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Področje in cilji

Fizioterapija je nacionalna znanstvena in strokovna revija, ki objavlja recenzirane prispevke z vseh področij fizioterapije (mišično-skeletna fizioterapija, nevrofizioterapija, kardio-respiratorna fizioterapija, fizioterapija za zdravje žensk, fizioterapija starejših in drugo), vključujoč vlogo fizioterapevtov v preventivni dejavnosti, akutnem zdravljenju in rehabilitaciji. Obsega tudi širša področja telesne dejavnosti in funkcioniranja ter zmanjšane zmožnosti in zdravja zaradi bolečine. Namenjena je fizioterapevtom, pa tudi drugim zdravstvenim delavcem in širši javnosti, ki jih zanimajo razvoj fizioterapije, učinkovitost fizioterapevtskih postopkov, standardizirana merilna orodja in klinične smernice na tem področju.

Fizioterapija objavlja le izvirna, še neobjavljena dela v obliki raziskovalnih prispevkov, kliničnih primerov, preglednih prispevkov ter komentarjev in strokovnih razprav. Izhaja dvakrat na leto, občasno izidejo suplementi.

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Screening for medical referral

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Diagnosis by medical doctors of many diseases requires advanced imaging, laboratory tests and/or tissue biopsy. Physiotherapists can make significant contributions to these diagnoses by referring patients to physicians in a timely fashion. The average length of time duration between when pain from cancer begins (anache) and the diagnosis is made is 9 months (1). While physiotherapists see many patients with ache complaints, most do not have cancer. It is important for physiotherapists to recognize the warning signs of serious disease like cancer. There are many examples of physiotherapists effectively screening patients for medical doctor referral (2).

Occult cancer typically presents with an ache that starts insidiously and over time becomes more severe and intense. Weight-bearing activities aggravate the pain and unloading the body provides relief, but as the disease progresses less and less weight-bearing is tolerated and less and less relief is noted with unloading strategies. This pattern of pain progression is not unusual for many patients whom respond well to physiotherapy management. So when should one be concerned about a patient's health status? Literature suggests that having a personal history of cancer (e.g., breast, prostate, lung cancer etc.) is a major risk factor. In fact recent back pain guidelines recommend that a patient with such a history and a new onset of back pain should undergo an MRI (4). Also, a patient with a progressive pain pattern history over 50 years of age, unexplained weight loss with lack of response to conservative care should be referred to a physician.

The screening process for physiotherapists includes: 1) identifying health risk factors (e.g., age, sex, illnesses, family history), 2) recognizing a symptom pattern that is progressive or atypical in nature, 3) review of systems (e.g., unexplained weight loss, urinary retention or incontinence, increased urinary frequency etc.), 4) recognizing a physical examination pattern that is progressive or atypical in nature, and 5) assessing response to treatment. Due to the potential overlap of visceral/disease pain patterns with pain from conditions that respond well to physiotherapy management collecting patient health risk factors and review of systems is critical to recognizing a pain pattern that suggests disease versus dysfunction. For example ischemic heart disease can cause right shoulder, jaw and inter scapular pain; abdominal aortic aneurysms can cause lower thoracic/upper and mid lumbar pain, gall bladder disease can cause right scapular or central mid/lower thoracic pain (3). So when should the physiotherapist worry that the inter scapular pain is from the heart? The response is – does the patient have risk factors associated with heart disease, or other symptoms associated with heart disease – dyspnea, diaphoresis, and what is the patient's heart rate and blood pressure? In many cases the entire examination is required before a decision to refer to a medical doctor can be reached with confidence.

Keywords: medical screening, differential diagnosis, red flags, night pain, patient referral.

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Exercise for low back pain and pelvic girdle pain in pregnancy

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Objectives: At the end of this session the participant will be able to:

1. Be familiar with current literature on efficacy of exercise as an intervention for low back and pelvic girdle pain in pregnancy.
2. Understand the PEDro Scale as a means of evaluating physiotherapy research literature.
3. Discern best evidence-based practices for use of exercise as an intervention for low back and pelvic girdle pain in pregnancy.

Pelvic girdle and low back pain are common in pregnant women with prevalence rates averaging near 50% at some time during a woman's pregnancy. Assessment of exercise intervention studies may provide the physical therapist with evidence to assist in care of the pregnant population with these dysfunctions.

This presentation will cover current literature on the use of exercise to treat and/or prevent low back pain and pelvic girdle pain in pregnancy. A recently published systematic review and some very recent additional studies will inform the discussion.

The systematic review of prospective clinical trials, published in the Journal of Women's Health Physical Therapy in 2012 (1) involved a search of CINAHL, MEDLINE, PEDro, and the COCHRANE data bases and reference screening was conducted for prospective clinical trials published in English. Three reviewers used a consensus process to select articles for final review. Two of the reviewers then independently reviewed the selected articles according to the PEDro Scale. Where available, the reviewer's results were compared against PEDro Reviews and reviewer scores were altered if both reviewers agreed that the published PEDro Score was more accurate.

In this systematic review, eleven studies were reviewed. Four were deemed to be of good quality (range 7-8/10); 5 of moderate quality (range 4-6/10); 2 of poor quality (1-2/10). High-quality studies support the intervention of exercise, either alone or combined with advice or other treatment (support belts, acupuncture) as a means of prevention or management of pelvic girdle and low back pain. One study found aquatic-based exercise to be of greater benefit than land-based exercise. Another found acupuncture superior to exercise which was, in turn, more effective than "standard treatment". Addition of pelvic support belts to exercise intervention did not further decrease pain. Reports of sick leave conflicted across studies.

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Regulation of physiotherapy in Croatia

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After many years of efforts by physiotherapists in Croatia, The Croatian Parliament passed the Act on Physiotherapy on 3rd October 2008.

What is regulated by the Act on Physiotherapy?

- The protection of education level for practice – basic education physiotherapists acquire after completing the study of physiotherapy that ensures a high level of education in accordance with the regulations in the field of higher education.
- The protection of the title bachelor of physiotherapy.
- The protection of performing activities – bachelor physiotherapist is a medical worker who performs physical therapy procedures and conducts the process of physical therapy.
- The protection of the introduction of additional education – additional education is required for physiotherapist when capacity and complexity of the expected results demand additional education in specific areas of health care. The need, contents and length of the additional educational program for physiotherapists are determined by the regulations of the Croatian Council of Physiotherapists.
- The protection of mandatory permanent education
  1. Physiotherapists in physical therapy are obligated to continuously update their knowledge and acquire new knowledge within the latest developments and discoveries in the field of physiotherapy care.
  2. The contents, deadlines and procedure of permanent professional training for physiotherapists in physical therapy are prescribed by the regulations of the Croatian Council of physiotherapists.

- The protection of terms to perform physical therapy
  1. Physiotherapy can be practiced only by a physiotherapist who is registered as a physiotherapist at the Croatian Council of Physiotherapists and is licensed for practice.
  2. The approval for independent work/licence is a document that gives or denies specific administrative act of the Statute of the Croatian Council of physiotherapists.
  3. Conditions, methods and procedures for granting, renewing and revoking approval for independent work/licence in physical therapy are prescribed by the regulations of the Croatian Council of Physiotherapists.

- Obligations and responsibilities of the physiotherapists:

  Obligations:
  1. A physiotherapist is obligated to take the patient into physiotherapy procedure according to the doctor's indication for physical therapy. A physiotherapist must make a plan and a program of physical therapy according to the medical diagnosis.
  2. Implementation of physiotherapy procedures for established programs, policies and protocols in teamwork.
  3. Application of scientifically validated methods and techniques with regard to performance, durable and safe use based on evidence from the fields of physical therapy.

4. Application of methods to solve problems in the implementation of physiotherapy procedures that require analytical skills and critical approach.
5. Constant consultation with a doctor who guides and monitors the patient's condition.
6. Cooperation with all team members and associates.
7. Keeping accurate, detailed and dated medical records in accordance with harmonized standards at European level, to record all the actions performed and which can at any time provide sufficient information about the condition of the patient at all stages of physiotherapy.
8. Conscientious conduct at work.
9. Keeping professional secret.
10. Knowing and respecting patient's rights.
11. Respecting the code of physiotherapy ethics and deontology.
12. Respecting the patient's religious principles.
13. Economic, efficient and effective use of tools and equipment.
14. Acting in the interests of patients.

Responsibilities:
1. For the authenticity of the recorded data.
2. For the patient's safety while performing duties.
3. For taken medicines and equipment to be used for the duration of the activity.

– Required contents of physiotherapy records are defined:
  1. Initial assessment and documentation for each patient.
  2. The goal of the therapy.
  3. Treatment plan/procedure undertaken.
  4. Periodic re-evaluation and its documentation for each patient.
  5. Documented release of a patient including the clinical response to the procedure at the time of release.
  6. Date and time of the service provided and signature of the physiotherapists.
  7. Additional functional tests and measurements must be attached to the record.

– Serious violation of physiotherapist's duty is defined:
1. If the physiotherapist refuses to provide physiotherapy care to a patient when a medical doctor referred her/him.
2. If the physiotherapist applied incorrect and improper physiotherapy procedures.
3. If the physiotherapist failed to inform doctors about the worsening condition of the patient during the physiotherapy.
4. If the physiotherapist does not send the patient to the doctor when within the physiotherapy procedure he or she establishes a report which is not in the physiotherapist's competence.
5. If due to negligence or ignorance improper conduct harms the health of patients.
6. If the physiotherapist applies the methods and techniques that are not within the competence of the job description of his/her work.
7. If he/she violates the honour and reputation of their profession.
8. When any provision of this Act is violated.
9. When the code of ethics and deontology is violated.

– The control of quality is also defined:
  1. Quality control of physiotherapy is carried out by a specially trained physiotherapist who is appointed by the employer, in cooperation with the Ministry of Health and the Croatian Council of Physiotherapists.
  2. Quality control of the physiotherapist's work includes: physiotherapy care plan, implementation of physiotherapy procedures, the results of physiotherapy care and its impact on the health status of patients.

– The establishment of the Croatian Council of Physiotherapists is defined:

The Croatian Council of physiotherapists was established on 28 January 2009 as an autonomous and independent professional organization with the status of legal persons and public authorities.
The Council has these authorities:

1. It keeps the register of its members.
2. It issues, renews and revokes the approval of independent work/licence.
3. It performs supervision over the work of physiotherapists who perform tasks in physiotherapy.

In addition to public authorities, the Council:

- enacts the Code of physiotherapy ethics and deontology;
- cooperates with the Ministry of Health in all areas of interest to physiotherapists, provides expertise and participates in the preparation of regulations in the field of physiotherapy;
- enacts the contents of physiotherapy guidelines for planning and implementation of Physiotherapy care;
- enacts the contents of physiotherapy record;
- proposes the standards and norms for the activity of physiotherapists to the Minister of Health;
- determines the need, contents and duration of additional training program for physiotherapists;
- gives an opinion on the quality of physiotherapy procedures, tools and equipment which are subject to registration;
- enacts general acts which regulate contents, deadlines and procedures for continuing professional development and testing expertise of its members;
- organizes continuing professional development of its members and conducts a proficiency check;
- gives an opinion on the justification of private practice, health institution or company engaged in physical therapy in the network public health service, or outside the network of public health service;
- represents the interests of its members at the conclusion of the contract with the Croatian health insurance and other insurance companies;
- provides effective advertising and way of highlighting the names of private practice;
- sets minimum prices for certain tasks from physiotherapy activities outside the network of public health services and determines the prices for certain tasks from physiotherapy from the scope of voluntary health insurance;
- gives a prior opinion on the act of the Croatian Institute for Health Insurance, which determines how to implement the plan and programs of health care, the formation of cost of health care and other grounds for concluding contracts with health institutions and private health workers who form a network of public health service;
- prescribes the contents, deadlines and verification process expertise of bachelor physiotherapist, assistant physiotherapist and masseur;

- monitors and analyses the issues and cares for coordination of physiotherapy;
- performs professional supervision of bachelor physiotherapist, assistant physiotherapist and masseur;
- monitors and supervises the implementation of the rules of ethics and deontology in physiotherapy and takes appropriate measures in case of their violation;
- cooperates with health inspection of the Ministry of Health;
- coordinates relations among its members and actively participates in solving possible disputes;
- collaborates with the World Health Organisation, the World Confederation for Physical therapy and other international organizations of interest to physiotherapy;
- issues newsletter and other professional editions;
- performs publishing and issuing activity;
- organizes professional seminars, courses, conferences;
- provides professional advices to its members;
- gives professional opinion in the preparation of regulations in the field of prevention and wellness;
- performs other duties specified by the Constitution and other regulations of the Council.

Explaining the beneficial effect of exercise in knee osteoarthritis

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Background: Exercise reduces pain and improves functioning in osteoarthritis of the knee (OAk). Underlying mechanisms are still under debate and better understanding of the pathways involved may contribute to more targeted treatment strategies. This qualitativ

analysis of the literature aims to provide an overview of theoretical models that are put forward to explain the treatment effects of exercise in OAk. **Methods:** *An inductive qualitative approach, based on the 'grounded theory' of Glaser and Straus, was used.* Studies emphasizing on exercise therapy for OAk, collected from three Cochrane reviews and nine guidelines of the Physiotherapy Evidence Database (PEDRO) published between 2000 and 2012, were included. The introduction and discussion parts of these papers were screened for explanations of exercise-induced benefits in OAk patients. **Results:** Twenty-two studies were included and 73 key points were identified which were subdivided into 16 core theoretical concepts. Finally, 5 categories were formed: neuromuscular, peri-articular, intra-articular, and psychosocial components, and general fitness and health. **Conclusion:** Future research on exercise in OAk should allow distinguishing the contribution of different potential pathways to the treatment effects.

Keywords: osteoarthritis, knee, exercise, aetiology, rationale.

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Robotsko merjene anteriorne laksnosti kolenskega sklepa

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Uvod: Anteriorna laksnost kolenskega sklepa je pri nepoškodovanem kolenu dejavnik tveganja za poškodbo sprednje križne vezi (1) in poškodbo kolena (2). Pri poškodovanem kolenu pa je indikator za poškodbo sprednje križne vezi (3, 4). Nov robotski artrometer za merjenje anteriorne laksnosti kolenskega sklepa kolenski artrometer GNRB® (GeNouRoB SAS, Montenay, France) ima nekatere prednosti v primerjavi z nerobotskim kolenskim artrometrom KT. Namen raziskave je bil ugotoviti zanesljivost posameznika pri uporabi kolenskega artrometra GNRB®in predstaviti normativne vrednosti anteriorne laksnosti kolena pri mladih preiskovankah z uporabo artrometra GNRB®. **Metode**: Anteriorna laksnost kolenskega sklepa je bila testirana pri 2 skupinah mladih, nepoškodovanih preiskovank. Med izvedbo testa smo spremljali EMG aktivnost zadnjih stegenskih mišic. Zanesljivost kolenskega artrometra GNRB® je bila testirana v skupini 13 preiskovank, zbiranje normativnih podatkov je potekalo v skupini 23 preiskovank. Anteriorna laksnost kolenskega sklepa (anteriorni odmik golenice) je bila izmerjena pri silah 134 N in 250 N. Rezultati so predstavljeni na nestandardiziran način (brez uporabe dodatne stabilizacije) in standardiziran način (z uporabo dodatne stabilizacije) upoštevajoč stabilizacijsko silo na pogačici. **Rezultati:** Relativna zanesljivost (95-odstotni interval zaupanja) kolenskega artrometra GNRB®je bila pri sili 134 N med 2 in 3 mm. Normativni podatki so pokazali, da je anteriorna laksnost levega kolena skoraj za 1 milimeter večja od desnega kolena. **Zaključki:** Relativna zanesljivost kolenskega artrometra GNRB®je primerljiva s KT kolenskim artrometrom. Kot ugotovljeno na nerobotskem kolenskem artrometru, je tudi pri robotskem artrometru GNRB® anteriorna laksnost kolenskega sklepa večja na levem kolenu v primerjavi z desnim kolenom.

Ključne besede: sprednja križna vez, EMG, sila, artrometer.

Robotic testing of knee anterior laxity

Background: Anterior laxity is a risk factor for anterior cruciate ligament (1) and traumatic knee injuries (2), generally, in the uninjured knee. In the injured knee, it is indicative of anterior cruciate ligament injury (3, 4). A new knee ligament arthrometer for testing knee anterior laxity, the GNRB® knee arthrometer (GeNouRoB SAS, Montenay, France), has been developed and offers additional characteristics that may improve testing as compared to nonrobotic devices such as the KT. Purpose of the study was to evaluate the reliability of the GNRB® knee arthrometer and present normative values of knee anterior laxity using this device on young females. **Methods**: Knee anterior laxity in both knees was tested in two groups of young, uninjured females using the hamstrings electromyography biofeedback feature of the device. There were 13 participants in the group tested for reliability and 23 for the normative study. Knee anterior laxity (mm of movement of the tibia in the anterior direction) was calculated at test forces of 134 N and 250 N with values presented for the unstandardised and standardised (relative to stabilisation force) conditions. **Results:** The relative reliability (95 % limits of agreement) of the device for laxity at a test force of 134 N was 2 to 3 mm. Left knee anterior laxity was almost 1 mm greater than the right. **Conclusions:** The relative reliability of the GNRB® knee arthrometer is comparable to the KT device. In agreement with previous work on the nonrobotic KT arthrometer, the knee anterior laxity values found with the GNRB® knee arthrometer are greater in the left as compared to right knees.

Keywords: anterior cruciate ligament, electromyography, force, arthrometry.

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Izokinetična ocena funkcije kolenskega sklepa po rekonstrukciji sprednje križne vezi

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Uvod: Izokinetična ocena mišične funkcije je po vsem svetu znana in zelo uveljavljena metoda ocenjevanja mišične moči in jakosti, ki se uporablja od leta 1967 (1). Testiranje je pomembno za natančno spremljanje učinka treninga mišične moči in vzdržljivosti v sklopu rehabilitacijskega programa po operaciji sprednje križne vezi (SKV). Namen: V Termah Zreče izvajamo izokinetične meritve od leta 1997, najprej na izokinetičnem dinamometru EN KNEE, zdaj na najsodobnejši aparaturi BIODEX PRO 4. V ta namen smo želeli prikazati naše izkušnje pri izokinetični oceni funkcije kolenskega sklepa po operaciji SKV. V raziskavo smo vključili 80 preiskovancev. Pri 40 preiskovancih je bila rekonstrukcija SKV narejena s presadkom tetiv fleksorjev kolenskega sklepa, in sicer s tetivo mišic semitendinosus in gracilis (skupina STG). Pri 40 preiskovancih pa je bila rekonstrukcija narejena s presadkom patelarnega ligamenta (skupina PT). Predvidevali smo, da je med skupinama STG in PT razlika v mišični moči in vzdržljivosti fleksornih in ekstenzornih mišic kolenskega sklepa. **Metode:** Testirali smo moč in vzdržljivost ekstenzornih in fleksornih mišic kolenskega sklepa. Testiranje na izokinetičnem dinamometru smo izvedli 3 in 6 mesecev po operaciji SKV pri 60°/s in z obsegom giba med 10° in 90°, 6 ponovitev – za test moči in pri 180°/s, z obsegom giba med 20° in 90°, 25 ponovitev – za test vzdržljivosti. Poleg tega smo po testu moči izmerili tudi anteriorni premik golenice na artrometru KT-1000. **Rezultati:** Pridobljene podatke smo statistično analizirali s programom SPSS. Povprečni deficit moči ekstenzorjev pri skupini STG je bil 6 mesecev po operaciji – 13,1 %, pri skupini PT pa 25,2 %. Ugotovljena je bila statistično značilna razlika v moči ekstenzorjev med skupinama STG in PT ($p = 0,00015$). Za moč fleksorjev in vzdržljivost fleksorjev in ekstenzorjev ni bila ugotovljena statistično značilna razlika. Pri testiranju na artrometru KT-1000 smo ugotovili, da je bil povprečni anteriorni premik golenice pri sili 136 N za skupino STG 1,07 ± 1,47 mm in pri skupini PT 0,84 ± 1,64 mm. **Zaključki:** Rekonstrukcija SKV je v obeh skupinah pokazala dobre rezultate pri izokinetičnih meritvah. V literaturi je mogoče razbrati, da je moč ekstenzornih mišic kolenskega sklepa pri skupini PT zmanjšana za 20 % še 2 leti po operaciji. V naši raziskavi smo ugotovili, da je taka razlika pri 6 mesecih po operaciji. Glede na rezultate meritev z artrometrom KT-1000 ugotavljamo, da lahko dosežemo odlično objektivno stabilnost kolenskega sklepa pri uporabi obeh presadkov.

Ključne besede: izokinetične meritve, rekonstrukcija sprednje križne vezi, tetiva mišic fleksorjev, tetiva patelarnega ligamenta, KT-1000 artrometer.

Isokinetic evaluation of knee joint function after anterior cruciate ligament reconstruction

Background: Isokinetic evaluation of muscle function is a worldwide known and well established method for evaluation of the muscle strength and intensity, which has been in use since 1976. Testing is important in order to follow exactly the impact of training muscle power and resistance of rehabilitation program after anterior cruciate ligament (ACL) reconstruction. Purpose: In Unitur Spa Resorts, isokinetic measurements have been performed since 1997, initially on isokinetic dynamometer EN KNEE and now on the most modern apparatus BIODEX PRO 4. Therefore, we wanted to present our experience in the isokinetic evaluation of the knee joint after the ACL reconstruction. The study included 80 patients. In 40 patients, ACL reconstruction was performed by hamstring tendon autograft (semitendionosus and gracilis (STG) group), in the other 40 patients by patellar tendon autograft (PT group). We expected a difference in muscle power and intensity extensors and flexors of the knee joint between STG and PT groups. **Methods:** We tested the strength and intensity of the knee joint muscles. Isokinetic dynamometer testing was performed three and six months after the ACL reconstruction. At three months, the Endurance test has been performed (180°/s velocity with ROM between 20° and 90°; 25 repetitions). At six months, the Endurance and Power test (60°/s velocity and ROM between 10° and 90°; six repetitions) were performed. After the strength tests, we additionally measured the total AP displacement of the tibia with the KT-1000 arthrometer. **Results:** The gained data was statistically analyzed with the program SPSS. The average deficit of extensors strength in STG group at 6 months after ACL reconstruction was 13.1 %, while in the PT group the deficit was 25.2 %. The statistically significant difference was observed in strength extensors between the groups ($p = 0.00015$). For flexors strength and intensity we did not find statistically significant difference. We found that mean 136-N side-to-side difference (arthrometer KT-1000) for STG group was 1.07 ± 1.47 mm and for PT group 0.84 ± 1.64 mm (not significant). **Conclusions:** ACL reconstruction in both groups showed good results in isokinetic measurements. The literature states that the power of extensor muscles of the knee joint in the PT group can be reduced by 20 % in the next 2 years after the ACL reconstruction. However, in our study we found that this difference is at 6 months after the surgery. Our results of KT-1000 measurements prove that we can get excellent objective knee stability using both transplants.

Keywords: isokinetic measurements, anterior cruciate ligament, reconstruction, hamstring tendons, patellar tendon, KT-1000 arthrometer.

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Fizioterapija po artroskopiji kolka z rekonstrukcijo labruma

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Uvod: Utesnitveni sindrom kolka in posledično poškodbe labruma se klinično lahko kažejo z bolečino, zmanjšanim obsegom giba, spremembami v mišični moči in koordinaciji, s slabšo stabilnostjo in izgubo funkcije (1). Za obnovitev skladnosti sklepnih površin kolčnega sklepa se uporablja artroskopija, s katero kirurg popravi kostno geometrijo, labrum in ligamentarne strukture, temu pa sledi proces fizioterapije, ki se spreminja skladno z razvojem operativne tehnike. Pomembno je, da sledimo procesu celjenja tkiva ter da s pravilno izbiro in aplikacijo fizioterapevtskih postopkov telesu omogočamo optimalne pogoje za celjenje. Glede na to, da se tovrstne poškodbe pojavljajo predvsem pri mladi, aktivni populaciji, je pomembno tudi, da upoštevamo individualne lastnosti vsakega pacienta. Glavni cilj posega in pooperativne fizioterapije je povrnitev neboleče in popolne funkcije kolčnega sklepa (2). **Metode:** Pregled literature v bazah Pub Med, Medline in EBSCO z iskalnim kriterijem »rehabilitation hip arthroscopy«, izdane med letoma 2006 in 2012, je izločil 11 člankov. Članki so poleg rekonstrukcije labruma vključevali tudi druge rekonstrukcijske posege na kolku. Zaradi praktične uporabnosti smo se odločili osredotočiti le na protokole, ki so bili vezani na rekonstrukcijo labruma. Na podlagi pridobljenih člankov in svojih praktičnih izkušenj smo pripravili protokol rehabilitacije po artroskopiji kolka z rekonstrukcijo labruma, ki je tudi vpeljan v prakso. **Rezultati:** Protokol rehabilitacije po artroskopiji kolka mora upoštevati načela: upoštevanje procesa celjenja, zmanjševanje otekline in bolečine, zgodnje pridobivanje obsega gibljivosti, omejitev obremenjevanja pri hoji, vzpostavljanje mišične aktivacije in nevromišičnega nadzora, postopna krepitev in ponovna vzpostavitev propriocepcije, kardiovaskularni trening in športno specifični trening (3). Večina literature navaja protokol v štirih fazah (1, 2, 4), mi pa smo se odločili za pripravo protokola, ki vsak teden prikazuje vključevanje posameznih fizioterapevtskih postopkov in je namenjen fizioterapevtom in ne pacientu. Zaradi specifičnosti smo združili le aktivnosti prvih štirih tednov, in sicer za delno obremenjevanje operirane noge in postopno krepitev mišic, v nadaljevanju pa smo se osredotočili na posamezne fizioterapevtske postopke (raztezanje, moč in funkcija mišic, kontrola mišične aktivacije, stabilizacija, kardiovaskularne vaje, hidroterapija, manualna terapija, pliometrija) in znotraj njih na nekaj specifičnih aktivnosti. **Zaključki:** Mehanične težave v kolku se odpravljajo z artroskopijo, funkcionalni primanjkljaj pa pridobimo skozi pooperativni fizioterapevtski proces. Za povrnitev neboleče in popolne funkcije kolčnega sklepa sta pomembna dobro sodelovanje zdravnika kirurga s fizioterapevtom ter motiviran pacient, ki ga mora fizioterapevt educirati. Predstavljeni rehabilitacijski protokol je osnova, ki jo je treba prilagajati stanju pacienta.

Ključne besede: pregled literature, proces celjenja, rehabilitacijski protokol, kolčni sklep.

Rehabilitation after hip arthroscopy with reconstruction of labrum

Background: Pain, loss of motion, changes in muscle strength and motor control, loss of stability and loss of function can be caused by femoroacetabular impingment and labral tear (1). To restore the consistency of joint surfaces of hip joint arthroscopy is used, in which a surgeon corrects bony geometry, labrum and ligament structures, followed by rehabilitation process, which varies in accordance with the development of surgical techniques. It is important to follow the process of healing of tissue, and with the proper selection and application of physiotherapeutic procedures we enable the body optimal conditions for healing. Given that these types of injuries occur mostly in young, active population, it is also important to consider the individual characteristics of each patient. The main objective of surgery and post-operative physiotherapy is to restore pain-free and full function hip joint (2). **Methods:** With a literature review in the databases Pub Med, Medline and EBSCO, the search criteria being "hip arthroscopy rehabilitation", issued between 2006 and 2012, 11 articles were selected. Articles in addition to reconstruction of labrum also included other reconstructive operations on the hip. Due to practical use, we decided to focus only on the protocols that have been linked to the reconstruction of labrum. On the basis of articles and our own practical experiences, we have prepared the "Protocol of rehabilitation after hip arthroscopy with labrum reconstruction", which is also implemented in practice. **Results:** Rehabilitation protocol after hip arthroscopy needs to follow several basic principles: consideration of soft tissue healing constraints, control of swelling and pain, early range of motion, limitation on weight bearing, initiation of muscle activity and neuromuscular control, progressive strengthening and restoration of proprioception, cardiovascular training and sport specific training (3). The majority of literature indicates the protocol in four phases (1, 2, 4). We decided to make a protocol, which shows individual rehabilitation procedures applied at different time of rehabilitation and is designed for physical therapists and not for the patient. Due to the specifics, we combined only the first four weeks of activities that are related to the partial weight bearing on operated leg and gradually strengthening the muscles, later we focused on specific rehabilitation procedures (stretching, strength and muscle function, control of muscle activation, stabilization, cardiovascular exercises, hydrotherapy, manual therapy, pliometrics) and within these on a few specific activities. **Conclusions:** Mechanical problems of the hip are removable with arthroscopy, functional deficit is obtainable through postoperative rehabilitation process. To restore painless and full function of hip joint is important to have a good cooperation between a surgeon and a physical therapist. Also important is well motivated and properly educated and supervised patient. Presented protocol of rehabilitation is a base, which has to be adapted to a patient's individual condition.

Keywords: literature review, tissuehealing, rehabilitation protocol, hip joint.

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Uporaba ravnotežne plošče Wii kot dodatek k standardni fizioterapiji

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Uvod: Sodobni svet in razvoj tehnologije prinašata nove načine, kako spremeniti, izboljšati ali popestriti standardno fizioterapevtsko obravnavo. Dokazano je, da igre spodbujajo raven kognitivnega procesiranja (1), trening v navideznem okolju pa posledično pripelje do izboljšanja izvedbe gibov v realnem svetu (2) in pomeni dodatno motivacijo skozi zabavo pri igri (3). Namen raziskave je bil ovrednotiti izboljšanje procesa rehabilitacije pri različnih poškodbah spodnjih udov z vadbo na ravnotežni plošči Wii. **Metode:** V raziskavi je prostovoljno sodelovalo 95 bolnikov (14 izključenih), starih od 15 do 79 let (44 ± 16,6 leta). Vključili smo bolnike z različno patologijo spodnjih udov akutne ali kronične narave. Zdravljeni so bili operativno ali konzervativno, dovoljena je bila polna obremenitev poškodovanega uda. Bolnike smo naključno razporedili v testirano ali kontrolno skupino. Testirana skupina je v desetih obravnavah izvajala dodatne vaje na ravnotežni plošči Wii, ki so obsegale štiri različne igre. V obeh skupinah smo pred začetkom in po koncu fizioterapevtske obravnave uporabili časovno merjeni test vstani in pojdi, stojo na poškodovanem udu na trdi podlagi pri odprtih in zaprtih očeh, stojo na poškodovanem udu na mehki podlagi pri odprtih očeh ter podatek o projekciji telesnega težišča, pridobljen z ravnotežno ploščo Wii. Ob koncu obravnave smo izvedli anketo o zadovoljstvu z vadbo. Rezultate smo statistično obdelali s t-testom za neodvisne vzorce s programom SPSS 17.0. **Rezultati:** Časovno merjeni test vstani in pojdi, test stoje na eni nogi na trdi podlagi pri odprtih očeh in stoje na eni nogi na mehki podlagi pri odprtih očeh se niso statistično značilno razlikovali med kontrolno in testirano skupino. Rezultat testa stoje na eni nogi na trdi podlagi pri zaprtih očeh je bil v povprečju v testirani skupini po obravnavi boljši za 7,0 s, v kontrolni pa za 2,3 s ($p < 0,01$). Odstotek obremenitve poškodovanega uda se je v testirani skupini povečal za 3,3 %, v kontrolni skupini pa za 1,2 % ($p < 0,05$). Odziv bolnikov na dodatno vadbo je bil zelo pozitiven, tudi rezultati iger so se postopoma izboljševali glede na izhodiščne vrednosti. **Zaključki:** Naši rezultati nakazujejo izboljšanje procesa rehabilitacije z dodatno vadbo na ravnotežni plošči Wii. Taka vadba sicer zahteva nekaj dodatnega časa tako terapevta kot bolnika. Glede na rezultate meritev in stopnjo zadovoljstva bolnikov pa menimo, da vadba s pomočjo Wii ugodno vpliva na rehabilitacijo po poškodbi spodnjega uda.

Ključne besede: fizioterapija, rehabilitacija, spodnji ud, navidezna resničnost, Nintendo.

The use of Wii balance board as a supplement to conventional physiotherapy

Background: The modern world and technology development provide new ways to change, improve or diversify conventional physiotherapy treatment. It is proven that games can help improve visual perceptual processing, balance, and functional mobility (1), while virtual reality based rehabilitation approach assumes that training in virtual environment will lead to corresponding performance improvements in the real world (2). Gaming system can be intended for an enjoyable method of encouraging physical movement (3). Purpose of the study was to determine whether additional training on Wii balance board improves rehabilitation process even more than just conventional physiotherapy in different lower limb injuries. **Methods:** There were 95 voluntary patients involved in this research (14 patients were excluded), aged from 15 to 79 years (mean: 44 ± 16. 6 years). Patients with different lower limb pathologies were included in this study. They had an acute or chronic diagnosis, which was treated conservatively or surgically. A full load of the injured leg was required. The patients were randomly divided into the test and the control group. The tested group performed four additional different game exercises on the Wii balance board each time in 10 sessions. In both groups before and after the physiotherapy treatment measurements were made. Timed up and go test, stance on the injured leg on the firm surface with eyes opened and closed, stance on the injured leg on the soft surface with eyes opened and the projection of the body center of gravity were assessed. A projection was measured with Wii balance board. At the end of the sessions a questionnaire about satisfaction with Wii training was filled up. Results were analyzed with SPSS 17.0. The independent samples t-test was used. **Results:** There were no statistically significant differences between the control and the tested group in timed up and go test, stance on the injured leg on the firm surface with eyes opened and stance on the injured leg on the soft surface with eyes opened. The results when standing on the injured leg on the firm surface with eyes closed improved in the tested group after the rehabilitation program on average for 7.0 s, while the control group improved for 2.3 s ($p < 0,01$). A load percentage of the injured leg increased for 3.3 % in the tested group and 1.2 % in the control group ($p < 0,05$). The patients' responses on additional Wii training were highly positive, while all game results improved according to the starting values. **Conclusions:** Our results indicate that additional training on Wii balance board improves the rehabilitation process. Extra time of a patient and a physiotherapist is needed in case of Wii training, but according to the study results and the patients' satisfaction level we believe that it is worth to continue Wii training after lower limb injuries.

