

Vpliv telesne dejavnosti na kognicijo starostnikov

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Uvod: Starostnim spremembam so podvrženi osrednje živčevje in kognitivne sposobnosti, ki omogočajo avtonomijo in socialno vključenost ter določajo kakovost staranja. Za spremembe so najbolj dovzetni pozornost, kratkoročni in dolgoročni spomin ter centralni izvršitelj. Spremenijo se hitrost obravnave informacij, mišljenje in spomin, opazen je upad sive možganovine v senzornem delu hipokampusa in spremenjeno je delovanje nevrottransmitterjev v dopaminergičnem sistemu. Kognitivne sposobnosti se s starostjo spreminjajo in naglo upadajo med 60. in 70. letom. S telesno dejavnostjo je upad mogoče zmanjšati ali celo spodbuditi možgane k nastajanju novih celic, zato je pomembno za kakovostno življenje starostnikov preučiti, kakšna in kako intenzivna telesna dejavnost je najprimernejša. **Metode:** Pregled objavljenih preglednih člankov in raziskav od leta 2001 do 2016 s ključnimi besedami, starost, staranje, telesna dejavnost, telesne sposobnosti, kognitivne sposobnosti in spomin. **Rezultati:** Upad telesne dejavnosti vpliva na spremenjeno delovanje nevrottransmitterjev v dopaminergičnem sistemu, zaradi česar je mogoče predvidevati težave z delovnim spominom in učenjem (1). Telesna dejavnost upočasni kognitivni upad in deluje preventivno. Zadostuje že povečanje telesne dejavnosti za 10 odstotkov (2). Nevroplastičnost možganov in nevrogenezo je mogoče dokazati s povečanim številom nevrotrofinov (BDNF). Telesna dejavnost pozitivno vpliva tudi na delovni spomin in pozornost, govorni spomin in centralni izvršitelj, zvišuje raven BDNF in vpliva na povečanje hipokampusa ter sive možganovine (3). Za vzdrževanje kognitivnih sposobnosti in nevrogeneze je primerna vadba za vzdržljivost (4), ki zagotavlja tudi boljšo srčno-žilno zmogljivost (5) in pozitivno vpliva na angiogenezo. Nizko-intenzivna aerobna vadba pozitivno vpliva na vidno prostorsko zaznavo in pozornost, zmerna telesna dejavnost na splošno kognitivno sposobnost, delovni spomin in pozornost ter govorni spomin. Večina strokovnjakov priporoča intenzivno do zmerno vadbo, čeprav večja intenzivnost namenja več pozornosti telesni dejavnosti in manj kognitivnim procesom. **Zaključki:** Učinki vadbe na kognitivno delovanje starostnikov naj bi bili posledica izboljšane prekrvavitve in preskrbe možganov s kisikom, zaradi česar naj bi se tvorilo več nevronov in ohranjal možganski volumen. Redna telesna dejavnost zmanjšuje upad kognitivnih sposobnosti in omogoča »uspešno staranje«. Nerešeno ostaja vprašanje optimalne intenzivnosti aerobne telesne dejavnosti.

Ključne besede: starost, staranje, telesna dejavnost, kognitivne sposobnosti, spomin.

Impact of physical activity on cognition of elderly

Background: Age-related changes are subjected to the central nervous system and cognitive abilities, which allow autonomy and social inclusion, and determine the quality of aging. Most affected by age-related changes are attention, short-term and long-term memory and central executive. The changes are associated with the changes in the speed of processing the information, thinking and memory, the substantial decrease in grey matter in the sensory part of the hippocampus and the changes in functioning of the neurotransmitters in the dopaminergic system. Cognitive abilities change with the age and decrease rapidly at the age between 60 and 70. The decline can be reduced or the brain can even be stimulated to generate new cells through physical activity (PA), so it is important for the quality of life of older people to consider what PA should be like and how intense it should be. **Methods:** Review of scientific articles and sample surveys, published between 2001 and 2016, was carried out, that was based on the key words: age, aging, physical activity, physical abilities, cognitive abilities and memory. **Results:** The decline of PA has an impact on modified functioning of the neurotransmitters in the dopaminergic system, which makes it possible to anticipate problems with the help of working memory and learning (1). PA slows down the cognitive decline and has a positive impact on prevention. Increasing PA for 10% is already sufficient (2). Neuroplasticity and neurogenesis of the brain can be demonstrated by the increased number of neurotrophins (BDNF). PA has positive effect on working memory and attention, verbal memory and attention, as well as central executive, it raises BDNF level and has an impact on the increase in the hippocampus and grey matter (3). To maintain cognitive function and neurogenesis a suitable endurance training (4) is necessary, which also provides better cardiovascular fitness (5) and has positive effect on angiogenesis. Low-intensity aerobic exercise has positive effect on the visual spatial perception and attention, moderate PA on general cognitive ability, working memory and attention, as well as verbal memory and attention. Most experts recommend vigorous or moderate exercise even though higher intensity requires more attention to PA and less of it to cognitive processes. **Conclusion:** The effects of PA on cognitive functions of the elderly should be the result of improved blood circulation and oxygenation of the brain, which is expected to form more neurons and thereby maintain the brain volume. Regular PA reduces the decline of cognitive abilities and enables »successful ageing«. The question of proper intensity of PA remains unsolved.

Key words: age, ageing, physical activity, cognitive abilities, memory.

Literatura/References:

1. Benedict C, Brooks SJ, Kulberg J, Nordenskjöld R, Burgos J, Le Grevès M, Kilander L, Larsson EM, Johansson L, Ahlström H, Lind L, Schiöth, HB (2013). Association between physical activity and brain health in older adults. *Neurobiol Aging* 34 (1): 83–90.
2. Barnes DE, Yaffe K (2011). The project effect of risk factor reduction on Alzheimer`s disease prevalence. *Lancet Neurol.* 10 (9): 819–28.
3. Erickson KI, Leckie RL, Weinstein AM (2014). Physical activity, fitness, and gray matter volume. *Neurobiol Aging* 35 (2): 20–8.
4. Chodzko-Zalko WJ, Proctor DN, Flatarone Singh M, Minson CT, Nigg CR, Salem GJ, Skinner JS. (2009). American College of Sports Medicine position stand. Exercise and physical activity for older adults. *Med Sci Sports Exerc.* 41 (7): 1510–30.
5. Fisher G, Brown AW, Bohan Brown MM, Alcorn A, Noles C, Winwood L, Allison DB. (2015). High intensity interval- vs moderate Intensity-training for improving cardiometabolic in overweight or obese males: a randomised controlled trial. *Plos One* 10 (10).

Fizioterapija v okviru osnovnega zdravstvenega varstva leta 2016. Do kdaj tako?

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Uvod: Dostopnost do fizioterapevtskih storitev v osnovnem zdravstvenem varstvu se ne izboljšuje. Zavod za zdravstveno zavarovanje Slovenije (ZZZS) je leta 2016 korigiral mrežo fizioterapevtske dejavnosti za 26,3 fizioterapevtskega tima (1) s hkratnim dvigom normativa za izvedbo storitev na posameznega fizioterapevta za 21,54 uteži (3,79 odstotka). Slednje je ob vse večjih potrebah po fizioterapiji naložilo dodatno breme na pleča izvajalcev. Gotovo pa ni rešilo nezadovoljstva uporabnikov, ki jim nerazumno dolge čakalne dobe ne omogočajo hitrejšega okrevanja in s tem boljše kakovosti življenja. **Metode:** V analizi je vključeno realizirano število storitev 152 izvajalcev, razdeljenih v deset območnih enot, s katerimi je imel Zavod za zdravstveno zavarovanje Slovenije leta 2016 sklenjeno pogodbo o izvajanju fizioterapevtskih storitev na področju osnovnega zdravstvenega varstva (2). Porazdelitev programov in njihova realizacija, tako s presežki kot tudi z nedoseganji programa, sta prikazana za skupine izvajalcev zdravstvenih domov, bolnišnic, zdravilišč, koncesionarjev in dveh socialnih zavodov. Prikazani sta število obravnavanih zavarovanih oseb in število čakajočih na nacionalni ravni konec leta 2016. **Rezultati:** ZZZS je z izvajalci sklenil program v velikosti 313. 680,28 uteži, kar je predstavljalo finančna sredstva za delo 531,95 fizioterapevtskega tima (3). 136 izvajalcev je program skupaj presežlo za 30.881,96 uteži (9,8 %). 16 (10,5 %) izvajalcev pogodbenega programa ni realiziralo v skupni velikosti 0,2 % letnega programa ali 590,21 uteži. Največji presežek v izvedbi storitev so dosegli zdravstveni domovi, v katerih je bil program za delo 240,58 fizioterapevtskega tima presežen za 20.000,82 uteži in je predstavljal kar 64,8 % celotnega presežka. Sledijo jim koncesionarji s 4347,25 uteži (14,1 %) in bolnišnice s 3888,01 uteži (12,6 %). Zdravilišča s programom dela za 140,36 fizioterapevtskega tima tega presežejo za 2552,26 uteži (8,3 %), socialna zavoda pa za 93,62 uteži (0,3 %). Ker Zavod za zdravstveno zavarovanje Slovenije plačuje programe le v pogodbenem obsegu, predstavlja znesek vseh neplačanih storitev v deležu obveznega zdravstvenega zavarovanja več kot 1.500.000 evrov. Izvajalci so skupaj obravnavali 162.754 zavarovanih oseb. Kljub presežku v realizaciji storitev je konec leta v seznamu Nacionalnega inštituta za javno zdravje na fizioterapijo čakalo 33.187 zavarovanih oseb (4). Slednje je predstavljalo največje število čakajočih oseb v državi. **Zaključek:** Rezultati kažejo, da se kriza na področju izvajanja fizioterapije v osnovnem zdravstvenem varstvu pogloblja. V dobro tako uporabnikov kot tudi izvajalcev storitev bi se morali odgovorni dejavno vključiti v snovanje nove mreže na področju fizioterapije v osnovnem zdravstvenem varstvu. Da bi dosegli dostopnost fizioterapevtske obravnave brez čakalnih vrst, bi potrebovali dodatnih 178 fizioterapevtskih programov, porazdeljenih po območnih enotah glede na število zavarovanih oseb. Tako bi omogočili fizioterapevtom osnovnega zdravstvenega varstva normalne delovne pogoje in hkrati povečali učinkovitost izvedenih storitev v korist uporabnikov.

