeutic exercises and monitoring of pain, shoulder joint mobility, and upper limb function.

ESMO guidelines support the concept of long-term follow-up after completion of anticancer treatment, within which physical therapy and the promotion of physical activity aim to preserve functional independence and quality of life. A substantial proportion of these interventions can be delivered through telerehabilitation via remote guidance and adjustment of rehabilitation programs.

National regulatory frameworks in Ukraine create legal prerequisites for the use of telerehabilitation as a mode of rehabilitation service delivery, enabling the integration of international approaches into the domestic healthcare system. Telerehabilitation models may be considered a structured component of hybrid physical therapy, ensuring continuity of care after hospital discharge.

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Preparation of Patients for Running After Transtibial Amputation and Prosthetics

Introduction: Due to active hostilities in Ukraine, the number of military personnel and civilians receiving mine-blast injuries is increasing daily, most often affecting the lower limbs. Extremity injuries account for 56–70% of the total structure of sanitary losses. The modern development of prosthetic manufacturing technologies and the emergence of innovative tools, such as running-specific prostheses (RSP), require the development and implementation of new approaches to physical therapy. Returning to an active lifestyle, particularly running, is a key factor in social integration and improving the quality of life after transtibial amputation. The aim of the study is to develop and implement individual physical therapy programs to prepare patients with transtibial amputation for running after prosthetics and to analyze the results of their application.

Materials and Methods: Four patients participated in the study, all of whom were fitted with running prostheses (specifically the The Levitate Blade series). Examinations were conducted before and after the rehabilitation intervention using the following tools: CHAMP (Comprehensive High-Level Activity Mobility Predictor) – a comprehensive system for objective measurement of high-level mobility (speed, agility, coordination); Berg Balance Scale (BBS) – for assessing static and dynamic balance and predicting the risk of falls; 10-Meter Walk Test – to measure comfortable walking speed; Illinois Agility Test and T-Test – components of CHAMP used to assess the ability to change direction quickly; American Mobility Scale and biomechanical analysis of walking and running characteristics.

Physical Therapy Interventions. The program was divided into three stages:

– Preparatory: edema management (compression, bandaging), prevention of contractures, strengthening of antagonist muscles, and formation of correct posture.

– Educational: mastering balance skills on the prosthesis, forming the correct step pattern, and shifting body weight in frontal and sagittal planes.

– Specialized (Running Preparation): use of running-specific prostheses made of fiberglass with high energy return. Exercises focused on developing endurance, speed, and coordination in various outdoor conditions (stairs, uneven terrain).

Results: Following the intervention, a significant increase in the total score of the CHAMP system was recorded. Key changes included: Illinois Agility Test and T-Test: patients demonstrated the ability to change direction rapidly and coordinately. 10-Meter Walk Test: an increase in comfortable walking speed and improved gait biomechanics were observed. Berg Balance Scale (BBS): results showed substantial improvement in static and dynamic equilibrium and a reduced risk of falls during complex motor tasks, confirming the program's effectiveness.

Keywords: transtibial amputation, prosthetics, physical therapy, running, mobility, CHAMP.

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Prevalence of postural system disorders in preschool and younger school-age children in Slovakia: a baseline for preventive physiotherapy research

Introduction: Postural disorders represent a significant health problem of modern society and are increasingly observed already in childhood. Experts from both medical and non-medical disciplines report a rising prevalence of postural disorders in almost all industrialized countries. Professor Janda has described postural disorders as a pandemic of contemporary civilization. Hypokinesia, sedentary lifestyle, and prolonged exposure to posturally unfavorable positions are considered the main contributing factors, leading to muscle imbalance from an early age. The aim of this contribution was to analyze the administrative prevalence of selected postural system disorders in preschool and younger school-age children in Slovakia and to provide a baseline for targeted preventive physiotherapeutic intervention.

Materials and Methods: The analysis was based on data from the National Health Information Center of Slovakia, derived from general health care records for children and adolescents. Administrative prevalence was expressed as the number of registered cases per 10,000 registered individuals. The evaluated diagnoses included scoliosis (ICD-10: M41), flat foot (M21.4), and postural disorder (R29.3), with a particular focus on children aged 6–14 years.

Results: Between 2019 and 2023, an increasing trend in administrative prevalence was observed for all monitored diagnoses in children aged 6–14 years. The prevalence of scoliosis increased from 112 to 141 cases per 10,000 registered individuals, flat foot from 356 to 418 cases, and postural disorders from 284 to 372 cases per 10,000 registered individuals. Flat foot showed the highest prevalence throughout the observed period.

Conclusion: The results indicate a growing burden of postural system disorders already in early childhood and emphasize the need for early identification and systematic prevention. The presented findings form an expert basis for the APVV-24-0251 project "Consequences of Muscle Imbalance on the Postural System of Preschool and Younger School-Age Children", within which direct physiotherapeutic intervention in the form of preventive exercise programs will be implemented in preschool and primary school settings.

Keywords: Prevalience. Children. Postural disorders. Physiotherapy.

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Potential causes of optimal gait in healthy middle-aged men

Introduction: Alternately and economically losing and regaining balance while walking requires optimal positioning of body segments and physiological mobility in the joints. A physical examination and photo- and videometric analysis of the subject's silhouette while walking without discomfort are intended to reveal the secret of optimal movement.
Material and methods: There were 60 men examined with a sedative lifestyle between the ages of 35 and 45. The following exclusion criteria were used: injury in the last year, feeling unstable when standing or walking or fear of falling, walking aids, limited ability to maintain balance and walk around the house, known vestibular disorders, neurological conditions, movement impairment, cognitive impairment, history of major orthopedic surgery of the lower limbs, unequal absolute length of the lower extremities, and acute illness. After taking them into account, 60 men with a sedative lifestyle aged 35 to 45 years were examined to determine the length norms of the piriformis, iliopsoas, quadriceps femoris, and calves of the triceps (or their absence) and pelvic balance. The subjects then began walking on the treadmill at their optimal pace until discomfort occurred or until they reached 5 kilometers. The subject of the research is a group of 23 patients who reached the 5 km limit without reporting discomfort.
Results: More than half of the patients did not have the standard length of at least one muscle in the upper extremities, and in one/third a twisted pelvis with the overtaking were noted. Almost half of the patients increased flexion in the sagittal plane and only a quarter increased flexion in the frontal plane. Most of patients also demonstrated co-movements of lower limbs during their gait.
Conclusions: Functional limitations in the range of motion of the upper limbs do not cause discomfort during a 5-kilometer gait. During optimal gait, deviations in the sagittal plane have less impact than deviations in the frontal plane.
Keywords: economical gait, photo and videometric analysis, pelvic balance, muscle length standards