Keywords: physiotherapy, rehabilitation, lower limb, virtual reality, Nintendo.

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The impact of coping style on quality of life in persons with Parkinson's disease

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Background: We hypothesized that quality of life in persons with Parkinson's disease (PD) is determined not only by the severity of the disease but also by the way the patients cope with the disease (1, 2). We investigated the coping styles used by patients with PD, their quality of life and the relationship between coping styles and quality of life. **Methods:** PD-patients were recruited during a yearly PD-convention of the Flemish Parkinson League. The respondents completed a clinical questionnaire including a self-reported version of the Hoehn & Yahr scale, the Utrecht Coping List and the Parkinson Disease Quality of Life-39 questionnaire (PDQ-39). **Results:** 60 men and 37 women with PD (mean age 66.5 y, mean duration of PD 10.0 y) responded. The mean total score on the PDQ-39 was 42.4 ± 16.9. The reported coping styles (UCL-subscales) were reassuring thoughts (48 %), active coping (46.2 %), palliative coping (41.8 %), seeking social support (35.8 %), avoiding (35.1 %), passive coping (27.4 %) and emotional coping (25.4 %). Multiple regression analysis showed a main effect of the Hoehn & Yahr scale on the PDQ-39 total score. For patients in Hoehn & Yahr stage I and II, the combination of passive coping, active coping and age, explained 66.5 % of the variance of the PDQ-39 total score. For patients in Hoehn & Yahr stage IV, the passive coping style explained 10.1 % of the variance of the PDQ-39. **Conclusions:** Mainly in the first stages of the disease, passive and active coping styles explain a large portion of the variance of the quality of life. In rehabilitation more attention should be given to assess and modify the way patients cope with their disease (3).

Keywords: coping style, quality of life, Parkinson's disease, rehabilitation.

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Učinki vadbe s sistemom Nintendo Wii Fit na ravnotežje pri bolniku s Parkinsonovo boleznijo – poročilo o primeru

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Uvod: Parkinsonova bolezen je počasi napredujoča degenerativna bolezen možganov neznanega vzroka, ki prizadene predvsem telesno gibanje (1). Moteno ravnotežje pri bolnikih s Parkinsonovo boleznijo je lahko posledica spremenjene, naprej nagnjene drže pri stoji, kar zmanjša učinkovitost izvajanja reakcij nadzora drže (2). Uporaba navidezne resničnosti sistema Nintendo Wii Fit pri telesni vadbi poveča motivacijo bolnika ter intenzivnost vadbe za nadzor drže oziroma ravnotežje (3, 4). Namen raziskave je bil ugotoviti, ali lahko štiritedenska vadba s sistemom Nintendo Wii Fit vpliva na izboljšanje ravnotežja in hoje pri bolniku s Parkinsonovo boleznijo. **Metode:** Sodeloval je 73-letni bolnik s Parkinsonovo boleznijo, ki se je začela 10 let pred raziskavo. Program vadbe s sistemom Nintendo Wii Fit je trajal štiri tedne, trikrat na teden, od 35 do 40 minut na dan. Vključeval je šest iger, in sicer korakanje, nagibno mizo, ravnotežni mehurček, drsenje pingvina, zasuk trupa in boksanje v ritmu. Dodatno je preiskovanec vsak dan pred začetkom vadbe izvajal vaje za ohranjanje splošne gibljivosti ter 20 minut tekel na tekočem traku. Pred štiritedensko vadbo in po njej smo v fazi vklopa izvedli Bergovo lestvico za oceno ravnotežja, časovno merjeni test vstani in pojdi ter test hitrosti hoje na 10 metrov z motoričnim delom združene ocenjevalne lestvice za Parkinsonovo bolezen, in sicer za oceno splošne prizadetosti. Razporeditev telesne teže na spodnja uda smo z ravnotežno ploščo Wii merili enkrat na teden. **Rezultati:** Po vadbi so se izboljšali ravnotežje in funkcijska sposobnost (Bergova lestvica za 10 točk, časovno merjeni test vstani in pojdi za 4,5 sekunde, hitrost hoje za 0,3 m/s) ter motorični del združene ocenjevalne lestvice za Parkinsonovo bolezen za 3 točke. Razporeditev telesne teže na bolj okvarjeni strani se je po končanem programu vadbe povečala iz 46,7 % na 51,1 %. **Zaključki:** Štiritedenska vadba na ravnotežni plošči Wii je pri tem bolniku s Parkinsonovo boleznijo vplivala na izboljšanje statičnega in dinamičnega ravnotežja ter funkcijske sposobnosti v fazi vklopa. Glede na rezultate tega poročila o primeru lahko priporočimo uporabo sistema Nintendo Wii Fit pri vadbi za izboljšanje ravnotežja pri nekaterih pacientih s Parkinsonovo boleznijo. Za določitev, kateri pacienti so sposobni te vrste vadbe, in za ugotavljanje dolgoročnih učinkov so potrebne nadaljnje raziskave z naključno izbrano kontrolno skupino.

Ključne besede: Parkinsonova bolezen, ravnotežje, navidezna resničnost, Nintendo Wii Fit.

Effects of training with Nintendo Wii Fit on balance at a patient with Parkinson's Disease – a case report

Background: Parkinson's disease is a progressive degenerative disease of the brain, which causes disorder of physical activity from unknown reasons (1). Disturbed balance at patients with Parkinson's disease can be caused by altered, forward sloping posture in standing position, which reduces the effectiveness of postural control (2). Use of a virtual reality system Nintendo Wii Fit during physical activity increases patient's motivation and intensity of postural control or balance training (3, 4). The purpose of the study was to investigate whether four-week's training with Nintendo Wii Fit system might influence improvement of balance and walking at a patient with Parkinson's disease. **Methods:** A 73-year-old patient with Parkinson's disease, which began 10 years before the study, was included. The training program using Nintendo Wii Fit was performed for 35 to 40 min, three times per week, four weeks, and included six games (Basic step, Table tilt, Balance bubble, Penguin slide, Torso twist, Rhythm boxing). Additionally, the patient performed a 20-minute run and exercises for general flexibility maintenance before each Nintendo Wii Fit training session. Before and after the four weeks' training period, Berg Balance Scale, Timed Up and Go test, and 10-meter walk test were performed to evaluate balance and gait speed and motorpart of Unified Parkinson's disease rating scale to generally evaluate the disorder. Additionally, weight distribution on each foot was measured with Wii balance board once a week. **Results:** After the training period, improvement of balance and functional capability of the patient (Berg Balance Scale: for 10 points, Timed Up and Go test: for 4.5 s; walk speed: for 0.3 m/s), and motor part of Unified Parkinson's disease rating scale (for 3 points) were evident. Weight distribution on the more affected side increased from 46.7 % to 51.1 %. **Conclusion:** The four weeks' training with Wii balance board influenced improvement of static and dynamic balance and functional capability at this patient with Parkinson's disease. According to the results of this single case report we might recommend the use of Nintendo Wii Fit for balance training in some patients with Parkinson's disease. To define certain group of patients who are capable for this type of training and to establish the long-term effects further research with RCT design is needed.

Keywords: Parkinson's disease, balance, virtual reality, Nintendo Wii Fit.

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Vpliv uporabe elastičnih lepilnih trakov na bolečino in obseg gibljivosti ramenskega sklepa pri pacientih po možganski kapi: pilotska študija

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Uvod: Bolečina v rami okvarjenega zgornjega uda je pogosta in razmeroma zgodnja komplikacija pri pacientih po možganski kapi (1). Elastični lepilni trakovi (ELT) se vedno pogosteje uporabljajo pri športnikih in tudi ljudeh z različnimi bolezenskimi stanji. Učinkovitost omenjenega terapevtskega postopka še ni povsem dokazana (2), posebno vprašljiva je uporaba ELT pri nevroloških bolnikih. Namen te pilotske študije je bil ugotoviti, ali uporaba ELT vpliva na zmanjšanje bolečine in povečanje obsega gibljivosti ramenskega sklepa pri pacientih po možganski kapi. **Metode:** Sodelovalo je 12 pacientov s popolno ali delno ohromelim zgornjim udom po možganski kapi, razdeljenih v poskusno (povprečna starost 48 let; 4 moški in 2 ženski) in kontrolno skupino (povprečna starost 66 let; 3 moški in 3 ženske). Stran ohromelosti je bila pri obeh skupinah enako porazdeljena (4 levo, 2 desno). Poskusni skupini smo trikrat v dveh tednih namestili ELT ter pred nameščanjem in po njem vsakokrat z goniometrom izmerili pasivno gibljivost ramenskega sklepa in z vizualno analogno lestvico (VAS) ocenili bolečino. Pri kontrolni skupini smo izvedli enake meritve v istih časovnih intervalih. Dodatno smo pri vseh pacientih s prirejenim testom po Rossu (3) pred prvo meritvijo ocenili motorične funkcije zgornjega uda in senzibiliteto. Pri statistični analizi smo za primerjavo skupin uporabili Mann- Whitneyjev test, za ugotavljanje sprememb med posameznimi meritvami pa Wilcoxonov test (programski paket SPSS, verzija 20.0). **Rezultati:** Pri poskusni skupini se je pasivna gibljivost pri gibu elevacije skozi antefleksijo in pri elevaciji skozi abdukcijo statistično pomembno izboljšala ($p < 0,05$) po drugi in tretji namestitvi ELT. Statistično pomembno zmanjšanje bolečine smo ugotovili pri gibu elevacije skozi abdukcijo, prav tako po drugi in tretji namestitvi ELT. V nobeni izmed preučevanih spremenljivk se poskusna skupina ni pomembno razlikovala od kontrolne skupine ($p > 0,05$). **Zaključki:** Po izsledkih te pilotske študije in dosedanjih izkušnjah se zdi, da lahko terapevtski postopek z ELT pri pacientih po možganski kapi z bolečo ramo prispeva k izboljšanju pasivne gibljivosti in zmanjšanju bolečine. Vsekakor bo ocena učinkovitosti metode, kdaj in v katerih primerih je primerna pri zdravljenju boleče rame po možganski kapi, mogoča šele po izsledkih bolje načrtovane kontrolirane študije na večjem številu preiskovancev skozi daljše časovno obdobje.

Ključne besede: elastični lepilni trakovi, možganska kap, rama, bolečina, gibljivost.

The effect of elastic adhesive tapes on pain and mobility in the shoulder joint in patients after stroke: a pilot study

Background: A painful shoulder of the impaired upper limb is a frequent and relatively early complication in stroke patients (1). Elastic adhesive tapes (EAT) have been increasingly used in athletes and persons with different health conditions. The efficiency of the mentioned therapy has not been proven yet (2); the use of EAT is especially questionable in neurological patients, including patients after stroke. The aim of the pilot study was to evaluate whether the use of EAT decreased the pain and increased the mobility of the shoulder in patients after stroke. **Methods**: The study included 12 patients after stroke with complete or partial paralysis of an upper limb, who were divided into a test group and a control group. The subjects in the test group were applied elastic adhesive tapes three times in two weeks. Before and after the application, passive mobility of the shoulder joint was measured with goniometer and pain was evaluated with the visual analogue scale (VAS). The same measurements were performed in the control group at the same time intervals. Motor functions and sensitivity of the upper limb in all patients were assessed with an adjusted Ross test (3) before the first measurement. In the statistical analysis, the groups were compared with Mann Whitney test and the differences among individual measurements were defined with Wilcoxon test (SPSS version 20.0). **Results**: The average age of the subjects was 48 years in the test and 66 in the control group. There were 4 men and 2 women in the test and 3 men and 3 women in the control group. The side of paralysis was evenly distributed in both groups. In the test group, passive mobility improved with statistical significance ($p<0.05$) in elevation with anteflexion and elevation with abduction after the second and third application of EAT. The pain decreased with statistical significance in elevation with abduction after the send and third application of EAT. In none of the analysed variables, the subjects in the test group differed significantly from the control group subjects ($p>0.05$). **Conclusions**: Based on the pilot study and our experience, it seems that the therapy with EAT in patients with painful shoulder after stroke can improve passive mobility and decrease pain. The evaluation of the efficiency of the method, its suitability for specific cases of treatment of painful shoulder after stroke will have to base on a well-planned, controlled study with a larger number of subjects and of a longer duration.

Keywords: elastic adhesive tapes, stroke, shoulder, pain, mobility.

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Fizioterapija pacienta z nepopolno okvaro vratnega dela hrbtenjače z bolečo ramo – poročilo o primeru

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Uvod: Boleča rama je pri pacientih z okvaro hrbtenjače pogost sekundarni zaplet, ki s svojim vplivom na premičnost, funkcijsko neodvisnost, zdravje in kakovost življenja določa potek, čas in izid rehabilitacije. Razvije se v akutnem stanju po poškodbi, med rehabilitacijo ali nekaj let pozneje, pogosteje pri pacientih s tetraplegijo kot pacientih s paraplegijo (1). Za uspešno obravnavo boleče rame sta nujna interdisciplinarni pristop in poznavanje značilnosti okvare hrbtenjače, dejavnikov tveganja in prognoze. V poročilu je prikazana kompleksna obravnava boleče rame pri pacientu z okvaro hrbtenjače s pristopom manualne terapije. **Metode:** Vključen je bil 71-letni pacient, dva meseca po poškodbi vratnega dela hrbtenice, s posledično tetraparezo in bolečo ramo. Oceno stanja pacienta smo opravili pred začetkom in po petih mesecih rehabilitacije, na podlagi petstopenjske lestvice prizadetosti Ameriškega združenja za paciente po poškodbi hrbtenjače (2), manualnega mišičnega testa, merjenja obsega pasivne gibljivosti zgornjih in spodnjih udov, ocene bolečine z vizualno analogno lestvico, ocene mišičnega tonusa z Ashworthovo lestvico, Bergove lestvice za oceno ravnotežja, lestvice funkcijske neodvisnosti, lestvice neodvisnosti za paciente z okvaro hrbtenjače (3), indeksa hoje za paciente po poškodbi hrbtenjače (4), testa hoje na deset metrov in šestminutnega testa hoje. V fizioterapijo je bil pacient vključen povprečno dve uri na dan in je vključevala sklepno mobilizacijo, mišično energetske manualne tehnike, mobilizacijo živčevja, vadbo trebušnega dihanja, vaje za intersegmentalno stabilizacijo vratne, prsne in ledvene hrbtenice, vaje za stabilizacijo ramenskega sklepa/obroča, kolčnega sklepa, medenice in ledvenega dela, raztezanje mehkih tkiv, funkcijske aktivnosti na blazinah, funkcionalno električno stimulacijo mišic abduktorjev ramenskega sklepa ter ekstenzorjev zapestja in prstov, stoječ položaj ter hojo s pripomočki. **Rezultati:** Po petih mesecih fizioterapevtske obravnave lestvica prizadetosti (stopnja C) ostaja enaka glede na stanje ob sprejemu. Izboljšali sta se mišična moč in pasivna gibljivost vseh sklepov zgornjih in spodnjih udov. Zmanjšala se je bolečina ramenskega sklepa v mirovanju, med gibanjem in ležanjem na boku in trebuhu. Tonus mišic notranjih rotatorjev in mišic adduktorjev ramenskega sklepa, mišic fleksorjev in pronatorjev komolčnega sklepa, mišic fleksorjev zapestja in prstov obeh zgornjih udov se je iz 4 pred rehabilitacijo obojestransko zmanjšal na 3 za desni ud in na 2 za levi ud. Tonus mišic adduktorjev kolčnega sklepa, mišic ekstenzorjev in fleksorjev kolenskega sklepa ter mišic plantarnih fleksorjev stopala se je iz 3 pred rehabilitacijo obojestransko zmanjšal na 2. Vsi funkcijski testi, ravnotežje in hoja so se po petih mesecih fizioterapevtske obravnave izboljšali. **Zaključki:** Glede na izid fizioterapevtske obravnave sklepamo, da tehnike manualne terapije v kombinaciji s funkcijskimi aktivnostmi in nameščanjem pacienta v ustrezne položaje vplivajo na zmanjšanje bolečine v rami pri pacientih z okvaro vratnega dela hrbtenjače. Fizioterapevti se moramo zavedati, da je pri pacientih s tako hudo okvaro in dejavniki tveganja za bolečo ramo nujen interdisciplinarni pristop.

Ključne besede: poškodba hrbtenjače, boleča rama, rehabilitacija.

Physiotherapy of a patient with incomplete spinal cord injury and shoulder pain – a case report

Background: Many patients with incomplete spinal cord injury suffer from shoulder pain - a common secondary complication that influences patient's mobility, functional independence, health, quality of life and determines the duration and outcome of rehabilitation. Shoulder pain occurs either in acute phase after injury, during rehabilitation or few years later, more commonly in patients with tetraplegia than in patients with paraplegia. In order to treat shoulder pain, interdisciplinary approach is recommended and physiotherapist should be familiar with spinal cord injury characteristics, and understand the risk factors and prognosis. The present report shows an example of a complex shoulder pain treatment with use of manual therapy in a patient with spinal cord injury. **Methods:** The included patient was 71 years old, two months after cervical spine injury which resulted in tetra paresis and shoulder pain. The assessment was performed prior to the treatment and after five months of rehabilitation. It included American spinal injury association impairment scale, manual muscle test, measurement of passive range of motion for upper and lower limbs, shoulder pain assessment with Visual analog scale, muscle tone assessment with Ashworth scale, Berg balance scale, Functional independence measure, Spinal cord independence measure, Walking index for spinal cord injury, 10-meter walk test and 6-minute walk test. The patient was involved in physiotherapy 2 hours per day (average), 5 days a week, 5 months. The following procedures were used: joint mobilization; muscle energy techniques; mobilization of the nervous system; exercises for abdominal breathing; exercises for intersegmental stabilization of the cervical, thoracic and lumbar spine; exercises to stabilize the shoulder joint/girdle, hip joint, pelvis and lumbar spine; stretching of soft tissue; functional activities on matt-activities; functional electrical stimulation of abductor muscles of the shoulder and extensor muscles of the wrist and fingers; standing position and walking with aids. **Results**: After five months of physiotherapy the Impairment Scale (level C) remained at the same level as prior the study. Muscular strength and passive range of motion of the joints of the upper and lower limbs improved. The shoulder pain decreased during rest, in side-lying or in prone position as well as during movement. Muscle tone of internal rotators and adductor muscles of the shoulder joint, flexor and pronator muscles of the elbow, flexor muscles of the wrist and fingers, in both upper limbs decreased from stage 4 (prior the study) to stage 3 - in the right and to stage 2 - in the left upper limb. Muscle tone of the hip adductor muscles, knee extensor and flexor muscles, plantar flexor muscles of the foot decreased from stage 3 (before the rehabilitation) to stage 2 - both in the right and left lower limb. All the functional tests, balance and walking improved after five months of physiotherapy. **Conclusions**: Based on the results achieved using intensive physiotherapy we might suggest that the manual therapy techniques in combination with functional activities and appropriate patient positioning have an impact to reduce shoulder pain in patients with cervical spinal cord injury. Physiotherapists need to be aware that in patients with severe impairment and risk factors for shoulder pain, interdisciplinary approach is required. **Keywords:** spinal cord injury, shoulder pain, rehabilitation.

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Fizioterapija bolnika s klopnim meningoencefalitisom – poročilo o primeru

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Uvod: Klopni meningoencefalitis je najpogostejša virusna bolezen osrednjega živčevja v državah centralne Evrope, v delu Skandinavije in tudi v Sloveniji. V Evropi prenaša virus centralnoevropskega meningoencefalitisa vrsta klopov Ixodes ricinus, ki je v Sloveniji najpogostejša vrsta klopov. Inkubacijska doba bolezni je povprečno od 7 do 14 dni. Pri 75 odstotkih okuženih je potek bolezni dvofazen. Prvo obdobje bolezni je posledica viremije in traja od 1 do 8 dni. Znaki so slabo počutje, bolečine v mišicah, glavobol, vročina, možni so lahni prehladni znaki in bolečine v trebuhu, bruhanje in driska. Sledi prosto obdobje, ki traja od 1 do 20 dni. V drugem obdobju bolezni se pojavijo znaki prizadetosti osrednjega živčevja, kot so glavobol, splošna slabost, vročina do 39 °C in bruhanje. Pojavi se otrplost vratu in hrbtnih mišic, bolnik ima lahko tudi psihične motnje. Najpogostejši znaki encefalitisa, ki se pridružijo meningitisu, so zaspanost, tremor rok in jezika, nistagmus in statične motnje. Lahko se pojavijo tudi hujše motnje zavesti, motnje govora in motnje v delovanju živčevja. Zdravljenje je simptomatsko. Pri večini okuženih se razvije lažja oblika bolezni, bolj redki pa so bolniki s parezami in paralizami mišičja (1, 2). Namen prispevka je prikazati fizioterapijo pri bolniku s klopnim meningoencefalitisom. **Metode:** V poročilo o primeru je bil vključen 48-letni bolnik. Glede na fizioterapevtsko preiskavo bolnika, vključujoč oceno mišične zmogljivosti, je bil izveden 14-tedenski program fizioterapije, ki je vseboval metode kinezioterapije (pasivno in aktivno-asistirano gibanje, pristop proprioceptivne nevromuskularne facilitacije, učenje pravilne drže, sedenje, stojo, nameščanje udov v pravilni položaj), respiratorno fizioterapijo in živčno-mišično elektrostimulacijo paretičnih mišic. Program fizioterapije smo izvajali vsak dan, dopoldne, uro do uro in pol. Na koncu smo testiranje ponovili (3). **Rezultati:** Po obdobju obravnave so se izboljšale ocene mišične zmogljivosti in povečal se je obseg aktivne gibljivosti. **Zaključki:** Izbor fizioterapevtskih postopkov se je pri tem bolniku izkazal kot uspešen. V primeru okužbe s klopnim meningoencefalitisom je poleg medikamentozne terapije zelo pomembna fizioterapija. Pristop k bolniku je individualiziran, kar pomeni, da sta izbor postopkov fizioterapije in intenzivnost obravnave specifična glede na bolnikovo počutje in odgovor na terapijo.

Ključne besede: klopni meningoencefalitis, fizioterapija.

Physiotherapy of a patient with tick-borne encephalitis – a case report

Background: Tick-borne encephalitis is the most frequent viral disease affecting the central nervous system in the central Europe, part of Scandinavia, and also in Slovenia. The central European subtype of encephalitis virus is mainly transmitted to humans via infected ticks, *Ixodes ricinus,* which is the most widely spread type of tick in Slovenia. The average incubation period is between 7 and 14 days. In 75 % of cases the disease has a typical biphasic course. The first phase of the disease is the result of viraemia and lasts 1 to 8 days. The clinical signs are: malaise, muscle pain, headache and fever, possibly signs of light cold, abdominal pain, vomiting and diarrhea. This is followed by a period with no signs of the disease for 1 to 20 days. In the second phase, signs of central nervous system involvement appear, such as headache, general weakness, fever up to 39 °C, and vomiting. Neck and back muscle stiffness breaks out, the patient may also have psychological problems. The most common signs of encephalitis, accompanying meningitis are drowsiness, tremor of hands and tongue, nystagmus and postural stability problems. Patient may also experience severe alteration of consciousness, speech disorders and malfunction of the nervous system. Treatment is symptomatic. In considerable number of infections the disease only develops in its milder form, whereas cases with muscular paresis and paralysis are less frequent (1, 2). The purpose of this paper was to demonstrate physiotherapy in a patient with tick-borne encephalitis. **Methods:** A 48-year old patient was included in the case report. In view of the problems experienced by the patient and according to the assessment of his muscle performance, a specific 14-weeks' programme of physiotherapy was set up, which included: kinesiotherapy (passive and active - assisted motion, proprioceptive neuromuscular facilitation approach, learning of the correct posture, seating, standing, positioning of the extremities), respiratory physiotherapy and electrostimulation of muscular paresis. The program of physiotherapy was carried out daily through one or one-and-a-half-hour long morning sessions. At the end the physiotherapeutic testing was repeated (3). **Results:** Improvement of muscle performance and active range of motion was evident after treatment. **Conclusions:** we might conclude that the physiotherapy procedures selected in this patient were effective. In case of infection with tick-borne encephalitis, physiotherapy is very important as a complementary treatment to medicamentous therapy. The approach should be individually based and adjusted to the patient's state of health and response to therapy.

Keywords: tick-borne encephalitis, physiotherapy.

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WCPT mreža za promocijo zdravja v življenju in pri delu

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Uvod: Med fizioterapevti po svetu narašča število tistih, ki jih s strokovnega vidika vedno bolj zanimata promocija zdravja in preventiva. Po drugi strani pa ne vemo, ali fizioterapevti igrajo svojo vlogo pri promociji zdravja in preprečevanju invalidnosti, zato je bila ena od diskusij na prejšnjem kongresu World Confederation for Physical Therapy (WCPT) junija 2011 v Amsterdamu namenjena tej temi (1). Kot posledica omenjene diskusije je tako med fizioterapevti na globalni ravni nastala pobuda za ustanovitev nove mreže WCPT za promocijo zdravja v življenju in pri delu (2). **Namen:** Tovrstna mednarodna WCPT-mreža je osredotočena na promocijo zdravja v vseh pogledih, ki so vitalnega pomena za uspešno življenje in delo. Pokriva vrednote in težave, povezane s promocijo zdravja, welnessom in preprečevanjem invalidnosti v vseh okoljih skozi vse življenje, vključno s težavami, povezanimi s spremembo vedenja. **Cilji:** Mreža ima pet glavnih ciljev, ki so navedeni v nadaljevanju: 1) spodbujanje fizioterapevtov, da bi promovirali zdravje in dobro počutje v življenju ter pri delu, zdrav življenjski slog in aktivno življenje svojim klientom oziroma pacientom; 2) prepoznavanje in mreženje fizioterapevtov oziroma članov WCPT, ki so tudi strokovnjaki na področjih promocije zdravja v življenju in pri delu, welnessa, preprečevanja invalidnosti in vedenjskih sprememb; 3) izmenjavanje dokazljivega znanstvenega znanja, najboljših praks, idej, mnenj in promocijskega gradiva, povezanega s promocijo zdravja v življenju in pri delu, z welnessom, preprečevanjem invalidnosti in vedenjskimi spremembami; 4) spodbujanje znanstvenega dela med fizioterapevti oziroma člani WCPT na področjih promocije zdravja v življenju in pri delu, welnessu, preprečevanju invalidnosti in vedenjskih sprememb, kar bi posledično ustvarjalo spremembe v sistemu izobraževanja fizioterapevtov in v praksi, zato da bi vse skupaj postalo bolj usmerjeno k tem problemom; 5) promoviranje zdravja in dobrega počutja v življenju in pri delu, spodbujanje zdravega življenjskega sloga in aktivnega življenja med fizioterapevti, člani WCPT. **Članstvo:** V WCPT-mreži za promocijo zdravja v življenju in pri delu je članstvo brezplačno in odprto za vse fizioterapevte, člane WCPT, ki delajo na področjih promocije zdravja, welnessa, preprečevanja invalidnosti in/ali vedenjskih sprememb, vključno s tistimi, ki se samo zanimajo za omenjena področja. Za članstvo lahko posameznik zaprosi po elektronski pošti tako, da navede svoje ime, državo, e-naslov, pripadnost WCPT-organizaciji, kratek opis svojega profesionalnega ozadja in področja strokovnosti na WCPT.HPLWmembers@workingtowardswellbeing.com. Prek članstva bo povezan s kolegi, ki imajo enako ali podobno ozadje in interese v njegovi državi in tujini. **Zaključki:** Promocija zdravja postaja zelo pomembna tema za WCPT. Zadnji svetovni dan fizioterapevtov je bil na primer osredotočen na gibanje za zdravje, zato se pričakuje, da bo glede na članstvo v prihodnosti mreža postala ena največjih WCPT-mrež.

Ključne besede: WCPT-mreža, promocija zdravja, fizioterapevti.

WCPT Network for Health Promotion in Life and Work

Background: There is an increase among those physical therapists in the world who are getting more and more interested in health promotion and prevention from their point of professional view. On the other hand we do not know if physical therapists play their part at health promotion and disability prevention. That is why one of discussion panels at the last World Confederation for Physical Therapy (WCPT) Congress in June 2011 in Amsterdam was oriented to that topic (1). Consequently an initiative was created among physical therapists on a global level for the establishment of a new WCPT Network for Health Promotion in Life and Work (2). **Purpose:** This international WCPT network is focused on the promotion of all aspects of health vital to successful living and working. This network covers the values and issues concerning health promotion, wellness and disability prevention in all settings across the lifespan, including issues related to behavioural change. **Objectives:** The network has five main objectives, which are quoted here: 1) facilitate physical therapists to promote health and well-being in life and work, healthy lifestyle and active living for their clients/patients; 2) identify and network with physical therapists/WCPT members who are also experts in the fields of health promotion in life and work, wellness, disability prevention and behavioural change; 3) exchange evidence-based/scientific knowledge, best practices, ideas, opinions and promotion materials related to health promotion in life and work, wellness, disability prevention and behavioural change; 4) facilitate scientific work among physical therapists/WCPT members in the fields of health promotion in life and work, wellness, disability prevention and behavioural change, consequently creating changes in physical therapy educational system and practice, so that it becomes more oriented towards these issues; 5) promote health and well-being in life and work; facilitate healthy lifestyle and active living among physical therapists/WCPT members. **Membership:** Membership in WCPT Network for Health Promotion in Life and Work is free and open to physical therapists/WCPT members working in fields of health promotion, wellness, disability prevention and/or behavioural change, including to those only interested in mentioned fields. You can apply for membership by sending an email with your name, country, e-mail address, WCPT member organization he/she belongs to, short professional background and field(s) of expertise to WCPT.HPLWmembers@workingtowardswellbeing.com. Through the membership he/she will be linked with colleagues who share the same or similar background and interests in his/her own country and abroad. **Conclusions:** Health promotion is becoming very important topic for the WCPT. The last World Physical Therapy Day was focused on Movement for Health for example. That is why it is expected that this network will be one of the largest WCPT networks membership wise in the future

Keywords: WCPT Network, Health Promotion, Physical Therapists.

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Potreba po organizaciji fizioterapije na domu

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Uvod: V 90. letih se je večina evropskih držav spopadala s finančnimi težavami. Primorane so bile znižati stroške za zdravstvo. Veliko pozornosti so namenili fizioterapiji na domu (1) ob predvidevanju, da so stroški zdravljenja s tako obravnavo nižji. Sledile so številne študije o učinkovitosti fizioterapije bolnikov na domu. Tovrstna obravnava je dokazano učinkovita in sprejemljiva tako za paciente kot njihovo družino ter potencialno zmanjšuje trajanje ležalne dobe v bolnišnicah (2). Prav tako je bilo dokazano, da so stroški zdravljenja nižji v primerjavi z dolgim standardnim bolnišničnim zdravljenjem (1). Prednost fizioterapije na domu je, da se izvaja tam, kjer bo pacient naučene veščine tudi uporabljal. Pacienti se prej in lažje prilagodijo bivanju v domačem okolju, aktivneje sodelujejo, so bolj samoiniciativni in bolj izrazijo svoje cilje (3, 4). Namen raziskave je bil z anketo prebivalcev ugotoviti potrebo po organizaciji fizioterapije na domu. **Metode:** Anketa je vključevala 50 naključno izbranih prebivalcev občine Kranj (46 % moških in 54 % žensk), starih od 60 do 90 let ter oddaljenih od fizioterapevtske ambulante največ 10 kilometrov. Delo je potekalo tako, da smo se prej najavili po telefonu in pustili anketo, ki vsebuje 16 vprašanj, da jo anketiranec samostojno reši brez navodil in sugestij. **Rezultati:** Anketa je pokazala, da je bila večina preiskovancev oddaljena od prve fizioterapevtske dejavnosti od 1 do 5 kilometrov, kar je razmeroma blizu. Večina preiskovancev (40 %) je navedla, da potrebuje nekoga, da jih pelje na fizioterapijo. Pri tej ugotovitvi je zanimivo, da je le pri 16 % preiskovancev težava za prihod na fizioterapijo prevoz. Pri vprašanju, zakaj bi želeli imeti fizioterapijo na domu, je večina odgovorila, da bi imela fizioterapijo na domu zaradi individualnega dela s terapevtom. Izbran vzorec preiskovancev je bil pretežno brez resnih zdravstvenih težav (57,9 %), le nekateri so imeli travmatološka, nevrološka, kardiovaskularna ali respiratorna obolenja (33,3 %). **Zaključki:** Na podlagi rezultatov naše ankete menimo, da bi bila uvedba fizioterapevtske dejavnosti na domu smiselna. Delovala naj bi prek koncesije in bila financirana prek ZZZS, pa tudi samoplačniško. Pomembno bi bilo razširiti to dejavnost po vsej Sloveniji, v vseh zdravstvenih domovih in njihovih območnih enotah. Nadalje pa bi bilo treba razmišljati o ustreznem izobraževanju fizioterapevtov. S ponovno uvedbo izvajanja fizioterapije na domu bi naredili velik korak naprej in tako omogočili fizioterapijo bolnikom vseh starosti in z vsemi patološkimi stanji.

Ključne besede: fizioterapija, fizioterapija na domu, organizacija fizioterapije.