Ključne besede: fizioterapija, izvajalci, uteži, presežek, zavarovane osebe.

Physiotherapy in the framework of basic health care in 2016. How much longer this way?

Introduction: The availability of physiotherapeutic treatment in basic health care is not getting better. In 2016 Health Insurance Institute of Slovenia (Zavod za zdravstveno zavarovanje Slovenije – ZZZS) corrected the network of physiotherapeutic activity by adding 26.3 physiotherapeutic teams' work (1) and raising simultaneously the norm for individual physiotherapists by 21.54 weightings (3.79%). Considering the increasing needs for physiotherapeutic treatments this means additional burdening for the practitioners. On the other hand, it is certainly not a solution for the discontented beneficiaries for whom the unreasonably long waiting times represent a serious impediment to faster recovery and better quality of life. **Methods:** The analysis comprises the number of realized treatments of 152 practitioners of physiotherapy divided into ten regional units who had valid contracts with ZZZS in 2016 for physiotherapeutic activity in the field of basic health care (2). The distribution of programs, their realization, with surpluses as well as deficits, is presented for groups of practitioners with community health centers, hospitals, health resorts, licensees and two social institutions. The number of treated insured persons is presented as well as the number of those on the waiting lists on national level at the end of 2016. **Results:** ZZZS contracted with practitioners a program amounting to 313,680.28 weightings, which meant financial means for the work of 531.95 physiotherapeutic teams (3). 136 practitioners together exceeded the program by 30,881.96 weightings (9.8%). 16 (10.5%) practitioners did not realize the contractual program in altogether 0.2% of the annual program or 590.21 weightings. The highest surplus in the realized treatments was attained by community health centers where the working program for 240.58 physiotherapeutic teams was exceeded by 20,000.82 weightings and represented no less than 64.8% of the total surplus. Following are licensees with 4,347.25 weightings (14.1%) and hospitals with 3,888.01 weightings (12.6%). Health resorts with a working program for 140.36 physiotherapeutic teams exceed it by 2,552.26 weightings (8.3%), and the two social institutions by 93.62 weightings (0.3%). Since ZZZS finances programs only within the limits of the contracts, the amount of all unpaid treatments in the share of obligatory health insurance is more than 1,500,000 EUR. The practitioners treated altogether 162,754 insured persons. Despite the surplus in the realization of treatments the waiting list of the National Institute of Public Health for physiotherapy comprised at the end of the year 33,187 insured persons (4). This is the largest number of waiting persons in the country. **Conclusion:** According to the results the crisis in the field of physiotherapeutic treatments in basic health care is getting worse. For the benefit of both the clients and the practitioners those responsible should be more actively involved in the formation of a new framework in the field of physiotherapy in basic health care. In order to make physiotherapeutic treatment accessible without waiting lists we should have additional 178 programs, distributed among regional units according to their numbers of insured persons. This would provide physiotherapists in basic health care with normal working conditions and at the same time improve the efficiency of the realized treatments for the clients' good.

Key words: physiotherapy, practitioners, weightings, surplus, insured persons.

Literatura/References:

1. Aneks št. 1 k Splošnemu dogovoru za pogodbeno leto 2015 <http://www.zzzs.si/ZZZS/info/egradiva.nsf/o/EA9727176319A542C1257F32002BED63?OpenDocument> <22. 1. 2017>.
2. Splošni dogovor za pogodbeno leto 2016 <http://www.zzzs.si/ZZZS/info/egradiva.nsf/o/827714AA6BBB87D2C1257FD40041FCC2?OpenDocument> <22. 2. 2017>.
3. Zavod za zdravstveno zavarovanje Slovenije <http://www.zzzs.si/Izvajalci> <22. 1. 2017>.
4. Nacionalni inštitut za javno zdravje http://www.nijz.si/sites/www.nijz.si/files/publikacije-datoteke/porocilo_nacas_1.1.2017.pdf <22. 2. 2017>.

Fizioterapija pri promociji zdravja na delovnem mestu v podjetjih predelovalne industrije v okviru projekta Zdravi na kvadrat 2

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Uvod: Fizioterapevtska dejavnost se izvaja v različnih okoljih, kar vključuje tudi delovna mesta oziroma podjetja (1). Fizioterapija se ukvarja z opredeljevanjem in izboljševanjem kakovosti posameznikovega življenja ter njegove zmožnosti za gibanje na področjih promocije zdravja, zdravljenja, rehabilitacije in rehabilitacije (1). Po Zakonu o varnosti in zdravju pri delu je delodajalec dolžan načrtovati in izvajati promocijo zdravja na delovnem mestu (2). Vse več zdravstvenih težav je povezanih z nezdravim življenjskim slogom, delovno mesto pa je lahko idealna priložnost za pozitivne spremembe. Namen projekta Zdravi na kvadrat 2, ki poteka pri GZS-Združenju kemijske industrije in ga je finančno podprl ZZS, je dolgoročno prispevati k boljšemu zdravju zaposlenih in zmanjšanju odsotnosti z dela ter k povečanju usposobljenosti odgovornih oseb za promocijo zdravja na delovnem mestu v podjetjih (3). **Metode dela:** Projekt Zdravi na kvadrat 2 je nadaljevanje prvega, ki je potekal od leta 2013 do 2015. S projektom razvijamo celosten praktičen pristop promocije zdravja na delovnem mestu s povezovanjem podjetij in deležnikov na lokalni ravni, ki podpirajo razvoj zdravega življenjskega sloga (3). Področja delovanja so psihosocialna tveganja, ergonomija, prehrana in gibanje zaposlenih. V projekt Zdravi na kvadrat 2 je vključenih 58 podjetij predelovalne industrije. Za natančno oceno stanja in potreb smo za delodajalce in delavce uporabili dva namenska anketna vprašalnika in ju posredovali podjetjem v izpolnitev aprila 2016 (3). **Rezultati:** Spomladi 2016 je v raziskavi stanja in potreb na področju promocije zdravja na delovnem mestu sodelovalo 19 podjetij in 860 delavcev (od tega 55 % moških). Vprašalniki so bili posredovani v 58 podjetij predelovalne industrije, kar pomeni skoraj 33 % odzivnost. Med drugim smo ugotovili, da je imelo v zadnjih 30 dnevih največ v raziskavi sodelujočih delavcev zdravstvene težave zaradi mišično-skeletnih bolečin (križ: 61 %; vrat/ramena: 57 %; drugi sklepi: 41 %). 45 % v raziskavi sodelujočih delavcev pretežno sedi. Obe ciljni skupini si najbolj želita intervencij s področij, kot so obvladovanje stresa (zaposleni: 55 %; menedžment: 67 %), skrb za zdravo hrbtenico (zaposleni: 58 %; menedžment: 50 %) in spodbujanja telesne dejavnosti pri delu (zaposleni: 47 %; menedžment: 44 %). Na podlagi rezultatov smo pripravili poseben strateški načrt intervencij promocije zdravja na delovnem mestu, da bi jih implementirali v raziskavi sodelujočih podjetjih do konca projekta. Od septembra 2015 do marca 2017 je bilo tako izvedenih 13 skupnih seminarjev in usposabljanj za motivatorje promocije zdravja na delovnem mestu, sedem dni zdravja in gibanja, 14 delavnic zdravega življenjskega sloga, v 13 podjetjih so potekale meritve telesne sestave, v šestih prikaz aktivnega odmora, v treh pa demonstracije nordijske hoje. Pri intervencijah, povezanih z gibanjem za zdravje, preprečevanje sedenja, zdravje hrbtenice in ergonomijo, je sodelovalo deset fizioterapevtov (z Nacionalnega inštituta za javno zdravje, iz zdravstvenovzgojnega centra oziroma centra za krepitev zdravja, zasebne prakse). **Zaključki:** Med vsemi strokovnjaki za gibanje delodajalci in delavci najbolj zaupajo prav fizioterapevtu, ker je kot zdravstveni delavec kompetenten za predpisovanje, svetovanje in vodenje programov gibanja za zdravje tako zdravim kot bolnim osebam. Projekt Zdravi na kvadrat 2 ima velik vpliv na zaposlene iz podjetij predelovalne industrije, saj so podjetja glede na udeležbo in odzive zelo zadovoljna z intervencijami in izvajalci. Marsikje je prišlo do konkretnih premikov na področju promocije zdravja na delovnem mestu.

Ključne besede: promocija zdravja na delovnem mestu, fizioterapija, ocena stanja in potreb, intervencije, gibanje.