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Spinal Cord Stroke: A Case Study

Introduction: A 65-year-old patient survived a cardiac arrest in February 2025, resulting in spinal cord ischemia and paraparesis. This presentation focusses on highlighting the patient's needs in hospital and home care, as well as the challenges of physiotherapy.
Material and Methods: The patient was hospitalized in the intensive care unit, three times in the neurology department, and twice in the rehabilitation department.
Results: His first active verticalization was in May, first steps with a walker in June, first level of stairs in October, and first floor in December 2025.
Conclusions: Faith, hope, conversation, and gradual increase in physical activity are the keys to descending the 4th floor without an elevator with paraparesis.
Keywords: spinal cord stroke, physiotherapy, lower limb paraparesis

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Diagnosis and therapeutic management of patellar tendon injury in a young tennis player: A case report

Introduction: injuries of the patellar tendon constitute a significant clinical problem among young athletes, particularly in sports requiring dynamic jumping, sprinting and rapid changes of direction, such as tennis. Overload of the knee extensor mechanism may lead to microtrauma, tendinopathy and partial tears, resulting in pain, functional limitation and reduced athletic performance. Early diagnosis and appropriately selected physiotherapeutic management are crucial for a successful return to sport. Aim of the study: The aim of this study was to present the diagnostic process and therapeutic management in a young tennis player with patellar tendon injury.

Material and methods: A case of a 19-year-old competitive tennis player presenting with anterior knee pain exacerbated by jumping, acceleration and changes of running direction is described. The diagnostic process was based on functional examination, clinical tests of the knee extensor mechanism and soft tissue ultrasound, which revealed features of overload-related patellar tendon injury. A comprehensive physiotherapy program was implemented, including manual therapy, fascial techniques, progressive load training, and neuromuscular control training supported by biofeedback based on electromyographic (EMG) activity analysis. The therapeutic protocol was supplemented with radiofrequency therapy.

Results: The applied treatment resulted in a significant reduction of pain, improved tolerance to training loads and normalization of knee extensor mechanism function. Follow-up ultrasound examination demonstrated improvement in patellar tendon structure and reduction of overload-related changes. The athlete returned to full training without pain.

Conclusions: Comprehensive functional diagnostics and an individually tailored physiotherapy program enable effective treatment of patellar tendon injuries in young athletes and allow a safe return to competitive sport.

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Aesthetic physiotherapy in the treatment of complications after chin liposuction: A case report

Introduction: Submental liposuction is a procedure of aesthetic surgery aimed at removing excess adipose tissue from the submandibular area in order to improve facial contour. It is performed in patients in whom reduction of body weight does not result in a decrease in the volume of this region. A double chin occurs in both women and men regardless of age and may result from overweight, genetic predisposition, or skin aging processes, leading to disturbed facial proportions. Conservative methods usually provide only temporary effects, whereas liposuction enables permanent fat reduction. As any invasive procedure, it may be associated with postoperative complications such as edema, hematomas, adhesions, tissue fibrosis, and sensations of tightness and stiffness. The aim was to present possibilities of treating complications after submental liposuction using aesthetic physiotherapy.
Material and Methods: The described patient was a 24-year-old woman who underwent submental liposuction due to dissatisfaction with the appearance of this area despite body weight reduction. Diagnostics included manual examination and soft tissue ultrasound. Postoperatively, tissue thickening, a sensation of pulling, and contour irregularities were observed. The therapy included manual therapy, lymphatic drainage, proprietary soft tissue release techniques, tissue stretching, and work on adhesions. Shockwave therapy and radiofrequency were used as adjunctive modalities. The patient was instructed in home self-therapy.
Results: The applied therapy resulted in complete resolution of visible and palpable nodular fibrotic tissue in the submental area and reduction of adhesions in the neck region. Palpation and stretching tests revealed no pathological bands or limitations in tissue glide. Improvement in submental contour and complete resolution of stiffness and pulling sensations were achieved. The patient reported significant improvement in functional comfort and aesthetic satisfaction.
Conclusions: Appropriately selected aesthetic physiotherapy, conducted in accordance with the healing process, enables effective tissue remodeling and treatment of complications following submental liposuction.

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The role of aesthetic physiotherapy in the postoperative care of patients after plastic surgery

Introduction: Aesthetic physiotherapy is a developing field of physiotherapy focused on supporting tissue healing processes, improving function, and optimizing aesthetic outcomes in patients undergoing plastic surgery procedures. The perioperative period is often associated with symptoms such as edema, pain, hematomas, fibrosis, adhesions, sensory disturbances, and reduced tissue elasticity, which may negatively affect final surgical outcomes. Appropriately planned physiotherapeutic management plays an important role in preventing complications and supporting tissue remodeling processes.

Material and methods: This lecture abstract is based on an analysis of available literature, current knowledge in the field of aesthetic physiotherapy, and clinical experience in working with patients during the perioperative period. The lecture presents the definition of aesthetic physiotherapy, its therapeutic goals, principles of preoperative patient preparation, physiological stages of tissue healing, and the selection of physiotherapeutic procedures depending on the type of surgery and the phase of tissue healing.

Results: Available clinical observations indicate that appropriately selected physiotherapeutic management contributes to the reduction of edema and pain, prevention of fibrosis and adhesions, improvement of tissue elasticity, and enhancement of scar quality. Both preoperative preparation and postoperative therapy support proper regenerative processes and tissue remodeling.

Conclusions: Aesthetic physiotherapy constitutes an important element of comprehensive perioperative care in plastic surgery, supporting tissue healing and regeneration processes and contributing to the optimization of aesthetic and functional outcomes.