The need for organisation of home-based physiotherapy

Background: In the nineties, the majority of European countries faced financial difficulties. They were forced to reduce the costs of health care. Greater attention was assigned to home-based physiotherapy (1) on the assumption that the costs of treatment would therefore decrease. Numerous studies dealing with efficiency of home-based physiotherapy followed suit. Such treatment was proven effective and acceptable to both patients and their families and potentially reduced the length of hospitalization (2). It was also substantiated that the costs of home-based treatment were lower compared to long conventional hospitalized treatment (1). An advantage of home-based physiotherapy is that it is performed at the same place where also the patients will use the skills learned. They adapt to their home environments earlier and more easily. The patients participating in home-based physiotherapy are more actively involved, take more initiative, and express their objectives to a greater extent (3, 4). The purpose of the research was to conduct a survey and identify the need for home-based physiotherapy. **Methods:** We surveyed a random sample of 50 elderly residents of the City Municipality of Kranj (46 % male and 54 % female) aged 60 to 90 who reside at most 10 km from the physiotherapy. The working procedure was the following: preliminarily, we notified our candidates by phone, and then delivered them the surveys with 16 questions to answer without our instructions and suggestions. **Results:** The results of the survey revealed that the majority of our subjects reside 1 to 5 km from first physiotherapy, which is relatively near. Most subjects stated that they need someone to take them to physiotherapy treatments (40 %). What is interesting with the former statement is that only 16 % of the subjects see transportation to physiotherapy as a problem. The answer of the majority to the question why they would make use of home-based physiotherapy was due to individual work with the physiotherapist. The selected sample of subjects was predominantly without serious health problems (57.9 %), and some were diagnosed with traumatic, neurological, cardiovascular or respiratory conditions (33.3 %). **Conclusions:** Based on the results of our survey, a reintroduction of home-based physiotherapy seems reasonable. The service could be available on concession via The Health Insurance Institute of Slovenia or financed as a self-pay treatment. It is crucial to spread the service throughout Slovenia to all health care centres and their regional units. Furthermore, considerable thought should be given to proper training of physiotherapists. Home-based physiotherapy could become an independent service within the community nursing care under the organization of a health care centre or a concessionaire. A reintroduction of home-based physiotherapy would represent a great improvement and would provide for patients of wide age range and various pathologies.

Keywords: physiotherapy, home-based physiotherapy, organization of physiotherapy.

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Dejavniki za izbor študija fizioterapije, poznavanje poklica in želene usmeritve po končanem študiju

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Uvod: Po standardih Svetovne organizacije za fizioterapijo je fizioterapevt avtonomen strokovnjak, ki mora imeti svobodo za sprejemanje odločitev pri svojem delu (1). Interesi in drugi dejavniki, ki spodbudijo študente za študij fizioterapije, imajo pomembno vlogo, saj njihovo poznavanje poklica in zaposlitvenih možnosti vpliva na načrtovanje študijskih programov in razvoj fizioterapevtske stroke (2, 3). Namen raziskave je bil ugotoviti dejavnike za izbor študija fizioterapije med študenti študijskega programa prve stopnje fizioterapija, poznavanje izbranega poklica, želje in načrte glede podiplomskega izobraževanja in poklicnih usmeritev. **Metode:** V raziskavi je bilo 222 anketiranih, študentov 1. in 3. letnika fizioterapije na Zdravstveni fakulteti Univerze v Ljubljani. Ankete so bile razdeljene vsako študijsko leto od leta 2009/2010 do 2011/2012. Narejena je bila opisna statistika. S testom Hi-kvadrat so bile izračunane razlike med spoloma in med 1. in 3. letnikom. **Rezultati:** Najpomembnejši dejavnik za izbiro študija fizioterapije je bilo veselje do dela z ljudmi (57,7 %). Značilnosti poklica fizioterapevt so bile potreba po poklicu (97,8 %), atraktivnost poklica (89,6 %), ugled poklica v Sloveniji (52,8 %), razsežno znanje posameznika (89,6 %), ugled v družbi (64,9 %) in zanesljiva služba (57,7 %). Največja pomanjkljivost poklica je bila nezadostna cenjenost fizioterapevta pri zdravnikih (64,5 %). Več preiskovancev je želelo nadaljevati študij druge stopnje ob delu (53,8 %). Z zaposlitvenimi možnostmi so bili preiskovanci seznanjeni s 66,2 %, menili so, da se je zaposliti kot fizioterapevt v Sloveniji enostavno (49,1 %). O enostavni zaposlitvi v tujini niso bili prepričani (26,6 %). Najbolj želeno področje je bila fizioterapija mišično-skeletnega sistema (24,3 %), najbolj želeno zaposlitveno mesto zasebna praksa (20,3 %). Študentje 3. letnika so bili mnenja, da delo ni dobro plačano (45,6 %), medtem ko so v 1. letniku menili ravno obratno (39,7 %), razlika je bila statistično značilna ($p < 0,05$). Ženske so menile, da je delo dobro plačano (46 %), moški, da ni (50 %), tudi ta razlika je bila statistično značilna ($p < 0,05$). Prav tako je prišlo do statistično značilnih razlik med spoloma ($p < 0,05$) pri mnenju, da poklic ni dovolj cenjen pri zdravnikih (ženske: 67 %), moški pa se niso strinjali z nobeno trditvijo (34 %). **Zaključki:** Poklic fizioterapevta je v slovenski družbi premalo znan v vsej svoji širini in je velikokrat omejen le na poškodbe ali telesno dejavnost. To je lahko vzrok, da so si študentje ustvarili idealno podobo poklica, ki temelji na fizioterapiji v športu in zasebni praksi. Za oblikovanje nove podobe poklica je treba spremeniti mišljenje o poklicu v družbi. Tako bi lahko povečali zanimanje mladih tudi na drugih področjih, na katerih bi bili fizioterapevti nujni, pa je zanje zanimanje zelo majhno.

Ključne besede: izobraževalni program, mnenje študentov, poklic fizioterapija.

Factors that influence the decision to study physiotherapy, understanding of the profession and preferred orientation after graduation

Background: According to the standards of the World Confederation for Physical Therapy, physical therapists are autonomous specialists. Various factors encourage students to study physiotherapy (1). Students' knowledge of the profession plays an important role to design study programme (2, 3). The study aimed to identify factors which influence the decision to study physiotherapy, the knowledge of the chosen profession, desires and plans for postgraduate education and professional orientation among the students of the 1st cycle physiotherapy study programme. **Methods:** 222 1st and 3rd year students of physiotherapy study programme at the Faculty of Health Sciences in Ljubljana participated in the study. Questionnaires were distributed each academic year, starting with 2009/2010 and up to 2011/2012. Descriptive statistics and chi-square test were used for the evaluation of differences between the genders and between 1st and 3rd year students. **Results:** The most important factor to study physiotherapy was pleasure in working with people (57.7 %). Characteristics of physiotherapy as a profession were: the need for the profession (97.8 %), attractiveness of the profession (89.6 %), appreciation of the profession in Slovenia (52.8 %), extensive knowledge (89.6 %), reputation (64.9 %) and a reliable post (57.7 %). The biggest drawback of the profession was insufficient appreciation of physical therapists by doctors (64.5 %). A lot of students wanted to continue the studies at post-graduate level (53.8 %). 66.2 % of the students were familiar with employment opportunities; they believed that it is easy to find employment in physiotherapy in Slovenia (49.1 %). They were not sure about easy employment opportunities abroad (26.6 %). The most desired area was the muscular-skeletal physiotherapy (24.3 %), and the preferred workplace was private practice (20.3 %). Third year students shared the opinion that physiotherapy is not a well-paid profession (45.6 %), while first year students disagreed (39.7 %); the difference was statistically significant ($p < 0.05$). Female students considered the work of a physiotherapist as well-paid (46 %), and male students as not well-paid (50 %), the difference was statistically significant ($p < 0.05$). There was a statistically significant difference between the genders ($p < 0.05$), where the women felt that the profession is not sufficiently appreciated by the doctors (67 %), while men did not agree with any of the statements (34 %). **Conclusions:** Physiotherapy as a profession with wide variety of branches is not well recognised in our society and is often limited to injury or physical activity. This may be the reason why students created an ideal image of the profession, which is based on physiotherapy in sport and in private practice. To create a new image of the profession it would be necessary to change the society's view of this profession. This could increase the interest of students in other areas of physiotherapy.

Keywords: educational programme, student opinion, physiotherapy profession.

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Študenti fizioterapije in invalidnost: modeli, odnos in študij fizioterapije

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Uvod: Invalidnost je večplasten, dinamičen, večrazsežnosten in sporen pojav. Na njegovo izraženost vplivajo socialne in fizične ovire ali njihova odsotnost. Po oceni Svetovne zdravstvene organizacije se kar 15,6 odstotka svetovne populacije, to je 720 milijonov ljudi, spopada z neko obliko invalidnosti. Študenti fizioterapije se zaradi narave svojega izobraževanja že med študijem srečajo z invalidnostjo. Ker so bodoči nosilci zdravstvene oskrbe, njihov odnos do invalidnosti neposredno vpliva na način in kakovost dela z invalidnimi osebami. V primeru negativnega odnosa študentov do invalidnosti obstaja tveganje, da bo izid rehabilitacije oseb z invalidnostjo slabši. Namen raziskave je bil ugotoviti, koliko so študenti fizioterapije seznanjeni z različnimi modeli invalidnosti, kakšna so njihova stališča do invalidnosti in ali je študij fizioterapije povezan s temi stališči. **Metode:** K sodelovanju so bili povabljeni študenti, ki so bili v študijskem letu 2010/2011 vpisani v kateri koli letnik študija fizioterapije. Podatki so bili zbrani s spletno anketo in obdelani s programskim paketom IBM Statistics SPSS 20. Narejena je bila opisna statistika. Stopnja statistične značilnosti (p) je bila 0,05. **Rezultati:** Sodelovalo je 70 študentov fizioterapije, 57 žensk in 13 moških. Povprečna starost je bila 22,43 leta. Večina se je strinjala tako z medicinskim kot družbenim modelom invalidnosti. Z moralnim modelom invalidnosti se niso strinjali. Le 30 odstotkov anketirancev je te modele poznalo, le 7,1 odstotka je poznalo tudi druge modele. Moški bolj poznajo modele invalidnosti kot ženske ($p = 0,038$). S povprečno oceno odnosa 5,63 točke ($s = 2,767$) imajo študenti fizioterapije pozitiven odnos do invalidnosti ($p = 0,000$). Poznanstvo z osebo z invalidnostjo po mnenju študentov ne vpliva na odnos do invalidnosti ($p = 0,371$). Po mnenju študentov študij fizioterapije vpliva na odnos do invalidnosti ($p = 0,001$). Nekdanji gimnazijci imajo do invalidnosti manj pozitiven odnos kot dijaki srednjih zdravstvenih šol ($p = 0,001$). Gimnazijci imajo statistično značilno manjše ocene vseh komponent odnosa ($p < 0,05$). Študenti fizioterapije imajo kognitivno komponento manj pozitivno kot vedenjsko ($p = 0,005$). **Zaključki:** Odnos do invalidnosti je med študenti fizioterapije pozitiven. Povezan je s študijem in srednjo šolo. Ker fizioterapevti delujejo v okolju medicinskega modela invalidnosti, so izpostavljeni negativističnemu pogledu na invalidnost. To možnost nakazuje tudi nižja povprečna ocena kognitivne komponente. Zato je nujno, da študenti samokritično ocenjuje svoj odnos do invalidnosti in si ga prizadevajo izboljšati.

Ključne besede: študenti fizioterapije, gimnazijci, medicinski in družbeni model invalidnosti, odnos do invalidnosti.

Physiotherapy students and disability: models, attitude and physiotherapy studies

Background: Disability is complex, dynamic, multidimensional and contested. It's severity is influenced by social or physical barriers or lack of those. World health organisation estimates that as far as 15,6% of world population, that means 720 million people, is somehow disabled. Because of nature of their work physiotherapy students face disability during their study. They are future medical service's carriersa and their attitude toward disability directly affects the manner and qualitiy of their work. Risk exists that in case of students' negative attitude toward disability the outcome of rehabilitation of disabledis worse than it could be. The purpose of the study was to determine wheter physiotherapy students know different models of disability, what are their attitudes toward disability and whether they are affected by physiotherapy studies. **Methods:** Students which attended any year of physiotherapy studies in 2010/2011 were invited to participate. Data was collected via web questionnaire and processed with IBM Statistics SPPS 20 software. Descriptive statistics were made. P-value was set to 0,05. **Results:** 70 students cooperated, 57 of them women and 13 men. Average age was 22,43 years. Most of them agreed with both medical and social model of disability. They didn't agree with the moral model of disability. Only 30% knew the described models and only 7,1% knew other models of disability. Men are more familiar with disability models than women ($p = 0,038$). With average attitude value 5,63 points ($s = 2,767$) students have positive attitude towards disability ($p = 0,000$). Knowing a person with disability doesn't seem to have an effect on attitude ($p = 0,371$). In students' opinion physioterapy studies affect their attitude ($p = 0,001$). Ex grammar school pupils have a less positive attitude towards disability than nursing high school pupils ($p = 0,001$). Grammar school pupils also have significantly lower values of all attitude components ($p < 0,05$). A cognitive component was significantly lower than the behavioral in physiotherapy students ($p = 0,005$). **Conlusions:** Attitude towards disability among physiotherapy students is positive. It is affected by physiotherapy studies and high school. Physiotherapists work in a medical model settlement and they are exposed to negativistic view of disability. This possibilty is indicated by lower cognitive component value, too. It is necessary for students to be critical about their own attitude towards disability and that they try to improve it.

Keywords: physiotherapy students, high school, medical and social model of disability, attitude toward disability.

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Terapija s transkutano električno živčno stimulacijo pri pacientki z izzvano vulvodinijo – poročilo o primeru

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Uvod: Vulvodinija je definirana kot neugodje, najpogosteje razloženo kot pekoča bolečina v predelu vulve, ki nastane v odsotnosti ustreznih vidnih sprememb ali specifičnih klinično spoznavnih nevroloških motenj (1). Vulvodinija se deli glede na anatomsko mesto bolečine in glede na to, ali je bolečina izzvana ali neizzvana. Etiologija vulvodinije je najpogosteje primarno razložena z biomedicinskimi dejavniki, spremembami v imunskem sistemu in iatrogenimi dejavniki. Tudi različni psihološki in spolni dejavniki lahko vplivajo na stanje ali ga celo izzovejo. Za obravnavo vulvodinije je želen timski pristop, ki vključuje ginekologa in strokovnjake s področij psihoseksualne medicine, fizioterapije in obravnave bolečine (1). Pri bolnicah z lokalno izzvano vulvodinijo, odporno na druge oblike zdravljenja pride v poštev vulvektomija. Namen poročila o primeru je prikazati primer pacientke z izzvano vulvodinijo, pri kateri je bila zaradi neodziva na zdravila indicirana vulvektomija. Da bi se temu izognili, smo se odločili poskusiti terapijo s transkutano električno živčno stimulacijo (TENS). Pacientka je pisno privolila v raziskavo. **Prikaz primera:** Petintridesetletna pacientka se je že pri 18 letih starosti zdravila zaradi depresije. Ob zamenjavi službe po drugem porodu so se ji pojavili napadi tesnobnosti, povišan krvni pritisk, tiščanje v prsih in alergija. Začela je terapijo z anksiolitikom in beta blokatorjem. Opravila je alergična testiranja, na katerih je bila dokazana alergija na nekatere snovi. Urološka anamneza je bila brez posebnosti. Pred enim letom je prišla na pregled zaradi srbečice na spolovilu. Pri ginekološkem pregledu so bile vidne petehije po perineju. Terapija z antimikotikom, kortikosteroidom in lokalnim anestetikom je bila neuspešna. Test z vatirano palčko je razkril občutljivost in bolečnost na vestibulumu. Histološka slika biopsije bolečega mesta je ustrezala blažjemu nespecifičnemu kroničnemu vnetju. Pacientki je bil prepovedan vaginalni spolni odnos. Oralni spolni odnos je bil dovoljen. Za oceno uspešnosti terapije s TENS-om sta bila pred zadnjo obravnavo in po njej uporabljena vizualna analogna lestvica in indeks spolne funkcije pri ženskah (2). Stimulacija z vaginalno sondo je bila aplicirana v dveh 15-minutnih intervalih (prvi interval: dolžina dražljaja 50 μs, frekvenca 10 Hz, drugi interval: dolžina dražljaja 100 μs, frekvenca 50 Hz), 20-krat, 2-krat na teden (3). **Rezultati:** Stopnja srbečice, merjena z vizualno analogno lestvico, je bila pred terapijo ocenjena z 10, po terapiji pa z 0. Srbečica je izginila že po prvih dveh terapijah. Pacientka je na indeksu spolne funkcije pred terapijo zbrala 32 točk, ob odpustu pa 91 točk (nad 26 točk ni spolne disfunkcije). **Zaključek:** TENS je enostavna, učinkovita in varna terapija za zdravljenje izzvane vulvodinije.

Ključne besede: vulvodinija, izzvana, biomedicinski dejavniki, transkutana električna živčna stimulacija, timski pristop.

Transcutaneous electrical nerve stimulation in a patient with provoked vulvodynia - a case report

Background: Vulvodynia has been defined as vulvar discomfort, most often described as burning pain, occurring in the absence of relevant findings or a specific clinically identifiable neurologic disorder (1). Vulvodynia is classified according to the localisation of pain in the vulva, whether it is generalised or localised, and whether it arises on provocation of the area or occurs spontaneously. Most commonly it is primarily explained by bio-medical factors, changes in the immune system and iatrogenic factors. However, various psychological, sexual and context related factors have also been documented to contribute to or perhaps elicit the condition. To manage the various components, a team approach may be required, headed by a lead clinician and assisted by experts in psychosexual medicine, physiotherapy, and pain management teams (1). In patients with local provoked vulvodynia refractory to other treatments, surgical excision of the vestibule may be considered. The purpose of this case report is to present the patient whose provoked vulvodynia was refractory to other treatment modes and surgical excision of the vestibule was therefore considered. To avoid surgical treatment, transcutaneous electrical nerve stimulation (TENS) was tried out. The patient consented to participate in the study. **Case description:** A 35-year-old patient had been treated for depression since the age of 18. Since she changed her job after she had given birth to her second child, she started suffering from anxiety, hypertension, chest pressure and allergy. She was treated with anxiolitic and beta blocker. She took allergy tests, which confirmed allergy to a number of different allergens. Her urinary tract function was normal. A year ago she came for a check-up for genital itching. Gynaecological examination revealed petechiae on perineum. Treatment with antimycotic locally and orally, corticosteroid ointment and local anesthetic proved unsuccessful. Cotton swab testing of the vestibulum of the vagina revealed sensitivity and pain. Histological picture of biopsy from the painful area corresponded to changes associated with mild non-specific chronic inflammation. The patient was strongly encouraged to abstain from vaginal intercourse, while oral sex was allowed. Her clinical conditions were assessed by the Female Sexual Function Index questionnaire and the visual analogue scale symptoms assessment at baseline and immediately after completing the 20 treatment sessions on a twice per week basis (2). The stimulation was delivered through a commercially available vaginal probe. Protocol for TENS was 15 minutes of 10 Hz frequency and pulse duration of 50 μs followed by 15 minutes of 50 Hz frequency and pulse duration of 100 μs (3). **Results:** The baseline score of visual analogue scale was 10 and the post-treatment score was 0. The vaginal itching disappeared after only two consecutive treatment sessions with TENS within a period of one week. Female Sexual Function Index score improved from 32 to 91. **Conclusions:** TENS is a simple, effective and safe treatment for the management of provoked vulvodynia.

Keywords: vulvodynia, provoked, bio-medical factors, transcutaneous electrical nerve stimulation, team approach.

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Prisotnost fizioterapije v okviru šol za starše v Sloveniji

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Uvod: Šola za starše je zdravstvenovzgojna oblika dela, ki nosečnice in njihove partnerje pouči o vseh vprašanjih telesnega in duševnega zdravja med nosečnostjo, o kompleksnem dogajanju med nosečnostjo in porodom in o negi novorojenca (1). V Sloveniji je vsem nosečnicam oziroma vsem bodočim staršem zagotovljena možnost udeležbe v šoli za starše (2). To možnost v Sloveniji izkoristi več kot polovica nosečnic (2). Vse šole za starše obravnavajo nosečnost, porod, nego dojenčka, prehrano in dojenje; nekatere vključujejo zobozdravstveno vzgojo, psihološko pripravo na porod in starševstvo, pripravo na družinsko življenje ter informiranje o socialnem varstvu nosečnosti in starševstva ter varnosti v cestnem prometu. Nekatere ponujajo predavanja anestezista in tudi fizioterapevta. Namen raziskave je bil ugotoviti, ali so v šolah za starše po Sloveniji prisotni elementi fizioterapije in, če so prisotni, katere vsebine obravnavajo, koliko časa je namenjeno fizioterapevtskim vsebinam ter katerim priporočilom glede telesne dejavnosti v nosečnosti sledijo. **Metode:** Ankete smo poslali 59 šolam za starše po Sloveniji. Anketo, ki je vsebovala 28 vprašanj, je izpolnjevala oseba, ki vodi fizioterapevtski del oziroma del v šoli za starše, povezan s telesno dejavnostjo. Za analizo podatkov so bile uporabljene deskriptivne statistične metode. **Rezultati:** Vrnjenih je bilo 33 (55,9 %) anket, od katerih je bilo analiziranih 31 (52,5 %). Med anketiranimi, ki vodijo fizioterapevtski del ali del, povezan s telesno dejavnostjo, je največ, in sicer 24 (77,7 %) višjih ali diplomiranih fizioterapevtov. Največ, devet (29,0 %) anketirank/-cev je odgovorilo, da nameni fizioterapevtskemu delu in/ali telesni dejavnosti v okviru šole za starše dve uri. V osmih primerih (25,8 %) pa fizioterapevtske vsebine niso zastopane. Najpogosteje navedene vsebine v fizioterapevtskem delu šole za starše so bile trening mišic medeničnega dna (26 anketirancev (92,9 %)) ter terapevtske vaje za stabilizacijo hrbtenice in medenice ter dihalne in sprostitvene terapevtske vaje (23 anketirancev (82,1 %)). Druge navedene vsebine so bile še opozorila o pravilni mehaniki gibanja, teoretične osnove telesne dejavnosti v nosečnosti, praktična telesna dejavnost v nosečnosti, obravnava izključno zdravih nosečnic, obravnava zdravih nosečnic in nosečnic z različno patologijo. Le trije (10,7 %) anketiranci pa vključujejo vsebine, ki obravnavajo različne vrste patologij v nosečnosti. Več kot polovica (17 (54,8 %)) je navedla, da nimajo organizirane vadbe v nosečnosti. Med anketiranimi jih je 16 (51,6 %) odgovorilo, da so seznanjeni s trenutnimi strokovnimi priporočili za telesno dejavnost v nosečnosti. Enako število anketirank/-cev pa se ni opredelilo za nobeno izmed trenutno veljavnih strokovnih priporočil. **Zaključki:** V večini analiziranih slovenskih šol za starše so prisotne fizioterapevtske vsebine, v katere so po večini vključeni fizioterapevti. Le nekaj fizioterapevtov obravnava nosečnice s patologijo. Čeprav jih več kot polovica meni, da je seznanjena s sodobnimi strokovnimi priporočili za telesno dejavnost v nosečnosti, jih le nekaj sledi tem priporočilom.

Ključne besede: nosečnost, šola za starše, telesna dejavnost, fizioterapija, Slovenija.

The physiotherapy components within the antenatal classes in Slovenia

Background: Antenatal classes are a form of health education which instructs pregnant women and their partners about all physical and mental hygiene issues during pregnancy, the complex events during pregnancy and childbirth and neonatal care (1). In Slovenia, all pregnant women as well as future fathers are provided with opportunity to participate in the antenatal classes (2). More than half of pregnant women in Slovenia take this possibility (2). All antenatal classes address pregnancy, childbirth, infant care, nutrition and breastfeeding; some include also oral health education, psychological preparation for childbirth and parenthood, preparation for family life, information about pregnancy and parenthood social care, and road safety. Several offer lectures by anaesthetists and physiotherapists. The purpose of the study was to determine if and which components of physiotherapy are included in the antenatal classes in Slovenia, how much time is dedicated to physiotherapy contents, and which physical activity recommendations during pregnancy are followed. **Methods:** A questionnaire was distributed to 59 antenatal classes in Slovenia. Surveys, consisting of 28 questions, were completed by professionals responsible for physiotherapy part of the programme or the part associated with physical activity in an antenatal class. Descriptive statistical methods were used for data analysis. **Results:** 31 (52.5%) out of the total 33 (55.9%) completed and returned questionnaires were analysed. The majority of the respondents (24, namely 77.7%) have a higher or a bachelor degree in physiotherapy. Most of the respondents (9, namely 29.0%) devote two hours to physiotherapy components or physical activity within the entire antenatal education programme. Eight of the respondents (25.8%) state that physiotherapy contents are not included in the programme. Physiotherapy components most frequently stated include pelvic floor muscle training (26 respondents, namely 92.9%) and therapeutic exercises for lumbopelvic stabilization, and respiratory and relaxation therapeutic exercises (23 respondents, namely 82.1%). Other physiotherapy components refer to correct body mechanics, theoretical foundations of physical activity during pregnancy, practical physical activity during pregnancy, treatment of healthy pregnant women exclusively, treatment of healthy pregnant women and those with different pathologies. Only three respondents (10.7%) stated contents dealing with different types of pathologies in pregnancy. More than half of the respondents (17, namely 54.8%) stated that they do not have organized exercise classes in pregnancy. A good half of the participants (16, namely 51.6%) are familiar with the current professional recommendations for physical activity in pregnancy. The same number of the respondents has not exercised choice for any of the current professional recommendations. **Conclusions:** The majority of Slovenian antenatal classes encompass physiotherapy components taught by qualified physiotherapists. Only few physiotherapists treat pregnant women with different pathologies. Even though a good half of the respondents claim to be cognisant of the current professional physical activity recommendations during pregnancy, only few follow the proposed recommendations.

Keywords: pregnancy, antenatal classes, physical activity, physiotherapy, Slovenia.

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Simfizioliza po porodu: prevalenca in dejavniki tveganja

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Uvod: Simfizioliza je definirana kot bolečina okrog sramnične zrasti med nosečnostjo in po porodu, s prisotnostjo diastaze ali brez nje (1). Pregled literature je pokazal velik razpon v pogostosti simfiziolize, in sicer od 1 : 300 do 1 : 30.000 (2, 3). Dokazi o možnih dejavnikih tveganja za pojav simfiziolize so neprepričljivi in nekateri tudi nasprotujoči si (4). Namen raziskave je bil oceniti prevalenco simfiziolize po porodu in ugotoviti možne dejavnike tveganja. **Metode:** V retrospektivno raziskavo so bile vključene vse ženske, ki so rodile v slovenskih porodnišnicah v obdobju od januarja 2002 do decembra 2008. V tem obdobju je rodilo 129.557 žensk. Uporabljeni so bili podatki iz Nacionalnega perinatalnega informacijskega sistema Republike Slovenije, ki vsebuje podatke iz porodnega zapisnika. Uporabljene so bile statistične metode Hi-kvadrat za preizkušanje povezanosti opisnih spremenljivk in T-test za preizkušanje razlike med dvema aritmetičnima sredinama. Za oceno neodvisnih dejavnikov tveganja je bila uporabljena multivariatna logistična regresija. **Rezultati:** Prevalenca simfiziolize po porodu, v obdobju do odpusta iz porodnišnice, je bila 0,08 odstotka. Univariatna analiza je pokazala, da so bile ženske s simfiziolizo po porodu statistično pomembno starejše ($p = 0,013$), večkrat noseče ($p = 0,031$) in so večkrat rodile ($p = 0,006$), so imele gestacijski diabetes ($p = 0,001$), plod v glavični vstavi ($p = 0,034$) in instrumentalni vaginalni porod ($p < 0,001$), so dobile analgetična sredstva med porodom ($p < 0,001$), rodile večje novorojence (porodna teža ($p < 0,001$), obseg glavice ($p < 0,001$), dolžina ($p = 0,001$)) in imele velike novorojence glede na gestacijsko starost ($p = 0,032$). Kot statistično pomembni neodvisni dejavniki tveganja za pojav simfiziolize po porodu so se pokazali porodna teža novorojenca > 3500 g (95 % IZ za RO 1,9: 1,1–3,2), obseg glavice novorojenca > 35 cm (95 % IZ za RO 2,1: 1,3–3,6), analgetična sredstva med porodom (95 % IZ za RO 2,2: 1,3–3,7) in gestacijski diabetes (95 % IZ za RO 3,7: 1,7–7,9). **Zaključki:** Simfiziolizo po porodu ima manj kot en odstotek otročnic. Porodna teža in obseg glavice novorojenca, analgetična sredstva med porodom in gestacijski diabetes so se pokazali kot najpomembnejši dejavniki tveganja za pojav simfiziolize po porodu. Rezultati prevalence simfiziolize po porodu nakazujejo potrebo po večji ozaveščenosti zdravstvenih delavcev in večjem strokovnem znanju, ki bi pripomogla k odkrivanju večjega števila žensk s to težavo, k uspešnemu zdravljenju in izboljšanju kakovosti življenja teh žensk.

Ključne besede: simfizioliza, po porodu, prevalenca, dejavniki tveganja, Slovenija.

Symphysiolysis after labour: prevalence and risk factors

Background: Symphysiolysis is defined as pain around the symphysis pubis joint, during pregnancy and after delivery with or without the evidence of pubic separation (1). The reported incidence of symphysiolysis varies from 1 in 300 to 1 in 30.000 deliveries (2, 3). Several risk factors were found to be associated with symphysiolysis (4). The purpose of the study was to assess the prevalence of symphysiolysis after labour and its possible risk factors. **Methods:** A retrospective population-based analysis of all women, who delivered in Slovenian maternity hospitals from January 2002 to December 2008, was performed (n = 129.557). The data were extracted from the computerized national perinatal database which consists of obstetrics and perinatal information, recorded within the period from delivery to discharge from the hospital by an obstetrician. Statistical significance was calculated using x^2 test for difference in qualitative variables and t-test for difference in continuous variables. To evaluate the best independent predictors of symphysiolysis the multivariate logistic regression was used. **Results:** The prevalence of symphysiolysis after labour was 0.08%. Based on univariable analysis, a woman with symphysiolysis is more likely to be an older ($p = 0.013$), multigravida ($p = 0.031$) and multipara ($p = 0.006$), has gestational diabetes ($p = 0.001$), has an infant who was in the vertex presentation ($p = 0.034$) or has had an instrumental delivery ($p < 0.001$), receives analgesics during labour ($p < 0.001$), has a larger infant (birth weight ($p < 0.001$), length ($p = 0.001$), head circumference ($p < 0.001$)) or has a LGA baby (large for gestational age) ($p = 0.032$). Multivariate logistic regression showed the infant birth weight > 3500 g (OR=1.9, 95% CI 1.1-3.2), infant head circumference > 35 cm (OR=2.1, 95% CI 1.3-3.6), analgesics during delivery (OR=2.2, 95% CI 1.3-3.7) and gestational diabetes (OR=3.7, 95% CI 1.7-7.9) are the only statistically significant independent risk factors for symphysiolysis. **Conclusions:** Symphysiolysis after labour is present at less than one percent of women. Infant birth weight, head circumference, analgesics during labour and gestational diabetes are concluded to be the most important risk factors for the symphysiolysis. The results of the prevalence for symphysiolysis after labour showed the need for higher awareness of the health workers and higher professional knowledge, which would help to diagnose a bigger number of women with that problem, to more successful treatment and higher quality of life.

Keywords: symphysiolysis, after labour, prevalence, risk factors, Slovenia.

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Urinska inkontinenca v nosečnosti in po porodu

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Uvod: Urinska inkontinenca (UI) je pogost pojav v nosečnosti in po porodu. V literaturi je opisanih veliko dejavnikov tveganja, ki naj bi pripomogli k njenemu nastanku (1, 2, 3, 4). Namen: Ocena prevalence UI v nosečnosti in po porodu ter ugotovitev možnih dejavnikov tveganja za njen nastanek. **Metode:** K raziskavi so bile povabljene vse ženske, ki so rodile septembra 2010 v ljubljanski porodnišnici. 509 prostovoljk (88,5 %) je pisno privolilo v sodelovanje v študiji. Podatki so bili pridobljeni z vprašalnikom. **Rezultati:** UI v nosečnosti je imelo 35,8 % žensk, 4. teden po porodu 19,3 %, 8. teden po porodu 5,9 %, 12. teden po porodu pa je UI imelo le še 2,6 % žensk. Ugotovili smo statistično pomembno povezavo med nastankom UI v zadnji nosečnosti in temi kazalniki: UI pred nosečnostjo ($p < 0,001$), UI v prejšnjih nosečnostih ($p < 0,001$) in povezava z inkontinentno bližnjo sorodnico ($p = 0,017$). Statistično pomembne povezave na vpliv večjega pojava UI v nosečnosti nismo ugotovili za mnogorodnost, večji indeks telesne mase pred nosečnostjo, večjo pridobitev telesne teže med nosečnostjo, večje število plodov, veliko porodno težo otroka, dvigovanje težkih bremen pri delu, pogostost izvajanja treninga mišic medeničnega dna v nosečnosti, starost nosečnice, kajenje, uhajanje blata ali vetrov v nosečnosti ter bolečine v ledvenem delu hrbtenice in/ali medenice v nosečnosti. UI pred nosečnostjo ($p < 0,001$), nizka porodna teža ($p = 0,027$) ter prvi porod ($p = 0,012$) so statistično pomembno vplivali na večji pojav UI po porodu. Vaginalni porod, mnogorodnost, večje število plodov, velika porodna teža otroka, pogostost izvajanja treninga mišic medeničnega dna v nosečnosti, UI v nosečnosti, starost porodnice, epiziotomija, poškodbe porodne poti, instrumentalni porod, povezava z inkontinentno bližnjo sorodnico niso statistično pomembno vplivali na večji pojav UI po porodu. **Zaključki:** Rezultate raziskave so pokazali, da UI pred nosečnostjo, UI v prejšnjih nosečnostih ter povezava z inkontinentno bližnjo sorodnico povezani z večjim pojavom UI v nosečnosti. UI pred nosečnostjo, nizka porodna teža in prvi porod pa so bili povezani z večjim pojavom UI po porodu. V naši raziskavi smo ugotavljali le povezave s posameznimi dejavniki tveganja in nismo preučevali njihovega medsebojnega vpliva pri etiologiji UI. To bi bilo smiselno preučevati v nadaljnjih raziskavah, saj verjetno k nastanku UI v nosečnosti in po porodu bolj kot en sam pripomore več dejavnikov tveganja.