Physiotherapy with the workplace health promotion in process manufacturing industry enterprises, in the framework of the Healthy on a square project

Introduction: Physiotherapy activities are carried out in a variety of environments, which includes workplaces/companies (1). Physiotherapy deals with defining and improving the quality of an individual's life and their capacity for physical activity in the fields of health promotion (HP), treatment, habilitation and rehabilitation (1). In accordance with the Health and Safety at Work Act, the employer is required to plan and implement workplace health promotion (WHP) (2). A growing number of health problems are connected with unhealthy lifestyles, while the workplace can present an ideal opportunity to make positive changes. The purpose of the Healthy on a Square project (HS) is a long-term contribution to the better health of employees, a reduction of absenteeism, and an increase in the qualifications of persons responsible for WHP in companies (3). **Work Methods:** The project HS 2 is the sequel to the first (in operation from 2013 to 2015). With the project HS 2, we are developing a comprehensive practical approach to WHP by – at a local level –connecting companies and stakeholders, which offer support in the field of healthy lifestyle development (3). The areas of activity include: psychosocial risks, ergonomics, nutrition and movement of employees. The project HS 2 includes 58 process manufacturing industry enterprises. To accurately assess the state and the needs, we used two dedicated survey questionnaires for employers and employees and submitted them to the companies in April 2016 (3). **Results:** In the spring of 2016, 19 companies and 860 employees (55% of which were men) took part in the survey of the state and the needs in the field of WHP. Among other things, we found that in the period of 30 days prior to the survey, most of the participating workers had experienced health problems caused by musculoskeletal pains (lower back: 61%; neck/shoulders: 57%; other joints: 41%). 45% of participating workers usually work in a sitting position. What both target groups want the most are interventions in the fields such as stress management (staff: 55%; management: 67%), spinal care (employees: 58%; management: 50%) and the promotion of physical activity at work (employees: 47%; management: 44%). Based on the results, we have created a specific strategic plan for WHP interventions, with the outlook of its implementation in the companies who partook in the survey before the project completion. Following that, from September 2015 to March 2017, we organised 13 joint seminars and trainings for WHP motivators; 7 days of health and movement; 14 workshops on healthy lifestyle; measurements of body composition in 13 companies; work break (active pause) demonstrations in 6 companies; and Nordic walking demonstrations in 3 companies. 10 physiotherapists participated in the interventions related to the movement for health, sitting prevention, spinal care and ergonomics (from National Institute of Public Health, the health education center/center for the promotion of health, private practices). **Conclusions:** Among all the movement experts, employers and workers trust physiotherapists the most, since as health professionals, they can prescribe, counsel and manage movement for health programmes, both for healthy and sick persons. The project HS 2 has greatly impacted the employees of process manufacturing industry enterprises, since – judging by the participation and the response – the companies have been very satisfied with the interventions and the contractors. In many places, concrete steps forward have been made in the field of WHP.

Key words: workplace health promotion, physiotherapists, assessment of the state and the needs, intervention, physical activity.

Literatura/References:

1. RSK za fizioterapijo (2012). Opis poklica fizioterapevt. Ljubljana: DFS-SZ. www.dfs.si/mojprostor/novica/Opis%20poklica%20fizioterapevt%20RSK%202012.pdf. <10. 3. 2017>.
2. Uradni list RS, št. 43, 2011. Zakon o varnosti in zdravju pri delu (ZVZD-1). <https://www.uradni-list.si/glasilo-uradni-list-rs/vsebina/103969>. <10. 3. 2017>.
3. Backović Juričan A, Dovč A (2016). Promocija zdravja na delovnem mestu v podjetjih predelovalne industrije – projekt Zdravi na kvadrat 2. V: Kongres preventivne medicine 6. Javno zdravje – povezovanje za zdravje [Elektronski vir], Portorož, 22.–22. oktober 2016. Ljubljana: Sekcija za preventivno medicine Slovenskega zdravniškega društva, 127–8.

Vloga fizioterapije pri paliativnem bolniku v rehabilitaciji

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Paliativna medicina raziskuje in skrbi za bolnike z neozdravljivimi boleznimi ter krajšo pričakovano življenjsko dobo. Cilj zdravljenja je omogočiti najboljše mogoče pogoje za najboljšo mogočo kakovost življenja bolnika in njegove družine do konca življenja (1).

Svetovna zdravstvena organizacija opredeljuje paliativno oskrbo kot pristop, ki s preprečevanjem in lajšanjem trpljenja, torej z zgodnjim odkrivanjem in natančno oceno ter zdravljenjem bolečine in drugih fizičnih, psihosocialnih in duhovnih težav izboljšuje kakovost življenja bolnikov in njihovih družin, ki se spoprijemajo s težavami, povezanimi z življenje ogrožajočimi boleznimi (2).

Rehabilitacija v paliativni oskrbi je pogosto spregledana (3). Namen rehabilitacije pri obravnavi bolnikov v paliativni oskrbi je določiti cilj zdravljenja, tako da lahko bolnik ohrani ali izboljša funkcijo in zmanjša posledice bolezni za tako dolgo, kot je mogoče (4). Bolnike z resnimi, življenje ogrožajočimi boleznimi prizadene visoka stopnja funkcionalne izgube z zmanjšanjem neodvisnosti v njihovih vsakodnevnih aktivnostih in mobilnosti (5). Dejavniki, ki prispevajo k izgubi funkcije, so podaljšano bolnišnično zdravljenje, upad zmogljivosti, bolečine, utrudljivost, depresija, podhranjenost, odpoved organov, nevrološke poškodbe in mišično-skeletne težave (3). Postopki fizioterapevtske obravnave so uporabni za številna življenje ogrožajoča in življenje omejujoča stanja, kot so rak in z njim povezana stanja, HIV, nevrodegenerativne bolezni, bolezni dihal, psihiatrične bolezni in spremembe duševnega stanja (6). Rehabilitacija je za bolnika v paliativni oskrbi dostopna v akutni bolnišnični oskrbi, rehabilitacijskih ustanovah, negovalnih bolnišnicah, ambulantah, hospicijih in v domači oskrbi (7). Cilj fizioterapevtske obravnave je obdržati čim večjo neodvisnost in poenostaviti za bolnika pomembne aktivnosti (4). S fizioterapijo pri paliativnem bolniku ne vplivamo le na ohranjanje ali izboljšanje gibanja in funkcijskih sposobnosti, temveč tudi na zaplete, kot so anksioznost, depresija, utrudljivost, oslabelost, bolečina, oteklina, občutek težkega dihanja, slabost in zaprtost (1).

Danes paliativni bolniki živijo dlje zaradi izboljšane zdravstvene oskrbe. Številni med njimi imajo kronično funkcijsko okvaro, ki jo je povzročila bolezen ali medicinski in/ali kirurški posegi, zato je rehabilitacija, katere del je tudi fizioterapija, zelo pomembna (8).

Ključne besede: paliativna oskrba, fizioterapija, rehabilitacija, zapleti, kakovost življenja.

The role of physiotherapy in palliative care of a patient in rehabilitation

Palliative medicine includes care of and research on patients with incurable diseases and short expected survival. The goal of the treatment is to give the best possible conditions to the best possible quality of life for patients and their families for the rest of their lives (1).

World Health Organization defines palliative care as an approach that improves quality of life of patients and their families facing the problem associated with life-threatening illness through prevention and relief of suffering by means of early identification and impeccable assessment, as well as treatment of pain and other physical, psychosocial and spiritual problems (2).

Rehabilitation in palliative care is often overlooked (3). The aim of having a rehabilitative approach when treating patients in palliative care is to set the goal for treatment so the patient can keep or improve functions and reduce the consequences of the disease for as long as possible (4). Patients with a serious life threatening illness experience high levels of functional loss, with decreased independency for their activities of daily living and mobility (5). Among the factors that can contribute to loss of function are prolonged hospitalization, deconditioning, pain, fatigue, depression, undernutrition, organ failure, neurologic injury, and musculoskeletal problems (3). Physiotherapy treatment methods are useful for a range of life threatening and life limiting conditions like cancer and cancer associated conditions, HIV, neurodegenerative disorders, respiratory disorders, psychiatric disorders and altered mental states (6). Settings for delivery of rehabilitation services for palliative care include the acute care hospitals, rehabilitation hospitals, skilled nursing facilities, outpatient clinics, hospice settings and home (7). The goal for the physiotherapeutic treatment is to keep as much independency as possible to make the important activities for the patient easy (4). Physiotherapy in palliative care influences not only maintenance or improvement of the patient's movement or functional abilities but also the complications such as: anxiety, depression, fatigue, weakness, pain, swelling, dyspnoea, nausea, and constipation (1).

Today patients in a palliative stage live with their illness longer thanks to the improved medical treatment. Many of these patients get chronic functional impairment caused by the disease or by medical or surgical treatments. This makes rehabilitation and physiotherapy very important (8).

Key words: palliative care, physiotherapy, rehabilitation, complications, quality of life.

Literatura/References:

1. Physiotherapy in palliative care – a clinical handbook. Frymark U, Hallgren L, Reisberg AC. <http://www.stockholmssjukhem.se/Documents/SPN/Physiotherapy%20in%20palliative%20care%20-%20a%20clinical%20handbook.pdf> <23. 2. 2017>.
2. WHO Definition of Palliative Care. <http://www.who.int/cancer/palliative/definition/en/>.
3. Javier NS, Montagnini ML (2011). Rehabilitation of the hospice and palliative care patient. *J Palliat Med* 14: 638.
4. Bruera E, Higginson I, Ripamonti C, von Gunten C (2006). Textbook of palliative medicine, Oxford university press inc USA.
5. Jordhoy MS, Inger Ringdal G, Helbostad JL et al (2007). Assessing physical functioning: a systematic review of quality of life measures developed for use in palliative care. *Palliat Med* 21: 673.
6. Kumar SP, Jim A (2010). Physical therapy in palliative care: from symptom control to quality of life: a critical review. *Indian J Palliat Care* 16 (3): 138–46.
7. Montagnini M, Noelle MJ. Physical therapy and other rehabilitation issues in the palliative care setting. <http://www.uptodate.com/contents/physical-therapy-and-other-rehabilitation-issues-in-the-palliative-care-setting> <21. 2. 2017>.
8. Doyle D, Hanks G, Cherny N, Calman K (2004). Oxford textbook of palliative medicine. Third edition.