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The relationship between hydration parameters and myotonometric stiffness of the medial head of the gastrocnemius muscle in young healthy men

Introduction: Water, which constitutes approximately 75% of skeletal muscle mass, is crucial for its structure and function. Its distribution between the intracellular (ICW) and extracellular (ECW) space is a significant marker of muscle quality. Bioelectrical impedance analysis (BIA) is commonly used to assess water compartments, whereas myotonometry is used to assess soft tissue stiffness. However, the relationship between these parameters remains uninvestigated. The aim of this study was to analyze the association between hydration parameters and the myotonometric stiffness of the medial gastrocnemius in healthy men.

Material and Methods: The study included 97 healthy men (age 20.74 ± 1.69 years; height 1.81 ± 0.07 m; mass 81.53 ± 14.63 kg; BMI 24.91 ± 3.90 kg/m^2). Total body water (TBW), intracellular water (ICW), and extracellular water (ECW) were assessed using a TANITA MC-780 MA analyzer. The myotonometric stiffness of the medial gastrocnemius was analysed using MyotonPRO® device. Statistical analysis was performed in Jamovi (2.6.44) using Spearman's rank correlation.

Results: A positive and significant relationship was demonstrated between all hydration parameters and muscle stiffness. For TBW: right side r=0.29 (p=0.003), left side r=0.25 (p=0.012); ICW: right side r=0.28 (p=0.005), left side r=0.25 (p=0.015); and ECW: right side r=0.28 (p=0.004), left side r=0.26 (p=0.011).

Conclusions: A significant and positive association was found between TBW, ICW and ECW and myotonometric stiffness in young men. This relationship may reflect changes in tissue structure resulting from the regulation of cellular volume. Although the observed correlations are low, they constitute preliminary confirmation of a direct link between the BIA parameters and the myotonometric indices, indicating the need for further research on the physiological determinants of muscle stiffness.

Keywords: body water distribution, bioelectrical impedance analysis, myotonometry.

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New technologies in pediatric rehabilitation: Effectiveness of therapies based on virtual and augmented reality

Introduction: The aim of this study is to evaluate the effectiveness of therapies using virtual reality (VR) and augmented reality (AR) in pediatric rehabilitation, with a focus on increasing patient motivation and improving therapeutic outcomes.

Material and Methods: This study is a narrative review. An analysis of the literature published between 2016 and 2025 was conducted, including clinical studies on the use of VR and AR in children with neurological and orthopedic disorders. Key areas of interest included patient participation in the therapeutic process, motor functions, motor coordination, and balance.

Results: The results of most studies indicate a significant improvement in the analyzed functions, as well as higher motivation levels among children who participate in VR- and AR-based therapy compared to conventional methods.

Conclusions: VR and AR represent a promising adjunct to pediatric rehabilitation, enhancing its attractiveness, patient engagement, and overall effectiveness of the therapeutic process.

Keywords: new technologies, pediatric rehabilitation, virtual reality, augmented reality

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Physiotherapy of people with pusher syndrome after stroke: Strategies for diagnosis and neurorehabilitation, from classic methods to augmented reality

Introduction: The aim of this study is to collect, review, and present information on the methods used in pusher syndrome and the recommended interventions.

Materials and Methods: To obtain information on methods to improve the condition of patients with pusher syndrome, the following bibliographic databases were searched: PEDro, Medline (PubMed) using the keywords: 'pusher syndrome', 'physiotherapy', 'lateropulsion', "stroke", 'neurorehabilitation'. Based on the titles, abstracts, and full texts of the publications, original works were included in the analysis.

Results: Contemporary therapeutic strategies for people with pusher syndrome are based on the use of brain neuroplasticity and focus on recalibrating disturbed vertical perception. Instead of passive correction methods used in the past, the current priority is for the patient to actively seek verticality using preserved sensory channels.

Conclusions: The therapeutic process should remain sequential, starting with calming the side indirectly affected in low positions, moving on to dynamic stabilization in standing and walking, always using the patient's visual control.

Keywords: pusher syndrome, lateropulsion, physiotherapy, stroke, neurorehabilitation

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The effect of dance therapy on balance, gait, and mood in geriatric psychiatric patients

Introduction: The aim of the study is to assess the effects of dance therapy on balance, gait, and mood in geriatric psychiatric patients.

Material and Methods: Ten patients with geriatric psychiatric disorders (6 women and 4 men) participated in the study and underwent two evaluations and a dance therapy intervention between the assessments. All participants were 65 to 80 years and were long-term residents of a closed psychiatric ward. The severity of dementia and cognitive functions were rated with the Mini Mental State Examination (MMSE). Balance was assessed with the Functional Reach Test (FRT). Gait was assessed with Timed Up and Go (TUG). The mood was assessed with the Geriatric Depression Scale (GDS). Between the first and second assessments, the patients participated in an eight-week dance therapy. Dance therapy sessions took place twice a week and lasted 50 minutes. The dance therapy intervention incorporated a variety of dance forms based on a carefully structured therapeutic program.

Results: Comparison of the results indicates a significant increase in forward reach distance in the FRT, a significant reduction in the completion time, and a significant decrease in the GDS scores. No significant correlations were found between the degree of cognitive impairment and the outcomes of the functional and mood assessments.

Conclusions: Balance, gait, and mood improved in patients after the eight-week dance therapy program. Dance therapy appears to be a useful therapeutic intervention in the treatment of psychiatric geriatric patients.

Keywords: dance therapy, geriatric psychiatric patients, balance and gait, mood

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The Role of Myokines and BDNF in Neurorehabilitation: Molecular Aspects of the Effects of Physical Exercise on the Brain

Introduction: Contemporary physiotherapy redefines the role of skeletal muscle, viewing it not only as the organ of movement, but also as a key endocrine organ. Communication along the muscle to the brain axis occurs through myokines (including irisin, cathepsin B, IGF-1) that can cross the blood-brain barrier. These compounds stimulate the expression of brain derived neurotrophic factor (BDNF). This paper highlights the dual nature of BDNF, including a form associated with apoptosis and elimination of weak connections and a form that supports neurogenesis and plasticity, which can be modulated through targeted physical activity.
Materials and Methods: This work is a narrative review of the literature that focusses on the molecular effects of different training protocols (aerobic, resistance, and interval) in the context of their impact on the biochemistry of the central nervous system.
Results: The literature indicates that maximizing the brain's reparative potential depends on the precise selection of training parameters, particularly the intensity and modality. Sprint interval training has been shown to induce the highest immediate BDNF release, acting as a 'molecular priming' that facilitates neuronal plasticity. In contrast, achieving a sustained chronic increase in baseline levels of myokines (including irisin and cathepsin B) and BDNF requires resistance training. Full structural adaptations, such as neurogenesis and synaptogenesis, require interventions lasting at least 12 weeks, as these changes develop over weeks.
Conclusions: Based on the available evidence, the most effective model in neurological physiotherapy appears to be a hybrid protocol combining high intensity exercise with resistance training. This approach enables the use of the anti-inflammatory and neuroprotective effects of myokines.
Keywords: myokines, BDNF, neurological physiotherapy, neuroplasticity