Ključne besede: uhajanje urina, nosečnost, porod, prevalenca, dejavniki tveganja.

Raziskava je nastala v okviru evropske raziskave OB.surve: Project No 2007111 under EU Health Programme 2008-2013 Surveillance system: Occurrence of urinary incontinence in women as a consequence of inefficient or inappropriate obstetric care (Ob.Surve).

Urinary incontinence in pregnancy and postpartum

Background: Urinary incontinence (UI) is a common condition during pregnancy and postpartum. The literature has described many risk factors that may contribute to its occurrence. Purpose: To estimate the prevalence of UI during pregnancy and postpartum and its possible risk factors. **Methods:** All women who gave birth at Department of Obstetrics and Gynecologic at University Medical Center Ljubljana in September 2010 were asked to participate in the study. 509 volunteers (88.5%) gave written consent to participate in the study. The data was gathered by means of a questionnaire. **Results:** The prevalence of UI during the last pregnacy was 35.8%, 4^{th} week postpartum was 19.3%, 8^{th} week 5.9% and 12^{th} week postpartum was only 2.6%. UI during pregnancy was significantly associated with UI before pregnancy ($p < 0.001$), UI in previous pregnancies ($p < 0,001$), and the connection with the incontinent female close relatives ($p = 0.017$). The number of previous deliveries, higher body mass index before pregnancy, greater weight gain during pregnacy, number of fetuses, birth weight, heavy lifting at work, frequency of pelvic floor muscle training during pregnancy, age, smoking, anal and flatal incontinence during pregnancy, and pain in lumbar spine and/or pelvis during pregnacy were not statistically shown to be significant in the UI occurrence during pregnancy. UI before pregnancy ($p < 0.001$), first delivery ($p = 0.012$), and lower birth weight ($p = 0.027$) were significantly associated with postpartum UI. Vaginal delivery, number of previous deliveries, number of fetuses, birth weight, frequency of pelvic floor muscle training during pregnancy, UI during pregnancy, age, episiotomy, birth trauma, instrumental delivery, and the connection with the incontinent female close relatives were statistically not confirmed as significant for the UI occurrence postpartum. **Conclusions:** Based on these results, UI before pregnancy, UI in previous pregnancies, and the connection with the incontinent female close relatives were significantly associated with UI during pregnancy. UI before pregnancy, lower birth weight, and first birth are contributed to the increased occurrence of postpartum UI. The study investigated only the independent risk factors and it did not investigate the correlations among these risk factors in the etiology of UI. For the further research it is suggested to study correlations among risk factors, because probably more than one risk factor is responsible for occurrence of UI.

Keywords: urine leakage, pregnancy, childbirth, prevalence, risk factors.

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Konservativno zdravljenje urinske inkontinence po radikalni prostatektomiji – pregled literature

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Uvod: Rak prostate je v razvitem svetu v porastu, zato je velik medicinski in ekonomski problem (1). Posledice zdravljenja raka prostate po večini prinašajo komplikacije, kot sta urinska inkontinenca in impotenca, ki posledično zmanjšata kakovost življenja posameznika (2). Prevalenca urinske inkontinence en mesec po radikalni prostatektomiji je visoka in se giblje med 6 in 87 odstotki (3). Konservativno zdravljenje naj bi bila metoda prvega izbora za zdravljenje urinske inkontinence po kirurškem posegu raka prostate (4). Namen raziskave je bil na podlagi domače in tuje strokovne in znanstvene literature predstaviti rezultate raziskav, katerih namen je bil ugotoviti učinkovitost konservativnega zdravljenja urinske inkontinence po radikalni prostatektomiji. **Metode:** Iskanje literature je potekalo po računalniških bazah PubMed, PubMed, Cinahl, Embase, Index Medicus in v registru študij Cochrane Library. Iskanje je bilo omejeno na besedila v angleškem in slovenskem jeziku in na časovno obdobje od leta 1994 do leta 2011. **Rezultati:** V pregled literature je bilo glede na vključitvene in izključitvene kriterije vključenih 17 randomiziranih kontroliranih raziskav. Raziskave so preučevale učinkovitost treninga mišic medeničnega dna, biološke povratne zveze, električne stimulacije in magnetne stimulacije na urinsko inkontinenco po radikalni prostatektomiji. Vse preučevane metode so se izkazale kot učinkovite za zdravljenje urinske inkontinence po prostatektomiji. Trening mišic medeničnega dna je v primerjavi z drugimi metodami dal statistično pomembno boljše rezultate. Dodatek biološke povratne zveze k treningu mišic medeničnega dna ni imel dodatnega učinka v primerjavi s samostojnim treningom mišic medeničnega dna. Podobno tudi dodajanje električne stimulacije k treningu mišic medeničnega dna ni dalo boljših rezultatov zdravljenja. Dokazi o učinkovitosti magnetne stimulacije so omejeni. **Zaključki:** Urinska inkontinenca pušča posledice na posameznikovi socialni in čustveni ravni. Konservativno zdravljenje je bolj učinkovito kot nezdravljenje pri izboljšanju urinske inkontinence po prostatektomiji. Vse štiri preučevane metode so se sicer izkazale kot učinkovite pri zdravljenju urinske inkontinence, vendar naj bi bil glede na izsledke raziskav trening mišic medeničnega dna prva metoda izbora. Biološka povratna zveza in električna stimulacija pa se priporočata predvsem za povečanje zavedanja mišic medeničnega dna in za učenje njihove zavestne kontrakcije. Magnetna stimulacija je nova obetavna metoda, potrebne pa so nadaljnje raziskave, ki bodo potrdile njeno učinkovitost.

Ključne besede: rak prostate, incidenca raka, trening mišic medeničnega dna, biološka povratna zveza, električna stimulacija.

Conservative treatment of urinary incontinence after radical prostatectomy – literature review

Background: Prostate cancer is on the increase in developed countries, so that is why it is a major medical and economic problem (1). The consequences of radical prostatectomy are urinary incontinence and erectile dysfunction which affect the quality of life (2). Following radical prostatectomy, the prevalence of urinary incontinence at 1 month after surgery is high, ranging from 6% to 87% (3). Conservative treatment should be offered as first-line therapy to men with urinary incontinence after prostatectomy (4). Purpose: To review the literature on the effectiveness of conservative treatment for urinary incontinence after radical prostatectomy. **Methods:** A computer search on PubMed, Cinahl, Embase, Index Medicus and the Cochrane Central register of Controlled Trials Cochrane Library was carried out for randomized controlled trials published between 1994 and 2011. Searching for the literature was limited to English and Slovenian and the time period between 1994 and 2011. **Results:** Considering the inclusion and exclusion criteria, 17 randomized controlled trials have been included. Studies have examined the effectiveness of pelvic floor muscle training, biofeedback, electrical stimulation and magnetic stimulation to improve urinary incontinence after radical prostatectomy. All studied methods have proven to be effective. In comparison to other methods the pelvic floor training gave significantly better results. Adding biofeedback to pelvic floor muscle training had no additional effect compared to pelvic floor muscle training alone. Similarly, in studies comparing pelvic floor muscle training with pelvic floor muscle training combined with electrical stimulation no additional effect was demonstrated adding electrical stimulation. Evidence of the effectiveness of magnetic stimulation is limited. **Conclusions:** Urinary incontinence is an undeniable social problem, associated with impaired emotional and psychological well-being. Conservative treatment is more effective than no treatment in improving urinary incontinence after radical prostatectomy. All four studied methods have proven to be effective, however, according to the results of the studies, pelvic floor muscle training should be offered as first-line therapy to men with urinary incontinence after prostatectomy. Biofeedback and electrical stimulation are recommended as facilitation methods in order to stimulate awareness and obtain voluntary pelvic floor muscle contraction. Magnetic stimulation is a new promising method, but further research is needed to confirm its effectiveness.

Key words: prostate cancer, cancer incidence, pelvic floor muscles, biofeedback, electrical stimulation.

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Epidemiološke značilnosti poškodb v slovenskem rokometu

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Uvod: Rokometna igra je povezana s številnimi nepričakovanimi situacijami, z zunanjimi motnjami gibanja in s skrajnimi položaji telesnih segmentov, zato je pojavnost poškodb pri rokometaših velika (1, 2). Namen prispevka je prikazati izsledke analize poškodb rokometašev in rokometašic iz slovenskih članskih lig v sezoni 2010/2011. **Metode:** Izvedena je bila retrospektivna epidemiološka raziskava. Podatki so bili zbrani z anketami, ki so bile poslane dvajsetim slovenskim rokometnim klubom. Iz vsake lige so bili naključno izbrani 4 klubi, iz posameznega kluba je ankete reševalo 15 igralcev. Za analizo rezultatov so bili uporabljeni opisna statistika, povprečje, srednja vrednost in delež. Zbiranje podatkov je potekalo od februarja do maja 2012. **Rezultati:** Od 300 poslanih je bilo analiziranih 159 vrnjenih in pravilno rešenih anket, ki jih je izpolnilo 81 (50,9 %) rokometašev in 78 (49,1 %) rokometašic. Povprečna starost rokometašev (24,6 leta) je bila višja od rokometašic (20,5 leta), z rokometom so se igralci v povprečju ukvarjali 15 let in igralke 10,5 leta. V sezoni 2010/2011 se je poškodovalo 45 % igralcev in igralk. Incidenca poškodb pri ženskah je bila višja kot pri moških (ženske 26,7 poškodbe/1000 ur igranja tekme in 0,97 poškodbe/1000 ur treninga; moški 10 poškodb/1000 ur igranja tekme in 0,5 poškodbe/1000 ur treninga). Incidenca poškodb na tekmah pri rokometašicah je bila skoraj trikrat in na treningih dvakrat večja kot pri rokometaših. Največji odstotek poškodovanih igralcev in igralk je bil v 1. B moški (46 %) in ženski ligi (62 %). Preventivno vadbo je imelo vključeno v treninge 67 (42 %) od vseh rokometašev in rokometašic, 92 (58 %) igralcev in igralk preventivne vadbe ni imelo. Od tistih, ki so izvajali preventivno vadbo, se jih je 51 % poškodovalo. Med tistimi, ki preventivne vadbe niso imeli vključene v treninge, se je poškodovalo 41 %. V sezoni 2010/2011 se je vsaj enkrat poškodovalo 72 (45 %) igralcev in igralk, 87 (55 %) se jih ni poškodovalo. Pripetilo se je 0,58 poškodbe na igralca oziroma igralko. Rokometašice so imele 57 poškodb (62 %), rokometaši pa 35 (38 %). Od vseh poškodb (92) pri obeh spolih se jih je največ zgodilo v jesenskem tekmovalnem obdobju (49 %) in najmanj (8 %) v spomladanskem pripravljalnem delu sezone. Prevladovale so poškodbe spodnjih udov (62 % vseh poškodb), najpogosteje je bil pri obeh spolih poškodovan skočni sklep (30 poškodb). Največ poškodb (27) je bilo hudih (odsotni od treningov za več kot 4 tedne), najpogosteje so bili poškodovani levi in desni zunanji igralci oziroma igralke (38 poškodb). **Zaključki:** Incidenca, vrsta poškodb in vzroki za nastanek poškodb med slovenskimi rokometaši ter rokometašicami so primerljivi z izsledki v literaturi (3, 4). Zbrani podatki so lahko v pomoč vsem, ki se ukvarjajo s to športno panogo, za izboljšanje preventivnih ukrepov, boljšega predvidevanja in ukrepanja ob nastanku poškodb.

Ključne besede: rokomet, športne poškodbe, pogostost.

Epidemiology of injuries in Slovene handball

Background: Handball is associated with a number of unexpected situations, with external disturbances of movement and the extreme positions of body segments, hence the frequency of injuries among handball players is high (1, 2). The purpose of this study was to identify and analyse injuries amongst handball players from different Prime Slovene leagues in the season 2010/2011. **Methods:** A retrospective epidemiological study of injuries in handball was conducted. A questionnaire was send to twenty Slovene handball teams. From each league, four teams were randomly selected and from individual team 15 players fulfilled the questionnaire. Descriptive statistics, average and percentage values were used for analysis. Data were collected between February and May 2012. **Results:** Three hundred questionnaires were sent and 159 questionnaires that were sent back were used for analysis. Eighty-one (50.9%) male players (average age 24.6 years) and 78 (49.1%) female players (average age 20.5 years) fulfilled the questionnaire. On average male players had longer duration of playing handball in comparison to female players (male: average 15 years; female average 10.5 years). During the season 2010/2011 forty-five percent of all players were injured. The incidence of injury in females (27.7 injuries/1000 hours competition and 0.97 injuries/1000 hours training) was higher than in men (10 injuries/1000 hours competition and 0.5 injuries/1000 hours training). The incidence of injury on competition and on training was higher in female players in comparison to male three to two times, respectively. The largest percent of injured players was in 1.B male (46%) and in female league (62%). From all players, 67 (42%) had been involved in prevention training programme and 92 (58%) not. Fifty-one percent of the players involved in prevention training injured and 41% players who were not involved in the prevention programe. In the 2010/2011 season from all players, 72 (45%) injured themselves at least once, 87 (55%) did not experienced the injury. There was 0.58 injury per player, 57 (62%), injuries in female and 35 (38%) in male players. From all injuries (92) in both genders, the highest percentage of all injuries occured in the first half of the competition season (49%) and the least (8 %) in the preparatory season. From all injuries, the lower limb was injured most frequently; the most common was ankle injury (30 injuries). The majority of the injuries (27) were severe (absence from training for 4 weeks) and the backcourt players (38) were most frequently injured. **Conclusion:** The incidence, type and cause of injuries among Slovenian handball players are comparable to reports in the literature (3, 4). The collected data may be helpful to improve the prevention, prediction and treatment of injuries to all who are involved in this sport discipline.

Keywords: handball, sport injuries, incidence.

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Razlike v somatotipu med atleti veterani tekmovalci in netekmovalci

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Uvod: Z naraščajočo starostjo nastopijo značilne spremembe v zgradbi in sestavi človeškega telesa. Dejavniki, ki vplivajo na spremembe, so številni (1). Eden pomembnejših je telesna dejavnost, ki ugodno vpliva na maščobno, mišično in kostno tkivo (5). Namen raziskave je bil ugotoviti, kako se s starostjo spreminja somatotip pri moških in pri ženskah ter kako na somatotip vpliva redna telesna dejavnost oziroma nedejavnost. **Metode:** V raziskavi je sodelovalo 336 oseb, od tega 193 moških in 143 žensk oziroma 280 tekmovalcev ter 56 netekmovalcev. Udeleženci so bili naključno izbrani na evropskem atletskem veteranskem prvenstvu leta 2008. Za pridobitev potrebnih podatkov smo naredili 10 antropometričnih meritev. Preiskovanci so bili deljeni glede na spol ter starost v skupine od 35 do 44 let, od 45 do 54 let, od 55 do 64 let ter 65 let in več. **Rezultati:** Analizirali smo 336 oseb, od tega 280 (83 %) tekmovalcev in 56 (17 %) netekmovalcev. Povprečna starost (standardni odklon) preiskovancev je bila 55,0 (12,1) let. Povprečna starost vseh moških je bila 55,0 (12,2) let, žensk pa 54,9 (12,1) leta. Somatotip pri moških je bil zelo homogen, saj je 193 (100 %) moških imelo somatotip endomorfni mezomorf. Pri ženskah so bili zastopani štirje različni somatotipi. Kar 85 (59,4 %) žensk je imelo somatotip mezomorf – endomorf, 47 (32,8 %) žensk pa somatotip mezomorfni endomorf. Pri moških je prevladovala mezomorfna komponenta, pri ženskah pa endomorfna komponenta, ne glede na telesno dejavnost. **Zaključki:** Rezultati so pokazali, da ima telesna dejavnost pozitiven vpliv na biologijo staranja in spremembe, ki nastopajo vse do pozne starosti. Prav tako so rezultati pokazali, da se je somatotip moških razlikoval od somatotipa žensk, in sicer v skupini tekmovalcev in netekmovalcev. S starostjo so nastopile spremembe, ki so bile skupne obema spoloma.

Ključne besede: antropometrija, somatotip, sestava telesa, staranje, telesna aktivnost.

Differences in somatotype between veteran athletic competitioners and non-competitioners

Background: A lot of typical changes in body composition and body built are affected by ageing process. Factors which have influence on human body are several (1). One of the most important is physical activity. It has positive affect on fat, muscle and bone tissues (5). The purpose of this work was to find out how somatotype changes with growing age in group of men and women and how physical activity or non-activity affects somatotype. **Methods:** In our research we tested 336 persons, of whom 193 were men and 143 were women. We tested 280 active and 56 non-active people. All participants were chosen by chance on European Veteran Athletic Championship in 2008. For our research we needed 10 anthropometric measurements. Participants were divided by gender and age into age groups 35-44 years, 45-54 years, 55-64 years and 65 years and more. **Results:** We analysed 336 participants, 280 (83%) of all were active and 56 (17%) were non active participants. Mean age (standard deviation) for all participants was 55.0 (12.1) years. Mean age of all male participants was 55.0 (12.2) years, and of female participants 54.9 (12.1) years. Somatotypes in the male sample were similar, because all the 193 (100%) men had somatotype endomorphic mesomorph. In the female sample we found four different somatotypes. 85 (59.4%) women had somatotype mesomorph – endomorph, 47 (32.8%) women had somatotype mesomorphic endomorph. In male sample the dominant component of somatotype was mesomorphic component but in female sample the dominant component of somatotype was endomorphic component, for active and non-active participants. **Conclusions:** The results showed that physical activity has a positive effect on biology of ageing and on changes correlated with ageing process. The results also showed that the somatotype of the men is different from the somatotype of the women in the group of active and non-active participants. Ageing brings changes in the body structure and composition which are equal for both genders.

Keywords: anthropometry, somatotype, body composition, ageing, physical activity.

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Zanesljivost Constantove ocenjevalne lestvice funkcije rame

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Uvod: Ocenjevalne lestvice za ramenski obroč se delijo v splošne (American Shoulder and Elbow Surgeons, Disabilities of the Arm, Shoulder and Hand), specifične glede na okvaro oziroma bolezen (Rotator cuff Quality of Life, Western Ontario Rotator Cuff Index) in specifične glede na stanje (Oxford Shoulder Instability Questionnaire) (1). V rehabilitacijski obravnavi bolnikov z boleznimi in poškodbami ramenskega sklepa je večina ocenjevalnih sistemov zasnovana na ravni okvare, vendar narašča potreba po meritvah omejitve dejavnosti. Constant in Murley (2) sta ena prvih opisala sistem točkovanja, ki je usmerjen izključno v številčen opis kakovosti funkcije rame. Constantova ocenjevalna lestvica funkcije rame (COLFR) je pogosto uporabljen točkovalni sistem, specifičen za oceno rame. Z raziskavo smo želeli ugotoviti zanesljivost COLFR pri pacientih s poškodbami ramenskega sklepa. **Metode:** V raziskavo je bilo vključenih 30 polnoletnih prostovoljcev, starih povprečno 47,7 ± 15,9 leta, z unilateralno poškodbo ramenskega sklepa. Sodelovali so naključno izbrani pacienti z različnimi okvarami ramen, ne glede na vrsto poškodbe in način zdravljenja, ki so bili po poškodbi ramenskega sklepa vključeni v rehabilitacijo v Zdravilišču Laško. Pogoj je bil, da so imeli poškodovano ramo pred manj kot tremi leti. Kontrolna rama je morala biti nepoškodovana oziroma naj bi od poškodbe ali operacije minilo več kot 5 let. Za ocenjevanje funkcije rame smo uporabili v slovenščino prevedeno lestvico COLFR (3). Uporabljena je bila metoda testa in ponovnega testa, saj so bile meritve opravljene dvakrat v razmiku treh dni. Raziskavo je odobrila komisija Republike Slovenije za medicinsko etiko. **Rezultati:** Povprečna vrednost COLFR za levi zgornji ud pri prvem testiranju je bila za 0,8 večja kot povprečna vrednost pri drugem testiranju. Povprečni vrednosti COLFR za desni zgornji ud sta bili pri prvem in naslednjem testiranju enaki. Razlika v obeh primerih ni bila statistično pomembna ($p < 0,05$). Do statistično pomembnih razlik ($p = 0,018$) med prvimi in drugimi meritvami je prišlo v kategoriji bolečina pri testiranju na levem zgornjem udu. Povprečna vrednost prve meritve je znašala 2,5 točke, povprečna vrednost druge meritve pa 2,8 točke. Celotna ocenjevalna lestvica, kot tudi osem izmed desetih kategorij na levem zgornjem udu, je imelo intraklasni koeficient korelacije (ICC) večji od 0,9. Na desnem zgornjem udu je imela celotna ocenjevalna lestvica, kot tudi vse posamezne kategorije, ICC večji od 0,9. **Zaključki:** Rezultati so pokazali, da je COLFR zanesljiv merilni pripomoček za oceno funkcije ramenskega sklepa po različnih poškodbah ali operacijah. Čeprav je izvedba COLFR zelo preprosta, cenovno dostopna in zahteva minimalen čas za oceno pacienta, se v terapiji bolj malo uporablja. Z njo bi lahko objektivneje spremljali rezultate fizioterapevtskih obravnav.

Ključne besede: Constantova ocenjevalna lestvica funkcije rame, zanesljivost, poškodbe ramenskega sklepa.

Reliability of the Constant shoulder function assessment scale

Background: Shoulder joint evaluation scales are divided into general scale (American Shoulder and Elbow Surgeons, Disabilities of the Arm, Shoulder and Hand), specific in relation to the injury or disease (Rotator cuff Quality of Life, Western Ontario Rotator Cuff Index) and specific in relation to the condition (Oxford Shoulder Instability Questionnaire) (1). Most of the shoulder rehabilitation evaluation systems are based on the level of impairment, but there is an increased need for measurement of activity limitations. Constant and Murley (2) were among the first ones to describe grading system, using numerical description of shoulder function. Their Constant shoulder function assessment scale (COLFR) is commonly used shoulder scoring system. The aim of this study was to determine the reliability of COLFR in patients with shoulder injuries. **Methods:** The study included 30 adult volunteers, average age 47.7 ± 15.9 years, with unilateral shoulder injury which occurred last than three years ago. Control shoulder should be free from injury or surgery more than five years. Participants were randomly selected, regardless of the type of injury and treatment. Their rehabilitation took place in Spa centre Laško. For the assessment of shoulder function, the COLFR scale, translated into Slovene, was used (3). Test-retest reliability was determined with measurements performed twice in the interval of three days. Research was approved by the Slovenian Republic medical ethics committee. **Results:** The average value of COLFR for the left shoulder in the first testing was 0.8 higher than the average value for the left shoulder in the second testing. Average values of COLFR for the right shoulder were the same for the first and subsequent testing. The difference was not statistically significant ($p < 0.05$) for either left or right shoulder. Statistically significant difference ($p = 0.018$) was found only between the first and the second measurement in the category of pain in the left shoulder. First measurement average value was 2.5 points, second measurement average value was 2.8 points. The whole evaluation scale, as well as the eight out of ten categories on the left shoulder had interclass correlation coefficient (ICC) higher than 0.9. On the right shoulder the whole evaluation scale as well as all single categories had ICC higher than 0.9. **Conclusions:** The results showed that the COLFR is reliable measuring device for the assessment of shoulder condition after injuries and various operations. Although the performance of COLFR is very simple, cost effective and easy to use, it is not frequently used in therapy. Using COLFR assessment scale could help to evaluate the results of physiotherapeutic treatments more objectively.

Keywords: Constant shoulder function assessment scale, reliability, shoulder injuries.

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Učinki elastičnega lepilnega traku na aktivnost mišice vastus medialis oblikus po vstavitvi kolenske endoproteze po resekciji tumorja

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Uvod: Elastični lepilni trak se uporablja kot podporna metoda v fizioterapiji (1). Ena izmed funkcij elastičnega lepilnega traku je tudi podpora oslabeli mišici pri krčenju (2, 3). Pacienti imajo po vstavitvi kolenske endoproteze po resekciji tumorja v distalnem delu stegnenice poleg zmanjšane pasivne gibljivosti zmanjšano tudi moč štiriglave stegenske mišice (4). Namen raziskave je bil ugotoviti, ali uporaba elastičnega lepilnega traku vpliva na aktivnost mišice vastus medialis oblikus pri pacientih po vstaviti kolenske endoproteze po resekciji tumorja v distalnem delu stegnenice. **Metode:** Namestitev elastičnega lepilnega traku na mišico vastus medialis oblikus in merjenje površinske električne napetosti s površinskimi EMG-elektrodami (v μV) pri dveh pacientih. Prvi pacient, star 20 let, je sodeloval v raziskavi 5 tednov po resekciji tumorja v distalnem delu leve stegnenice, druga pacientka, stara 38 let, pa je sodelovala 6 mesecev po resekciji sarkoma distalnega dela desne stegnenice. Prva meritev je bila izvedena brez elastičnega lepilnega traku, druga takoj po namestitvi elastičnega lepilnega traku, tretja čez 1 uro in četrta po 24 urah namestitve elastičnega lepilnega traku na mišico vastus medialis oblikus. Med raziskavo sta bila oba vključena v standardno rehabilitacijo in nista izvajala zahtevnejših gibalnih dejavnosti. **Rezultati:** Meritve so pokazale, da nameščanje elastičnega lepilnega traku vpliva na aktivacijo mišice vastus medialis oblikus. Površinska električna napetost mišice je bila pri obeh pacientih večja po namestitvi elastičnih lepilnih trakov (pacient za 89 % in pacientka za 31 %). Še večje izboljšanje površinske električne napetosti glede na prvo meritev je bilo ugotovljeno eno uro po namestitvi trakov (pacient za 120 % in pacientka za 33 %). Meritev po 24 urah je pri obeh preiskovancih pokazala še večje izboljšanje mišične aktivnosti glede na prvo meritev (pacient za 163 % in pacientka za 46 %). **Zaključki:** Rezultati kažejo, da z nameščanjem elastičnih lepilnih trakov lahko vplivamo na izboljšanje aktivacije mišice vastus medialis oblikus in da se ta v času 24 ur od namestitve izboljšuje. Izboljšanje aktivacije mišice vastus medialis oblikus po uporabi elastičnih lepilnih trakov so ugotavljali že v predhodnih raziskavah (2, 4). Uporaba elastičnih lepilnih trakov v kombinaciji z EMG-biološko povratno zvezo je kot dopolnilna metoda lahko uspešna v klinični praksi za hitrejšo aktivacijo oslabljene mišice. Ugotovitve, dobljene pri dveh pacientih po resekciji tumorja v distalnem delu stegnenice, so lahko podlaga za nadaljevanje ugotavljanja učinkov elastičnih lepilnih trakov na večjem številu pacientov.

Ključne besede: elastični lepilni trak, kolenska endoproteza, mišica vastus medialis oblikus, površinski EMG.

Effects of kinesio taping on vastus medialis obliquus muscle activity after knee endoprosthesis after resection of tumor

Background: Kinesio taping is a common approach in the field of physical therapy (1). One of the roles of kinesio taping is also to support the increase of muscle contraction (2, 3). Patients after knee endoprosthesis have increased passive ROM and also an increased strength of a quadriceps muscle (4). The aim of the study was to determine effects of kinesio taping on the vastus medialis obliquus muscle by patients after knee endoprosthesis after resection of tumor of a distal part of femur. **Methods**: Application of kinesio taping on the vastus medialis obliquus muscle and measurement electrical activity with surface electromyography (EMG) (with μV) by two patients. The first patient (male, 20 years old) participated 5 weeks after resection of tumor in the distal part of the left femur. The second patient (female, 38 years old) participated 6 months after resection of sarcoma in the distal part of the right femur. The measurements involved an average maximal contraction of vastus medialis obliquus muscle, the second measurement was after the application of kinesio taping, the third measurement was after one hour and the fourth measurement was after 24 hours of application of kinesio taping on vastus medialis obliquus muscle. Both patients have standard physiotherapy without high intensity of activity. **Results**: Measurements show effects of kinesio taping on vastus medialis obliquus muscle. Electrical activation of muscle was in both cases better after application of kinesio taping (male patient 89 % increasing; female patient 31 % increasing). After one hour of kinesio taping, the increase was even better with regard to the first measurement (male 120 % and female 33 %). After 24 hours the activation increased for 163 % by the male patient and for 46 % by the female patient. **Conclusion**: Clinical effects of kinesio taping on vastus medialis obliquus muscle by patients after knee endoprosthesis included an increase in the electrical activity of the muscle. Researches (2, 4) have determined increasing of activation of vastus medialis obliquus muscle after kinesio taping. Kinesio taping with combination of EMG biofeedback could be a supporting method of a therapy in the clinical practice for faster activation of the weakened muscle. Further researches of application of kinesio taping on activation of muscles should be done.

Keywords: kinesio taping, knee endoprosthesis, vastus medialis obliquus muscle, surface electromyography.

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Program stopnjevane vadbe v vodi pri poskusni multidisciplinarni obravnavi sindroma fibromialgije – poročilo o primeru

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Uvod: Sindrom fibromialgije je opredeljen kot kronično razširjen bolečinski sindrom, ki prizadene mehkotkivne strukture. Zdravljenje je dolgotrajno in večplastno. Najboljši rezultati se dosežejo z multidisciplinarnim pristopom, ki povezuje delo različnih zdravstvenih delavcev: zdravnika, fizioterapevta, delovnega terapevta, psihologa in socialnega delavca (1). Za zmanjšanje simptomov so pomembni redna vsakodnevna telesna vadba, edukacija bolnika, vedenjsko-kognitivna terapija in, če je treba, še medikamentozna terapija (1). Vadba v vodi ima blagodejne učinke na telo (2), ki trajajo dalj časa (3), zmanjšujejo se simptomi bolečine, depresije, prestrašenosti in dnevne utrujenosti, izboljšajo pa se splošna telesna pripravljenost, čas hoje (4), moč, ravnotežje in gibljivost (5). Namen dela je bil predstaviti program stopnjevane vodene vadbe v vodi v poskusni multidisciplinarni obravnavi bolnika s sindromom fibromialgije. **Metode:** Sodeloval je 54-letni bolnik s sindromom fibromialgije. Fizioterapevtska ocena pred obdobjem obravnave in po njem je vsebovala inspekcijo, 6-minutna testa hoje v telovadnici in v bazenu ter oceno bolečine z numerično vidno lestvico pred izvedbo 6-minutnega testa hoje in hoje v bazenu ter po njej. Program hidrogimnastike je trajal 4 tedne, 4-krat na teden po 1 uro**. Rezultati:** Preiskovancu se je stanje ob koncu programa v primerjavi z začetkom izboljšalo na področju ocene bolečine, merjene pred izvedbo 6-minutnega testa hoje (z 10 na 3; 75 %) in hoje v bazenu (z 9 na 4; 56,6 %) in po njej. Primerjava ocene bolečine ob koncu programa v telovadnici in bazenu pokaže razliko za 8,4 % v korist bazena. Vzdržljivost pri hoji se je povečala enako kot pri hoji v bazenu (38,6 %). **Zaključki:** Prvič uporabljeni multidisciplinarni pristop v obravnavi sindroma fibromialgije se je izkazal kot zelo uspešen, saj se je pri predstavljenem bolniku pomembno izboljšala splošna telesna pripravljenost ter zmanjšala ocena doživljanja bolečine. To kaže na pravilen izbor fizioterapevtskih postopkov v telovadnici in bazenu, ki so bili usklajeni z delom drugih članov tima. Prvič je bil tudi uporabljen prilagojen 6-minutni test hoje v bazenu, ki se je izkazal kot dober pokazatelj splošne telesne pripravljenosti in bi ga po ustrezni standardizaciji lahko uporabljali za spremljanje bolnikovega napredka. Smiselno bi bilo dodati še spremljanje bolnikovega počutja med vadbo, na primer s preverjanjem srčnega utripa. Hidroterapija je področje z manj kakovostnimi raziskavami, zato predlagamo še dodatne za dvig kakovosti dela.

Ključne besede: kronično razširjen bolečinski sindrom, hidroterapija, vodena vadba, multidisciplinaren pristop, 6-minutni test hoje v bazenu.

Progressive programme of hidrotherapy in first trial multidisciplinary approach of fibromyalgia syndrome – a case report

Background: The fibromyalgia syndrome is defined as a chronic widespread pain syndrome which affects soft-tissue structures. The treatment is long lasting and often very comprehensive. The best results are achieved with multidisciplinary approach which combines various health professionals; a physician, a physiotherapist, an occupational therapist, a psychologist and a social worker (1). Factors for reducing fibromyalgia syndrome are: regular exercise (on daily basis), education of the patient, behavioural-cognitive therapy and often pharmacological therapy if needed (1). Exercising in water has a lot of pleasant effects on the body (2) and it seems to have more advantages in long-term pain management (3). Improvement was found in pain, depression, anxiety, number of days feeling good, cardiovascular capacity and walking time (4). It also effects on strength, balance and joint mobility (5). The purpose of the report was to present the stepwise programme of hydrotherapy in the first trial multidisciplinary approach of fibromyalgia syndrome treatment**. Methods:** A 54-year-old patient with fibromyalgia syndrome participated in the study. The methods included physiotherapeutic assessment composed by inspection, endurance assessment in gym and pool and also assessment of pain before and after having a 6-minute walk test in gym and in pool, too. The hydrotherapy programme duration was 4 weeks, 4 days per week for 1 hour**. Results:** The patient's condition was assessed at the beginning and at the end of the treatment. Comparison showed that pain evaluated by visual numeral scale decreased from 9 to 4 (56.6%) measured in a pool and from 10 to 3 (75.0%) measured in a gym. Comparison of pain at the end of the programme showed the difference between gym and pool for 8.4% better for pool. The patient's endurance assessed by a 6-minute walk test increased for 38.6% in both – a swimming pool and in gym**. Conclusions:** A case report of a 54-year-old patient showed the significant improvement in his endurance and decreasing his pain. The multidisciplinary approach of fibromyalgia syndrome was used for the first time. The outcomes show efficient selection of physiotherapy methods and techniques in gym and pool which were also coordinated with other members of the team. For the very first time, the adapted 6-minute walk test in a pool was used. It becomes evident that it should be used in working with patients with fibromyalgia syndrome to evidence and attend the patient's progress. Attending of patient's feeling during exercising appears to be bad therefore pulse rate should be monitored. Hydrotherapy is an area with less qualitative researches, so we recommend further should be done to improve the quality of work.