Mreža pokritosti in značilnosti fizioterapevtskih obravnav na primarni ravni leta 2015

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Uvod: Fizioterapija na primarni ravni se na podlagi šifrantna vrst vodi pod številko 507 028. Izvaja se v zdravstvenih domovih, bolnišnicah, zdraviliščih, socialnih zavodih in pri zasebnikih s koncesijo. Fizioterapevti na primarni ravni načrtujejo delo v številu uteži in obravnav. Leta 2015 je bilo določeno, da mora fizioterapevt opraviti 568,19 uteži in 286 obravnav (1). Predvideno število obravnav je bilo 329. Ker je fizioterapija na primarni ravni javna služba, se opravlja v okviru mreže pokritosti (2). Leta 2015 naj bi en fizioterapevt pokrival 3978 zavarovancev (1). Namen dela je opraviti poglobljeno statistično analizo podatkov o številu obravnavanih primerov posameznih izvajalcev fizioterapije na primarni ravni in preveriti dostopnost do fizioterapevtskih storitev. **Metode:** Literatura je bila iskana v Cobbisu in PubMedu. Pregledani so bili zakonska podlaga in splošni dogovori. Podatki, uporabljeni za statistično obdelavo, so bili povzeti s spletnih strani ZZZS. Uporabili smo podatke vseh izvajalcev fizioterapije na primarni ravni. Od statističnih metod so bile uporabljene mere središčnosti in razpršenosti, odstotni račun ter Studentov t-test za neodvisne vzorce. **Rezultati:** 506,61 fizioterapevta je naredilo skupno 161.412 obravnav. Fizioterapevt v povprečju pokriva 4043 zavarovanih oseb. Med območnimi enotami se pojavljajo občutne razlike v pokritosti. Najbolje je pokrita območna enota Celje, najslabše pa je pokrita območna enota Ljubljana. Velike razlike v pokritosti je opaziti tudi med izpostavami znotraj območnih enot. Približno polovico obravnav so naredili zdravstveni domovi. Predvideno število obravnav je doseglo 42 odstotkov izvajalcev. Minimalno število obravnav je doseglo 85 odstotkov izvajalcev. Analiza je pokazala, da število fizioterapevtov pri izvajalcu ne vpliva na realizirano število obravnav izvajalca. **Zaključek:** Fizioterapevska dejavnost na primarni ravni ni enakomerno porazdeljena znotraj Slovenije. Največ obravnav naredijo zdravstveni domovi. Izvajalci težko dosežejo predvideno število obravnav, minimalno število obravnav pa v večini realizirajo. Nekateri izvajalci so opravili veliko več obravnav od predvidenega števila, pri takih bi bilo treba preveriti kakovost storitev. Ustanove z več fizioterapevti ne dosežejo večjega števila obravnav. Kot možna rešitev problematike se omenjata neposredni dostop in razširitev vloge fizioterapevtov. Obravnavano področje je precej slabo raziskano, zato bi bile potrebne dodatne raziskave.

Ključne besede: fizioterapija na primarni ravni, mreža pokritosti, obravnave, izvajalci.

Network of coverage and features of physiotherapy treatments at the primary level of health care in the year of 2015

Background: Physiotherapy at the primary level is listed under the number 507 028. It is carried out in health centers, hospitals, spas, social institutions and in private practices with concession. Physiotherapists at the primary level plan their work in the number of weights and treatments. In the year 2015, it was determined that a physiotherapist carries out 568.19 weights and 286 treatments (1). The estimated number of treatments was 329. Since physiotherapy at the primary level is a public service it is arranged through the network of coverage (2). In 2015, one physiotherapist covered 3978 insured individuals (1). The purpose of the work is in-depth statistical analysis of data on the number of cases dealt with individual providers of physiotherapy at the primary level, and to check availability of physiotherapy services. **Methods:** The literature was searched in Cobiss and PubMed. The legal basis and general arrangements were also examined. The data used for the statistical analysis was summarized from the websites of the Health Insurance Institute of Slovenia. Statistical methods used are a degree of centrality and variability, percentage, and Student t-test for independent samples. **Results:** 506.61 physiotherapists made a total of 161,412 treatments. At the national level, a single physiotherapist covers 4,043 insured individuals on average, between regional units significant differences occur. The best covered regional unit is Celje, the worst covered regional unit is Ljubljana. Big differences in coverage were observed among city municipalities within the regional units. Health care centers made approximately half of the treatments. Planned number of treatments was reached by 42 % of the providers. Minimal number of treatments was reached by 85 % of the providers. Analysis showed that the size of the team does not affect the number of treatments. **Conclusion:** Physiotherapy activity at the primary level is not evenly distributed within Slovenia. Health centers made most of the treatments. Most providers have not reached the planned number of treatments; the minimum number of treatments is accessible. Certain providers exceeded the planned number of treatments. In such cases, the quality of work should be inspected. Providers with numerous teams do not reach a greater number of treatments. As a possible wholesome solution for the listed problems direct access and expanded role of physiotherapist should be taken into consideration. The presented subject is poorly researched, so additional studies are needed.

Key words: physiotherapy in primary health care, network of coverage, treatments, providers.

Literatura/References:

1. ZZS (2015a). Splošni dogovor za pogodbeno leto 2015.
Dostopno na: <http://www.zzs.si/egradivap/2EC3F2AC07922434C1257E7C0040094A>
<20. 2. 2016>.
2. Zakon o zdravstveni dejavnosti (ZZDej) (2005). Uradni list RS 05 (23).

Načini merjenja razmika preme trebušne mišice –pregled literature

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Uvod: Razmik preme trebušne mišice je stanje, pri katerem pride do nenormalnega razmika med trebuhoma preme trebušne mišice vzdolž bele črte zaradi njene raztegnitve (1). Največkrat se pojavi pri ženskah med nosečnostjo in po porodu (2, 3). Fizioterapevt si pri pregledu in postavitvi fizioterapevske diagnoze pomaga z različnimi metodami merjenja razmika preme trebušne mišice (4). Namen pregleda literature je bil na podlagi pregleda strokovne in znanstvene literature predstaviti metode merjenja, ki se uporabljajo pri razmiku preme trebušne mišice, ter ugotoviti njihovo zanesljivost in veljavnost. **Metode:** Uporabljena je bila deskriptivna oziroma opisna metoda. Za tehniko zbiranja in analize podatkov je bil izbran pregled literature s podatkovnimi bazami PubMed, Science direct, SpringerLink, Dikul, Cochrane, PEDro in drugimi. Iskanje literature je potekalo tudi ročno v različnih strokovnih revijah in knjigah, omejeno je bilo na članke v angleškem in slovenskem jeziku. Članki obsegajo obdobje od leta 1987 do 2015. **Rezultati:** Po iskalni strategiji je merilom izbora ustrezalo enajst raziskav. V klinični praksi je metoda merjenja razmika preme trebušne mišice s prsti še vedno najbolj razširjena metoda, čeprav, če jo uporablja več preiskovalcev, zaradi različne debeline prstov oziroma različne interpretacije dobljenih rezultatov ni zanesljiva. Kljunasto merilo se je izkazalo za zanesljivo pri opravljanju meritev v predelu popka in nad njim. Najbolj zanesljiv in hkrati veljaven merilni instrument za merjenje razmika je ultrazvok. Na tem področju je bilo opravljenih tudi največ raziskav. V klinični praksi ultrazvoka žal ne uporabljamo velikokrat, ker je predrag in zahteva posebna usposabljanja za fizioterapevta. **Sklep:** Pri pregledu literature je bilo najdenih malo strokovnih in znanstvenih raziskav s tega področja. V prihodnosti bi potrebovali nadaljnje in bolj poglobljene študije. Uvesti bi bilo treba tudi standardni protokol, ki bi vključeval kritično mejo (širino), ki predstavlja patološki razmik preme trebušne mišice, točno določiti lokacijo za merjenje razmika in določiti, kaj pomeni širina prstov v centimetrih. Le tako nam bodo dobljeni izmerjeni podatki pravilno služili.

Ključne besede: razmik preme trebušne mišice, merilna orodja, veljavnost, zanesljivost.

Measurement methods for diastasis of the rectus abdominis muscle – literature review

Introduction: Diastasis recti abdominis muscle is a condition where there is abnormal separation of rectus abdominis muscle along the white lines as a result of its stretching (1). Most often it occurs in women during pregnancy and after childbirth (2, 3). During reviewing and setting physiotherapy diagnosis, physiotherapist helps himself with different methods of measuring the distance of rectus abdominis muscle (4). The purpose of the thesis is based on a review of technical and scientific literature to present the measurement methods used in diastasis recti abdominis muscle and determine their reliability and validity. **Methods:** In this thesis the descriptive method was conducted. Data collection and analysis were based on the overview of the literature, using the databases PubMed, Science Direct, SpringerLink, Dikul, Cochrane, Pedro and other. Literature search was conducted manually in various professional journals and books. The search was limited to articles in English and Slovene, published between 1987 and 2015. **Results:** According to the search strategy, 11 studies complied with the inclusion criteria. In clinical practice, a method of measuring the distance rectus abdominis muscle, using fingers, is still the most widely used method, although it is unreliable, when it is used by several raters, because of the different thickness of the fingers or different interpretations of the results. Caliper has proved to be reliable in performing measurements in the area of the umbilicus and above. The most reliable and at the same time a valid measuring instrument for measuring the separation is ultrasound. In this area, also the most studies have been done. In clinical practice, unfortunately, it is not used often because it is too expensive and requires special training for physical therapist. **Conclusion:** During the review of the literature, not many technical and scientific researches were found in this field. In the future, it would require further and more in-depth study. There should be a standard protocol that would include a critical threshold (width), which represents the pathological separation rectus abdominis muscle, to accurately determine the location of the measurement and, of course, to determine what constitutes a finger width in centimeters. Only in this way the obtained and measured data will be useful.

Key words: diastasis recti abdominis, measuring tools, validity, reliability.