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How to Use SCORE 2 Results in Physiotherapy Practice – From Risk Assessment to Improving Quality of Life

Introduction: Contemporary physiotherapy increasingly includes activities related to prevention and promotion of health. In middle-aged and older individuals referred for orthopedic rehabilitation, there may be undiagnosed cardiovascular risk and should be considered when planning the rehabilitation process. The SCORE 2 form, recommended by the European Society of Cardiology, enables the assessment of 10-year cardiovascular risk in primary prevention. The aim of the study was to present the possibilities of using the SCORE 2 form in physiotherapy practice, with a particular emphasis on planning safe rehabilitation and assessing its impact on patient quality of life.

Materials and Methods: The study included 30 participants, aged 40 to 69 years, with musculoskeletal pain and patients who began rehabilitation after knee or hip arthroplasty. The inclusion criteria were the absence of diagnosed heart disease, diabetes, and chronic kidney disease. Cardiovascular risk was assessed in all participants using the SCORE 2 form.

Results: Based on the results, individualized rehabilitation programs were developed, including kinesiotherapy, general conditioning exercises, and health education. Therapy outcomes were evaluated using the Visual Analogue Scale (VAS), the 6-Minute Walk Test, and quality of life assessment tools.

Conclusion: The use of the SCORE 2 form in physiotherapy allows for individualized rehabilitation planning, increases therapy safety, supports a holistic approach to patient care, and contributes to improved quality of life.

Keywords: SCORE 2, physiotherapy, risk assessment, quality of life

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The impact of pelvic floor muscle exercises on sexual function in postmenopausal women: A systematic review of the literature

Introduction: Hormonal changes associated with menopause often lead to the development of sexual dysfunction in women. The most common problems include pelvic organ prolapse, urinary incontinence and recurrent urinary tract infections, which can significantly affect the quality of sexual life. Pelvic floor muscle training is recommended as the first-line non-pharmacological intervention in the treatment of these conditions. The aim of this study was to conduct a systematic review of the literature on the impact of pelvic floor muscle exercises on sexual function in postmenopausal women.

Material and method: A systematic review of the literature was conducted in accordance with PRISMA guidelines, covering publications from 2012 to 2023. The following databases were searched: PubMed, MEDLINE, Cochrane Library, Google Scholar, PEDro and GBL, using the keywords: sexual function, pelvic floor muscles, pelvic floor exercises. After the search, duplicates were removed and a selection was made based on titles and abstracts.

Results: A total of 326 records were identified, including: PubMed (n=21), Cochrane Library (n=51), MEDLINE (n=109), GBL (n=72), PEDro (n=2), Google Scholar (n=71). After removing duplicates (n=142), 164 articles were selected for further analysis. Based on the analysis of titles and abstracts, 64 publications were selected. In the next stage, studies that did not meet the inclusion criteria were rejected, including those based on the age of the subjects, lack of access to the full text, or lack of randomised controlled trials (RCTs). Ultimately, 5 articles met the inclusion criteria for the review. The methodological quality of the studies was assessed using the PEDro scale.

Conclusions: Based on the analysis, it was found that sexual dysfunction in postmenopausal women is common, as confirmed by the epidemiological data cited in the studies analysed. Pelvic floor muscle exercises have a significant positive effect on sexual function in this group of women. The limited number of available RCT studies indicates a research gap and the need for further studies of high methodological quality.

Keywords: sexual function, pelvic floor muscles, pelvic floor exercises

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Rehabilitation and new techniques in improving the condition of children with cerebral palsy: A literature review

Introduction: Cerebral palsy (CP) is one of the most common permanent neurological disorders of developmental age, characterized by non-progressive but variable posture and movement disorders resulting from brain damage. The purpose of this study is to review the literature on modern methods of rehabilitation of children with a CP, with particular emphasis on innovative technologies that support the improvement of motor functions.

Materials and Methods: Twenty-five publications from 2015–2025 were analyzed, including randomized clinical trials, systematic reviews, and meta-analyses from the PubMed, Scopus, and Web of Science databases. The effectiveness of methods such as exoskeletons, rehabilitation robots, virtual reality (VR), and transcranial magnetic stimulation (TMS) was evaluated.

Results: The results of the study indicate that the use of modern technologies in the rehabilitation of children with CP leads to improved motor function, balance, and coordination. The greatest effectiveness was demonstrated in therapy using gait-assist robots and balance training in VR. These technologies also increase children's engagement and motivation to exercise. However, it should be emphasized that innovative solutions are only a supplement to traditional forms of rehabilitation; the manual work of the therapist still plays a key role in the rehabilitation process.

Conclusions: Modern technologies offer valuable therapeutic opportunities and can increase the effectiveness of rehabilitation for children with CP, but require an individual approach and further research into their long-term impact. High costs and limited availability remain significant limitations, hindering their wider implementation in clinical practice.

Keywords: rehabilitation of children, cerebral palsy, modern techniques, neurological disorders.

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Complications of vaginal childbirth and the role of rehabilitation in preventing and minimization of perinatal consequences.

Introduction: Vaginal delivery is the most common mode of pregnancy and may be associated with complications that affect both the mother and the child, influencing their health and quality of life. The aim of this study was to analyze the most common complications of vaginal delivery, their incidence and occurrence mechanisms, risk factors, as well as principles of treatment and prevention principles, with a particular emphasis on the role of rehabilitation in preventing and minimizing the effects of overload.