Keywords: chronic widespread pain syndrome, hydrotherapy, guide exercises, multidisciplinary approach, 6-minute walk test in pool.

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Trunk muscle activity in patients with multiple sclerosis: the influence of body weight support

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Background: Multiple sclerosis (MS) often lead to gait problems. The available literature does not present evidence that body weight supported treadmill training (BWSTT) is more effective than other methods of gait rehabilitation (1, 2). BWSTT (with minimum 30% BWS) reveals a gait pattern with only the lower limbs participate actively. The active dynamic trunk stability - important for the retention of the posture and balance during normal gait - is consequently less well involved in the gait training session. Only limited evidences have been published concerning the influence of BWS on the trunk muscle activity (3, 4). In this study, walking with different BWS levels were compared to a reference walking without BWS. We hypothesized that with increasing BWS levels the muscle activity would decrease due to passive suspension of the trunk in the harness. **Methods:** 14 patients with MS (EDSS-score: 2.5 to 6) and 14 healthy persons walked on a treadmill on different BWS levels (0%, 10%, 20%, 30%, 50% and 70%). After an acclimatization period, EMG measurements with surface electrodes bilaterally placed on the trunk muscles at the level of the m. rectus abdominis, m. obliquusexternus, m. erector spinae and m. multifidus were performed. To synchronize with the gait cycle, an electromagnetic sensor was placed on the left calcaneus. The muscle activation was presented as a percentage of a performance related reference contraction. A repeated measures ANOVA with simple contrasts was used. **Results:** The use of BWS system has an influence on the trunk muscle activity. Comparison of the different BWS levels with the condition of walking without BWS revealed the following general results: in healthy persons, no significant differences in rectus abdominis muscle activity, an increase in obliquusexternus muscle activity (on the left side) and a decrease in back muscle activity was measured with increasing BWS levels. In patients with MS, an increase in abdominal muscle activity and a decrease in back muscle activity was measured with increasing BWS levels.Most of the differences as compared to walking without BWS were found during high percentages (30% to 70%) of BWS. The conditions with 10% and 20%BWS are for trunk muscle activity closer to normal walking. **Conclusion:** Because of this reason we suggest to decrease the percentage BWS as fast as possible beneath the 30% BWS.

Keywords: trunk muscles, body weight support, electromyography, gait, multiple sclerosis.

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Uporaba vidne povratne informacije na sistemu Lokomat pri pacientih z nepopolno okvaro hrbtenjače – pregled literature

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Uvod: Vadba hoje na tekočem traku z delno razbremenitvijo telesne teže je v rehabilitaciji pacientov z nepopolno okvaro hrbtenjače stalna praksa. Pri hoji pacientu pomagata dva, včasih trije fizioterapevti, ki morajo opravljati ergonomsko zahtevno delo. Fizioterapevt pomaga pacientu pri izvedbi korakov, hkrati pa z rokami zaznava njegovo aktivno sodelovanje in mu lahko zaradi tega posreduje primerne napotke za dosego učinkovite vadbe. Napredek tehnologije je v zadnjih desetih letih omogočil razvoj robotskih sistemov za vadbo hoje. Eden takih je Lokomat. Prednosti vadbe hoje z njim so dolgotrajnejša obdobja vadbe, pravilen vzorec hoje in zmanjšanje števila potrebnih fizioterapevtov. Ena izmed slabosti je odsotnost fizioterapevtovega vodenja z dotikom. Lokomat ima v pogone za kolka in koleni vgrajene senzorje sil, ki ves čas med hojo zaznavajo pacientovo aktivno sodelovanje ali njegovo odsotnost. Pacient na zaslonu pred seboj dobiva povratne informacije o izvedbi korakov v smeri fleksije in ekstenzije kolkov in kolen v različnih oblikah, ki jih izbere s fizioterapevtom. **Metode:** Pregledali smo literaturo s področja uporabe Lokomata v kombinaciji z vidno povratno informacijo pri pacientih z nepopolno okvaro hrbtenjače. Iskali smo jo s podatkovno bazo PubMed. **Rezultati:** Ugotovili smo, da je literature z omenjenega področja malo. Splošno sprejeto je, da povratna informacija učinkovito pospeši motorično učenje, naj jo zagotovi strokovnjak ali naprava (1). Mišična aktivnost, opazovana z elektromiografijo, se poveča z upoštevanjem povratnih informacij o izvedbi korakov, ki jih pacienti dobijo na zaslonu, pri uporabi ogledala, pri hoji v navideznem okolju ali z verbalnimi spodbudami (2). Raziskovalci ugotavljajo, da je učinkovitost vadbe hoje z vidno povratno informacijo v obliki grafov enakovredna verbalnim spodbudam (3). Vendarle pa z vrednostmi, ki jih pacienti dosežejo na zaslonu, ni mogoče zaznavati napredka pri hoji (4). **Zaključki:** Koncept k nalogi usmerjene ponavljajoče se vadbe predlaga, da bi bile povratne informacije podajane med funkcijskimi aktivnostmi (5), kar nam Lokomat omogoča. Potrebne so nadaljnje raziskave, ki bi potrdile ali ovrgle hipotezo, da je sistem za podajanje vidnih povratnih informacij, ki je dodan k Lokomatu, učinkovit pripomoček za izboljšanje različnih vidikov hoje.

Ključne besede: hoja, robotika, povratna informacija, poškodba hrbtenjače, rehabilitacija.

The use of visual feedback with the system Lokomat in patients with incomplete spinal cord injury – literature review

Background: Treadmill training with partial body weight support is a common practice in rehabilitation of patients with incomplete spinal cord injury. A patient needs assistance of two or three physiotherapists that need to do ergonomically demanding task. A physiotherapist helps the patient during walking and at the same time feels his participation. That is how adequate guidance can be provided to the patient to achieve effective training. Advances in technology in past ten years enabled development of robotic systems for gait training. Lokomat is one of them. Advantages of gait training with the Lokomat are longer training periods, regular gait pattern and fewer physiotherapists needed for training. One of the disadvantages is absence of physical contact between a patient and a physiotherapist. Lokomat has built-in force sensors that perceive active participation of the patient or absence of it. On the screen in front the patient receives feedback about active participation in hip and knee joints in flexion and extension. The feedback comes in different forms that are selected in cooperation with the patient. **Methods:** We reviewed literature about the use of Lokomat in combination with visual feedback in patients with incomplete spinal cord injury. We searched it with database PubMed. **Results:** We found out the lack of literature. It is generally accepted, that feedback effectively facilitates motor learning, if provided by an expert or a machine (1). Muscle activity observed with electromyography is increased with feedback about gait, no matter what the form of the feedback is; on the screen, with mirror, in virtual reality or with verbal stimulus (2). The effectiveness of gait training is the same comparing visual feedback in the form of graphs and verbal stimulus (3). However, the values reached by the patient on the screen cannot be a measure of progress in gait training (4). **Conclusions:** The concept of task-oriented training suggests that the feedback should be delivered to the patient during functional activities (5). This is what the Lokomat enables. There is the need for further research, which would confirm or deny the hypothesis, that the Lokomat with integrated feedback system is an efficient tool for improving different aspects of gait.

Keywords: gait, robotics, feedback, spinal cord injury, rehabilitation.

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Učinki vadbe hoje z različnimi fizioterapevtskimi postopki, vključno s sistemom Lokomat, pri pacientki z dedno spastično paraparezo – poročilo o primeru

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Uvod: Poškodbe in obolenja živčnega sistema pogosto vplivajo na pacientovo sposobnost hoje. Eden glavnih ciljev rehabilitacije nevroloških pacientov je ponovno učenje hoje. Cilj fizioterapije je izboljšati funkcijo hoje z različnimi fizioterapevtskimi postopki (1). Vadba temelji na motoričnem učenju, učinki pa so odvisni od specifičnosti naloge, intenzivnosti vadbe in trajanja. V prispevku so predstavljeni učinki vadbe hoje z različnimi fizioterapevtskimi postopki, vključujoč vadbo hoje s sistemom Lokomat, na funkcijo hoje pri pacientki z dedno spastično paraparezo. **Metode dela:** 53-letna pacientka z diagnozo dedne spastične parapareze je bila sprejeta na programe rehabilitacije. Pred dvema letoma je prišlo pri pacientki do poslabšanja hoje v smislu vedno manj zanesljive hoje, zanašanja, težje je hodila po klancu in stopnicah navzdol. Brez dodatne opore je lahko hodila od 50 do 100 metrov. Namen fizioterapije je bil izboljšati funkcijo hoje (doseči varnejšo hojo in izboljšati vzorec hoje). Vadba hoje je obsegala 15 obravnav, in sicer po 30 minut z različnimi fizioterapevtskimi postopki, ki so vključevali hojo po različnih podlagah (mehke blazine, hrapava tla), v različnih smereh in z različno hitrostjo ter hojo po stopnicah in 30 minut vadbe hoje na sistemu Lokomat (2). Pred začetkom in po obravnavah je bila ocenjena z Bergovo lestvico za oceno ravnotežja, testom hitrosti hoje na 10 metrov, časovno merjenim testom vstani in pojdi in 6-minutnim testom hoje. Narejena je bila tudi kineziološka analiza hoje (3). **Rezultati:** Pri pacientki so se po obdobju vadbe izboljšali ravnotežje na Bergovi lestvici (s 53 na 56 točk), čas pri časovno merjenem testu vstani in pojdi (z 21 na 10 sekund), hitrost hoje (z 21 na 9 sekund) in vzdržljivost pri hoji (129 m več). Kineziološka analiza hoje je potrdila, da sta se po obdobju vadbe občutno povečala hitrost hoje (za 0,20 m/s) in dolžina koraka (z levo nogo je bil korak daljši za 0,11 m, z desno za 0,09 m). Povečalo se je tudi število korakov (s 86 korakov/min na 93 korakov/min). Dolžina dvojne opore se je zmanjšala za 0,22 sekunde, enojne opore pa povečala za 0,07 sekunde. Hoja je bila še vedno toga, z zmanjšanimi obsegi gibljivosti v vseh sklepih. **Zaključki:** Vadba hoje z različnimi fizioterapevtskimi postopki, vključno s sistemom Lokomat, je pri pacientki z dedno spastično paraparezo pripomogla k izboljšanju hitrosti in vzdržljivosti pri hoji ter k varnejšemu spreminjanju smeri hoje. V terapevtskem in bolnišničnem okolju je pacientka varneje hodila, sama pa ni opazila vidnejših sprememb v sposobnosti hoje.

Ključne besede: dedna spastična parapareza, hoja, nevrofizioterapija, Lokomat.

Effect of gait training with conventional physiotherapy and Lokomat system in a patient with hereditary spastic paraparesis – a case report

Background: Injuries and diseases of the nervous system often affect the patient's ability for walking. One of the main goals of rehabilitation in neurological patients is relearning of walking. The aim of physiotherapy is to improve walking with different physiotherapeutic interventions. A treatment is based on motor learning, task-oriented training, intensive and repetitive training (1). The article presents the effectiveness of robotic assisted gait training – Lokomat (2) with conventional physiotherapy on the gait function in a patient with hereditary spastic paraparesis. **Methods:** A 53-year-old patient with hereditary spastic paraparesis was included in the rehabilitation programs. Two years ago her walking worsened. She had difficulties with maintaining her balance, walking downhill and down the stairs. She was able to walk from 50 to 100 meters without support. The purpose of the gait training was to improve the gait function (walking pattern and to achieve safer walk). The patient was included in fifteen treatment sessions. Treatment session included 30 minutes of conventional physiotherapy (gait training on different surface, walking in different directions and velocity) and 30 minutes of robot-assisted gait training (Lokomat). The patient was evaluated before and after the fifteen treatment sessions. Primary outcomes were Berg balance scale, gait velocity with 10-meter walk test, timed up and go and 6-minute walk test. The kinesiologic gait analysis was also made. **Results:** The balance improved from 53 to 56 points measured with Berg balance scale. The 10- meter walk test improved from 21 seconds to 9 seconds. Up and go test improved from 21 seconds to 10 seconds and the patient was able to walk 129 meters farther than before the treatment. Kinesiologic gait analysis after the therapeutic treatment showed significant increase of walking speed by 0.20 m/s and the length of the step: left foot for 0.11 m, right foot for 0.09 m. The number of steps also increased after the therapeutic treatment: from 86 steps/min to 93 steps/min. The length of the double support was reduced by 0.22 seconds, single support increased by 0.07 seconds. The range of motion was still limited in all joints and the gait was still rigid. **Conclusions:** Five weeks of robot-assisted gait training with Lokomat and conventional physiotherapy improves gait speed, walking distance, the changing of walking direction is safer. The patient reported no visible changes in the gait function.

Keywords: hereditary spastic paraparesis, walking, neurophysiotherapy, Lokomat.

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Ugotavljanje razumljivosti in ocena skladnosti med ocenjevalci za slovenski prevod lestvice za oceno funkcionalne hoje (FGA) pri pacientih po možganski kapi

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Uvod: Pri osebah po preboleli možganski kapi so zelo pogosto prisotne motnje ravnotežja, ki pomembno vplivajo tudi na sposobnost hoje in tveganje za padce (1). Ocena funkcionalne hoje (angl. Functional gait assessment – FGA) je ena redkih ocenjevalnih lestvic, ki omogoča ocenjevanje ravnotežja med hojo. Vsebuje deset nalog, ki vključujejo hojo po ravnem, spremembo hitrosti hoje, hojo z obračanjem glave horizontalno, hojo z nagibi glave vertikalno, hojo in obrat na mestu, prestopanje ovire, hojo na zmanjšani podporni ploskvi, hojo z zaprtimi očmi, hojo nazaj in hojo po stopnicah (5). Namen predstavljene študije je bilo ugotoviti skladnost med ocenjevalci, ki so uporabljali slovenski prevod FGA pri pacientih po možganski kapi. **Metode:** Pet ocenjevalcev (4 fizioterapevti z 10- do 20-letnimi delovnimi izkušnjami na področju rehabilitacije po možganski kapi ter 1 študentka fizioterapije) je pol ure pred predvidenim začetkom ocenjevanja dobilo ocenjevalne protokole z navodili za ocenjevanje. Sledilo je samostojno preučevanje testa brez možnosti diskusije. Nato so se ocenjevalci razporedili na statična mesta za opazovanje vzdolž poligona. Dva ocenjevalca in fizioterapevt, ki je preiskovancem demonstriral naloge, dajal ustna navodila in spremljal preiskovance med hojo, so imeli štoparice. Ocenjevalci so po lestvici FGA hkrati ocenili vsakega izmed desetih pacientov po možganski kapi, ki so bili sposobni brez pomoči in čezmernega utrujanja prehoditi vsaj 6 metrov. Demonstraciji posamezne naloge je sledil testni poizkus in nato poizkus, ki je bil vrednoten s točkami od 0 do 3 glede na hitrost in kakovost izvedbe ter obseg motenj ravnotežja. Dobljeni podatki so bili obdelani s programom SPSS, razlike med ocenjevalci glede povprečne ocene smo preizkusili z enosmerno analizo variance za ponovljene meritve. Skladnost med ocenjevalci smo ocenili z intraklasnim korelacijskim koeficientom (dvosmerni naključni model za posamezno meritev – ICC (2,1), oblika za absolutno skladnost (2) in prikazali s črtnim diagramom (3, 4). **Rezultati:** ICC je znašal 0,984. Med ocenjevalci ni bilo statistično značilne razlike v povprečni oceni (analiza variance za ponovljene meritve: $p = 0{,}190$). **Zaključki:** V primerjavi z drugimi podobnimi študijami (5, 6) smo pri slovenskem prevodu lestvice FGA ugotovili odlično skladnost ocenjevalcev, zato ga bomo na oddelku po možganski kapi uporabljali kot eno izmed metod ocenjevanja funkcionalnosti hoje in dinamičnega ravnotežja. Z nadaljnjim delom bomo poskušali natančneje opredeliti vrsto dejavnikov in stopnjo njihovega vpliva na nepravilnosti pri hoji.

Ključne besede: ocenjevanje hoje, ravnotežje, rehabilitacija, veljavnost in zanesljivost, možganska kap.

Evaluation of comprehensibility of Slovenian translation of Functional Gait Assessment (FGA) and conformity among raters in patients after stroke

Background: Balance impairments are a frequent consequence of cerebral stroke which can impair the patient's walking abilities and increase the risk of falls (1). The Functional gait assessment (FGA) scale is one of the few measuring scales that enable the assessment of balance during gait. It consists of 10 tasks including gait on level surface, change in gait speed, gait with horizontal head turns, gait with vertical head turns, gait and pivot turn, stepping over obstacle, gait with narrow base of support, gait with eyes closed, ambulating backwards and gait on steps (5). The aim of the study was to determine internal consistency among raters using Slovenian translation of FGA in patients after stroke. **Methods**: Five raters (4 licensed physical therapists with 10-20 years of experience in rehabilitation of patients after stroke, and 1 physiotherapy student), received instructions for the assessment half an hour before the testing and studied the instructions independently without questions or discussion. Then they positioned themselves at equal interval along both sides of the walkway and simultaneously used the FGA to evaluate each of the ten persons after stroke that were able to walk at least 6 m without assistance or fatigue. Individual tasks were demonstrated and then performed by the subjects firstly as a test trial and secondly as a trial evaluated on a scale from 0 to 3 in relation to the speed and quality of activity and the severity of balance deficit. The collected data were analyzed with SPSS, the differences among the raters in relation to the average score were tested with one-way analysis of variance for repeated measures. The conformity among the evaluators was assessed with intraclass correlation coefficient - Two-way random single measure ICC (2, 1) – Consistency/Absolute Agreement (2) and illustrated on a line diagram (3, 4). **Results**: Similarly to other comparable studies (5, 6) the consistency among raters using the Slovenian translation of FGA was found to be excellent. **Conclusions:** The Slovenian translation of FGA will therefore be used at the department for rehabilitation after stroke as one of the methods for assessment of gait functionality and dynamic balance. In our further activities we intend to define the type of factors and the level of their effect on gait anomalies.

Keywords: gait assessment, balance, rehabilitation, validity and reliability, stroke.

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Ocena skladnosti med ocenjevalci za slovenski prevod krajše različice testa za oceno sistemov ravnotežja (mini-BESTest) pri pacientih po možganski kapi

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Uvod: Ravnotežje je ključno za delovanje gibalnega sistema in izvajanje večine dejavnosti vsakdanjega življenja (1). Če opredelimo vzrok motnje ravnotežja pri posameznem pacientu, lahko izboljšamo učinkovitost vadbe ravnotežja. Ena izmed pomembnejših ocenjevalnih lestvic za sistemsko klinično ocenjevanje ravnotežja je test za oceno sistemov ravnotežja (angl. Balance Evaluation Systems Test – BESTest) (2). Ocenjuje 36 nalog, ki so razdeljene v šest kategorij, kar nam pomaga pri določanju vzrokov motnje ravnotežja. Glavna omejitev te ocenjevalne lestvice je poraba časa, ocenjevanje traja od 30 do 45 min. Zaradi tega so razvili krajšo različico, tako imenovani mini-BESTest (3). Vključuje le 14 nalog (ocene od 0 do 2) in se lahko izvede v približno 15 minutah. Je zanesljiv, veljaven in ponovljiv (3). Namen: Oceniti skladnost med ocenjevalci pri uporabi mini-BESTest v slovenskem prevodu pri pacientih po možganski kapi. **Metode:** Pet ocenjevalcev je hkrati ocenjevalo istega pacienta, skupaj so ocenili 10 pacientov z motnjami ravnotežja po možganski kapi. Ocenjevalci so bili diplomirani fizioterapevti z 10- do 20-letnimi delovnimi izkušnjami na področju rehabilitacije pacientov po možganski kapi. Nobeden izmed njih še ni izvajal testa. Navodila so dobili uro pred začetkom ocenjevanja. Pri vsakem preiskovancu so ocenili vseh 14 nalog. Skladnost med ocenjevalci smo ocenili z intraklasnim korelacijskim koeficientom (dvosmerni naključni model za posamezno meritev – ICC (2, 1), oblika za absolutno skladnost (4); in prikazali s črtnim diagramom (5, 6). Razlike med ocenjevalci glede povprečne ocene smo preizkusili z enosmerno analizo variance za ponovljene meritve. **Rezultati:** Povprečna ocena posameznega ocenjevalca se je gibala med 18,6 (standardni odklon: 14,2) in 19,7 (standardni odklon: 14,5). ICC je znašal 0,96. Med ocenjevalci ni bilo statistično značilne razlike v povprečni oceni (analiza variance za ponovljene meritve: $p = 0,190$). **Zaključki:** Slovenski prevod mini-BESTest je razumljiv, po izsledkih naše študije je skladnost med ocenjevalci odlična. Na oddelku za rehabilitacijo bolnikov po možganski kapi URI – Soča smo ga začeli uporabljati poleg drugih kliničnih testov za ocenjevanje ravnotežja, da bi izboljšali učinkovitost terapevtskih ukrepov.

Ključne besede: slovenski prevod, Mini BESTest, ravnotežje, možganska kap.

Assessment of conformity among raters using Slovenian translation of the short version of Balance evaluation systems test (mini-BESTest) in patients after stroke

Background: Balance is essential for functioning of the motor system and performance of most daily activities (1). With identifying the cause of balance deficit in individual patients, the efficiency of balance training can be improved. One of the most important evaluation scales for systemic clinical balance assessment is Balance evaluation systems test (BESTest) (2). The test evaluates 36 different tasks divided into six different categories and is aimed at identifying the causes of balance disorder. The main shortcoming of the test is its length – the evaluation takes from 30 to 45 minutes. For that reason, a shorter version has been developed, the so called mini-BESTest (3). The later includes only 14 tasks and can be done in about 15 minutes. Aim: To assess conformity among raters when using the Slovenian translation of mini-BESTest. **Methods**: Five raters simultaneously assessed the same patient; a total of 10 patients with balance disorder after stroke were assessed. The raters were certified physical therapists with 10 to 20 years of work experience in the field of rehabilitation of patients after stroke. None of the raters had used the test before. The instructions were given one hour before the assessment. In each subject, 14 tasks were evaluated on a scale from 0 to 3. The conformity among the raters was assessed with intraclass correlation coefficient - Two-way random single measure ICC (2, 1) – Consistency/Absolute Agreement (4); and then illustrated on a line diagram (5, 6). The difference among the raters in relation to the average score was tested with one-way analysis of variance for repeated measures. **Results:** The ICC was 0.962. The difference among the raters in relation to the average score was not statistically significant (repeated measures ANOVA: p=0.190). The average score of individual raters ranged from 18.6 (st. deviation 14.2) to 19.7 (st. deviation 14.5). **Conclusions:** Different authors found mini-BESTest reliable, valid and repeatable (3). The Slovenian translation of mini-BESTest is comprehensible, and the present study has shown excellent conformity among the raters. It is used beside other clinical tests for balance assessment at University Rehabilitation Institute, Republic of Slovenia department for rehabilitation of patients after stroke with the purpose of improving the efficiency of therapeutic interventions.

Keywords: Slovenian translation, mini-BESTest, balance, stroke.

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Diagnostika in fizioterapija pri pacientki z nestabilnostjo zgornje vratne hrbtenice – poročilo o primeru

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Uvod: Nestabilnost zgornje cervikalne hrbtenice se največkrat odkrije kot dodatna diagnoza v okviru skrbne preiskave vratne hrbtenice (1). Dejstvo odkritja nestabilnosti vsekakor pomembno vpliva na vrstni red in izbor metod terapije, ki zahteva obravnavo radikulopatije. Namen: Predstaviti fizioterapevtsko diagnostiko s testi stabilnosti vratne hrbentinice, testiranje prevodnosti vertebralne arterije (2), preiskavo mobilnosti živčevja (3) in obravnavo nestabilnosti vratne hrbtenice (4) ter mobilizacijo živčevja (5). **Metode:** Poročilo prikazuje primer preiskovanke, ki je prišla na obravnavo s simptomatiko radikulopatije C 7 (3) in z okcipitalnimi glavoboli. V preiskavi, v katero so bili vključeni testi hipermobilnosti zgornjih vratnih segmentov (1) in provokacijski test za vertebralno arterijo po De Kleijnu ter preizkus po Hautantu (2), je bilo ugotovljeno, da dodatno trpi še za nestabilnostjo zgornje vratne hrbtenice. Na podlagi fizioterapevtske ocene in imobilizacije nevrologa so bile uporabljene te fizioterapevtske tehnike: mobilizacija medianega in ulnarnega živca (5) in terapevtske vaje za stabilizacijo vratne in prsne hrbtenice (4). **Rezultati:** Po sedmih obravnavah je preiskovanka dobila dober občutek za pravilno stabilizacijo vratne hrbtenice pri aktivnostih vsakdanjega življenja. Mravljinčenje in bolečine, zaradi katerih je preiskovanka prišla v ambulanto, so se v poteku obravnave zmanjšali. Refleks mišice triceps brachii se ni opazno spremenil. Tudi zmanjšana mišična moč se je le nekoliko poboljšala. **Zaključek:** Ker stabilizacija vratne hrbtenice in obravnava radilukopatije zahtevata dolgoročno terapijo, štejemo zaradi razmeroma naglega poboljšanja splošnega občutka (nočni spanec, glavoboli) in s tem kakovosti življenja fizioterapevtsko obravnavo kot uspešno.

Ključne besede: manualna terapija, mobilizacija živčevja, stabilizacija, vratna hrbtenica.

Diagnosis and physiotherapy of a patient with instability in upper cervical spine – a case report

Background: Instability of upper cervical spine is often detected as an additional diagnosis within a diligent examination of the cervical spine (1). The fact of having discovered instability certainly has a significant impact on the order and selection of methods and therapies required in the treatment of radiculopathy. Purpose: To present a physiotherapeutic diagnosis of cervical spine stability tests, a conductivity test of artery vertebralis (2), an investigation of mobility of the nervous system (3), including a treatment of cervical spine instability (4) and mobilization of the nervous system (5). **Methods:** The report shows an example of a woman patient who came to be treated for the symptoms of radiculopathy of C 7 (3) and occipital headaches. Investigation which included the tests of hyper mobility of the upper cervical segments (1) and provocation tests of the artery vertebralis according to De Kleijn and Hautant (2) revealed the existence of further suffering - the instability in the upper cervical spine. Based on physical therapy evaluation and immobilization by the neurologist the following physical therapy techniques were applied: mobilization of median and ulnar nerve (5) and medical training to stabilize the cervical and thoracic spine (4). **Results:** After seven treatments the patient got a good feeling for the proper stabilization of the cervical spine in her activities of daily living. The tingling and pain, which guided her to the health care, reduced in the course of treatment. M. triceps reflex did not significantly change and the decreased muscle strength also only slightly improved. **Conclusion:** Since the cervical spine stabilization and the treatment of radiculopathy requires a long-term therapy and the present physiotherapeutic treatment resulted in a relatively rapid improvement of general good health (sleep, headaches) and consequently in the quality of life, the therapy is considered to be successful.

Keywords: manual therapy, nerve mobilization, stabilization, cervical spine.

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Teoretične osnove in dokazi o učinkovitosti mobilizacije fascij

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Uvod: Ekstraartikularna bolečina, značilna za miofascialne bolečinske sindrome, se pogosto širi oziroma seli z enega dela telesa na drugega (1). Nov postopek v manualni terapiji je mobilizacija fascij. Njen namen je ponovna vzpostavitev fizioloških biomehanskih pogojev za delovanje mišično-skeletnega sistema. Z globoko frikcijsko masažo naj bi se vzpostavilo drsenje med različnimi plastmi fascij ter med fascijami in drugimi tkivi (2). To naj bi omogočilo fiziološko delovanje mehanoreceptorjev, zmanjšano draženje nociceptorjev in posledično vplivalo na izboljšanje gibanja (3). Namen: Predstaviti teoretične osnove in dokaze o učinkovitosti mobilizacije fascij. **Metode:** Narejen je bil pregled literature v angleškem jeziku, neodvisno od leta objave. **Rezultati:** Večina raziskav je preučevala anatomijo in fiziologijo fascij. Dokazi o učinkih postopka mobilizacije fascij so redki. Pri pacientih s patelarno tendinopatijo (n = 18) je bilo ugotovljeno značilno zmanjšanje bolečine takoj po terapiji, ki je pri ponovnem testiranju ostala nespremenjena ali se je dodatno zmanjšala (4). Pri pacientih s kronično bolečino v rami (n = 28) so avtorji ugotovili, da bi ta postopek lahko bil učinkovit za zmanjšanje bolečine (5). Pri pacientih z zvinom gležnja (n = 25) se je po terapiji značilno izboljšalo ravnotežje, kar se je ohranilo pri ponovnem testiranju (6). V raziskavi z naključno izbrano kontrolno skupino pri pacientih s subakutno nihajno poškodbo vratne hrbtenice (n = 18) je bilo ugotovljeno značilno večje izboljšanje obsega aktivne gibljivosti v skupini z mobilizacijo fascij kot v skupini s standardno obravnavo (kinezioterapija, sklepna mobilizacija) (7). **Zaključki:** Mobilizacija fascij je obetajoč fizioterapevtski postopek, vendar je za potrditev učinkovitosti potrebnih več raziskav. Prav tako je treba pojasniti mehanizme delovanja tega postopka.

Ključne besede: miofascialna bolečina, anatomija fascij, manualna terapija.

Theoretical backgrounds and effectiveness of fascial mobilization

Background: Extraarticular pain typical for myofascial pain syndromes is often irradiating or moving from one body segment to the other (1). Fascial mobilization is a new therapeutic procedure in manual therapy. Its aim is to reestablish physiological biomechanical conditions for optimal function of musculoskeletal system. By means of the technique similar to deep friction massage, the gliding between the layers of the fascia and fascia and other tissues is restored. This should enable physiological function of mechanoreceptors, inhibit the nociceptors and lead to effective movement (3). Purpose: To present theoretical basis and evidence based effectiveness of fascial mobilization. **Methods:** Review of English literature, regardless to the year of publishing. **Results:** The most research was dedicated to the anatomy and physiology of fascia. The evidences of the effectiveness of the technique were only a few. In patients with patellar tendinopathy (n=18), significant pain relief was documented immediately after the therapy which even improved in the follow up (4). In patients with chronic shoulder pain (n= 28) the authors found out that fascial mobilization could be effective treatment for pain relief (5). In patients with ankle sprain (n=25) the balance improvement was observed and it remained so also in follow up (6). The research with randomly selected control group which observed the patients with subacute whiplash injury of the cervical spine (n=18) reports significant improvement of the active range of motion in the group treated with fascial mobilization in comparison to the group treated with standard procedure (kinesiotherapy, joint mobilization) (7). **Conclusions:** Fascial mobilization is a promising therapeutic procedure. To confirm its effectiveness more studies are needed.

Keywords: myofascial pain, fascial anatomy, manual therapy.

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Manualna terapija in drugi fizioterapevtski postopki na področju glave

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Uvod: Fizioterapevti skrbimo za vzpostavljanje, vzdrževanje in krepitev zdravja in funkcionalnosti gibalnega sistema pri ljudeh. Večina se ukvarja z udi in trupom. H gibalnemu sistemu spada tudi glava, sicer le z eno premično kostjo, a z veliko mišicami in patološkimi stanji (1, 2). Namen prispevka je pregled najpogostejših okvar gibalnega sistema na področju glave in fizioterapevtskih postopkov za njihovo odpravljanje. **Metode:** Narejen je bil pregled strokovne literature, predvsem s področja manualne terapije. Pregledana so patološka stanja na glavi oziroma težave, ki se na glavi izražajo kot prenesena bolečina. Zaradi obširnosti so predstavljeni le največkrat uporabljeni postopki fizioterapije na področju glave. To so mobilizacija fascij (3), terapevtska obravnava miofascialnih prožilnih točk (4, 5), sklepna mobilizacija (7), metoda Cyriax (8) in proprioceptivna nevromuskularna facilitacija (7). **Rezultati:** Za obravnavo čeljustnega sklepa ter mišic na glavi in sprednjem delu vratu je veliko primernih tehnik manualne terapije in kinezioterapije, ki ponujajo dobre rezultate. Večina tehnik ima specifične teste, s katerimi se ocenjuje predvsem kakovost izvedenih gibov oziroma se ugotavlja simetrija mišične kontrakcije ali simetrija sklepnega gibanja. Pri čeljustnem sklepu so postopki usmerjeni v mobilizacijo sklepa, mišične tehnike pa večinoma v relaksacijo oziroma okrepitev za ponovno pridobitev simetrije. V vseh primerih je potrebna aktivna udeležba pacientov pri zdravljenju, ki obsega izvajanje vaj in terapijo doma. Z aktivno udeležbo pacienti tudi prevzamejo odgovornost za svoje zdravje. **Zaključki:** Za celovit pristop obravnave pacientov je treba obravnavati tudi glavo. Večina terapevtskih postopkov zahteva dodatno učenje, širino znanja in individualni, celostni pristop k pacientu. Dobra fizioterapija ni terapija le dela telesa. Že Hipokrat je navajal: »Delu nikoli ne more biti dobro, če celoti ni dobro.«

Ključne besede: glava, manualna terapija, fizioterapija, čeljustni sklep, bolečina.