Literatura/References:

1. Noble E (1982). *Essential Exercises for the Childbearing Year*, ed 2. Boston, MA, Houghton Mifflin Co 45–81.
2. Boissonault JS, Blaschak MJ (1988). Incidence of diastasis recti abdominis during the childbearing year. *Phys Ther* 68 (7):1082–6.
3. Gillearn W, Brown M (1996). Structure and function of the abdominal muscles in primigravid subjects during pregnancy and the immediate post partum period. *Phys Ther* 76 (7): 750–62.
4. Van de Water, Benjamin DR (2016). Measure methods to assess diastasis of the rectus abdominis muscle (DRAM): A systematic review of their measurement properties and meta- analytic reliability generalization. *Man Ther* 21: 41–53.

Ocenjevalno-triažni postopek pri pacientih s sindromom fibromialgija na Univerzitetnem rehabilitacijskem inštitutu Republike Slovenije - Soča, Ljubljana

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Uvod: Sindrom fibromialgije je kronično idiopatsko stanje z razširjeno mišično-skeletno bolečino (1). Simptomatika vključuje pacienta celostno, kar pomeni, da vključuje njegovo telesno, čustveno in socialno področje (2, 3). Zdravljenje z zdravili ni zadostno, temveč ga je treba oblikovati po bio-psiho-socialnem modelu (2, 3). Na URI - Soča smo oblikovali interdisciplinarni tim, ki temelji na tem pristopu. Izvajamo dva programa, in sicer prilagojeni štiritedenski in intenzivnejši pettedenski program. **Namen:** Namen prispevka je predstaviti ocenjevalno-triažni postopek pacientov s sindromom fibromialgija, ki ga izvajamo na URI - Soča. **Metode dela:** Pred vsako obravnavo pacienta s fibromialgijo je ta vključen v ocenjevalno-triažni pregled, v katerem ga ocenijo zdravnik, psiholog, fizioterapevt in socialni delavec. V prispevku se usmerimo na fizioterapevtsko testiranje, ki vključuje šestminutni test hoje, vizualno analogno lestvico pred testom hoje in po njem, Bergovo ravnotežno lestvico in meritve aktivne gibljivosti. **Rezultati:** Leta 2014 sta bila v ocenjevalno-triažni postopek vključena 202 pacienta. Interdisciplinarni tim je na podlagi testiranja odločil, da je 53 pacientov primernih za vključitev v prilagojen program, 34 za intenzivnejši program in 25 za individualen pristop. 90 pacientov ni bilo primernih za vključitev v obravnavo v naši ustanovi. **Zaključek:** Rezultati ocenjevalno-triažnega postopka nakazujejo, da pacienti z zelo visoko oceno bolečine po vizualni analogni lestvici dosegajo pomembno nižje rezultate pri šestminutnem testu hoje, Bergovi ravnotežni lestvici in aktivni gibljivosti ter tudi težje sledijo programu, zato jih ne vključujemo v zahtevnejše oblike programa, temveč jih usmerimo v individualen program, center za poklicno rehabilitacijo ali invalidsko komisijo. V intenzivnejši pettedenski program so vključeni pacienti, ki v povprečju dosegajo najboljše rezultate na vseh fizioterapevtskih testiranjih, v prilagojeni program pa so vključeni tisti, ki na vseh testiranjih dosegajo zmerne rezultate.

Ključne besede: kronično razširjena bolečina, interdisciplinarni rehabilitacijski program, ocenjevalni postopki.

The process of triage assessment process of patients with fibromyalgia syndrome at the University Rehabilitation Institute of the Republic of Slovenia – Soča, Ljubljana

Introduction: Fibromyalgia syndrome (FMS) is a chronic, idiopathic condition of widespread musculoskeletal pain (1). Symptomatology includes patient's overall functioning. It integrates his physical, psychical and social functioning (2, 3). This is why the medical model of treatment has to be replaced with the bio-psycho-social approach (2, 3). At the URI - Soča, we have formed an interdisciplinary team, which is based on the bio-psycho-social model. We implement two programs at the URI - Soča: an adjusted four-week and intensive five-week program. **Purpose:** The purpose of this paper is to describe the process of triage assessment for people with FMS. **Methods:** Before each treatment all patients with FMS are included in the triage assessment. They are assessed by a doctor, a psychologist, a physiotherapist and a social worker. In this presentation we are focused on physiotherapy testing, which includes six-minute walk test, a visual analogue scale before and after the walk test, Berg balance scale and measurements of the active range of motion. **Results:** In the 2014, 202 patients were included in the process of triage assessment. On the basis of the assessment, the interdisciplinary team decided that the 53 patients were eligible for inclusion in the adjusted program, 34 in the intensive program and 25 for an individual program. 90 patients were not suitable for inclusion in any treatment in our institution. **Conclusion:** The results of the triage assessment process suggested that patients with very high pain assessment by visual analogue scale achieved significantly lower results at six-minute walk test, Berg balance scale and active range of motion. We noticed that these patients had difficulties to follow the program, so they are not included in the advanced form of the program, but we directed them to the individual program, Centre for Vocational Rehabilitation and disability commission. Patients with the average best results on all physiotherapeutic tests are included in the intensive five-week program; those with moderate results on these scales are included in the adjusted program.

Key words: chronic widespread pain, interdisciplinary rehabilitation program, triage examination.

Literatura/References:

1. Theoharides TC, Tsilioni I, Arbetman L et al. (2015). Fibromyalgia Syndrome in Need of Effective Treatments. *J pharmacol Exp Ther* 355: 255–63.
2. Gatchel JR, McGeary DD, McGeary CA, Lippe B (2014). Interdisciplinary Chronic Pain Management: Past, Present, and Future. *American Psychologist* 69 (2): 119–30.
3. Kamper SJ, Apeldoorn AT, Chiarotto A et al. (2014). Multidisciplinary biopsychosocial rehabilitation for chronic low back pain. *Cochrane systematic review and meta-analysis. BMJ* 2015; 350.

Znanje, stališča in prepričanja pomurskih fizioterapevtov o telesni dejavnosti ter njihova vloga pri spodbujanju telesne dejavnosti

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Uvod: V raziskavi CINDI Slovenija 2002 do 2003 je bilo ugotovljeno, da je med odraslimi Slovenci zadosti telesno dejavnih samo 32,4 odstotka odraslih prebivalcev v starostni skupini od 25 do 64 let (1). Svetovna organizacija fizioterapevtov trdi, da so fizioterapevti po svoji izobrazbi pravi strokovnjaki za spodbujanje telesne dejavnosti (2). Medtem ko se po vsem svetu kopičijo dokazi spodbujanja telesne dejavnosti, nastaja potreba po raziskavah, ki se osredotočajo na to, kako fizioterapevske stroke prenašajo te dokaze v klinično prakso (3). Namen raziskave je bil raziskati odnose med znanjem pomurskih fizioterapevtov, njihovimi stališči in prepričanji o telesni dejavnosti in njihovim spodbujanjem telesne dejavnosti ter jih primerjati z raziskavo v Belgiji (3). **Metode dela:** Uporabljena je bila kvantitativna metoda raziskovanja. Kot raziskovalni instrument smo uporabili anketni vprašalnik, ki je bil preveden iz angleškega jezika. Prvi del anketnega vprašalnika je obsegal vprašanja z demografskimi podatki (spol, starost, strokovni naziv, leta delovnih izkušenj in delovno mesto) ter osebnimi telesnimi značilnostmi anketirancev (telesna višina in telesna teža), s pomočjo katerih je bil izračunan indeks telesne mase. Drugi del anketnega vprašalnika je vključeval sedem odprtih vprašanj vprašalnika mednarodne telesne dejavnosti – IPAQ-S. Temu je sledilo šest vprašanj odprtega tipa, s katerimi so se ugotavljali znanje, stališča in prepričanja o telesni dejavnosti ter njihova vloga pri spodbujanju telesne dejavnosti (3). V raziskavi je sodelovalo 55 fizioterapevtov, zaposlenih v pomurski regiji. **Rezultati:** Pri pomurskih fizioterapevtih je bila povprečna vrednost vprašalnika mednarodne telesne dejavnosti 1971,38 ($\pm 1589,42$). Skupni povprečni rezultat znanja, stališč in prepričanj o telesni dejavnosti med anketiranimi fizioterapevti je znašal $15,956 \pm 3,66$ od 25 možnih točk. **Zaključki:** V primerjavi rezultatov vprašalnika mednarodne telesne dejavnosti z belgijsko raziskavo je bilo ugotovljeno, da so pomurski fizioterapevti v povprečju dosegli višjo povprečno vrednost, kar pomeni, da so v povprečju telesno bolj dejavni. Prav tako je bilo ugotovljeno, da je skupni povprečni rezultat znanja, stališč in prepričanj o telesni dejavnosti med anketiranimi pomurskimi fizioterapevti višji kot med anketiranimi fizioterapevti v belgijski raziskavi. Zasluge za to lahko pripišemo kakovostno zastavljenemu visokošolskemu študijskemu programu na področju fizioterapije v Sloveniji in nacionalnim projektom, ki spodbujajo telesno dejavnost pod vodstvom CINDI Slovenija.

Ključne besede: telesna dejavnost, spodbujanje, fizioterapevti.