Materials and methods: The material consisted of an analysis of scientific literature available in the PubMed and Scopus databases, as the well as electronic resources of the university library databases from 2015-2025. The analysis included full-text articles on vaginal childbirth in mothers and newborns, risk factors, injuries mechanisms, and recommendations for therapeutic management and prevention.

Results: Although vaginal childbirth usually proceeds physiologically, it may be associated with complications. Clinically significant cervical tears requiring intervention occur in 0.2–4.8% of deliveries. Rare but serious uterine rupture is reported in 0.06–2% of cases. In newborns, mechanical injuries and hypoxic-ischemic complications predominate. Some maternal complications, such as fecal incontinence and urinary stress incontinence, may be long-lasting and require appropriate supervision and perinatal rehabilitation.

Conclusions: Complications of vaginal childbirth constitute a significant clinical problem, the incidence and severity of which depend on risk factors, obstetric practices, and the quality of perinatal care. Early identification of risk, rational management of labor, and appropriate therapeutic and preventive measures can reduce its frequency and consequences, improving the safety of both mother and child.

Keywords: vaginal childbirth, childbirth complications, rehabilitation, midwife

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Scoliosis: characteristics, diagnostic methods and treatment based on a clinical case study

Introduction: Scoliosis is a three-plane deformity of the spine that involves lateral deviation, vertebral rotation, and physiological curvature disorders. It most commonly occurs in idiopathic form in girls during puberty. The aim of this study is to present the current knowledge on scoliosis, diagnostic methods, and treatment, as well as to show their practical application using the example of a clinical case of a patient with severe scoliosis. The main research thesis is the assumption that early diagnosis and multifaceted treatment can significantly improve the functional efficiency of patients with advanced scoliosis and reduce the need for surgical intervention.

Materials and Methods: The review included articles published between 2015 and 2025 in the following databases: PubMed, Web of Science, and Google Scholar medical search engine. The literature was searched in November 2025 using the following keywords in Polish: *skolioza, skolioza idiopatyczna, diagnostyka skoliozy, leczenie skoliozy, korekcja kręgosłupa*, and in English: scoliosis, idiopathic scoliosis, diagnosis of scoliosis, scoliosis treatment, spinal correction. Out of the 35 publications found, 15 full-text scientific publications were selected for the final qualitative analysis, comparing the results in terms of methodology and outcomes. The second part of the article contains a case study of a patient (the author of this article) who was diagnosed with idiopathic scoliosis at the age of 11 years with the highest curvature at the L1 level (Cobb angle approx. 80°) and compensatory curvature at the Th8 level (approx. 60°). The description presents the therapeutic management and treatment effects observed between the ages of 11 and 22, supported by medical documentation.

Results: The diagnosis of scoliosis is based on noninvasive imaging techniques and posture assessment, which allows for early diagnosis and precise monitoring of its progression. The combination of early diagnosis, a targeted kinesitherapy program, sessions on the FED device, and the wearing of a Chêneau brace can significantly improve the quality of life of patients with advanced forms of scoliosis, as well as postpone and, in some cases, even eliminate the need for surgical treatment.

Keywords: scoliosis, diagnosis of spinal curvature, scoliosis rehabilitation.

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One pelvis – many problems: The role of physiotherapy in urogynecological and proctological disorders at any age

Introduction: The pelvic floor constitutes a functional anatomical and neuromuscular unit shared by the urinary, reproductive, and gastrointestinal systems. Disorders of pelvic floor function may manifest at various stages of life—from pediatric conditions such as nocturnal enuresis or functional constipation to disorders occurring in adulthood and older age, including urinary and fecal incontinence, pelvic organ prolapse, and pain syndromes. An increasing body of scientific evidence indicates that physiotherapy plays a key role in the management of these conditions.

Aim of the Study: The aim of this study is to present the role of physiotherapy and physiotherapy-oriented diagnostic methods in urogynaecological and proctological disorders in both adults and children.

Discussion: This paper discusses the most common pelvic floor dysfunctions, including urinary and fecal incontinence, urgency, functional constipation, defecatory dyssynergia, pelvic pain syndromes, pelvic organ prolapse, scar therapy, and pelvic disorders in the pediatric population. Physiotherapeutic and diagnostic methods used in clinical practice are presented, including manual therapy, pelvic floor muscle training, respiratory–postural re-education, biofeedback, electrostimulation, and the use of ultrasound and electromyography (EMG) in functional diagnostics, as well as behavioral education of patients and their caregivers. The importance of individualized assessment and an interdisciplinary approach is emphasized.

Conclusion: Physiotherapy constitutes an essential, and often primary, component in the treatment of urogynaecological and proctological disorders. A holistic, evidence-based approach to pelvic floor therapy within an interdisciplinary team enables effective treatment of patients across different age groups and contributes to improved quality of life.

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The rehabilitative function of the nurse in the comprehensive care of the oncology patient

Introduction: Advances in diagnostic and therapeutic methods contribute to prolonged survival of oncology patients, which increases the demand for comprehensive cancer rehabilitation. The purpose of this study was to present the role of the nurse in the rehabilitation process, with a particular emphasis on the tasks resulting from professional nursing functions and their impact on improving the quality of life.
Material and Methods: A systematic review of the literature and selected online resources was conducted. Articles published between 2010 and 2026 were analyzed. The reviewed studies covered issues related to cancer rehabilitation, rehabilitation nursing, and oncology nursing. The inclusion criteria comprised scientific publications in Polish and English published between 2010 and 2026, available in full text and containing up-to-date data relevant to the subject. The exclusion criteria included articles not directly related to the topic or not referring to contemporary research in the field discussed.
Results: The nurse plays a key role in the comprehensive rehabilitation of oncology patients. Through functional assessment and movement-based interventions, it is possible to prevent complications associated with immobilization, activate patients, provide health education, and offer psychosocial support. Active participation of nurses promotes greater patient independence, improved exercise tolerance, reduced fatigue, and, consequently, improves patient quality of life.
Conclusion: The tasks resulting from professional nursing functions are clearly reflected in cancer rehabilitation. The implementation of the rehabilitative function constitutes a crucial element of effective, interdisciplinary care for oncology patients, contributing to improved treatment outcomes and enhanced quality of life.
Keywords: cancer rehabilitation, quality of life, nurse, interdisciplinary collaboration