Manual therapy and other physiotherapeutic methods on region of the head

Background: The purpose of physiotherapy is to maintain, regain and improve health and functionality of human locomotion system. Most physiotherapists perform their work on trunk and extremities and not on head region that also belongs to the locomotion system. It truly has only one mobile joint, but also a lot of muscles and a lot of pathological conditions (1, 2). The aim of the present study is to describe the most common head pathologies and physiotherapeutic methods of diminishing them. **Methods:** The source was professional literature on manual therapy. The main emphasis was given to pathological circumstances and conditions on the head itself and on the head as a referred pain. Due to so many methods, only the most common ones are described. Those methods are fascial mobilization (3), miofascial techniques (4, 5), joint mobilization (6), Cyriax method (7) and proprioceptive neuromuscular facilitation (8). **Results:** There are a lot of good manual and kinesio therapeutic techniques for temporomandibular joint, head muscles and muscles on the frontal side of the neck. Most of them have their own tests for movement evaluation, mostly for quality of movement and symmetry of muscles contraction. In the treatment of temporomandibular joint there are mainly mobilization techniques and in muscles pathology relaxing techniques or techniques of improving muscle strength and regaining muscle symmetry. Patient's activities at home, such as exercises and home therapy are expected. The role of an active patient is an important factor of its own health responsibility. **Conclusions:** Considering holistic approach, the therapy of head is necessary to be a part of physiotherapy. Most methods can be learned in additional courses and require widespread knowledge and individual approach to a patient. Good physiotherapy is not only a therapy of a certain part of the body. Hippocrates said: »*A* P*art* can never *be well* unless the whole is *well«.*

Keywords: head, manual therapy, physiotherapy, temporomandibular joint, pain**.**

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Znanstveno dokazan pristop vadbe za obravnavo skolioz

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Uvod: Znanstveno dokazan pristop vadbe za obravnavo skolioz (angl. Scientific Exercise Approach to Scoliosis - SEAS) izhaja iz lyonske šole (1). Glavne značilnosti obravnave so: izboljšanje pacientovega zavedanja o deformaciji hrbtenice, aktivna samopoprava drže, izboljšanje stabilnosti hrbtenice, vključevanje aktivne samopoprave drže v stabilizacijske vaje, ki vključujejo nevro-motorično kontrolo, proprioceptivni trening in vaje za ravnotežje ter izvajanje posebnih vaj za skoliozo v stezniku, pri čemer se steznik uporabi kot vadbeno orodje (2). Aktivna samopoprava drže v treh prostorskih ravninah je najpomembnejši del individualne obravnave. Prva stopnja učenja popravljanja drže se začne v frontalni ravnini. Obravnava obsega učenje zavedanja premika vrha krivine proti konkavni strani. V drugi stopnji sledi poprava drže v sagitalni ravnini. Pacient ponovno vzpostavi prsno kifozo in ledveno lordozo. Tretja stopnja je združevanje gibov iz frontalne in sagitalne ravnine. Izvajanje korekcijskih gibov v dveh ravninah sproži vključitev gibanja v tretji, transverzalni ravnini, v kateri pride do rotacije vretenc v nasprotno smer (3, 4). Pacient se mora naučiti, da med izvajanjem vaj vedno kontrolira pravilno izvedbo izbrane poprave drže. Pri tem mu pomagajo štiri standardna vprašanja, ki si jih zastavi med izvedbo giba: Ali je moja hrbtenica vzravnana? Ali je moje telo po izvedbi poprave drže bolj simetrično kot prej? Ali sem sposoben zadržati popravljeno držo med izvajanjem vaje? Ali opazim, da se po izvedbi poprave drže moje telo vrne nazaj v položaj, v katerem je bilo pred izvedbo poprave? (2) Namen povzetka je predstaviti metodo SEAS. **Metode:** Preiskovanje na spletu dostopnih podatkovnih zbirk: Google, Google Scholar, PubMed, Scoliosisjournal. Kriterij za izbiro članka so bili prispevki o metodi SEAS, objavljeni v angleškem jeziku. **Rezultati in zaključki:** Metoda SEAS se od drugih pristopov razlikuje v tem, da pri oblikovanju terapevtskega programa upošteva in daje popolna pozornost pacientu in posebnostim njegovih skoliotičnih krivin. Program vaj se spreminja glede na pacientovo sposobnost izvedbe vaj. SEAS je aktiven pristop, ki zahteva aktiviranje globokih mišic ob hrbtenici in deluje na načelu miselno-vedenjskega pristopa. Rezultati znanstvenih raziskav potrjujejo, da se z obravnavo po metodi SEAS zmanjša potreba po predpisu steznika, SEAS izboljša parametre skoliotičnih krivin, z obravnavo po SEAS-u se ponovno vzpostavita normalno ravnotežje in koordinacija telesa, aktivna poprava drže po načelu SEAS vpliva na zmanjšanje velikosti krivin na rentgenskih posnetkih, obravnava po SEAS-u izboljša rezultate terapije v primeru nošnje steznika, z vajami v stezniku, za povečanje prsne kifoze po metodi SEAS se najbolje izkoristi korekcijski pritisk steznika na krivino. Številni objavljeni članki o učinkih metode SEAS dokazujejo, da gre za z dokazi podprto metodo. Za pacienta je učenje temeljnih principov SEAS-a precej enostavno. Metoda se lahko uporabi pri obravnavi krivin vseh velikosti.

Ključne besede: SEAS, vaje za skoliozo, adolescentna idiopatska skolioza, vaje v stezniku, konservativna obravnava**.**

Scientific Exercise Approach to Scoliosis

Background: SEAS is an acronym for Scientific Exercise Approach to Scoliosis and originates from the Lyon approach where a number of the basic characteristics to the approach had been developed (1). This includes: improving the patient's awareness of their deformity, active self-correction (ASC), improvement of the spinal stability, associating ASC with stabilizing exercises, that include neuro-motor control, proprioceptive training and balance, the performance of in-brace scoliosis specific exercises using the brace as a training tool (3). Active Self-Correction on the three spatial planes is the most important individualized therapeutic moment. The first phase includes becoming aware of curve apex translation toward concavity on the frontal plane. The second phase includes becoming aware of correction of the sagittal plane. The patient must ensure thoracic kyphosis and lumbar lordosis. The third phase is associating ASC movements of the frontal and sagittal planes. An action done on two spinal planes causes an involvement of the third plane, transversal where the cross-sectional derotation occurs (3, 4). During the performance of the exercise, the patient is asked to always verify the correct maintenance of the selected self-correction. In order to facilitate this control the patient uses a series of standard questions that they ask themselves during the treatment. These questions are: Is my spine supported? Is my body now more symmetrical than before? Whilst doing the exercise am I able to maintain the correction? Am I able to see that my body returns back to the original position it was before performing the self-correction? (2) The main object of the summary is to present the SEAS method. **Methods:** Findings published in English language in the following bibliographic databases were summarised: Google, Google Scholar, PubMed, Scoliosisjournal. The criteria for choosing the articles were articles about SEAS in English. **Results and Conclusions:** Strength of the SEAS approach is in the absolute attention and consideration of the patient's individual characteristics for the design of the treatment program. Exercise program changes according to patient's ability to perform the exercises. SEAS is the active intrinsic approach that works on the principals of a cognitive-behavioral approach. Scientific results of SEAS proves that SEAS treatment reduces the need for bracing, SEAS treatment improves scoliosis parameters, SEAS treatment normalizes balance and coordination in scoliosis patients, ASC according to SEAS principles reduces the radiographic curve, SEAS treatment improve results in case of bracing, SEAS kyphotisation exercises is the most useful to help bracing push work. A lot of published articles about the results obtained with SEAS prove that this is an evidence-based approach. From the patient point of view it is relatively simple way to accomplish the basic principles of the SEAS. SEAS can be used for treatment of all size curves.

Keywords: SEAS**,** exercises for scoliosis, adolescent idiopathic scoliosis, scoliosis in-brace exercises, conservative treatment.

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Primerjava učinkov vadbe za ravnotežje na ravnotežni deski in pritiskovni plošči Gamma pri pacientih s kronično bolečino v križu

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Uvod: Ravnotežje je sposobnost vzdrževanja težišča nad podporno ploskvijo znotraj meja stabilnosti (1). Za izvedbo funkcijskih dejavnosti je potrebno statično in dinamično ravnotežje. Pri pacientih z bolečino v križu lahko pride do spremembe pri nadzoru drže in ravnotežja (2), zato bi morala biti vadba za ravnotežje sestavni del programa fizioterapije. Za vadbo ravnotežja obstajajo številni pripomočki in različne naprave, ki vključujejo uporabo videoiger (3). Uporaba videoiger se je izkazala za učinkovito zaradi večje motivacije pri vadbi (4). Namen raziskave je bil primerjati vadbo ravnotežja na klasični ravnotežni deski z vadbo na pritiskovni plošči Gamma (angl. Gamma dinamographic platform) z uporabo videoigre pri osebah s kronično bolečino v križu. **Metode:** Sodelovalo je 13 preiskovancev s kronično bolečino v križu (4 moški, 9 žensk). Vključeni so bili v standardni program, ki je obsegal hidroterapijo, skupinske ali individualne vaje in protibolečinsko elektroterapijo. Preiskovanci so bili naključno razdeljeni v 2 skupini. Prva skupina (skupina RD) je dodatno izvajala vadbo na ravnotežni deski, druga pa na sistemu Gamma (skupina GS). Vsi so vadbo na ravnotežnih podlogah izvajali prvič. Posamezna vadba je pri obeh skupinah trajala enako: 5 minut vadbe, 5 minut počitka, 5 minut vadbe. Potekala je 10 dni. Na ravnotežni deski so preiskovanci izvajali sonožno stojo, prenos teže lateralno in prenos teže naprej-nazaj. Na sistemu Gamma smo uporabili dve igri – sortiranje in kotaljenje žoge. Pred začetkom in po obdobju vadbe sta bila narejena test funkcijskega dosega (FD) in test stoje na eni nogi (levi in desni). **Rezultati:** Program je končalo 11 preiskovancev. Povprečna starost v skupini RD je bila 54,2 ± 15,5 leta, v skupini GS pa 57,2 ± 11,7 leta. Pri skupini RD se je FD po vadbi statistično značilno izboljšal ($p < 0,05$) za 5,8 cm (z 20,2 ± 9,5 cm na 26 ± 7,4 cm), pri skupini GS pa ne (za 1,5 cm, s 30,5 ± 4,4 cm na 32 ± 4,6cm), vendar križna primerjava z 2-ANOVA ni pokazala razlike v izboljšanju med skupinama ($p = 0,1257$). Pri testu stoje na eni nogi pri nobeni izmed skupin ni bilo ugotovljene statistično značilne razlike med vrednostmi pred vadbo in po njej. Prav tako ni bilo ugotovljenih razlik v izboljšanju med skupinama. **Zaključki:** Z raziskavo nismo ugotovili razlik v vadbi. Vadba na sistemu Gamma z uporabo enostavnih videoiger je bila zanimiva predvsem za starejše. Vzrok za slabšo učinkovitost sistema Gamma bi lahko bil pomanjkanje težavnostnih stopenj. O učinkovitosti sistema za zdaj ni dostopnih raziskav. Vadba na ravnotežni deski je bila za preiskovance precej zahtevna. Omogoča veliko možnosti za napredovanje vadbe in je lahko dostopna. Za ugotovitev morebitnih razlik bi bile potrebne nadaljnje raziskave na večjem številu preiskovancev.

Ključne besede: vadba ravnotežja, ravnotežna deska, sistem Gamma, videoigre, motivacija.

Comparison of the effects of exercise on balance on wobble board and Gamma dynamographic platform in subjects with chronic low back pain

Background: Balance is the ability to maintain the center of gravity over the support surface within the limits of stability (1). Static and dynamic balance is necessary for execution of functional activity. In subjects with low back pain there may be a change in the control of posture and balance (2), so training for balance should be a part of each physiotherapy program. There are many accessories and a variety of devices available for balance exercise, including the use of video games (3). The use of video games has proven to be effective for increasing motivation to exercise (4). The purpose of this study was to compare balance exercise on classical wobble boards with exercise on Gamma dynamographic platforms using video games in subjects with chronic low back pain. **Methods:** 13 subjects with chronic low back pain (4 men, 9 women) participated in this research. They were included in the standard program, which included hydrotherapy, group or individual exercises and pain electrotherapy. Subjects were randomly divided into 2 groups. The first group (RD group) had additional training on the wobble board, the other group on the Gamma dynamographic system (GS group). They were all training on balance devices for the first time. The duration of each session was the same for both groups: 5 min. exercise, 5 min. rest, 5 min. exercise. The program lasted 10 days. On the wobble board subjects performed standing on both legs with weight transfers laterally and weight transfers backwards and forwards. In the Gamma system two games were used - sorting and rolling balls. Before the beginning and at the end of the training functional reach tests (FD) and tests standing on one leg (left and right) were made. **Results:** The program was completed by 11 subjects. The average age in the RD group was 54.2 ± 15.5 years, in the GS group 57.2 ± 11.7 years. In the RD group the FD after training significantly improved ($p < 0.05$) by 5.8 cm (from 20.2 ± 9.5 cm to 26 ± 7.4 cm), while in the GS group it did not improved significantly (1.5 cm, 30.5 ± 4.4 cm to 32 ± 4.6 cm). Cross comparison with the 2-ANOVA showed no difference in improvement between the two groups ($p = 0.1257$). In the tests standing on one leg the differences between the values before and after training were not found to be statistically significant in any of the groups. There was also no observed difference in improvement between the groups. **Conclusions**: This study did not find differences in the results based on the type of training. Training on the Gamma system with easy to use video games was interesting especially for the elderly. The reason for poor effectiveness on the Gamma system could be the lack of setting difficulty levels. Research of the effectiveness of the system is currently not available. Practicing on the wobble board was quite difficult for the subjects. It allows for many opportunities for advancement and training is easily accessible. Determining possible differences would require further research on a larger number of subjects.

Keywords: balance training, wobble board, Gamma dynamographic system, video games, motivation.

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Vpliv vadbe motoričnih aktivnosti na grobo motorično funkcijo otrok s cerebralno paralizo: pilotska študija

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Uvod: Vadba motoričnih aktivnosti zagotavlja sodelovanje otrok s cerebralno paralizo (CP) pri uradnih športnih tekmovanjih specialne olimpijade. Prav tako zagotavlja enake možnosti zanje pri doseganju uspešnosti v veščinah, ki so potrebne za posamezen šport specialne olimpijade oziroma med vadbo motoričnih aktivnosti. Namen vadbe motoričnih aktivnosti je zagotoviti motorično učenje in trening otrok s cerebralno paralizo za doseganje bistvenih veščin, ki jih fizioterapevti identificiramo za doseganje napredka. Naraščajoča zahteva po celostnem pristopu pri večdimenzionalni rehabilitaciji otrok s cerebralno paralizo (CP) potrebuje raziskovalni protokol, ki bi znanstveno ocenil predhodno netestiran vpliv specifične vadbe motoričnih aktivnosti na grobo motorično funkcijo otrok s CP. Pri določanju namena nevrofizioterapevtske obravnave in kratkoročnih ciljev ter izbiri primernih motoričnih nalog je fizioterapevt odgovoren za analizo trenutnih otrokovih zmogljivosti in identifikacijo motoričnih spretnosti, s katerimi bo prek motoričnega učenja ob upoštevanju načel razvojno nevrološke obravnave dosegal postavljene cilje pri vadbi motoričnih aktivnosti. Ob upoštevanju načel razvojno nevrološke obravnav je bila s pomočjo uporabe protokola kontrolne klinične študije raziskana in potrjena veljavnost učinkovitosti specifične vadbe motoričnih aktivnosti na grobo motorično funkcijo otrok s CP, da bi bila tovrstna vadba motoričnih aktivnosti v prihodnje del sodobne medicinske rehabilitacije otrok s CP. Sekundarni namen te pilotske študije je bil določiti izvedljivost prihodnje, večje kontrolne klinične študije o vplivu in učinkih vadbe motoričnih aktivnosti pri otrocih s CP v kliničnem okolju. **Metode:** 24 otrok s CP iz Centra za usposabljanje, delo in varstvo Dobrna je bilo naključno razvrščenih v študijsko (N = 12) in kontrolno skupino (N = 12). Skupini sta bili deležni razvojno nevrološke obravnave, študijska skupina pa je bila deležna še vadbe motoričnih aktivnosti. Meritve so v treh različno dolgih časovnih intervalih med 12-mesečno študijo opravili raziskovalci, ki niso vedeli, ali so bili otroci s CP v kontrolni ali študijski skupini. **Rezultati:** Statistično značilne razlike med skupinama so bile ugotovljene pri testu grobih motoričnih funkcij (GMFM). Študijska skupina je z dodatno možnostjo motoričnega učenja in vadbe motoričnih aktivnosti pridobila nove spretnosti, potrebne za posamezen šport na specialni olimpijadi. **Zaključki:** Specifična vadba motoričnih aktivnosti zagotavlja otrokom s CP številne pozitivne učinke na telesno dejavnost ter izboljšanje telesne pripravljenosti in funkcijskih spretnosti. Rezultati kažejo, da bi vadba motoričnih aktivnosti lahko bila uporabna v nevrofizioterapevtski obravnavi otrok s CP, ki imajo slabšo grobo motorično funkcijo.

Ključne besede: cerebralna paraliza, specialna olimpijada, vadba motoričnih aktivnosti, razvojno nevrološka obravnava (RNO), GMFM, kontrolirana klinična študija.

Impact of motor activities training program on gross motor function of children with cerebral palsy: a pilot study

Background: Motor activities training program leads to participation of children with cerebral palsy (CP) at official special olympics competitions and tends to create equal opportunities for them in order to perform their personal best effort in those skills in a culminating event during a regular special olympics competition or during a separate motor activity training program. The purpose of the motor activities training program is to provide motor learning and training for children with cerebral palsy (CP) in skills considered essential in the recognized skill progressions. The growing demand for holistic approach to multidimensional cerebral palsy (CP) rehabilitation requires a research program to evaluate scientifically previously untested impact of motor activities training program on gross motor function of children with CP. In order to set goals, short-term objectives, and select appropriate motor training activities during neuro developmental treatment physiotherapist is responsible to determine children's present abilities, identify motor skills on which children train with neuro developmental principles and develop goals and short-term objectives for the motor activities training program. The efficacy of motor activities training program on gross motor function was validated by true experimental study design in order to be used as an integral part of contemporary medicine rehabilitation of children with CP. Secondary aim of this pilot study was to determine the feasibility of conducting a clinical trial of motor activities training program's impact on children with CP in a clinical care setting. **Methods:** 24 children with CP from Center za usposabljanje, delo in varstvo Dobrna were randomised to the experimental (N=12) and to the control group (N=12). Both groups received the same neuro developmental treatment (NDT), while the experimental group additionally received motor activities training program. An experimental repeated measures design was used to investigate the differences over 12 months' period by blinded investigators using standardised test. **Results:** Significant differences were found between the experimental and control groups in GMFM scores over the study period and ability for experimental group to provide motor learning and training opportunities for children with CP in study group to acquire skills considered essential in the recognized skill progressions leading to participation in Official Special Olympics competitions. **Conclusions:** There are numerous benefits for children with CP who participate in the Special Olympics Motor Activity Training Program especially the increased physical activity that leads to improvement in motor skills, physical fitness and functional ability. The results indicate that motor activities training program could be useful clinical intervention for children with CP with low GMFM scores.

Keywords: cerebral palsy, Special Olympics, Motor Activity Training Program, neuro developmental treatment (NDT), GMFM, randomised controlled study.

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Učinkovitost serijskega mavčenja pri otrocih s cerebralno paralizo

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Uvod: Serijsko mavčenje je konservativen postopek za izboljšanje gibljivosti sklepa (1, 2), hkrati pa lahko tudi za zmanjšanje mišičnega tonusa (3). Namen: V prospektivni raziskavi smo želeli ugotoviti, ali lahko s serijskim mavčenjem pri otrocih s cerebralno paralizo (CP) in z omejeno gibljivostjo v gležnju ali hojo po prstih izboljšamo gibljivost v gležnju in dosežemo vsaj srednji položaj med dorzalno in plantarno fleksijo gležnja oziroma od 5° do 10° dorzalne fleksije pri iztegnjenem kolenu. Preučevali smo vpliv izboljšane gibljivosti gležnja na kakovost vzorca hoje pri samostojno hodečih otrocih in časovni okvir, v katerem otroci obdržijo izboljšano gibljivost v gležnjih. **Metode:** V raziskavo je bilo vključenih 14 otrok s spastično obliko CP: devet s hemiparetično in pet z asimetrično diparetično obliko CP, ki so lahko hodili brez pripomočkov in so imeli zmanjšano gibljivost v gležnju v smeri dorzalne fleksije. Vsi otroci s CP so opravili klinični pregled, oceno gibanja in meritve gibljivosti sklepov. Pri devetih otrocih smo ocenili spastičnosti z modificirano Ashworthovo lestvico. V primeru pomembno zvišanega tonusa (ocena po modificirani Ashworthovi lestvici 2 in več) so otroci pred namestitvijo mavcev prejeli botulinski toksin v mišice gastrocnemius in soleus. Mavci so bili nameščeni od dva do šest tednov (povprečno 2,7 tedna), pri 13 otrocih na eni strani, pri enem pa na obeh straneh. Kriterij za zaključek programa mavčenja je bila izboljšana gibljivost v gležnju (do 10° dorzalne fleksije). Otroci so bili med programom mavčenja vključeni v intenzivni program nevrofizioterapije. Po odstranitvi mavcev in po šestih mesecih smo ponovno ocenili vzorec hoje in ponovili meritve gibljivosti in oceno spastičnosti. **Rezultati:** Klinična analiza hoje je pri večini otrok (povprečna starost 8,1 leta) pokazala, da stopajo na prste vsaj deloma, le en otrok je stopal na celo stopalo. Po odstranitvi mavca je deset otrok še dostopalo na sprednji del stopala. Glede na to smo otroke opremili z ortozo za gleženj in stopalo. Po končanem terapevtskem programu je na sprednji del stopala stopal deloma le en otrok, preostalih 13 otrok pa je v srednji fazi opore obremenjevalo celo stopalo. Klinična analiza hoje po šestih mesecih je pokazala, da pet otrok v fazi opore obremenjuje celo stopalo, šest otrok pa obremenjuje sprednji del stopala, vendar v manjšem obsegu kot pred mavčenjem. Le pri enem otroku se je ponovno pojavila izrazita hoja po prstih. Po končanem programu je prišlo do statistično značilnega izboljšanja rezultatov meritev gibljivosti gležnja pri iztegnjenem kolenu ($p < 0,0001$) s povprečno razliko 15,5°. Rezultati so bili statistično značilno boljši tudi še po šestih mesecih sledenja ($p < 0,0002$) s povprečno razliko 6,9°. **Zaključki:** Rezultati raziskave serijskega mavčenja so pokazali, da so otroci tudi po šestih mesecih precej zadržali izboljšani vzorec hoje in boljšo gibljivost v gležnju.

Ključne besede: otroci s cerebralno paralizo, serijsko mavčenje, klinična analiza hoje, gibljivost, prospektivna študija, kontrakture.

Efficiency of serial casting in children with cerebral palsy

Background: Serial casting is a conservative procedure for improving the joint range of motion (1, 2), at the same time it may also serve to reduce spasticity in muscles (3). The aim of this prospective research was to analyse whether we can improve the ankle range of motion with serial casting in a group children with cerebral palsy (CP) that have a limited range of motion in ankles or they walk on their toes. Our goal was to improve the ankle range of motion to the extent that we achieve at least neutral position between dorsiflexion and plantarflexion of the ankle or from 5° to 10° of dorsiflexion while the knee is extended. We were also interested in how the improved range of motion affects walking patterns in ambulatory children and how long the children can keep the improved range of motion. **Methods:** We included 14 children: nine with hemiparesis and five with diparesis, who were able to walk without assistive devices and had decreased range of dorsiflexion in ankle. All children underwent initial examination, movement analyses, measurements of range of motion and nine children underwent spasticity assessment with Modified Ashworth scale. In cases where spasticity was substantially increased (2 or more at Modified Ashworth Scale), the children received botulinum toxin into the gastrocnemius and soleus muscles prior to the casting. Serial casts were placed from two to six weeks (mean 2.7 weeks) whereby 13 children had a cast on one leg and one child had both legs casted. The criterion for concluding the casting program was improvement in ankle dorsiflexion (up to 10°). During treatment the children were included in intensive neurophysical therapy. Assessment was repeated after the removal of castings and again after six months. **Results:** In most children (mean age 8.1 years) clinical gait analysis showed that they walked on their toes, either severely or mildly, and only one child was capable of full foot-floor contact. After the cast removal ten children still walked with initial toe contact, therefore they received ankle foot orthosis. After the therapeutic program was concluded only one child mildly walked on toes, while the other 13 children had full floor contact in middle stance phase. After six months five children had full floor contact in stance phase and six children had toe-walking but in minor degree as before the casting. In one child severe toe-walking reoccurred. Measurement results of ankle range of motion with the knee extended were significantly improved ($p < 0.0001$) after the program was concluded with mean difference 15.5°. When measuring after six months, the values remained significantly better than at the start of the program ($p < 0.0002$) with mean difference 6.9°. **Conclusions:** Results showed that children mostly maintained the improved gait patterns and ankle range of motion even after six months of follow-up.

Keywords: children with cerebral palsy, serial casting, clinical gait analysis, range of motion, prospective study, contracture.

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Uspešnost učenja plavanja po konceptu Halliwick pri otrocih z zmanjšanimi zmožnostmi

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Uvod: Plavanje je eden izmed primarnih načinov gibanja, ki pa zahteva dobro usklajeno delovanje vsega telesa in hkrati ob tem ponuja več pozitivnih učinkov na telo. Osebe, ki imajo zmanjšane zmožnosti pri gibanju ali učenju, imajo pri učenju gibanja v vodi in plavanja pričakovano več težav kot zdravi vrstniki otrok ali odraslih oseb. Tem osebam je namenjeno učenje plavanja in samostojnega gibanja v vodi po konceptu Halliwick, katerega uporaba je razširjena po vsem svetu (1–3). Ocenjevanje plavalčevih sposobnosti je sestavni del Halliwickovega koncepta učenja plavanja. Ocenjevanju je namenjen sistem štirih značk, za natančnejše ocenjevanje plavalnih sposobnosti pa se uporablja test Swiming With Independent Measurement (SWIM) (4). Namen: Podatkov o učinkovitosti učenja plavanja po konceptu Halliwick v dostopni literaturi nismo našli, zato smo želeli s testom SWIM preveriti, kakšen je napredek otrok pri plavalnih veščinah, ki so v program vključeni med enim šolskim letom. Zanimal nas je splošen napredek in to, pri katerih veščinah so otroci najbolj napredovali. Zanimalo nas je tudi, ali je bil napredek odvisen od starosti in osnovne diagnoze plavalca ter od pogostnosti vadbe. **Metode**: V študijo smo vključili rezultate ocenjevanja plavalnih veščin otrok, ki so bili v program učenja plavanja po konceptu Halliwick vključeni v obdobju od oktobra 2011 do junija 2012 na Univerzitetnem Rehabilitacijskem Inštitutu Republike Slovenije – Soča (URI – Soča). Iz dokumentacije smo zbrali podatke o številu otrok, spolu, starosti, diagnozi, začetni in končni oceni plavalnih veščin s testom SWIM (4) ter o številu ur, ki so jih opravili v tem obdobju. Pri ocenjevanju s testom SWIM je mogoče doseči 77 točk, kar pomeni, da je plavalec popolnoma samostojen in varen v vodi. **Rezultati**: V program učenja plavanja, ki poteka v skupini, je bilo vključenih 15 otrok z različnimi diagnozami in posledičnimi težavami na področju gibanja in/ali učenja. Deset otrok je redno prihajalo na vadbo in opravilo tudi začetno in zaključno ocenjevanje s testom SWIM. Pet otrok iz skupine je bilo v šolskem letu 2011/12 v program vključenih prvič, drugi pa so se programa udeleževali že v prejšnjih sezonah. Ocenjeni otroci so bili v povprečju stari 6,1 leta (od 3,3 do 14,2 leta). Povprečni rezultat testiranja s testom SWIM je pri prvem testiranju znašal 32 točk (SO 14,6), pri drugem pa 44 točk (SO 12,3). Skupina je v povprečju napredovala za 7 točk. Otroci, ki so bili v program vključeni prvič, so v povprečju napredovali za 12 točk, drugi, ki so se učili plavanja že v prejšnjih sezonah, pa za 5 točk. V povprečju so se otroci udeležili plavalne ure 18-krat (SO 4,14). Skupina petih otrok, ki je bila vključena prvič, je na vadbo prišla povprečno 16-krat (SO 2,88), drugi pa 22,5-krat (SO 3,86). Največji napredek so dosegli pri izstopu iz vode in vzdolžnem vrtenju, dobro so napredovali tudi pri vzdrževanju ravnotežja, prečnem in sestavljenem vrtenju ter razvoju plavalnih veščin. **Zaključki**: Otroci v skupini so napredovali pri usvajanju vseh posameznih veščin, vendar najbolj pri učenju vstopa in izstopa iz bazena, pri obvladovanju ravnotežja, prečnem vrtenju naprej in nazaj ter vzdolžnem vrtenju. Učenje vstopa v bazen je deloma vezano na psihično prilagoditev na vodo, deloma pa na zmožnosti na področju gibanja. Podobno je učenje izstopa iz bazena večinoma vezano na sposobnosti gibanja, zato se ga otroci, ki imajo na tem področju dobre sposobnosti, lahko hitro naučijo.

Ključne besede: zmanjšane zmožnosti, Halliwick, plavanje, ocenjevanje, SWIM.

Effectiveness of Halliwick concept based program of teaching swimming in children with disabilities

Background: Swimming is one of the primary modes of movement. It requires well-coordinated activity of the entire body and has several positive effects on the later. Compared to their healthy peers, learning to move in water and to swim represents a much bigger challenge for persons with reduced learning capacity and/or motor difficulties. The Halliwick concept was designed to facilitate the learning of swimming and moving in water in persons with disabilities and is today a world-wide accepted method (1-3). Assessment of swimming ability is an integral part of the Halliwick concept. The system of Halliwick badges is used, which has recently been supplemented by the Swimming With Independent Measurement (SWIM) (4). Purpose: To our knowledge no empirical data on the effectiveness of learning swimming through the Halliwick concept has been published so far. The aim was to determine the swimming skills progress in children who were involved in the program during one school year using SWIM. We were interested both in the general progress and in which skills the children have advanced the most. We were also interested in the relation of the progress to the child's age, his/her primary diagnosis and the swimming exercise frequency. **Methods**: The study includes the results of swimming skills assessment for children who were included in the Halliwick concept program at the University Institute for Rehabilitation of the Republic of Slovenia – Soča (URI - Soča) in the period from October 2011 to June 2012. We collected data on children gender, age, diagnosis, initial and final swimming skills according to SWIM test and the number of training hours in the given period. A total of 77 points can be achieved in the test, meaning that the swimmer is totally independent and safe in water. **Results**: In total 15 children diagnosed with various conditions, which affect their motor and learning capabilities, were included into the group swimming program. Out of these 10 children attended the training on a regular basis and performed the initial and final swimming skills assessment through SWIM tests. Five children were included into the Halliwick concept program group for the first time in the school year 2011/12, while the rest had already attended the program in previous years. The average group age was 6.1 years (from 3.3. to 14.2 years). The average SWIM test score in the initial evaluation was 32 points (SD 14.6), while in the final evaluation the average score was 44 points (SD 12.3). In average the group progress was 7 points. The children who were involved in the program for the first time improved on average by 12 points. The children who had already attended the program in previous years improved on average by 5 points in the last year. On average the children attended 18 swimming lessons (SD 4.14). The children who were involved in the program for the first time, attended 16 swimming lessons (SD 2.88) on average, while the rest attended 22.5 lessons (SD 3.86) on average. The most progress was achieved in exit from water and in longitudinal rotation. Substantial progress was also achieved in balance management, transverse and composite rotation and development of swimming skills. **Conclusion**: The children in the test group made progress in all swimming skills. However, the most progress was achieved in entry and exit from the pool, in the balance management, back and forth lateral rotation and longitudinal rotation. Learning entering the pool is partly linked to the mental adjustment to water and partly to mobility. Similarly, learning exiting the pool is mostly linked to mobility; therefore children with good motor capabilities acquire the skill more quickly.

Keywords: impairment, swimming, Halliwick, evaluation, SWIM.