Knowledge, attitudes and beliefs of the pomurje physiotherapists about activity and their role in physical activity promotion

Background: The research study CINDI Slovenia 2002 to 2003 found, that only 32.4% of adult Slovenes from the age of 25 to 64 are sufficiently physically active (1). The World Confederation for Physical Therapy claims, that physiotherapists are the true experts for promoting physical activity due to their education (2). While the evidence to promote physical activity accumulates across the world, it creates a need for research, focusing on how the profession of physiotherapy transmits the evidence into clinical practice (3). The purpose of the study was to examine the relationships between Pomurje physical therapists' knowledge, attitudes and beliefs towards physical activity, and their physical activity promotion, and also to compare the results with the study in Belgium (3). **Methods:** Quantitative research method was used in this study. As a research tool a questionnaire was used, which had been translated from English. The first part of the questionnaire included questions on demographic data (gender, age, professional title, years of work experience, workplace) and personal physical characteristics of the respondents (body height, body weight) by which the body mass index was calculated. The second part of the questionnaire consisted of seven open-ended questions of the International Physical Activity Questionnaire – (IPAQ-S). This was followed by a series of six open-ended questions, by which the knowledge, attitudes and beliefs towards physical activity and their role in physical activity promotion were found. (3). The study involved 55 physical therapists employed in the Pomurje region. **Results:** In physical therapists from Pomurje, the average value of the International Physical Activity Questionnaire was 1971.38 (± 1589.42). The overall score of knowledge, attitudes, and beliefs about physical activity among the interviewed physical therapists was 15.956 ± 3.66 out of 25. **Conclusion:** The comparison of the results of the International Physical Activity Questionnaire (IPAQ-S) between the Belgian study and the current study found that the physical therapists from Pomurje achieved a higher average value, meaning they are physically more active. It was also found that the total average score of knowledge, attitudes, and beliefs about physical activity among the interviewed physical therapists from Pomurje is higher than among respondents in the Belgian study. The credit for this can be attributed to the quality higher education program in the field of physiotherapy in Slovenia and many national projects for promoting physical activity led by CINDI Slovenia.

Key words: physical activity, promotion, physical therapists.

Literatura/References:

1. Fras Z, Maučec Zakotnik J, Zupančič A, in sod. (2007). Nacionalni program spodbujanja telesne dejavnosti za krepitev zdravja od 2007 do 2012: povzeto po strategiji Vlade Republike Slovenije na področju telesne (gibalne) dejavnosti za krepitev zdravja od 2007 do 2012. Ljubljana: Ministrstvo za zdravje, 8–9.
2. World Confederation for Physical Therapy (2007). Position Statement – Physical therapists as the exercise experts across the life span. General meeting 16 June. London.
3. Mouton A, Mugnier B, Demoulin C, Cloes M (2014). Physical Therapists' Knowledge, Attitudes, and Beliefs About Physical Activity: A Prerequisite to Their Role in Physical Activity Promotion? *Journal of Physical Therapy Education* (Vol. 28): 120–7.

Pridobitev poklicne kvalifikacije za poklic fizioterapevt v Republiki Sloveniji s primeri držav Evropske unije

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Uvod: Raziskava predstavlja primerjalno-pravni pregled in umestitev Slovenije v Evropi glede pridobitve poklicne kvalifikacije za opravljanje poklica fizioterapevt. Za pridobitev poklicne kvalifikacije za poklic fizioterapevt je v državah članicah Evropske unije (EU) zahtevano izpolnjevanje različnih pogojev. V Sloveniji traja visokošolski strokovni študij tri leta in obsega 180 ECTS. Diplomirani fizioterapevt ne more samostojno opravljati fizioterapevskega poklica, dokler v skladu z določili Zakona o zdravstveni dejavnosti (1) ne opravi pripravništva in strokovnega izpita. Raziskava primerja države članice glede na leta študija in ugotavlja, ali sta po diplomi praksa in strokovni izpit ter ali deluje fizioterapevt kot primarni stik z možnostjo postavljanja diagnoze. **Metode:** Znanstveni članek temelji na kvalitativni raziskavi, in sicer na pregledu sekundarnih podatkov, ki so dopolnjeni s komparativno metodo. V raziskovalni vzorec je bilo vključenih vseh 28 držav članic EU. Izbor podatkov je temeljil na zbiranju kvantitativnih in kvalitativnih podatkov za vsako izmed 28 držav EU posebej. **Rezultati:** Že ugotovitve različnih mednarodnih raziskav v ekonomiji in ekonomski svobodi (2) opozarjajo na neskladnost slovenske zakonodaje na področju izobraževanja in pridobivanja poklicne kvalifikacije. Postopek formalnega priznanja delovne, poklicne oziroma strokovne usposobljenosti za opravljanje poklica fizioterapevt v Sloveniji je primerljiv s Hrvaško, Romunijo in Liechtensteinom. V Sloveniji pripravništvo po diplomi ni urejeno sistemsko, kar pomeni, da si ga mora diplomant fizioterapije urediti sam. To pa je odvisno od finančne likvidnosti države in zavoda, v katerem se pripravništvo izvaja, kar povzroča zaostajanje za diplomanti drugih držav, ki pripravništva nimajo. Poleg tega v Sloveniji nimamo sistema samonapitve (3). Slovensko združenje fizioterapevtov je leta 2016 podalo predlog po zgledu uspešne prakse v drugih evropskih državah na tem področju. Slovenija spada tudi med države, v katerih fizioterapevt ne sme postavljati diagnoze, postavi jo lahko le zdravnik. Fizioterapija se je v Sloveniji tako kot tudi drugod razvila v samostojno strokovnoznanstveno dejavnost, vendar se stopnja avtonomnosti fizioterapevta po posameznih državah v Evropski uniji razlikuje. Vidimo, da ima slovenska fizioterapija pomanjkljivosti v regulaciji in organizaciji stroke. Obstaja viden interes, da bi bili slovenski fizioterapevti obravnavani kot avtonomni zdravstveni delavci z večjim obsegom kompetenc. **Zaključki:** Klinično delo in izobraževanje za poklic fizioterapevta se v državah članicah Evropske unije razlikujeta, hkrati pa se oblikuje skupen evropski trg dela. Slovenski fizioterapevti bi na skupen evropski delovni trg vstopali bolj enakovredno, če bi Slovenija spremenila zakonodajo s področja obveznega opravljanja pripravništva ter regulirala zakonodajo in tako odpravila pomanjkljivosti fizioterapevta, kot je sistem samonapitve ter postavljanja diagnoze.

Ključne besede: formalno priznanje, zakonodaja, fizioterapija, skupen trg dela EU, konkurenčnost.

The acquisition of professional qualification for the profession of physiotherapist in the Republic of Slovenia with examples of member states of the European Union

Background: The purpose of this scientific article is to explore and compare different European practices that enable one access to pursue the physiotherapy profession. To achieve that we rely on both the comparative and legal overview to establish the placement of Slovenia within the European area concerning the acquisition of professional qualifications required to practise the profession of a physiotherapist. A physiotherapist (BA) cannot independently perform his physiotherapeutical profession until he has officially finished his internship and successfully passed his professional exam, which in accordance with the laws of the Act on medical activity (1) endows him with full professional qualifications. Professional qualifications give a physiotherapist autonomy to exercise all his professional activities. Of course, the field of physiotherapy in Slovenia as well as in other developed countries has become an independent scientific expertise, but the extent of autonomy among the EU countries differs substantially. **Methods:** The scientific article is based on a qualitative study which minutely analyses all thus collected currently existing secondary data which have been upgraded by using comparative methods. The research sample embodied all 28 EU member states. Thus, the selection of data was based on the collection of these for each of the 28 EU countries respectively. **Results:** The conclusions of various international researches so far have proved that there is a lack of accordance (2) when it comes to the programs of university studies and the acquisition of professional qualifications. The process of official recognition of vocational qualifications necessary for the pursuit of the profession of a physical therapist in Slovenia is comparable to Croatia, Romania and Liechtenstein. Slovenia belongs to a handful of four EU countries, which require specific internships after the university graduation. Moreover, the internship in Slovenia is not regulated systematically, which means that individuals need to arrange it for themselves, which again in itself depends on the solvency of the country and each institution respectively. In this respect physical therapists (BA) are lagging behind their colleagues from other countries where internship is not a must. Besides, in Slovenia there is no possibility for one's own referral to physical therapists (3). The Slovenian Association of Physiotherapists made a proposition in 2016 to consider a self-referral as a solution that already exists in the majority of EU countries. What is more, Slovenia belongs to a group of countries where physical therapists are exempt from making a diagnosis; only doctors can do that. All things considered, physiotherapy in Slovenia obviously lacks in internal regulations and the organisation within the field itself, which would endow physical therapists with more autonomy and a wider scope of competences. **Conclusions:** Clinical work and training for the profession of a physical therapist in the EU member states is different, while at the same time a common EU labour market is being developed. If Slovenia agreed to change the legislation governing the mandatory internship following the university graduation, Slovenian physiotherapists could access the European labour market more equally, which would further enable physiotherapists from the EU countries a better chance to upgrade their knowledge and be more actively involved in lifelong education across Europe.

Key words: Formal recognition, legislation, physiotherapy, common EU labour market, competitiveness.

Literatura/References:

1. Zakon o zdravstveni dejavnosti. Uradni list Republike Slovenije št. 9/92, s spremembami.
2. Slovenija in ekonomska svoboda. TV Slovenija dne 28. 10. 2011. Dostopno na: <https://www.youtube.com/watch?v=cc0sIHv91f8> (31. 8. 2016). Economic Survey of Slovenia 2015. OECD. 2016. Dostopno na: <http://www.oecd.org/eco/surveys/economic-survey-slovenia.htm> (31. 8. 2016).
3. Lovinčič H. Predlog za dostop do fizioterapevta brez napotnice. MMC RTV Slovenija. 2016. Dostopno na: <http://www.rtvlo.si/zdravje/novice/predlog-za-dostop-do-fizioterapevta-brez-napotnice/402228> (31. 8. 2016).