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Physical activity as an element of therapy for children with obesity

Introduction: Childhood obesity is a significant and dynamically increasing public health problem, of a chronic and multifactorial etiology. The disease is associated with numerous somatic complications and negatively affects the child's psychological well-being and social functioning. Effective therapy requires a multidisciplinary approach, in which regular physical activity plays a key, non-pharmacological role.
Material and methods: A review of scientific literature was conducted to analyze the role of physical activity in the treatment of obesity in children. Current clinical studies, systematic reviews, and recommendations of international health organizations, such as WHO, were searched and analyzed. The thematic scope covered childhood obesity therapy with an emphasis on movement-based interventions.
Results: Physical activity is a fundamental element regulating energy balance and improving body composition. Its regular application leads to increased cardiorespiratory fitness, improved motor skills, and beneficial metabolic changes. Furthermore, it promotes the reduction of emotional tension and enhances self-esteem and psychosocial functioning, which is crucial for the long-term effectiveness of therapy. Effective motivation is based on adapting physical activities to the child's interests, family support, and building positive associations.
Conclusions: Physical activity is an indispensable and effective component of comprehensive childhood obesity therapy, significantly contributing to the improvement of physical and mental health, as well as quality of life. Long-term effectiveness of interventions requires interdisciplinary collaboration, adherence to WHO recommendations, and active engagement of the child and their family in the therapeutic process.
Keywords: childhood obesity, physical activity, interdisciplinarity

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Knowledge and attitudes of pregnant women regarding methods of delivery in low-risk pregnancy

Introduction: Low-risk pregnancy generally has a physiological course and requires only standard midwifery care. This presentation summarizes the findings of an article assessing pregnant women's knowledge and attitudes of pregnant women about low-risk pregnancy delivery methods, which is essential for planning educational and supportive strategies that enable evidence-based informed decisions about childbirth.

Material and methods: The material consisted of a review of original research on women's knowledge, delivery preferences, the impact of antenatal education and information sources. Full-text articles in Polish and English published between 2015–2025 were analyzed using PubMed, Scopus, and university library resources.

Results: Most women preferred vaginal delivery, but this was often accompanied by fear of pain, complications, and limited knowledge of methods that support physiological delivery, especially pelvic floor preparation and non-pharmacological pain relief. Women who attended antenatal classes or used physiotherapy showed higher awareness, although the Internet and social networks were the main sources of information.

Conclusions: Although attitudes towards vaginal birth are generally positive, knowledge about delivery in a low-risk pregnancy is insufficient. Antenatal education, physiotherapy, and access to reliable information are key to improving awareness, reducing fear, and supporting physiological labor and birth.

Keywords: knowledge, attitudes, physiological childbirth, low-risk pregnancy

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Objective assessment of cervical range of motion and proprioception using a novel diagnostic device

Introduction: Cervical range of motion (ROM) and proprioception are essential components of the clinical assessment of patients with neck disorders. The aim of this study was to evaluate the reliability, repeatability, and convergent validity of a novel device for measuring cervical ROM and proprioception compared to the CROM goniometer and the Zebris system (for ROM).

Materials and Methods: One hundred healthy adults (50 women and 50 men; age 21–27 years, mean 23.16) participated in the study. Cervical ROM was assessed using the novel device, the CROM goniometer, and the Zebris system. The order of the measurements was randomized, and three independent examiners performed all measurements to determine inter-rater reliability. The procedure was repeated after two weeks to assess test–retest reliability. Cervical proprioception was assessed by measuring joint position error (JPE) using the novel device and the CROM goniometer. The participants repositioned their heads to a predefined target position and the deviation from the target. Reliability and convergent validity were evaluated using intraclass correlation coefficients (ICC) and Spearman correlation coefficients.

Results: The novel device demonstrated very good reliability for cervical ROM measurements both over time and between examiners. For cervical flexion, no statistically significant differences were found between repeated measurements ($p = 0.610–0.287$), and the correlation coefficients were high ($r = 0.87–0.95$). High ICC values (0.870–0.952) and Cronbach's alpha coefficients (0.916–0.975) confirmed excellent repeatability of the measurement. The lowest agreement was observed for the right cervical rotation, similarly to the CROM goniometer. For cervical proprioception, the novel device showed moderate to high agreement with the CROM goniometer, with ICC values indicating good repeatability and convergent validity of joint position error measurements (JPE).

Conclusions: The novel device is a reliable and valid tool to assess both cervical range of motion and proprioception. It may serve as a modern and practical alternative to standard measurement methods in clinical practice and research.

Keywords: cervical proprioception; range of motion; cervical spine; joint position error; CROM; Zebris

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Neurodevelopmental care in the context of the impact of sound and light on the newborn

Introduction: Hospitalized newborns, especially premature ones, are exposed to adverse environmental stimuli, such as sound and light, which may disrupt neurological development. Limiting their exposure is an important element of neurodevelopmental care; therefore, the aim of this study was to assess the knowledge and attitudes of medical personnel in this regard.

Material and Methods: The study was conducted between 2024 and 2025 in four hospitals located in the city of Rzeszow and Rzeszów County. The study sample consisted of 109 medical personnel. The method used was a diagnostic survey and the research tool was a self-designed questionnaire.

Results: As the level of knowledge among medical personnel increased, a significant increase in actions taken was observed to limit the adverse impact of the neonatal intensive care unit environment on patients. Preventive actions that supported the child's neurodevelopment included conducting quiet conversations among staff, silencing cell phones, and quickly responding to audible alarms from medical equipment. Preventive actions that support the development of the newborn were significantly more frequently implemented by medical staff with longer experience ($p = 0.0063$), older age ($p = 0.0057$), higher education ($p = 0.0235$), employed in hospitals with higher referral levels ($p = 0.0003$), and access to training and educational materials in the field of neurodevelopmental care.

Conclusions: The results obtained confirm that a higher level of knowledge of medical personnel promotes a more frequent implementation of neuroprotective measures for newborns hospitalized in intensive care units, with professional experience, level of education, and participation in training playing an important role.

