

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 obravnave 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.

Literatura/References:

- Block ME (1992). What is appropriate physical education for students with the most profound disabilities? APAQ 9: 197–213.
- Auxter D, Pyfer J, Huettig C (2005). Principles and methods of adapted physical education and recreation. St. Louis: Mosby, 35–47.
- Sherrill C (2005). Adapted physical activity, recreation and sport: Cross disciplinary and lifespan. Madison, WI: McGraw-Hill, 23–34.
- Special Olympics motor activity training program coaches guide (2012). Dosegljivo na: <http://media.specialolympics.org/soi/files/sports/MATP/>. <December, 2012>

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 ortoza 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, kontraktura.

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.

Literatura/References

1. Blackmore AM, Boettcher-Hunt E, Jordan M, Chan MDY (2007). A systematic review of the effects of casting on equinus in children with cerebral palsy: an evidence report of the AACPD. *Dev Med Child Neurol* 49: 781–790.
2. Park ES, Rha D, Yoo JK, Kim SM, Chang WH, Song SH (2010). Short-term effects of combined serial casting and botulinum toxin injection for spastic equinus in ambulatory children with cerebral palsy. *Yonsei Med J* 51 (4): 579–584.
3. Bertoti DB (1986). Effect of short leg casting on ambulation in children with cerebral palsy. *Phys Ther* 66: 1522–1529.

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 Swimming 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.

Literatura/References:

1. McMillan J, McMillan P (2006). Halliwick Association of Swimming Therapy: Foundation Course Handbook. 14th ed. London: Halliwick Association of Swimming Therapy.
2. Martin J (1981). The Halliwick Method. *Physiotherapy* 67 (10): 288–91.
3. McMillan P (2002). The Halliwick Story. London: Halliwick Association of Swimming Therapy. www.halliwick.org.uk/html/history.htm <25. 2. 2013>.
4. Peacock K (1993). Swimming with independent measurement: manual for evaluation. London: Halliwick Association of Swimming Therapy.

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 prejel 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 Flexi-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.

Literatura/References

1. Horak FB (2006). Postural orientation and equilibrium: What do we need to know about neural control of balance to prevent falls? *Age Ageing* 35 (2): 7–11.
2. Herndon RM, Horak F (2000). Vertigo, imbalance and coordination. V: Burks JS, Johnson KP, eds. *Diagnosis, medical management and rehabilitation*. New York: Demos, 333–9.
3. Gunsch DG (2009). Deep penetrating 3-D training with the Flexi-bar. Dosegljivo na: www.miofasciale.it.
4. Cattaneo D, Jonsdottir J, Zocchi M, Regola A (2007). Effects of balance exercises on people with multiple sclerosis: a pilot study. *Clin Rehabil* 21 (9): 771–81.
5. Steffen T, Senney M. On test-retest reliability and minimal detectable change on balance and ambulation tests, the 36 item short form health survey and the unified Parkinson disease rating scale in people with parkinsonism. *Phys Ther* 2008; 88: 733–43.

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: $53,8 \pm 11,5$ leta) ter 20 enako starih zdravih preiskovancev ($54,7 \pm 11,8$ 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 found 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.

Literatura/References:

1. Arene N, Hidler J (2009). Understanding Motor Impairment in the Paretic Lower Limb After a Stroke: A Review of the Literature. *Top Stroke Rehabil* 16 (5): 346–356.
2. Bernard-Demanze L, Vuillerme N, Berger L, Rougier P (2006). Magnitude and duration of the effects of plantar sole massages on the upright stance control mechanisms of healthy individuals. *J Int Sport Med* 2 (4): 21–7.
3. Schabrun SM, Hillier S (2009). Evidence for the retraining of sensation after stroke: a systematic review. *Clin Rehabil* 23 (1): 27–39.
4. Sullivan JE, Hedman LD (2008). Sensory dysfunction following stroke: Incidence, significance, examination, and intervention. *Top Stroke Rehabil* 15 (3): 200–17.
5. Vaillant J, Rouland A, Martigne P, Braujou R, Nissen MJ, Caillat-Miousse JL, Vuillerme N, Nougier V, Juvin R (2009). Massage and mobilization of the feet and ankles in elderly adults: Effect on clinical balance performance. *Man Ther* 14 (6): 661–64.

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 logopedске 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.

Literatura/References

1. Zupanc Isoski V (2011). Uporaba Gussovega testa pri bolniku z disfagijo po možganski kapi. V: Zupanc Isoski V, Pražnikar A. Disfagija in možganska kap. Ljubljana: Nevrološka klinika UKC, 145–54.
2. Davies P (2000). Steps to follow: the comprehensive treatment of patients with hemiplegia. Berlin: Springer, 377–402.
3. Tušar H (2011). Ustna nega disfazičnega bolnika z možgansko kapjo v bolnišnični oskrbi. V: Zupanc Isoski V, Pražnikar A. Disfagija in možganska kap. Ljubljana: Nevrološka klinika UKC, 179–86.
4. Miller AJ (2008). The neurobiology of swallowing and dysphagia. *Dev Disabil Res Rev* 14: 77–86.
5. Vega J (2009). Dysphagia Therapy. Dosegljivo na:
<http://stroke.about.com/od/supportgroups/qt/dysphagiatherap.htm>. <2. 12. 2010>