Rehabilitacija po delni amputaciji roke zaradi vojne poškodbe – poročilo o primeru

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Uvod: Fizioterapija ima pomembno vlogo v rehabilitaciji vojnih poškodb in delo fizioterapevta je med vojaki dobro sprejeto ter spoštovano (1). Incidenca parcialnih ročnih amputacij je pri moških od tri- do šestkrat večja kot pri ženskah (2). Namen prispevka je prikaz rehabilitacije vojaka po poškodbi levega zgornjega uda. **Metode:** 26-letni tuji vojak je štiri mesece pred začetkom obravnave utrpel delno amputacijo leve roke po eksploziji na tujem bojišču. Prišlo je do zloma proksimalne falange 3. prsta, amputacije 5. prsta po zlomu, do eksartikulacije 2. prsta in amputacije 4. prsta po zlomu proksimalne falange. Utrpel je večplastne poškodbe živcev medianusa, ulnarisa in radialisa. Utrpel je tudi udarec v prsni koš, desno stegno, levo ramo in blago poškodbo glave. Prisotne so nevropatska bolečina po poškodbi živcev, fantomska bolečina, ki je najhujša v predelu 4. in 5. prsta, ter distonija v predelu 3. prsta. Pred obravnavo in po njej so bili izvedeni manualno testiranje mišic, meritve gibljivosti sklepov, vidna analogna lestvica (VAL) za oceno bolečine, meritev obsegov udov in test za sensoriko. Pacient je bil vključen v fizioterapijo in delovno terapijo, ne pa v psihološko obravnavo, ker je bila ovira jezikovno sporazumevanje. V fizioterapiji so bile izvajane individualna kinezioterapija, sklepna mobilizacija za povečanje gibljivosti, terapija z ogledalom, protibolečinska transkutana električna nevrostimulacija (TENS) in terapija za zmanjšanje brazgotin. V delovni terapiji je bila izdelana elastična opornica za izboljšanje opozicije, vključevani so bili tudi elementi desenzitizacije (1, 3). Terapija je trajala tri tedne, štiri ure na dan. **Rezultati:** Mišični test ob odpustu kaže popoln gib v vertikalni smeri z normalnim uporom v ramenskih in komolčnih mišicah ter mišicah zapestja. Mišice palca in sredinca so napredovale iz nepopolnega giba v vertikalni smeri do popolnega giba z minimalnim uporom. Gibljivost v ramenskem sklepu, komolcu, zapestju in palcu se je izboljšala do normalne stopnje. V vseh sklepih sredinca so bile na začetku prisotne močne kontrakture, na koncu pa so se zmanjšale, tako da sklene palec s sredincem. Bolečine so se med obravnavo zmanjšale, po vidni analogni lestvici na začetku iz 7 na 4 ob zaključku. Sensorika se v treh tednih ni spremenila. **Zaključki:** Pacient je po obravnavi pridobil sklepno gibljivost in mišično moč, brazgotine so se zmečale in postale bolj elastične, zmanjšala se je bolečina in izboljšala se je funkcija leve roke pri aktivnostih, ker lahko sklene palec z edinim prstom sredincem.

Ključne besede: delna amputacija, prsti, vojna poškodba, rehabilitacija, fizioterapija.

Rehabilitation after partial hand amputation because of the war injury – case report

Background: Physical therapy has an important role in the rehabilitation of war injuries and is well received and respected by soldiers (1). The incidence of partial hand amputation is 3 to 6 times higher in men than in women (2). The purpose of this paper is to show the rehabilitation of a soldier after injury of the left upper limb. **Methods:** A 26-year-old foreign male soldier suffered partial hand amputation after an explosion 4 months before therapy. There was minor damage to the thumb, exarticulation of the first finger, fracture of the proximal phalanx of the second finger, third finger amputated due to fracture of the proximal phalanx, and fourth finger amputated due to fracture of phalanx. He suffered multifaceted damage to the medianus, ulnaris and radialis nerves. He also suffered a blow to the chest, right thigh, and left shoulder. There was neuropathic pain after nerve injury and phantom pain which was the worst in the region of the third and the fourth finger, as well as dystonia in the area of the second finger. Before and after therapy muscle testing, range of motion (ROM), visual analog scale (VAS) for pain assessment, limb circumference, and sensitivity were evaluated to assess the functional status. The patient participated in physical therapy and occupational therapy but did not receive psychological therapy due to the language communication problem. The physical therapy program included individual kinesiotherapy, joint mobilization to increase mobility, mirror therapy, transcutaneous electrical nerve stimulation (TENS), and massage to reduce scar tissue. In occupational therapy an elastic splint was made to improve opposition and treatment included elements of desensitization (1, 3). Therapy lasted 3 weeks, 4 hours per day. **Results:** Muscle test results after treatment show full vertical movement with normal resistance in the shoulder, elbow and wrist muscles. Thumb and middle finger muscles improved from incomplete vertical movement to complete movement with minimal resistance. ROM of shoulder, elbow, wrist and thumb joints improved to normal. In the beginning strong contractions were present in all joints of the middle finger, in the end contractions were reduced so that he could touch thumb to middle finger. During the treatment the pain decreased from 7 to 4 according to VAS. Sensitivity did not change in three weeks. **Conclusions:** After the treatment the patient acquired joint mobility, muscle strength, softened and more elastic scar tissue, reduced pain, and improved function of the left hand because he can now connect the thumb to the remaining middle finger.

Key words: partial amputation, finger, war injury, rehabilitation, physical therapy.

Literatura/References:

1. Springer B, Doukas WC (2006). Process of care for battle casualties at Walter Reed Army Medical Center: part II. Physical therapy service. *Mil Med*; 171 (3): 203–5.
2. Burger H, Maver T, Marincek C (2007). Partial hand amputation and work. *Disabil and Rehabil*; 29 (17): 1317–21.
3. Smurr LM, Gulick K, Yancosek K, Ganz O (2008). Managing the upper extremity amputee. *J Hand Ther*; 21: 160–76.

Ocenjevanje premičnosti pacientov z mišično-kostnimi okvarami z indeksom premičnosti de Morton

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Uvod: Za oceno sposobnosti izvajanja gibalnih dejavnosti sta pri pacientu najpomembnejši oceni ravnotežja in premičnosti. Indeks premičnosti de Morton (angl. de Morton mobility index – DEMMI) vključuje oceno ravnotežja in sposobnosti premikanja. Ocenjuje 15 gibalnih nalog, od enostavnih, kot je premikanje po postelji ali hoja, do zahtevnejših nalog, kot je poskok s tal (1). Je zanesljivo in veljavno merilno orodje, sposobno zaznati spremembe pri starostnikih v različnih obdobjih zdravljenja in z različnimi vzroki za zmanjšano sposobnost premikanja (2). Namen prispevka je predstaviti del izsledkov raziskave, v kateri smo ugotavljali veljavnost slovenskega prevoda DEMMI za ocenjevanje premičnosti pri pacientih z mišično-kostnimi okvarami na rehabilitaciji. **Metode:** S slovenskim prevodom DEMMI (1), Bergovo lestvico za oceno ravnotežja (3) in motoričnim delom lestvice funkcijske neodvisnosti (4) smo ocenili 30 priložnostno izbranih pacientov (46,6 odstotka moških, 53,4 odstotka žensk) z mišično-kostnimi okvarami z okvarami perifernega živčevja ali brez njih. Njihova povprečna starost je bila 54 let (razpon: od 22 do 84 let). Ocenjevanje je potekalo ob sprejemu na rehabilitacijo in po štirih tednih obravnave. Razlike povprečnih ocen med prvim in drugim ocenjevanjem smo ugotavljali s testom t za odvisne vzorce, povezanost med ocenami različnih merilnih orodij pa smo ocenili z izračunom Spearmanovega korelacijskega koeficienta. Raziskavo je odobrila komisija za medicinsko etiko URI - Soča. **Rezultati:** Po povprečno 27,5 dne (SO 1,8) rehabilitacije so se pri pacientih statistično pomembno izboljšale povprečna ocena DEMMI za 23 točk (SO 9,4), povprečna ocena Bergove lestvice za oceno ravnotežja za 18,3 točke (SO 10,9) in povprečna ocena motoričnega dela lestvice funkcijske neodvisnosti za 22,2 točke (SO 14). Med ocenami DEMMI in Bergove lestvice za oceno ravnotežja je bila povezanost zelo dobra, tako ob sprejemu ($ro = 0,78$) kot pri drugem ocenjevanju ($ro = 0,92$). Z ocenami motoričnega dela lestvice funkcijske neodvisnosti je bila povezanost ob sprejemu dobra ($ro = 0,54$), pri drugem ocenjevanju pa zelo dobra ($ro = 0,75$). **Zaključki:** Izsledki o dobri oziroma zelo dobri povezanosti z Bergovo lestvico za oceno ravnotežja in z motoričnim delom lestvice funkcijske neodvisnosti potrjujejo veljavnost konstrukta DEMMI pri pacientih z mišično-kostnimi okvarami na rehabilitaciji. Ocenjevanje z DEMMI je kljub različnim vzrokom in ravnem zmanjšane sposobnosti premikanja pri preiskovancih pokazalo izboljšanje premičnosti po štirih tednih rehabilitacije, zato ga priporočamo za uporabo v fizioterapiji. Po končani raziskavi bo prevod DEMMI objavljen za uporabo v Sloveniji.

Ključne besede: premičnost, mišično-kostne okvare, DEMMI, ocenjevanje, veljavnost konstrukta.