Keywords: premature infant, neurological development, light, sound, medical staff

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Assessing the relationship between activity limitations and participant and context factors in individuals aged 80 years and older

Introduction: The purpose of this study was to evaluate the relationship between the limitations of activity and participation and contextual factors in older adults hospitalized in a geriatric ward in southeastern Poland, using the International Classification of Functioning, Disability, and Health (ICF).

Material and Methods: The study included 281 people aged 80 years and older. A set of ICF codes and the Disability Index were used to assess activity and/or participation in older adults. Contextual factors included sociodemographic characteristics, medication use, history of falls, self-assessed quality of life, and health satisfaction. The relationship between these factors was evaluated using a linear regression model.

Results: Significant difficulties were identified in activities such as walking (45.20%), performing a single task (28.83%), and carrying out daily routine (18.86%). The general difficulty was identified with housework (24.20%), preparing meals (8.90%), and washing yourself (8.19%). The Disability Index showed a statistically significant association with age, the occurrence of falls, and self-rated health and quality of life ($p < 0.001$).

Conclusions: Limitations in activity and participation in life among older adults are determined by contextual factors, some of which are modifiable. Identifying these factors and implementing therapeutic interventions to address them can improve functioning and prevent long-term disability in people aged 80 and older.

Keywords: older adults, health, cross-sectional study

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Comprehensive rehabilitation in a female patient after a right-hemisphere hemorrhagic stroke: A case report

Introduction: The aim of this study is to present a comprehensive rehabilitation program for a patient who has suffered a stroke.

Patient: A 34-year-old patient was admitted to a rehabilitation center for comprehensive rehabilitation following intracerebral hemorrhage and arteriovenous malformation in the right cerebral hemisphere. Neurological examination at discharge revealed moderate to severe general condition, good cardiorespiratory function, drowsiness, and no verbal communication. The patient had quadriplegia and was uncooperative. On the day of admission to the rehabilitation center, physiotherapy examination revealed that the patient was dependent, with a Barthel scale of 0/100 points; a Berg scale of 0/56 points. Functional status indicated extreme impairment in joint mobility, muscle strength, and exercise tolerance, as well as extreme difficulties in activity and participation (maintaining body position, changing body position, gait, and using hands and arms).

Intervention and Results: The patient was scheduled for intensive rehabilitation, consisting of 5-6 hours of exercise per day, including individual therapy, verticalization, vision therapy, Vojta therapy, therapy using modern technologies, and work with a psychologist and a speech therapist. The patient participated in a specially designed robotic-assisted therapy path and used the following devices from August to December: Vibramoov pro, Robogait, Exoskeleton, Alpha Platform, and Zerbis Treadmill. After 4 months of intensive rehabilitation, a physical examination revealed significant improvements in joint range of motion, muscle strength, and functional status (Barthel scale 75/100 points; Berg scale 49/56 points; Up-and-Go test 11 seconds).

Conclusions: Comprehensive rehabilitation supported by robotics and orthopedic equipment improved functional status and restored independence in daily life.

Keywords: rehabilitation, stroke, robotics

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Perineal incision and tear: Complications and rehabilitation

Introduction: The perineum is a soft tissue structure connecting the anus to the external genitalia and forms an essential part of the pelvic floor. It plays a key role in organ support and injury prevention. During vaginal childbirth, the perineum may be injured by rupture or episiotomy, which is currently recommended only in medically justified cases. Proper pelvic floor rehabilitation supports tissue healing and functional recovery. The purpose of this study was to review the literature on perineal incision and rupture, its health consequences, and rehabilitation methods used during the perinatal period.
Material and methods: This study is a review of the literature based on scientific articles published between 2015 and 2025 and available in PubMed, Scopus, and university library databases. The analysis focused on the types of perineal injuries, their consequences, and rehabilitation approaches.
Results: According to WHO recommendations, an episiotomy should be performed in 5-20% of births, although its frequency remains higher in practice. Most perineal injuries are mild. Possible complications include anal sphincter damage, infections, pain, pelvic floor dysfunction, urinary incontinence, and pelvic organ prolapse. Rehabilitation after perineal injury promotes healing, improves pelvic floor muscle strength and control, improves scar mobility, and reduces postpartum discomfort.
Conclusions: Perineal injuries during vaginal delivery may lead to short- and long-term complications depending on the severity of the injury. Appropriate pelvic floor rehabilitation, patient education, and individualized perinatal care reduce the risk of lasting consequences and improve postpartum quality of life.
Keywords: episiotomioraphia, perineal rupture, perineal injuries, rehabilitation

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Methodological and organizational challenges in the implementation of an exercise prehabilitation program before total hip arthroplasty: Experiences from a research project

Introduction: Exercise pre-habilitation is increasingly considered an important component of preparing patients with hip osteoarthritis for elective total hip arthroplasty. The aim of this study is to present the assumptions of a prospective single-center research project and to discuss organizational and methodological challenges related to the implementation of a prehabilitation program. The presentation is based on experiences from the pilot phase involving 40 patients.
Material and methods: The study was designed as a single-center prospective project including adult patients (≥18 years) diagnosed with hip osteoarthritis and qualified for elective total hip arthroplasty. At the pilot stage, experiences related to a two-month home exercise prehabilitation program are analyzed. Functional assessment includes hand-held dynamometry, Myoton PRO measurements, functional tests (Timed Up and Go, 10-Meter Walk Test), and the HOOS questionnaire.
Results: Pilot-phase experiences enabled the identification of key challenges, including difficulties in monitoring exercise adherence, complex coordination of preoperative assessments, and reduced adherence in some patients due to severe pain and advanced osteoarthritis.
Conclusions: Pilot stage experiences highlight the importance of addressing real-world clinical and organizational constraints when planning and implementing exercise pre-habilitation programs before total hip arthroplasty.
Keywords: exercise prehabilitation, total hip arthroplasty, pilot study, preoperative physiotherapy

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Anthropometric and body composition factors linked to elevated blood pressure in children and adolescents with intellectual disabilities

Introduction: Hypertension in children and adolescents is an increasing public health concern, particularly in high-risk populations such as individuals with intellectual disabilities (ID). Children with ID more frequently exhibit obesity, unfavorable body composition, and limited access to preventive healthcare; however, the relationships between anthropometric parameters, body composition, and elevated blood pressure remain insufficiently explored.