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Vpliv vadbe s pripomočkom za spodbujanje mišic stabilizatorjev Flexi-bar na ravnotežje pri bolniku z multiplo sklerozo – študija primera

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Uvod: Za uravnavanje ravnotežja med motnjami, ki jih pri gibanju povzročimo sami ali so posledica zunanjih dejavnikov, je potrebna usklajenost gibalnih strategij za stabilizacijo težišča telesa (1). Pri bolnikih z multiplo sklerozo je ravnotežje zelo pogosto prizadeto (2). Flexi-bar je pripomoček, ki spodbuja aktivacijo mišic stabilizatorjev, ki imajo veliko vlogo pri ohranjanju ravnotežja (3). Učinki treninga s pripomočkom Flexi-bar pri bolnikih z multiplo sklerozo niso znani. Namen prispevka je ugotoviti, ali tritedenska vadba s pripomočkom Flexi-bar® vpliva na ravnotežje, in rezultate primerjati z učinkovitostjo enako časa trajajoče standardne nevrofizioterapije s poudarkom na vadbi za ravnotežje (4). **Metode**: 49-letni bolnik s primarno napredujočo multiplo sklerozo je bil vključen v tritedensko vadbo s pripomočkom Flexi-bar. Vadba je potekala trikrat na teden po deset minut, kar je v skladu s priporočili (3). V tem obdobju je prejemal tudi funkcionalno električno stimulacijo na n. peroneus desno (v sedečem položaju, 20 minut na dan), nato pa je še tri tedne nadaljeval standardno nevrofizioterapijo s poudarkom na vadbi za ravnotežje (30 minut na dan). Za ocenjevanje (pred vadbo, po treh tednih ob koncu vadbe s flexi-barom ter po končani nevrofizioterapevtski obravnavi) smo uporabili Bergovo lestvico za oceno ravnotežja, test korakanja v štirih kvadratih, časovno merjeni test vstani in pojdi, test hitrosti hoje na 10 metrov ter 6-minutni test hoje. **Rezultati**: Po obdobju vadbe s pripomočkom Fleksi-bar® so se izboljšali ravnotežje, ocenjeno z Bergovo lestvico (s 44 na 48 točk), čas pri testu korakanja v štirih kvadratih (s 13,96 s na 9,69 s), hitrost hoje (s 7,22 s na 6,95 s) in vzdržljivost pri hoji (s 360 m na 390 m). Rezultati testa vstani in pojdi pa so se po drugem merjenju celo nekoliko poslabšali (s 7,75 s na 8,01 s). Po obdobju standardne nevrofizioterapije so se izboljšali rezultati Bergove lestvice (na 52 točk) in rezultati testa vstani in pojdi (na 7,65 s), rezultati vseh drugih testov pa so se poslabšali glede na drugo testiranje; test korakanja v štirih kvadratih (na 10,7 s), hitrost hoje (na 7,4 s) in vzdržljivost hoje (na 380 m). **Zaključki**: Rezultati testov so se po vadbi s pripomočkom Flexi-bar sicer nekoliko izboljšali, vendar o bistvenem izboljšanju ravnotežja ne moremo govoriti, saj se mora po ugotovitvah Steffena in Senneyja (5) rezultat Bergove lestvice izboljšati najmanj za 5 točk, da lahko govorimo o kliničnem izboljšanju. Morda bi k večjemu izboljšanju pripomogla več tednov trajajoča vadba s pripomočkom Flexi-bar® ali kombinacija te vadbe z drugimi fizioterapevtskimi postopki.

Ključne besede: časovno merjeni testi hoje, trening ravnotežja, Flexi-bar.

The influence of training with Flexi-bar on balance in a multiple sclerosis patient – single case study

Background: Postural balance involves the coordination of movement strategies to stabilize the center of mass during both self-initiated and externally triggered disturbances to stability (1). Balance is frequently impaired in patients with multiple sclerosis (2). Flexi-bar is a tool that encourages muscle activation of stabilizers, which play a major role in maintaining balance (3). Effects of training with Flexi-bar in multiple sclerosis patients are unknown. The purpose of this study is to determine the effectiveness of balance training with Flexi-bar and to compare the results with effectiveness of classic neurophysiotherapeutic treatment, based on balance training. **Methods:** 49-year-old patient with primary progressive multiple sclerosis was included in three weeks' training with Flexi-bar. He trained 10 minutes per day, three times a week, which is in line with recommendations. Additionally, he was given functional electrical stimulation of right nervous peroneus (in sitting position, 20 minutes per day). After training with Flexi-bar we continued with three weeks' classic neurotherapeutic treatment, based on balance training (30 minutes per day) (4). The outcomes were measured with: Berg balance scale, timed 10 m walk test, up and go test, four square step test and 6 minutes walking test. The first measurement was made before the beginning of the training, the second measurement after three weeks of training with Flexi-bar, and the third measurement at the end of neurotherapeutic treatment. **Results:** Berg balance scale results improved from 44 to 48 points, four square step test results improved from 13.96 s to 9.69 s. The results of timed 10 m walk test improved from 7.22 s to 6.95 s, the results of 6 minutes walking test improved from 360 m to 390 m. But the results of up and go test worsened from 7.75 s to 8.01 s. After classic neurophysiotherapeutic treatment the results improved in Berg balance scale from 48 to 52 points, the results of up and go test from 8.01 s to 7.65 s, but the results of other tests worsened at the second testing: four square step test results from 9.96 s to 10.7 s, the results of timed 10 m walk test from 6.95 s to 7.4 s, the results of 6 minutes walking test from 390 m to 380 m. **Conclusions:** We noticed slight improvement in test results, but we cannot talk about real improvement of balance after training with Flexi-bar because the findings of Steffen and Senney (5) suggest that the results of Berg scale must improve at least for 5 points in order to be able to talk about clinical improvement. Maybe the results would have been better if the training had taken more weeks or we had used a combination of this training with other physiotherapy techniques.

Keywords: balance training, timed walking test, Flexi-bar.

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Takojšnji vpliv masaže stopala na ravnotežje in hitrost hoje pri pacientih po možganski kapi

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Uvod: Zmanjšane gibalne sposobnosti in okvare senzibilitete se pri pacientih po možganski kapi odražajo v slabšem nadzoru drže in spremenjeni hitrosti ter mehaniki hoje (1). Predvideva se, da različne senzorične spodbude, med katere spada tudi masaža, lahko vplivajo na povečanje senzibilitete in izboljšanje gibalnih sposobnosti pacientov po možganski kapi (2–5). Namen študije je bil ugotoviti, ali ima od 5- do 7-minutna klasična terapevtska masaža stopala in gležnja kratkoročne pozitivne učinke na vzdrževanje ravnotežja na eni nogi in hitrost hoje pri pacientih po možganski kapi. **Metode:** V študijo je bilo vključenih 20 pacientov po možganski kapi (starost: 53,8 ± 11,5 leta) ter 20 enako starih zdravih preiskovancev (54,7 ± 11,8 leta). Pri vseh preiskovancih je bil dva dni zapored izveden test stoje na eni nogi na trdi in mehki podlagi, z odprtimi in zaprtimi očmi, pri pacientih pa tudi test hitrosti hoje na 10 metrov (sproščena in hitra hoja). Testiranju sta sledila terapevtska masaža enega stopala, določenega z žrebom, in nato ponovno testiranje. Naslednji dan je bil postopek ponovljen, le da je bilo masirano nasprotno stopalo. Za primerjavo rezultatov za posamezno skupino preiskovancev pred masažo in po njej je bil uporabljen t-test za odvisna vzorca. **Rezultati**: V povprečju se je pri pacientih v večini pogojev testa stoje na eni nogi po masaži ravnotežje izboljšalo tako na masirani (do 4,3 s) kot na nemasirani nogi (do 5,3 s), vendar do statistično značilne razlike ni prišlo pri nobenem testnem pogoju. Prav tako se je po masaži v povprečju izboljšala hitrost hoje, vendar se je statistično značilna razlika pokazala le pri testu hitre hoje (za 0,4 s), in sicer po masaži okvarjene noge ($p \leq 0,05$). Pri zdravih preiskovancih so bila po masaži ugotovljena statistično značilna izboljšanja na masirani nogi pri stoji na mehki podlagi z zaprtimi očmi ($p \leq 0,05$), pa tudi na nemasirani nogi pri stoji na trdi podlagi z zaprtimi očmi ($p \leq 0,05$), mehki podlagi z odprtimi ($p \leq 0,05$) ter zaprtimi očmi ($p \leq 0,05$). **Zaključki**: Klasično terapevtsko masažo stopala okvarjene noge lahko priporočimo kot dodatni fizioterapevtski postopek pri pacientih po možganski kapi, saj vpliva na izboljšanje sposobnosti hitre hoje. Za potrditev učinkov in mehanizmov delovanja masaže stopala na ravnotežje in hitrost hoje so potrebne nadaljnje raziskave.

Ključne besede: možganska kap, ravnotežje, senzorične spodbude, masaža stopala in gležnja.

Immediate effects of foot massage on standing balance and walking speed in stroke patients

Background: Motor impairments and sensory dysfunctions of patients after stroke are reflected in decreased postural control, and changed speed, and mechanics of the gait (1). It is assumed that various sensory stimulations, including massage, can increase somatosensation and improve motor abilities of patients after stroke (2-5). The purpose of the study was to establish whether a 5 to 7-minute classic therapeutic massage of the foot and ankle has short-term positive effects on one-leg stance balance and walking speed in stroke patients. **Methods**: 20 patients after stroke (age: 53.8 ± 11.5 years) and 20 equally old healthy subjects (54.7 ± 11.8 years) participated in the study. Patients and healthy subjects performed one-leg stance test on firm and compliant surface with eyes open and closed. Additionally, patients performed a 10-meter walk test with comfortable and fast speed. The assessment was performed before and after massage and for two consecutive days. The first assessment in a day was followed by a therapeutic massage of the randomly selected leg and then repeated. The other leg was massaged the next day. For comparison of the data before and after massage, a paired samples t-test was used. **Results**: After massage the average one-leg stance test performance of patients improved in most test conditions on the massaged (< 4.3 s) and the unmassaged foot (< 5.3 s); however no difference was statistically significant. After massage the average walking speed also increased, but the statistically significant difference was fined for the fast walking speed (< 0.4 s), following the massage of the impaired leg only ($p \leq 0.05$). Statistically significant improvements of one-leg stance test performance in healthy subjects were established for the massaged leg on compliant surface with eyes closed ($p \leq 0.05$), as well as for the unmassaged leg on firm surface with eyes closed ($p \leq 0.05$) and on compliant surface with eyes opened ($p \leq 0.05$) and closed ($p \leq 0.05$). **Conclusion**: We might recommend the use of therapeutic massage of the impaired foot as additional physiotherapy procedure in stroke patients, as it affects the improvement of fast gait. To confirm the mechanisms and effects of foot massage on balance and gait speed further research is needed.

Keywords: stroke, balance, gait, sensory stimulations, massage of foot and ankle.

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Fizioterapevtska obravnava pacientov z disfagijo

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Uvod: Možganska kap je po vsem svetu in tudi pri nas najpogostejša nevrološka bolezen. Spremljajo jo lahko zapleti, kot je motnja požiranja – disfagija (1). Ta je najpomembnejši dejavnik tveganja za nastanek aspiracijske pljučnice, ki pa je skupaj s pljučno embolijo najpogostejši vzrok smrti (2). Disfagija se pojavlja tudi pri intubiranih pacientih, pozorni pa moramo biti tudi pri pacientih po operaciji srca. **Metode**: Pregled literature s področja disfagije z iskanjem knjižnih virov in pregledovanjem spletnih podatkovnih baz. **Rezultati**: Iz pregledane literature je razvidno nezadostno vključevanje fizioterapevtov v obravnavo motenj požiranja z mastikatornimi vajami kot postopkom, ki ga vsak dan izvajamo. Fizioterapevti so vključeni le v respiratorni del obravnave. **Zaključki**: Fizioterapevt mora biti pri obravnavi pacientov z motnjami požiranja enakovreden član delovne skupine (3). To še posebno velja v ustanovah, v katerih ni logopedske obravnave in smo fizioterapevti tisti, ki lahko s fizioterapevtskimi postopki, na primer z mastikatornimi vajami, neposredno vplivamo na izboljšanje požiranja, pa tudi z zdravstveno vzgojo, tako pacienta kot drugih članov delovne skupine.

Ključne besede: motnje požiranja, možganska kap, mastikatorne vaje, preprečevanje nastanka aspiracijske pljučnice.

Physiotherapy in patients with dysphagia

Background: Stroke is worldwide as well as in our country the most common neurological disease. It might cause wide variety of complications, such as swallowing disorders – the so called dysphagia (1). Dysphagia is known as the most important risk factor for aspiration pneumonia, which is together with pulmonary embolism a leading cause of death (2). Dysphagia also occurs in intubated patients and attention should also be in cardiac surgery patients. **Methods:** A review of the literature in the field of dysphagia, including book resources and online databases. **Results:** The literature review showed lack of physiotherapists' involvement in the treatment of swallowing disorders using masticatory exercises, a procedure performed by physiotherapists on daily basis. Physiotherapists are involved only in the respiratory part of the treatment. **Conclusions:** A physiotherapist should be involved in the rehabilitation team as an equal member for the treatment of patients with swallowing disorders (3). This is especially important in the institutions without a speech therapist, where physical therapists are those who through their – physiotherapy procedures (i.e. masticatory exercises) might directly influence the improvement of swallowing, as well through health education of patients and other team members.

Keywords: swallowing disorders, stroke, masticatory exercises, prevent aspiration pneumonia.

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BIMEO – sistem za dvoročno in enoročno vadbo z zgornjimi udi

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Uvod: Največji vpliv na okrevanje gibanja ima vadba v prvih šestih mesecih po okvari živčno-mišičnega sistema (1). Pacienti so ob odpustu iz bolnišnične oskrbe pogosto motivirani, da bi vadbo nadaljevali tudi v domačem okolju (2). BiMeo rehabilitacijski inštrument je namenjen pacientom pri rehabilitaciji zgornjih udov v kliničnem in domačem okolju. Pacienti lahko samostojno, s pomočjo zdravega uda, izvajajo vadbo z okvarjenim oziroma poškodovanim udom. Namen: Pogosti težavi v rehabilitaciji sta dostopnost terapevtov in pomanjkanje objektivnih meritev. Prva težava je povezana z omejenim časom, ki ga ima terapevt na voljo, s čimer je povezana omejena dolžina intenzivne vadbe posameznega pacienta. Druga težava je pomanjkanje merilnih orodij in postopkov za objektivno merjenje, ki so ključnega pomena za spremljanje stanja in napredka pacientov ter prilagoditev vadbe potrebam posameznika. S sistemom BiMeo želimo odgovoriti na obe težavi. **Metode:** BiMeo je pasivna naprava, ki vsebuje le senzorje gibanja in sile, zato je povsem varna za uporabo. Za izvedbo gibanja se izkoriščajo preostale motorične sposobnosti uporabnika – pacienta. Neokvarjeni ud lahko pomaga pri gibanju okvarjenega uda, pri čemer se prispevek neokvarjenega uda meri in vrednoti. Vsi zajeti podatki iz senzorjev, nameščenih na uporabniku, se brezžično prenašajo na osebni računalnik. Uporabnik je v interakciji z navideznim okoljem, v katerem igra računalniške igre, ki so prirejene vadbi v rehabilitaciji. S prilagajanjem scenarija računalniških iger se maksimira aktivacija bolj okvarjenega uda. S sistemom BiMeo je bila opravljena študija uporabnosti na Univerzitetnem rehabilitacijskem inštitutu RS – Soča, kjer je 25 pacientov z različnimi okvarami živčno-mišičnega sistema enkrat na teden izvajalo vadbo. Pacienti so vadbo izvajali poleg standardne rehabilitacije. Vsak pacient je opravil dve različni nalogi, od katerih je vsaka trajala deset minut. Najprej je pacient z bolj prizadeto roko izvajal enoročno (razbremenitveno) vadbo na mizi. Po nekajminutnem premoru je opravil še dvoročno vadbo v vertikalni ravnini. **Rezultati:** Na podlagi zajetih podatkov o gibanju (koti, sile, hitrosti in pospeški) smo določili različne parametre, iz katerih je bil izračunan indeks uspešnosti gibanja (*I*). Indeks objektivno vrednoti uspešnost izvedbe celotne naloge. Pri zdravih osebah je povprečni indeks $I \cong 6$. Pri pacientih so bile izmerjene vrednosti v razponu od 1,8 do 6,5. Rezultati povsem sovpadajo s stopnjo motorične okvare posameznih pacientov. **Zaključki:** Vsi pacienti so uspešno izvedli tako enoročne kot dvoročne naloge. Če je bilo treba, so si pri gibanju pomagali z roko manj okvarjenega uda. Sistem se je izkazal kot primeren za vadbo pacientov z različnimi patologijami in stopnjami motoričnih okvar. Indeks uspešnosti gibanja objektivno ovrednoti pacientove motorične sposobnosti in podaja kvalitativno oceno stanja pacienta.

Ključne besede: zgornje ekstremitete, indeks uspešnosti gibanja, objektivne meritve, dvoročna vadba.

BIMEO – a system for bimanual and unimanual training of upper extremities

Background: Recovery of the neuromuscular system is the fastest in the first six months after injury (1). Patients are often motivated to continue their training at home, after being discharged from hospital care (2). Rehabilitation instrument BiMeo is designed for training of upper extremities in clinics and at patients' homes. Patients alone can perform rehabilitation tasks of their impaired or injured limb with the help of their healthy limb. Purpose: Common problems of motor rehabilitation are accessibility of therapists and the lack of objective measurements. The first problem is a consequence of a therapist's limited time, which affects the duration of intense training of individual patients. There is also a lack of tools and methods for objective measurements that are essential for monitoring patient's condition and progress, and adapting training to their individual needs. With the BiMeo system we want to address both of these problems. **Methods:** BiMeo is a passive device consisting only of movement and force sensors, and it is therefore entirely safe to use. In order to promote movement, the system exploits the preserved patient's motor functions. The less impaired limb can assist the movements of the more impaired limb, while its contribution is measured and evaluated. All collected data from the sensors attached to the user are wirelessly transmitted to a computer. The user interacts with a virtual environment in which he plays games adapted to rehabilitation training. Activation of the impaired limb is maximized by adaptation of the training game scenario. A preclinical study has been carried out at the University Rehabilitation Institute, Republic of Slovenia. The study included 25 patients with different impairments of the neuromuscular system. Training with BiMeo was performed alongside the patients' standard rehabilitation. Every patient executed two different 10 minute-long tasks. First, a unimanual task on a table was performed. After a short break the training continued with a bimanual task in a vertical plane. **Results:** From the collected movement data (angels, forces, velocities and accelerations) we defined different parameters from which a movement performance index (I) has been computed. This index objectively assesses the performance of the whole task. For healthy subjects the average index is $I \cong 6$. The patients had the index I in the range from 1.8 to 6.5. The results fully coincide with the level of patients' motor disabilities. **Conclusions:** All patients could successfully execute both unimanual and bimanual tasks. If it was necessary the less impaired arm assisted during the movement. The BiMeo system has proven to be suitable for training of patients with different pathologies and levels of motor disabilities. The movement performance index objectively assesses the patients' motor abilities and gives a qualitative assessment of patients' states.

Keywords: upper extremities, movement performance index, objective measurements, bimanual training.

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Uporaba metode Brain gym® v fizioterapiji

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Uvod: Metoda Brain gym® je program pedagoške kineziologije. Njena utemeljitelja sta dr. Paul in Gail Dennison, ki sta v 80. letih s skupino sodelavcev preučevala odnos med gibanjem in zaznavanjem ter učinek gibanja na področja človekovega delovanja. Program s 26 enostavnimi vajami omogoča doseganje integriranega delovanja možganov in telesa v okviru treh dimenzij telesnega gibanja (1, 2). Metoda Brain gym® omogoča, da z opazovanjem posameznikovega gibanja razumemo delovanje njegovih možganov. To je skladno s hipotezo, da ciljno gibanje spodbuja nastanek novih živčnih povezav (2, 3). Metoda Brain gym® bi lahko dopolnjevala standardne fizioterapevtske postopke, saj omogoča oceno koordinacije gibanja posameznega pacienta, razširi nabor vaj in pripomore k določanju ciljev fizioterapije (2, 3). Namen raziskave je bil ugotoviti, ali je uporaba metode Brain gym® smiselna tudi v standardni fizioterapiji. **Metode:** Pogovor s pacienti, pri katerih je bila uporabljena metoda Brain gym®. Zaradi specifičnosti metode rezultatov nismo merili s standardnimi testi. **Rezultati:** Metoda Brain gym® je bila uporabljena pri 325 pacientih, od tega 33,9 % moških (od 15 do 91 let; povprečno 53,1 leta) in 66,1 % žensk (od 13 do 87 let; povprečno 58,6 leta) z različnimi patologijami (starostna degeneracija sklepov, vrtoglavica, poškodbe, kronične bolečine, pooperativna fizioterapija), in sicer poleg standardne kinezioterapije. Trajanje obravnav z Brain gym® je variiralo od 2 do 6 tednov, od 2- do 5-krat na teden, posamezna obravnava pa je trajala 30 minut. Večina pacientov (92 %) je poročala o občutnem izboljšanju stanja težave, zaradi katere so obiskovali terapijo. Razlika je bila še posebno izrazita na področju funkcionalnih in mentalnih dejavnosti. **Zaključki:** Metoda Brain gym® se je izkazala kot zelo primerna za uporabo v fizioterapiji, in sicer za celostno obravnavo pacientov vseh navedenih starostnih skupin. Kaže, da poleg izboljšanja gibalnih sposobnosti pripomore tudi k izboljšanju mentalnih sposobnosti, vendar bi bilo treba za potrditev teh učinkov narediti raziskave visoke kakovosti.

Ključne besede: Brain gym®, telovadba za možgane, ravnotežje.

Use of Brain gym® in physiotherapy

Background: The Brain Gym® method is a program of educational kinesiology. Its founders are Paul Dennison, Ph.D. and Gail Dennison. In the 1980s they, together with a team of colleagues, researched the relations between movement and perception and the movement's effect on fine motor, mental and communication skills. They dedicated three decades to extensive research into the fields of learning and psychology as well as neural and muscular functioning. To integrate the functioning of the brain and the body within the three dimensions of movement the unique program offers 26 simple activities (1, 2). The Brain Gym® method enables us to understand the functioning of one's brain by simply observing the person's movement. This model of educational kinesiology supports the hypothesis congruent with the latest discoveries of neuroscience. They suggest that intentional movement is essential for the formation of new neural connections (2, 3). This simple fact based on the functioning of the brain can be an excellent complementary method in physical therapy. It enables us to get to know each patient's condition faster than usually; it widens our set of possible exercises and is incredibly effective in setting and achieving the goals of the rehabilitation process (2, 3). Purpose: Applying the Brain Gym® methods and principles to patient treatment at the physical therapy clinic. To determine the applicability of the Brain Gym® approach in classic physical therapy. **Methods**: Examination of published materials, discussions with patients with whom the Brain Gym® approach has been used. **Results**: In addition to the standard kinesiotherapy, the Brain Gym® method has been used with 325 patients of which 33,9% were men (from 15 to 91 years; average 53,1 years) and 66,1% women (from 13 to 87 years; average 58,6 years) with diverse pathologies (old age degenerative joint disease, vertigo, injuries, chronic pain, postoperative physical therapy etc.). Patients have attended Brain Gym® sessions 2-5 times a week, over the period of 2-6 weeks. Each session lasted 30 minutes. The majority of the patients (92%) reported of considerable improvements as the problems that made them undergo the therapy diminished. The improvements have been most notable in areas of functional and mental activities. **Conclusion**: In terms of holistic treatments of patients of all age groups the Brain Gym® method proved to be a valuable addition to physical therapy. It seems that, in addition to better movement skills, the method contributes to improved mental abilities. Yet, to support these effects, further high quality research should be conducted.

Keywords: Brain gym, action balance.

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Aktivnosti in terapija s pomočjo psov: uporaba v fizioterapiji

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Uvod: Aktivnosti in terapijo s pomočjo psov (ATP) vključujemo v obravnavo bolnikov z motoričnimi, senzoričnimi ali senzomotoričnimi motnjami. Prizadeti osebi tako omogočamo fizično, socialno, kognitivno in tudi emocionalno sprostitev oziroma napredovanje (2). Ločimo aktivnost in terapijo s pomočjo psov, ki se razlikujeta v načrtnosti, zahtevnosti in globini vplivanja (2). Aktivnosti s pomočjo psov (AP) dajejo možnost za motivacijske, izobraževalne, sprostitvene in terapevtske koristi, ki izboljšujejo kakovost življenja. Enake aktivnosti lahko ponavljamo z različnimi uporabniki oziroma skupinami. V tem programu ni točno določenega cilja. Gre za obliko druženja s psom (2). Terapija s pomočjo psov (TP) pa je ciljno usmerjeno posredovanje, pri katerem so psi, ki ustrezajo določenim kriterijem, pomemben del terapevtskega procesa. Program je skrbno načrtovan in zastavljen po korakih za dosego terapevtskega cilja. Terapevtski proces mora biti v celoti ovrednoten in dokumentiran, imeti mora merljive cilje (3). Namen prispevka je predstaviti primer ATP v fizioterapiji, prikazati način uporabe ter vrste in učinke terapije s psi. **Metode**: V okviru prispevka o izvajanju ATP so predstavljeni pogoji, ki jih je treba zadovoljevati, če želimo uspešno izvajati program. Pred izvedbo programa ATP so potrebne priprave, ki vključujejo pripravo terapevtskega psa, vodnika, interdisciplinarnih članov tima in ciljne skupine. Če želimo sestaviti dober program TP, je treba dobro oceniti pacientove težave, ovrednotiti njegovo stanje in upoštevati dogovorjene cilje fizioterapije. Fizioterapevt, ki se je odločil za uporabo TP, naj bi imel poglobljeno znanje o tem, kako, zakaj in kdaj uporabiti terapevtski par pri obravnavi posameznika. Pri izvajanju TP je zato potreben začetni pogovor z vodnikom psa in bolnikom, pri čemer se določijo cilji terapije. Pri tem se upoštevajo bolnikove želje, njegove trenutne sposobnosti, kontrolne točke in načini evalvacije terapije, ki pa morajo biti kompatibilni z dogovorjenimi cilji fizioterapije. Ko so zbrane vse potrebne informacije, se pripravi načrt o poteku srečanj, načrt obravnave, izberejo se namenske aktivnosti, opredelijo se kratkoročni in dolgoročni cilji. Terapija s pomočjo psa naj bi potekala v času fizioterapevtske obravnave posameznega pacienta. Najpogosteje se pes pri terapiji uporablja kot spremljevalec pri hoji prizadete osebe ali za trening ravnotežja in vertikalizacije najzahtevnejših bolnikov. **Zaključki**: Zaradi pomanjkanja randomiziranih kontrolnih študij o učinkovitosti ATP pri večji populaciji različnih pacientov o učinkovitosti ATP še ne moremo govoriti. Dejstvo je, da se svetovni trendi uporabe ATP uveljavljajo tudi v Sloveniji. ATP je dobrodošla dopolnitev kompetentne fizioterapevtske obravnave in rehabilitacije pacienta, saj povečuje bolnikovo motivacijo za delo. Pes je medij med bolnikom in terapevtom ter tako olajša delo rehabilitacijskemu timu, saj bolniki tako hitreje pridobijo zaupanje v terapevta. Prihodnji interes terapevtskih timov bi moral biti usmerjen v izvedbo več kontrolnih kliničnih študij o vplivu in učinkih TP.

Ključne besede: aktivnosti in terapija z živalmi, terapija s psi, pasji terapevti, integralna fizioterapija, rehabilitacija s pomočjo psov.

Dog assisted activity and treatment: use in physiotherapy

Background: Dog-assisted activities and therapy are included in the treatment of patients with motoric, sensoric or intellectual sensomotoric disorders and enable physical, social, cognitive and emotional release and progress to disabled persons (2). We distinguish between activity and therapy with dogs, which vary in planning, complexity and extent of influence (2). Dog assisted activity give us an opportunity for motivational, educational, relaxing and therapeutic benefits that improve quality of life. The same activity can be repeated with different users or groups. It is a form of socializing with dogs. This program is not objectively well-defined (2). Therapy in which we use dogs is a targeted intervention in which we use dogs who meet specific criteria. They are an important part of the therapeutic process. The program is carefully designed and set-by-step to achieve a therapeutic goal. Therapeutic process must be fully evaluated and documented with measurable objectives. The purpose of the contribution was to present dog-assisted activities and therapy in physiotherapy, to show how to use this type of therapy in practice and to show the types and effects of dog therapy. **Methods:** In the framework of the presentation of dog-assisted activities and therapy in physiotherapy, the required conditions, which are necessary for successful program implementation, are presented. Certain preparations, such as the preparation of the therapeutic dog, guider, interdisciplinary team members and patients, are necessary prior to the implementation of dog-assisted activity and therapy program. In order to create a successful dog-assisted therapy program, it is crucial to assess patients problems, evaluate his condition and compliance with agreed physiotheraphy program. The physiotherapist, who has decided to use the TP should have in-depth knowledge of how, why and when to use a therapeutic pair in the treatment of a patient. In the implementation of TP that requires an initial conversation with a dog guider and patients, where pledge goals of therapy, the patient's wishes, his current ability, control points and methods of evaluation are pointed. All this must be compatible with the agreed goals of physiotherapy program. When all the necessary information have been collected, we have to prepare a plan of progress meetings, treatment plan, choose the dedicated activities and identify short-term and long-term goals. Dog-assisted theraphy should take place during physiotherapy, which is assigned to each patient. The most commonly used therapy with a dog is a walking therapy or balance training and verticalisation of complex patients. **Conclusions:** The lack of randomized controlled studies on the effectiveness of ATP to a larger population of different patients can not speak truly about effectiveness of ATP. The fact is that the global trends in ATP have also been introduced in Slovenia. ATP is a great addition to a competent physiotherapy treatment and rehabilitation of the patient, as it increases the patient's motivation. A dog is a medium between a patient and a therapist in order to facilitate the work of the health team, because patients in this way quickly gain confidence in the therapist. Future interest in the therapeutic team should be focused on the performance of several controlled clinical studies on the effectiveness of TP.

Keywords: animal-assisted activities and therapy, dog therapy, integral physiotherapy, rehabilitation with dogs.

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Koristi terapevtskega potapljanja v moderni hidroterapiji

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Uvod: Potapljanje je lahko del rehabilitacije in rekreacije za ljudi s posebnimi potrebami. Primerno je tako za posameznike po poškodbi hrbtenjače kot tudi za ljudi z duševnimi in fizičnimi omejitvami, kot so cerebralna paraliza, živčno-mišična obolenja, multipla skleroza, astma, amputacije, diabetes, slepota in gluhost. V določenih segmentih je potapljanje primerno tudi za starejšo zdravo populacijo, ki želi obnoviti, ohraniti ali izboljšati kakovost svojega življenja. **Metode:** Od leta 2002 je [1]Mednarodna zveza društev IAHD Adriatic razvila veliko programov, v katere so bile vključene omenjene skupine, ki so jih skrbno spremljali zdravstveni in potapljaški strokovnjaki z vsega sveta. Programi se izvajajo v bazenih kot del moderne hidroterapije in v odprtih vodah kot osnovno in napredno usposabljanje za potapljače. **Rezultati:** V zadnjih desetih letih smo opazili, da so bili vplivi potapljanja majhni, vendar zelo koristni. Hidroterapija je zaradi redne telesne dejavnosti, izboljšane socialne interakcije in psiholoških prednosti precej pripomogla k izboljšanemu zdravstvenemu stanju in k večji kakovosti življenja invalidnih potapljačev. **Zaključki:** Čeprav invalidi, ki so bili do zdaj vključeni v naše programe, niso imeli omembe vrednih zdravstvenih zapletov, smo prepričani, da je še naprej treba nameniti veliko pozornost kakršnim koli spremembam. Sistematično zbiranje, dokumentiranje in obdelava pridobljenih podatkov povečujejo naše znanje in prispevajo k temu, da je potapljanje postalo dostopnejše in varnejše za vse več ljudi s posebnimi potrebami.

Ključne besede: hidroterapija, terapevtsko potapljanje, poškodba hrbtenjače, invalidnost, duševne motnje.

The benefits of therapeutic scuba diving in modern hydrotherapy

Background: Scuba diving can be a part of rehabilitation and recreation for groups of people with disabilities. It is suitable for individuals after spinal cord injury and also for others with mental and physical restrictions like cerebral palsy, nerve and muscular disorders, sclerosis multiplex, asthma, amputations, diabetes, blindness and deafness. To a certain extent it can be used for the healthy older population who needs to recover, preserve or improve their quality of life. **Methods:** Since 2002 [1]International association for handicapped divers Adriatic has developed a wide range of programs in which all the mentioned groups have been included and carefully monitored by medical and diving specialists worldwide. Programs are performed in swimming pools as a part of modern hydrotherapy and in open water as basic and advanced diving training. **Results:** For the last ten years we have noticed that immediate effects of diving are minor and mainly beneficial. However, improved health and quality of life of disabled divers could be the result of hydrotherapy, regular physical activity, improved social interactions, psychological benefits of achievements and fulfilled life. **Conclusions:** In spite of the fact that up until now disabled participants have not had any noteworthy medical complications, we believe that vigilance must be maintained. Systematic data collection, their analysis and documentation of experiences increase our knowledge and contribute to dive safety for people with disabilities.

Keywords: hydrotherapy, therapeutic diving, spinal cord injury, physical disabilities, mental disabilities.