Mobility assessment of patients with musculoskeletal impairments with de Morton mobility index

Background: The assessment of balance and mobility of a patient is crucial for assessing abilities to perform motor activities. De Morton mobility index (DEMMI) includes assessment of balance and ability to move. The 15 mobility items vary from the easiest, i.e., to move in bed and walk, to the most difficult, i.e., to jump from the floor (1). It is a reliable and valid measurement tool, which is able to detect change in older adults in different periods of health care and with different causes of mobility declines (2). The aim is to present a part of the study results in which validity of the Slovene translation of DEMMI for assessing mobility in patients with musculoskeletal impairments in rehabilitation was established. **Methods:** Thirty conveniently selected patients (46.6% men, 53.4% women) with musculoskeletal impairments with or without impairments of peripheral nerves, were assessed with the Slovene translation of DEMMI (1), Berg balance scale (3) and functional independence measure – motor part (4). Their age was 54 years on average (range: 22–84 years). The assessment was performed at admission to rehabilitation and after four weeks of treatment. The differences in scores of each measurement tool between the first and the second assessment were established with paired t test, and correlations between DEMMI and other measurement tools were assessed with the calculation of the Spearman's correlation coefficient. The research was approved by the Ethics Committee of URI - Soča. **Results:** After 27.5 days on average (SD 1.8) of rehabilitation, improvements of patients were significant; the DEMMI score increased on average for 23 points (SD 9.4), the Berg balance score increased on average for 18.3 points (SD 10.9) and the functional independent measure – the motor part increased on average for 22.2 points (SD 14). Correlation between the DEMMI and the Berg balance scores was very good at admission ($\rho=0.78$) and at the second assessment ($\rho=0.92$). Correlation with the functional independent measure – the motor part scores was good at admission ($\rho=0.54$) and very good at the second assessment ($\rho=0.75$). **Conclusions:** The results of good or very good relationship between the DEMMI, the Berg balance score, and functional independence measure – the motor part confirmed the construct validity of the DEMMI in patients with musculoskeletal impairments at rehabilitation. Despite different causes and levels of mobility decline in patients' assessment with DEMMI showed improved mobility after 4-week rehabilitation, therefore we recommended it for use in physiotherapy. At the end of the study, the translation of DEMMI will be published for use in Slovenia.

Key words: mobility, musculoskeletal impairments, DEMMI, assessment, construct validity.

Literatura/References:

1. De Morton NA, Davidson M, Keating JL (2008). The de Morton Mobility Index (DEMMI): an essential health index for an ageing world. *Health Qual Life Outcomes* 6: 63.
2. Zupanc A, Puh U (2016). Psihometrične značilnosti de Morton indeksa premičnosti za ocenjevanje premičnosti starostnikov - pregled literature. *Rehabilitacija* 15 (3): 53–62.
3. Rugej D, Palma P (2013). Bergova lestvica za oceno ravnotežja. *Fizioterapija* 21 (1): 15–25.
4. Grabljevec K (2003). Lestvica funkcijske neodvisnosti (FIM). Ocenjevanje izida v medicinski rehabilitaciji. V: zbornik predavanj 14. dnevi rehabilitacijske medicine, Ljubljana, 4. in 5. april 2003. Ljubljana: Inštitut Republike Slovenije za rehabilitacijo, 59–65.

Prehrana in fizioterapija: ali nas zanima prehrana bolnika pred fizioterapijo?

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Uvod: O ergonomski oceni napora za izvedbo pasivne ali aktivne terapije se v okviru fizioterapije redko pogovarjamo. Fizioterapija lahko za bolnika predstavlja različno stopnjo metabolne energetske porabe, zato je smiselno, da se upošteva metabolna poraba v mirovanju, da bi bolje razumeli ergonomsko stanje posameznika med fizioterapevtsko obravnavo. Cilj predmetne raziskave je bil ovrednotiti metabolni učinek zaužitega prehranskega obroka v mirovanju. Da bi izključili potencialno vpletene dejavnike telesne aktivnosti ali spremenjene prehrane na metabolizem, so preiskovanci deset dni bivali v nadzorovanem okolju brez večjih telesnih naporov. **Metode:** Preiskovali smo metabolne odzive zdravih posameznikov z normalno telesno maso in dobro aerobno treniranostjo ($n = 11$; $73,0 \pm 7,7$ kg; $23,7 \pm 4,0$ leta, ITM $22,2 \pm 2,4$ kg·m⁻²; VO_{2max} $60,6 \pm 9,5$ ml·kg⁻¹·min⁻¹). Preiskovanci so pod stalnim strokovnim nadzorom deset dni bivali v kontroliranem okolju z omejeno telesno aktivnostjo (dovoljeno le prosto gibanje po bivalnem prostoru), pri čemer smo nadzorovali tudi celodnevni energetski vnos posameznikov. Pred bivanjem v energetsko nadzorovanem okolju in po njem smo opravili metabolni tolerančni test (MTT), s katerim smo lahko podrobno opazovali metabolne odzive po hranjenju. Izmerili smo metabolno energetsko porabo v mirovanju (REE), sedem različnih metabolnih dejavnikov (krvni sladkor, GLP-1, inzulin, kateholamine, grelin, peptid-YY in leptin), črevesni pretok in subjektivno oceno apetita. Opisane parametre smo primerjali na tešče (pred hranjenjem) in desetkrat v času dveh ur po hranjenju (vsakih 15 min MTT). **Rezultati:** Rezultati študije so pokazali značilno zmanjšano telesno maso po desetdnevni izpostavitvi ($-0,7 \pm 0,2$ kg). Opazili smo povečanje celotne telesne maščobe ($0,23 \pm 0,45$ kg) po desetdnevnem obdobju zmanjšane telesne aktivnosti. Rezultati MTT se odražajo s značilnimi spremembami opazovanih metabolnih hormonov po prehranjevanju. **Zaključek:** Iz predstavljene raziskave izhaja, da ima zmanjšana telesna aktivnost sama po sebi učinek na telesno maso in sestavo telesa pri posameznikih z normalno telesno maso. Prehranjevanje sproži številne metabolne procese, ki smo jih opazovali med metabolnim testiranjem. Izrazite metabolne spremembe pred prehranjevanjem in dve uri po njem (črevesni pretok, krvni parametri metabolnih hormonov ter subjektivna ocena apetita) lahko predstavljajo proces, ki poteka pri vsakem bolniku ne glede na izbrani protokol fizioterapije (pasivna ali energetsko zahtevnejša aktivna fizioterapija). Poznavanje osnovnih metabolnih odzivov v mirovanju je lahko prispevek k optimizaciji izbranega fizioterapevtskega protokola.

Predstavljeno delo je nastalo v okviru raziskovalnega projekta.

Ključne besede: ergonomija, napor, mirovanje, metabolizem, hormoni.

Nutrition and physiotherapy: should we consider the patient's nutrition before physiotherapy?

Background: The ergonomic evaluation of effort required to perform passive or active physiotherapy is rarely debated in physiotherapy. Since physiotherapy can represent a different state of metabolic energy consumption for the patient, it would make sense to examine their metabolic consumption in a resting and fasted state, in order to better understand the ergonomic state of an individual during the course of physiotherapeutic treatment. The purpose of the presented part of research project was to examine the effect of food consumption in a resting state. In order to eliminate potential effects of physical activity or an altered diet on the metabolism, the subjects lived in a controlled environment for 10 days without any strenuous physical activity. **Methods:** We examined metabolic responses in healthy individuals with normal body mass, who were also well trained aerobically ($n=11$; 73.0 ± 7.7 kg; 23.7 ± 4.0 years, $ITM 22.2\pm 2.4$ kg·m⁻²; $VO_{2max} 60.6\pm 9.5$ ml·kg⁻¹·min⁻¹). The subjects remained in a controlled environment for 10 days under constant supervision with limited physical activity (they were only allowed to move around the apartment), while their daily caloric intake was monitored. Before and during their stay in the controlled environment a metabolic tolerance test was performed (MTT) in order to carefully examine the metabolic responses after feeding. We monitored their resting energy expenditure (REE), seven different metabolic factors (circulating glucose, GLP-1, insulin, catecholamines, ghrelin, peptide-YY, leptin), gastro-intestinal blood flow and appetite sensations. The listed parameters were compared in a resting state (before feeding) and ten times during the two hours after feeding (MTT every 15 min). **Results:** The results of the study demonstrated that body mass was significantly reduced after the 10-day confinement (-0.7 ± 0.2 kg). There was an increase in body fat mass (0.23 ± 0.45 kg) following the 10-day period of reduced physical activity. The MTT results reflect typical changes of the monitored metabolic hormones after feeding. **Conclusions:** The presented study demonstrated that reduced physical activity has an effect on the body mass and body composition in individuals with a normal body mass. Feeding induces several metabolic processes, which were monitored during the metabolic testing. Significant metabolic changes before and 2 hours after feeding (gastro-intestinal flow, blood parameters of metabolic hormones and appetite sensations) can represent processes that take place in every patient, regardless of the chosen physiotherapeutic protocol (passive or active physiotherapy, which requires more energy). The knowledge of basic metabolic responses in a resting state can help with optimizing the chosen physiotherapeutic protocol.

The presented paper is part of a research project.

Key words: ergonomics, effort, resting, metabolism, hormones.

Literatura/References:

1. Amon M (2012). Normobaric hypoxia: Metabolic responses following 10-day hypoxic confinement. Doctoral Dissertation. Jožef Stefan International Postgraduate School.
2. Hamburg NM, McMackin CJ, Huang AL, Shenouda SM, Widlansky ME, Schulz E, Gokce N, Ruderman NB, Keaney JF Jr, Vita JA (2007). Physical inactivity rapidly induces insulin resistance and microvascular dysfunction in healthy volunteers. *Arterioscler Thromb Vasc Biol* 27: 2650–6.
3. Mekjavic IB, Debevec T, Amon M, Keramidis ME, Kounalakis SN (2012). Intermittent normobaric hypoxic exposures at rest: effects on performance in normoxia and hypoxia. *Aviat Space Environ Med* 83 (10): 942–50.
4. Wasse LK, Sunderland C, King JA, Batterham RL, Stensel DJ (2012). The influence of rest and exercise at a simulated altitude of 4000 m on appetite, energy intake and plasma concentrations of acylated ghrelin and peptide YY. *J Appl Physiol* 112: 552–9.