Materials and Methods: This cross-sectional study included 461 children and adolescents with ID aged 7–18 years who attended special education schools. Anthropometric measurements (BMI, waist circumference, hip circumference) and a body composition assessment using BIA were performed. Blood pressure was measured three times according to the guidelines of the European Society of Hypertension. Associations between somatic parameters and categories of elevated blood pressure, including hypertension and isolated systolic hypertension, were analyzed.

Results: Hypertension was identified in 13.9% of the participants and isolated systolic hypertension in 10.4%. Abdominal obesity was present in 39.5% of the participants, and elevated hip circumference in 28.2%, more frequently among girls. Higher blood pressure categories were associated with significantly higher BMI, waist and hip circumferences, and body fat percentage, as well as with lower proportions of muscle mass, fat-free mass, and total body water ($p < 0.0001$). Hip circumference demonstrated the highest discriminatory ability for elevated blood pressure (AUC = 0.844).

Conclusions: Elevated blood pressure is common among children and adolescents with ID and is strongly associated with unfavorable anthropometric characteristics and body composition. Simple anthropometric measurements and body composition assessment may support the early identification of children at increased cardiovascular risk.

Keywords: intellectual disability; hypertension; anthropometry; body composition

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Childbirth and Its Consequences for the Musculoskeletal System: The Role of the Midwife

Introduction: Pregnancy and childbirth induce significant hormonal, biomechanical and anatomical changes in the female musculoskeletal system, often resulting in back pain, weakening of the pelvic floor and abdominal muscles, and altered posture and pelvic alignment. In the postpartum period, recovery of physical fitness is gradual and additional loads such as carrying and feeding the baby, may exacerbate pain. Therefore, individualized physical activity, education, and prevention are essential components of obstetric care. This study aims to analyze the effects of vaginal childbirth on the woman's musculoskeletal system and to discuss the midwife's role in preventing and reducing perinatal overload.
Materials and Methods: The study is based on a review of the scientific literature from 2015–2025 available in PubMed, Scopus, and academic library resources. Full-text articles in obstetrics, physiotherapy, and women's health were analyzed that address musculoskeletal changes during pregnancy, childbirth, and postpartum period, as well as the role of the midwife.
Results: The review indicates that childbirth and the perinatal period significantly affect the musculoskeletal system, leading most commonly to lumbosacral pain, impaired pelvic stabilization, and pelvic floor muscle weakness. The key role in educating women on proper posture, ergonomics, and safe physical activity was highlighted.
Conclusions: Through education, individualized guidance, and promotion of safe physical activity, the midwife plays an important role in preventing and reducing the musculoskeletal consequences of childbirth. Exercises strengthening the abdominal, back, and pelvic floor muscles, together with posture correction, support faster recovery and pain reduction in the postpartum period.
Keywords: childbirth, postpartum period, musculoskeletal system, midwife

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Impact of urogynecological physiotherapy on the quality of life of women during pregnancy and the postpartum period

Introduction: Urogynecological disorders that occur during pregnancy and the postpartum period, such as urinary incontinence, low back pain, and recti abdominis, may significantly reduce women's quality of life. Urogynecological physiotherapy represents an effective conservative treatment; however, its implementation in perinatal care remains limited. The aim of the study was to evaluate the impact of urogynecological physiotherapy on the quality of life of women during pregnancy and after childbirth.

Materials and Methods: An observational study was conducted between February and June 2025 in a group of 49 women aged 20–40 years who were pregnant or in the postpartum period. A proprietary questionnaire was used, including sociodemographic data, presence of urogynecological symptoms, use of urogynecological physiotherapy, and subjective assessment of physical and psychological quality of life. Pain intensity was assessed using the Visual Analogue Scale (VAS) and quality of life was analyzed according to selected domains of the WHOQOL-BREF questionnaire.

Results: The most frequently reported complaint was low back pain (77.1%), followed by stress urinary incontinence (43.8%) and urgency urinary symptoms (39.6%). The recti abdominis was observed in 22.9% of the participants. Women who underwent urogynecological physiotherapy reported a reduction in symptom severity of symptoms and higher quality-of-life ratings compared to women who did not receive physiotherapy.

Conclusions: Urogynecological physiotherapy has a positive effect on reducing symptoms and improving the quality of life of women during the perinatal period, supporting its wider inclusion in the standards of perinatal care.

Keywords: urogynecological physiotherapy, quality of life, pregnancy and postpartum period, women's health

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Proprioceptive Neuromuscular Facilitation in the Rehabilitation of a Patient with Guillain-Barré Syndrome Hospitalised in the Intensive Care Unit: a Case Study

Introduction: Guillain–Barré syndrome (GBS) is an acute autoimmune inflammatory polyneuropathy that, in severe cases, may lead to respiratory failure that requires intensive care unit (ICU) treatment. Early physiotherapy is crucial in preventing complications related to prolonged immobilization. One of the rehabilitation approaches used in ICU patients is proprioceptive neuromuscular facilitation (PNF).

Materials and Methods: A 38-year-old male with acute respiratory failure due to GBS secondary to diffuse large B-cell lymphoma was treated in the ICU and required periodic mechanical ventilation. Physiotherapy based on the PNF concept was implemented according to the patient's clinical status and vital parameters (HR, MAP, SpO_2, MV, Ppeak, RR). The progression of therapy depended on exercise tolerance and clinical signs such as fatigue, dyspnea, or sweating. Interventions included rhythmic initiation technique for upper limbs, a combination of isotonics and dynamic reversals techniques for lower limbs, manual respiratory facilitation, and neuromuscular electrical stimulation (NMES). Physiotherapy was temporarily withheld on days with excessive tachycardia (>150 bpm) or significant hypotension (MAP 50 mmHg).

Results: At admission to the ICU, the patient could move only the fingers of the right hand. One day after discharge from the ICU, muscle strength assessed using the abbreviated MRC scale reached grades 2–3 in the upper limbs and grade 2 in the lower limbs. Improved exercise tolerance and motor activity were observed during physiotherapy in the ICU.

Conclusions: PNF-based physiotherapy combined with NMES improved motor function and exercise tolerance in a patient with GBS treated in the ICU, despite periodic cardiovascular limitations.

Keywords: Guillain–Barré syndrome; proprioceptive neuromuscular facilitation; intensive care unit

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