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Primerjava termičnih in hemodinamskih odzivov v koži in mišicah na ogrevanje z električnim in magnetnim poljem

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Uvod: Raziskave kažejo, da elektromagnetna diatermija povzroči povišanje temperature površinskih in globokih tkiv, kadar je povprečna intenziteta dovedene energije zadostna (1, 2). Dvig temperature sproži različne fiziološke odgovore v tkivih (3). Kolikšni so dejanski toplotni učinki različnih oblik diatermije na kožo in spodaj ležeče mišice, še ni podrobno raziskano. Namen raziskave je bil primerjati termične in hemodinamske odzive v koži in mišicah na ogrevanje z električnim (EP) in magnetnim (MP) poljem. **Metode:** V raziskavi je sodelovalo 11 zdravih prostovoljcev (6 moških in 5 žensk). Vsak preiskovanec je bil na volarnem predelu podlakti izpostavljen 20-minutnemu ogrevanju z EP ali MP z najmanj 48-urnim razmikom. Terapija je bila aplicirana na levem zgornjem udu, medtem ko je desni ud služil kot kontrola. Intenziteta dovedene energije je bila določena z zgornjo mejo toplotne tolerance preiskovanca. Merili smo kožno in timpanično temperaturo, frekvenco srčnega utripa in kinetiko oksigeniranega in deoksigeniranega hemoglobina v mišici z infrardečo spektroskopijo. Preiskovanci so pred in med ogrevanjem ter med ohlajanjem ocenili občutenje in ugodje toplote na ogrevanem udu. **Rezultati:** Med 20-minutnim ogrevanjem z EP je temperatura kože narasla za 8,0 ± 1,3 °C in z MP za 8,1 ± 1,3 °C. Povečalo se je občutenje toplote, in sicer za 3 ± 1 pri ogrevanju z EP in za 2 ± 1 pri ogrevanju z MP. Prav tako se je spremenilo temperaturno ugodje pri ogrevanju z EP za 1 ± 1, pri ogrevanju z MP pa ni prišlo do značilnih sprememb. Minutna poraba kisika je narasla za 0,02 ± 0,02 $ml \cdot min^{-1} \cdot 100g^{-1}$ pri ogrevanju z EP in za 0,06 ± 0,04 $ml \cdot min^{-1} \cdot 100g^{-1}$ pri ogrevanju z MP. Prav tako se je med ogrevanjem z EP povečal minutni pretok krvi za 0,27 ± 0,25 $ml \cdot min^{-1} \cdot 100ml^{-1}$ in pri ogrevanju z MP za 0,72 ± 0,61 $ml \cdot min^{-1} \cdot 100ml^{-1}$. Vse navedene razlike so bile statistično značilne ($p < 0,05$). **Zaključki:** Pri enakem povišanju temperature kože ima ogrevanje z MP nekaj prednosti pred ogrevanjem z EP, in sicer je dvig temperature kože bolj postopen in zato za preiskovance bolj ugoden, poleg tega povzroči za ~ 42 % večji porast krvnega pretoka in porabe kisika v mišičnem tkivu. V primeru ciljane obravnave mišičnega tkiva je torej primernejša oblika diatermije z MP.

Ključne besede: radiofrekvenčna elektromagnetna diatermija, termični učinki, hemodinamski odzivi, mišična kinetika kisika.

Comparison of thermal and hemodynamic responses in the skin and muscles to heating with electric and magnetic field

Background: It has been demonstrated in humans that electromagnetic diathermy of sufficient energy output causes temperature elevation of surface and deep tissues (1, 2). The increase in tissue temperature triggers various physiological responses (3). However, little is known about the differences in responses elicited by various techniques of diathermy application. Purpose: To compare thermal and hemodynamic responses in the skin and muscles of the forearm to diathermy applied with predominant electric (EF) or magnetic field (MF). **Methods:** Eleven healthy volunteers participated (6 men and 5 women) in the study. They received one 20-minute diathermy session with EF and another one with MF, applied to the volar aspect of the forearm. The minimum interval between the two sessions was 48 hours. The energy output in each session was determined by the volunteer's pain tolerance. Measurements of skin and tympanic temperature, heart rate and muscle oxyhemoglobin and deoxyhemoglobin kinetics by near infrared spectroscopy (NIRS) were performed. Subjective heat perception and comfort at the experimental arm were also evaluated. **Results:** The skin temperature increased by 8.0 ± 1.3°C and 8.1 ± 1.3°C during the 20-minute application of diathermy with EF and MF, respectively. The thermal perception increased by 3 ± 1 during EF and 2 ± 1 during MF application. The thermal comfort changed by 1 ± 1 point during EF application, while no significant changes were noted during MF application. Minute muscle oxygen consumption increased by 0.02 ± 0.02 $ml \cdot min^{-1} \cdot 100g^{-1}$ during EF and 0.06 ± 0.04 $ml \cdot min^{-1} \cdot 100g^{-1}$ during MF application. Likewise, minute muscle blood flow increased by 0.27 ± 0.25 $ml \cdot min^{-1} \cdot 100ml^{-1}$ during EF and 0.72 ± 0.61 $ml \cdot min^{-1} \cdot 100ml^{-1}$ during MF application. All reported differences were statistically significant ($P < 0.05$). **Conclusions:** Despite an almost identical increase in skin temperature, the application of diathermy with magnetic field was perceived more comfortable by the subjects. This can be largely attributed to a slower rate of heat accumulation in the skin. Furthermore, the increase in both minute muscle blood flow and oxygen consumption was ~ 42 % higher compared to the diathermy with EF. Therefore, when muscle is the target tissue for therapy, a diathermy with magnetic field is a technique of choice.

Keywords: radio-frequent electromagnetic diathermy, thermal effects, hemodynamic responses, muscle oxygen kinetics.

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Sistem svetlobne terapije Bioptron

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Uvod: Svetloba ima v našem življenju zelo pomembno vlogo, saj vemo, da brez svetlobe ni življenja. Svetloba je bistveni del našega naravnega biološkega sistema, ki je potreben za ustrezno delovanje presnove in imunskega sistema. Večina encimov, hormonov in vitaminov za ustrezno delovanje potrebuje svetlobo (1). Pomanjkanje svetlobe ima lahko resne stranske učinke na naše telo in na normalne fiziološke procese, ki potekajo v njem. Kadar koli so normalni fiziološki procesi in ravnovesje med njimi moteni, nastopi bolezen. Predstavljen je sistem svetlobne terapije Bioptron, ki je vznemirljiva in inovativna tehnologija, ki omogoča poceni in učinkovito zdravljenje številnih bolezenskih stanj, uporabljamo pa jo lahko v medicini, fizioterapiji ali v udobju svojega doma. Optične naprave Bioptron oddajajo posebno vrsto svetlobe, ki združuje ugodne lastnosti naravne sončne svetlobe brez UV-sevanja in njegovih možnih škodljivih učinkov. Zaradi biološko spodbujajočih učinkov svetlobe pri osvetljevanju kože ta spodbudi za svetlobo občutljive znotrajcelične strukture in molekule. Svetlobna terapija Bioptron deluje naravno, tako da spodbuja obnovitvene zmogljivosti telesa in mu tako pomaga sproščati njegov potencial za zdravljenje. **Tehnologija:** Bioptron je medicinska naprava za svetlobno terapijo s specifično optično enoto, ki oddaja svetlobo, podobno delu elektromagnetnega spektra, ki ga naravno proizvaja sonce. Razlika je v tem, da nima UV-sevanja. V zgodnjih osemdesetih letih je skupina znanstvenikov odkrila pomen polarizirane polikromatske svetlobe. Na podlagi te raziskave je bil izdelan sistem svetlobne terapije Bioptron. Ta torej temelji na več kot dvajsetletnih izkušnjah in ga uporabljajo zdravniki in medicinske sestre v bolnišnicah, fizioterapevti ter družine in posamezniki doma. Prav vsi imajo koristi od pozitivnih učinkov, ki jih ima sistem na človeško telo. Patentirana tehnologija lahko pri preprečevanju in zdravljenju različnih zdravstvenih težav prinese klinični uspeh z neverjetnimi trajnimi rezultati. Visokokakovostna tehnologija in inovativni dizajn omogočata enostavno uporabo brez znanih negativnih stranskih učinkov. **Uporaba:** Svetlobna terapija Bioptron se lahko uporablja kot dopolnilno zdravljenje za podporo konvencionalnim metodam zdravljenja, za nekatere indikacije pa se lahko uporablja kot monoterapija. Svetlobna terapija Bioptron izboljšuje mikrocirkulacijo, harmonizira presnovne procese, okrepi človekov obrambni sistem in spodbuja regenerativne procese v celotnem organizmu. Certificirana področja uporabe so celjenje ran (2), zdravljenje preležanin, opekline (3), lajšanje bolečin ter športne poškodbe (4), revmatizem, sezonske razpoloženjske motnje (zimska depresija), bolezni novorojenčkov, kožne bolezni (5), otroške bolezni (5), lepota in dobro počutje. **Prednosti:** Široko področje uporabe, preprosto upravljanje, varna in neinvazivna terapija, zdravljenje je kratko in brez bolečin, ni UV-sevanja, ni negativnih stranskih učinkov, je stroškovno učinkovita terapija, ki prinaša sproščujočo in pomirjujočo izkušnjo. **Zaključki:** Leta izkušenj in raziskav so potrdila pozitivne učinke svetlobne terapije Bioptron in privedla do širokega spektra uporabe na številnih področjih medicine. Terapija je po svetu postala sprejeta kot nova oblika zdravljenja pri preprečevanju, zdravljenju in rehabilitaciji. Ekipa znanstvenikov podjetja BIOPTRON AG iz Švice stalno sodeluje s strokovnjaki, znanstveniki in zdravniki v številnih državah in skupaj preučujejo značilnosti ter terapevtsko učinkovitost svetlobne terapije Bioptron.

Ključne besede: svetloba, zdravilni učinki, neinvazivna terapija, medicinska naprava.

The bioptron light therapy system

Background: The light plays an extremely important role in our lives and, as it is well known, there is no life without light. The light is an essential part of our bio-natural system, needed for the adequate functioning of digestive and immune system. A large number of enzymes, hormones and vitamins need light for their proper functioning (1). The lack of light can bring about serious secondary effects on human body and on normal physiological processes which take place inside of it. Whenever the normal physiological processes and the balance between them are disturbed, illness appears. The article presents the Bioptron light therapy system, an exciting and innovative technology offering an inexpensive and efficient treatment for numerous medical conditions, which can be used in medicine, physiotherapy or in the comfort of one's home. Bioptron optical devices emit a special kind of light which combines the positive properties of natural sun light without the UV radiation and its potential harmful effects. The biostimulative effects of light on the skin stimulate light-sensitive intracellular structures and molecules. The Bioptron light therapy acts in a natural way by stimulating the regenerative capacity of the body, thus helping it release its own healing potential. **Technology:** Bioptron is a medical device applied in the light therapy, composed of a specific optical unit, spreading light in a similar way as the electro-magnetic spectrum does, a spectrum naturally produced by the sun. The difference is the lack of UV radiation. In the early 80s, a group of scientists discovered the meaning of polychromic polarized light. Based on this research, the Bioptron light therapy system was created. This technology lays on a 20 years' experience and is used today by doctors and nurses in hospitals, physiotherapists, individuals and families at home. All with no exception can enjoy the positive effects the method has on human body. The patented technology can bring about a clinical success with unbelievable lasting results in the prevention and treatment of different diseases. The high quality technology and innovative design empower a simple use with no known secondary effects. **Way of use:** The Bioptron light therapy can be used as additional treatment supporting the conventional treatment methods. For certain indications, however, it can also be used as a mono therapy. The Bioptron light therapy enhances the micro-circulation, harmonizes digestive processes, strengthens human defensive system and stimulates regenerative processes in the whole body. The certified applying areas are as follows: wounds healing (2), treatment of decubitus and burns (3), aches and sport injures relief (4), rheumatism, seasonal dispositional disturbs (winter depression), skin problems (5), newborns diseases (5), beauty and well being. **Advantages:** large sphere of use, easy handling, safe and non-invasive therapy, short and painless treatment, no UV radiation, no negative secondary effects, reasonable therapy from the point of view of expenses, a therapy which brings along a calming and relaxing experience. **Conclusions**: Many years of experience and numerous researches have confirmed the positive effects of Bioptron light therapy and lead to a large spectrum of use in different medicine areas. Worldwide the therapy is being accepted as new treatment form applied in preventive, healing and rehabilitation goals. The BIOPTRON AG Company researching team from Switzerland constantly cooperates with specialists, scientists and doctors from different countries. Together they study the characteristics and therapeutic efficiency of Bioptron light therapy system.

Keywords: light, healing effects, non-invasive therapy, medical device.

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Multiprogramme dynamic electrostimulation in rehabilitation of patients with the central and peripheral nervous system diseases

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Background: Motor violations in the form of paresis of various localizations and etiologies often occur at defeats of the central and peripheral structures of nervous system. They are the main indication to the neuromuscular electrical stimulation (ES). The application of ES directly activates big alpha motoneurons, as well as creates facilitating effect from skin afferents on them (1). The efficiency of ES is mainly defined by its parameters and modes. The goals of the proposed research were to investigate physiological justifications of parameters of ES and to elaborate new devices and software for clynical practice. **Methods:** The efficiency of ES different parameters at different types of paresis and denervation was studied. The indications were defined individually, according to the data of clinical inspection and electrophysiological researches by electromyography. **Results and discussion**: As it was shown, at peripheral paresis, depending on the degree of a muscle denervation pulses of various durations are used. In the case of absence or weak axon degeneration short pulses of 0.1–1.0 ms duration are optimal. At a partial denervation of a muscle pulses of 1–10 ms are effective. And finally, at a rough denervation pulses of 100–300 ms duration are necessary. The presence of a constant (galvanic) component of a range of incentives increases the destruction of cellular membranes and electrolytic destruction of the active surface of electrodes. At central paresis of a various etiology, the condition of the neuromuscular structure usually remains intact. In these cases, for ES of muscles alternating currents of the sound range (2–20 kHz in frequency) were used. During the pilot and clinical studies in norm and at various types of pathology, a number of dynamic types of activity for different groups of muscles of the slow, fast and mixed types were determined (2). In the majority of stimulators available in clinical practice, the ES parameters are set by the operator before the session. They either remain fixed before the end of the session, or are corrected manually within it. Under these conditions the effect of ES is far from an optimum. For optimization of the compliance of ES parameters with the initial and changing condition of a stimulated link we created new generation of stimulators of the “Omnistim” series (3–5). Their sets of programs of dynamic ES are realized which correspond to the criteria given above which can be expanded and modified according to specifics clinical tasks. **Conclusions:** The elaboration of new devices for ES allows minimizing the energy of ES action, to reduce side effects; to achieve a physiologically optimal mode of muscular activity, and to provide with the comfort of action at high intensities of muscular contractions.

Keywords: nerve stimulation; paresis; stimulator; parameters.

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Uporaba različnih fizioterapevtskih postopkov pri rehabilitaciji pacienta po rekonstruktivni operaciji roke – poročilo o primeru

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Uvod: Pri vsakodnevnem delu fizioterapevtov je zelo pomembno preiti iz teorije v prakso. Pri uspešnem izvajanju fizioterapevtskih programov je potrebno redno strokovno izobraževanje. Pridobljeno znanje o novih tehnikah in pristopih v fizioterapiji pa je nato mogoče uporabiti pri vsakodnevnem delu z bolniki. Namen je predstavitev uporabe različnih fizioterapevtskih metod in tehnik pri rehabilitaciji po zelo težki poškodbi in operaciji roke. Pri delni amputaciji roke je bil uspešno uporabljen mikrokirurški poseg. Primarni cilj fizioterapevtske rehabilitacije po operaciji je bil doseči čim višjo raven funkcionalnosti bolnikove roke. **Metode:** Delavec, star 31 let, se je poškodoval pri delu z rezkalnim strojem. Roka je bila v zapestju skoraj v celoti amputirana. Po rekonstruktivni operaciji smo začeli uporabljati več tehnik aktivnih in pasivnih fizioterapevtskih metod. Izkušen fizioterapevt je izvajal različne tehnike: kinezioterapijo, elektroterapijo, krioterapijo, magneto terapijo, ultrazvok in nevromuskularne trake. Da bi zmanjšali bolečino in povečali obseg gibljivosti, mišično moč in koordinacijo, so bile uporabljene tudi tehnike, kot so sklepna mobilizacija, proprioceptivna nevromuskularna facilitacija (PNF) z zadrži-sprosti gibanjem in frikcijska masaža. **Rezultati:** Mikrokirurški poseg in rehabilitacija z uporabo različnih fizioterapevtskih metod in tehnik sta vodila do popolne možnosti uporabe roke. Uspešna fizioterapevtska obravnava je pomagala bolniku, da lahko skoraj popolnoma normalno uporablja roko. **Zaključki:** Dobro in vzajemno sodelovanje med mikrokirurgom in fizioterapevtom je po operacijskem posegu in rehabilitaciji z različnimi fizioterapevtskimi metodami in tehnikami dalo zelo dobre rezultate. V fizioterapevtski obravnavi bolnikov je prav tako zelo pomembno sodelovanje med fizioterapevtom in bolnikom, saj mora bolnik aktivno sodelovati, da je zdravljenje čim bolj uspešno. Bolnik se je lahko vrnil k svojim normalnim dnevnim aktivnostim skoraj brez zmanjšanja zmožnosti uporabe poškodovane roke.

Ključne besede: poškodba roke, fizioterapevtske metode, fizioterapevtske tehnike, rehabilitacija.

The use of various physiotherapy procedures in rehabilitation of a patient after reconstructive hand microsurgery – a case report

Background: Permanent education and training is very important for successful implementation of physiotherapeutic programmes. To achieve that purpose, the acquired knowledge about new physiotherapeutic methods and techniques has to be incorporated into everyday work with patients. The purpose is to present the physiotherapy methods and techniques used on a patient with severe hand amputation after the reconstructive microsurgery. The goal of post microsurgical rehabilitation was to achieve a full function of the repaired hand. **Methods:** A 31-year old worker has sustained an injury working on the milling machine. He had almost completely amputated hand at the wrist. After reconstructive surgery both passive and active physiotherapy procedures were started. Experienced physical therapists performed various types of physiotherapy: kinesiotherapy, electrotherapy, cryotherapy, magnetic therapy, ultrasound and neuromuscular tape. The techniques used were also joint mobilization, proprioceptive neuromuscular facilitation (PNF) with hold-relax motion and transverse friction massage. **Results:** The microsurgery together with the rehabilitation using a combination of physiotherapy methods and techniques has lead to the patient's full recovery. The successful therapy helped to resume the normal use of the patient's hand after undergoing treatment. **Conclusions:** With emphasis on the rehabilitation of hand trauma, our surgeons and physical therapists specializing in hand rehabilitation worked closely with the patient to achieve the best results. This cooperation has helped the patient to return to normal day-to-day activities with only minor loss of capabilities or limitations after the severe hand injury.

Keywords: hand injury, physiotherapeutic methods, physiotherapeutic techniques, rehabilitation.

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Učinkovitost šole proti bolečini v hrbtenici

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Uvod: Znano je, da je kronična bolečina v ledveni hrbtenici prizadene v svetu do 80 odstotkov odrasle populacije (1). Začetki prevenitvnih edukacijskih programov, kot je Šola proti bolečini v hrbtenici (ŠPBH) segajo v leto 1958 (2). Program ŠPBH je zanimiv in obetaven v terapiji pri bolnikih z bolečino v ledveni hrbtenici (3). Na URI – Soča poteka ŠPBH od leta 1990. Vsebina ŠPBH traja štiri ure in seznani bolnike z zgradbo hrbtenice, pravilno držo, biomehaniko hrbtenice pri gibanju in različnih položajih, s terapevtskimi vajami in tehnikami dvigovanja bremen ter motiviranjem za telesne dejavnost. Namen raziskave je bil ugotoviti učinkovitost razumevanja edukacijskega programa pri bolnikih. **Metode:** V raziskavi so sodelovali vsi bolniki, ki so bili vključeni v ŠPBH od septembra do novembra 2009, in sicer 42 bolnikov, od tega 29 žensk in 13 moških. Na začetku in na koncu ŠPBH so izpolnili vprašalnik. Vprašalnik je bil sestavljen iz splošnega in strokovnega dela. Strokovna vprašanja so bila iz vsebine programa ŠPBH. Za analizo je bila uporabljena opisna statistika, McNemarov in parni t-test. **Rezultati:** Udeleženci so bili stari od 29 do 79 let; 21 zaposlenih, 7 nezaposlenih in 14 upokojencev. Izobrazba je bila: 10 % osnovna šola, 60 % srednja, 29 % visoka in 2 % podiplomska. Razlog napotitve je bil v 90 % bolečina v ledvenem delu, pri preostalih bolečina v vratni ali prsni hrbtenici. Aktivnosti, s katerimi so se ukvarjali: hoja (24 bolnikov), kolesarjenje (6 bolnikov), plavanje (3 bolniki), vaje (3 bolniki), fitnes (1 bolnik), joga (1 bolnik), namizni tenis (1 bolnik) in tek (1 bolnik). Aktivni so bili od 2- do 12-krat na teden. Na vprašanje, koliko vretenc je v ledvenem delu, je na začetku pravilno odgovorilo 22, na koncu pa 34 bolnikov. Na kaj moramo paziti pri sedenju, je na začetku pravilno odgovorilo 38, na koncu 42 bolnikov. O pravilnem pobiranju predmetov s tal je na začetku pravilno odgovorilo 40, na koncu 42 bolnikov. Kakšno naj bi bilo ležišče, je na začetku pravilno odgovorilo 34, na koncu 41 bolnikov. Kako si lahko izboljšamo delovno okolje, je na začetku pravilno odgovorilo 39, na koncu 42 bolnikov. V strokovnem delu vprašalnika se je delež pravilnih odgovorov statistično izboljšal ($p < 0,05$ McNemarov test). Skupna ocena vprašalnika se je tudi statistično izboljšala (maksimum 12, povprečje 6,4 na začetku, 8,3 na koncu, $p < 0,001$ parni t-test). Z oceno zadovoljstva s ŠPBH je 88 % udeležencev odgovorilo, da je dobilo ustrezne napotke za nadaljnje življenje, 12 % deloma. **Zaključki:** Rezultati vprašalnika so pokazali, da je bil program ŠPBH učinkovit pri razumevanju edukacijskega programa za bolnike z bolečino v hrbtenici.

Ključne besede: edukacija, kronična bolečina, ledvena hrbtenica, terapevtske vaje, vprašalnik.

Effectiveness of the back school educational program

Background: It is known that low back pain affects up to 80% of the adult population worldwide (1). Back School education dates back to 1958 (2). Back School education is an interesting and promising program to treat patients with low back pain (3). Back School education was started at URI – Soča in 1990. It familiarises the patients with spine anatomy, correct posture, spine biomechanics during movement and in various positions, therapeutic exercise, load-lifting techniques, and motivation for activities. The aim of this study was to assess the effectiveness of understanding our program. **Methods:** All the patients that attended the Back School education at URI – Soča in September and November 2009 took part in this study: 42 patients, of these 29 women and 13 men. They filled in a questionnaire at the beginning and end of the program. The questionnaire consisted of a general and specialised part. The specialised questions were based on the content of the Back School. Data were analysed using descriptive statistics, McNemar test and paired t-test. **Results:** Patients were 29 to 79 years old; 21 were employed, 7 unemployed and 14 retired. Education was 10% elementary school, 60% high school, and 30% university. 90% of the patients attended the program due to low-back pain, 10% due to cervical and thoracic back pain. Activities were: walking (n = 24), cycling (n = 6), swimming (n = 3), general exercise (n = 3), and fitness (n = 1), yoga (n = 1), running (n = 1) and table tennis (n = 1); active 2 to 12 times per week. With respect to the specialised questions, the number of lumbar vertebrae was known by 22 patients at the beginning vs. 34 at the end; correct sitting position was known by 38 at the beginning vs. 42 at the end; correct way of picking up objects by 40 at the beginning vs. 42 at the end; characteristics of a suitable bed by 34 at the beginning vs. 41 at the end; workplace improvement by 39 at the beginning vs. 42 at the end. In all the specialised questions the proportion of correct answers improved and was statistically significant (McNemar test: $p<0.05$). The total score also improved and was statistically significant (maximum 12, mean 6.4 at the beginning vs. 8.3 at the end, paired t-test: $p<0.001$). 88% of the patients stated that they received useful guidance for the future, while 12% received only some. **Conclusions:** The study showed the Back School education program to be effective.

Keywords: education, chronic pain, low back, therapeutic exercise, questionnaire.

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Effects of a single postero-anterior mobilization on the lumbar flexion range of motion

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Background: The technique of Maitland's postero-anterior (PA) mobilisation is often used to treat pain and restricted movement of the peripheral joints and the spine. In spite of its widespread use in clinical practice, previous research examining the efficacy of this technique failed to detect significant changes in lumbar flexibility after pa mobilization (1, 2, 3). As in all of these studies, the mobilization programs were performed with the subjects lying in prone position, it is plausible to assume that insufficient elongation was applied to anatomical structures to induce significant therapeutic effects. The aim of this study was to reveal possible changes in flexion range of motion (ROM) of the lumbar spine after a single session of pa mobilization in end-of-range (EOR) position. **Methods:** A same-subject, repeated-measures, crossover design was used to study 25 asymptomatic subjects (19 female and 6 male). All participants were scheduled for three visits, interspersed by a minimum of one week. The following treatments were applied in a randomised order: (a) pa mobilization of the lumbar spine in EOR position (one minute pa mobilization on the first, second and third lumbar vertebra of Grade III as described by Maitland); (b) kneeling on an examination bed with the lumbar spine flexed for a period of three minutes; (c) passive lying in prone position as control condition, also for a period of three minutes. Before and after each intervention the mobility of lumbar flexion was measured using the MediMouse® system, to detect possible changes in the pain freeROM. **Results:** No significant differences in flexion ROM were observed after application of different treatments. However, the effects of the mobilization program were found to differ significantly in dependency of the subjects' initial mobility ($p = 0.0013$). Participants with initial flexion ROM $\leq 31°$ (= median) increased their ROM following mobilization slightly ($M = 0.8$; $SE = 0.5$), whereas participants with initial flexion ROM $> 31°$ showed a decreased ROM following mobilization ($M = -1.6$; $SE = 0.5$). **Conclusions:** In our sample, mobilization had no significant effect on flexion ROM but treatment effects seem to depend on the subjects' pre-intervention mobility status. Subsequent studies investigating the effects of EOR mobilization should concentrate on subjects whose spinal mobility is restricted.

Keywords: lumbar mobility, spine, Maitland, end of range, Medimouse.

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Assessment and treatment of an adult after stroke with the Bobath concept – a case report

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Background: The Bobath Concept is a problem solving neurodevelopmental approach for the assessment and treatment of patients with disturbances of function, movement and postural control due to a lesion of the central nervous system. The rationale for current practice is based upon present scientific facts of motor control, motor learning and neural plasticity, as well as on science of biomechanics. The International Classification of Function (ICF) (WHO 2001) provides a basis for assessment of the patient's ability to perform functional activities and participate in life situations, and for analysing the underlying impairments which may result in dysfunction. The aim of the assessment of a patient diagnosed with tetraparesis spastica pps. relapse and ICV syndrome extrapyramidal ataxia, Pusher syndrome was to identify and analyse problems with functional activities and participation in daily life situations, as well as to analyse movement components and underlying impairments. Treatment strategies addressed underlying impairments, task-specific components of posture and movement, the functional activity and its integration into participation in relevant situations in daily life of the patient. Cognitive, emotional and behavioural factors were also addressed in order to enable him to engage in task-related problem solving. The purpose of this case study was to gather information on the immediate and short-term effects of Bobath intervention strategies and techniques including therapeutic handling, facilitation, inhibition and key points of control. **Methods:** The neurophysiotherapist tried to optimise postural and movement strategies in order to re-establish effective task performance of the patient. Specific handling techniques and facilitation of normal movement patterns were amongst the many strategies used to achieve functional goals, and were modified and withdrawn consequently. The task and the environment were structured to facilitate successful performance by directing the patient's attention to the task and awareness of it as well as by reducing the physical demands of the task. Effective intervention involved a total management strategy 24 hours per day, and preventative and promotive measures have been included by the assessment of activities of everyday life. All of the tests ("Stand up and sit down","Stand up and go", FIM test and Berg balance scale) were chosen because of their reliability, validity, and relevance to neurodevelopmental treatment research. **Results**: The case study showed significant improvements in sensorimotor control of the lower and upper extremity of the patient, balance control assessed with the Berg Balance Scale. **Conclusion:** The Bobath treatment should be based on up-to-date knowledge of evidence-based strategies as well as on knowledge of the time-dependent nature of recovery patterns. All Bobath therapists should be open-minded to evidence-based practice and receptive to new developments in neurodevelopmental rehabilitation.

Keywords: Bobath concept, facilitation, tetraparesis, assessment.

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Naprava za korekcijo everzije stopala med hojo pri pacientki po možganski kapi »nogomer« – poročilo o primeru

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Dom Starejših občanov Preddvor

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Uvod: Leto 2012 je bilo evropsko leto aktivnega staranja in solidarnosti med generacijami (1). Medgeneracijsko sodelovanje je potekalo tudi med Domom starejših občanov Preddvor in Osnovno šolo Predoslje. Ekipa [ne:]PREDvidljivi z Osnovne šole Predoslje sodeluje na tekmovanju *First lego league* in njihov izziv je bil najti rešitve za starejše ter kako staranje vpliva na sposobnost starajoče osebe v smislu ohranjanja življenjskega sloga (2). Rešitve so začeli iskati v Domu starejših občanov Preddvor, kjer so se srečali s stanovalko doma in s fizioterapevtko. Namen raziskave je bil ugotoviti uporabnost rešitve izziva iz tekmovanja *First Lego League* v fizioterapevtski obravnavi starostnika. **Metode:** Ekipa [ne:]PREDvidljivi z Osnovne šole Predoslje so imeli na prvem srečanju intervju s stanovalko Doma starejših občanov Preddvor. Med pogovorom so odkrivali težave, s katerimi se srečuje gospa v vsakdanjem življenju. Stanovalka je stara 69 let, pred 7 leti je imela možgansko kap s posledično desnostransko hemiplegijo. Desni zgornji ud je povsem plegičen, desni spodnji ud pa paretičen. Sposobna je hoje z berglo na krajše razdalje. Ima peronealno opornico in individualno izdelano obutev. Pri hoji ne izvede popolnega prenosa teže na desno nogo, prenos teže izvede hitro, pri dostopu na peto se stopalo obrne v izrazito everzijo (45°). Ob fizioterapevtovem vodenju je sposobna korigirati prenos teže na desno, s čimer je dostop boljši, v stopalu pa je everzija manjša. Zasuk noge v everzijo je gospa navedla kot težavo, ki je predstavljal izziv za ekipo [ne:]PREDvidljivi. Izdelali so napravo za korekcijo hoje in jo poimenovali nogomer. Sestavili so jo iz Lego kock Mindstorms in dveh žiroskopskih senzorjev, ki merita kot med stopaloma. Kadar je kot med levo in desno nogo prevelik, naprava s piskanjem in lučko opozori na nepravilen položaj stopala. Za ugotavljanje učinkovitosti sta bila pred namestitvijo naprave in po njej merjena število korakov in čas za prehojeno razdaljo na 20-metrski stezi (6 ponovitev). **Rezultati**: Položaj stopala je bil po nekajkratnih poskusih boljši, sposobna je bila prehoditi daljšo razdaljo brez stalnega piskanja. Pacientka je na prehojeni razdalji 20m naredila povprečno 33 korakov, v povprečno 1,26 minute. Povprečna kadenca je bila 23 korakov/minuto. Ob vodenju terapevta (brez naprave) je naredila 13 korakov brez izrazite everzije v stopalu, 15 korakov pa pri uporabi naprave. Brez vodenja terapevta in brez naprave (spontana hoja) je naredila le 7 korakov brez povečane everzije na 20-metrski stezi. **Zaključki:** Nogomer se je izkazal kot uporabna naprava v fizioterapiji, saj jo lahko uporabimo kot pomoč za korekcijo gibanja (»tretja roka«), hkrati pa deluje na pacienta motivacijsko. Za natančnejšo uporabo bi bilo treba narediti dodatne tehnične izboljšave in raziskave, ki bi potrdile njeno uporabnost in zanesljivost.

Ključne besede: medgeneracijsko sodelovanje, kap, fizioterapija pri starostnikih.

A device to correct foot eversion in walking after stroke "Foot-meter" – a case report

Background: The year 2012 was the European Year of active ageing and solidarity between generations (1). Intergenerational cooperation took place also between the Elementary school Predoslje and Home for elderly parishioners Preddvor. The Team [ne:]PREDvidljivi - nonpredictable from the Elementary school Predoslje participates in the competition First Lego League (FLL) and their challenge was searching for the solution for the elderly, and how ageing affects the ability of ageing people in terms of maintaining their lifestyle (2). They have started to search for solutions in the Home for elderly parishioners Preddvor, where they met with one of the residents of the Home and her physiotherapist. The purpose of the research was to present the intergenerational cooperation and estimate usability of the solution of the challenge from the competition FLL in therapy. **Methods:** The Team Nonpredictable from primary school Predoslje and the resident of HEP Preddvor had the interview at their first meeting in terms of detection of the problem of an old lady. She is 69 years old. 7 years ago she had the CVA which resulted in a right-sided hemiplegia. The right arm is completely paralysed and the leg is paretic. She is able to walk with a crutch at shorter distances. She uses the fibular brace and custom-made footwear. When walking she fails to make a complete transfer of weight to the right foot, she does it very quickly, first she steps on her heel, and her foot turns in strong eversion (45°). When she is controlled she is able to correct her weight transfer to the right which results in the better access and smaller foot eversion. The lady stated the rotation of her hoot into eversion as a problem, which became a challenge for the Team Nonpredictable. **Results:** The Team Nonpredictable produced a device for the correction of a foot, and named it "foot-meter". From Lego mindstorms and 2 gyroscopic sensors they constructed the "foot-meter", which measures the angle between both feet. When the angle between the left and the right foot is too high the "foot-meter" notes the improper foot position with the light and beeping. The lady had installed the device while walking, and beeps at every step warned her if the position of her feet was too much in the eversion. The tolerance was 10 degrees. The position of her foot was better after several attempts, and she was able to walk at longer distances without constant beeping. In an average she made 33 steps at 20 m distance in approximately 1.26 minutes. Cadence was 23 steps/minute. With guiding by the physiotherapist she succeeded in making 13 steps without eversion of the foot, 15 steps with the use of a "foot-meter", and without any correction she was able to make only 7 steps without the eversion. **Conclusion:** The foot-meter is a useful instrument for the implementation of physiotherapy. It can be used as a third hand which at the same time influences also the patient's motivation. For a more detailed application it would be required to make some technical improvements, more tests and studies to confirm its usefulness and reliability.

Keywords: intergenerational cooperation, stroke, physiotherapy for geriatric patients.

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