



Monday 9 May 2011

This free weekly bulletin lists the latest research on cerebral palsy (CP), as indexed in the NCBI, PubMed (Medline) and Entrez (GenBank) databases. These articles were identified by a search using the key term "cerebral palsy".

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Interventions

1. Disabil Rehabil. 2011 Apr 1. [Epub ahead of print]

Measuring impairment and functional limitations in children with cerebral palsy.

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Objective. The disablement model provides a theoretical framework for the assessments of individuals with cerebral palsy (CP). The purpose of this study was to evaluate the relative validity of multiple measures for impairment and functional limitations and to estimate the relationship between the two global factors using confirmatory factor analysis. **Methods.** Over 50 measures of impairment and functional limitations were collected for 57 children with spastic CP. There were 12, 10, 5, 7 and 23 children who were classified in Gross Motor Function Classification System (GMFCS) Levels I to V, respectively. **Results.** The measures of impairment with the highest factor loadings were several single-item ratings of spasticity; the Modified Ashworth hamstring and biceps ratings, and goniometric measures. All of the functional limitation measures had high factor loadings, including the gross motor function measure, GMFCS, the Paediatric Evaluation of Disability Inventory and WeeFIM self care and mobility scales. The correlation between the global factors of impairment and functional limitations was 0.96, indicating that the two factors are highly correlated in spastic CP. **Conclusion.** The disablement model is a valuable theoretical tool that can be used to organise assessments in CP and to explain how they are related.

PMID:21529123 [PubMed - as supplied by publisher]

2. Phys Ther. 2011 May 5. [Epub ahead of print]

Muscle Strengthening in Children and Adolescents With Spastic Cerebral Palsy: Considerations for Future Resistance Training Protocols.

Verschuren O, Ada L, Maltais DB, Gorter JW, Scianni A, Ketelaar M.

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Resistance training of the lower limbs is now commonly used in clinical practice in children and adolescents with spastic cerebral palsy (CP). However, the effectiveness of this type of training is still disputed. The most recently published systematic review with meta-analysis included interventions such as electrical stimulation and resistance training and found insufficient evidence to support or refute the efficacy of these exercises in children with CP. Thus, the aim of this article is to evaluate the extent to which training protocols from the most recent randomized

controlled trials are in keeping with the evidence for effective resistance training in children who are developing typically, as reflected in the training guidelines of the National Strength and Conditioning Association. **RECOMMENDATIONS:** for resistance training protocols, based on this evidence and appropriate to children with CP, are provided to help guide both future research and clinical practice for resistance training in children with CP.

PMID:21546567[PubMed - as supplied by publisher]

3. Res Dev Disabil. 2011 Apr 30. [Epub ahead of print]

Arm swing during walking at different speeds in children with Cerebral Palsy and typically developing children.

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Children with Cerebral Palsy (CP) have difficulties walking at a normal or high speed. It is known that arm movements play an important role to achieve higher walking speeds in healthy subjects. However, the role played by arm movements while walking at different speeds has received no attention in children with CP. Therefore we investigated the use of arm movements at two walking speeds for children with diplegia (DI) and hemiplegia (HE) as compared to typically developing (TD) children. Arm and leg swing lengths were determined in 11 HE children and 15 DI children and compared to 24 TD children using 3D gait analysis at their preferred and "as fast as possible" walking speeds. We found that TD children increased walking speed more than both CP groups. HE children showed larger arm swings on the non-hemiplegic compared to the hemiplegic side for both walking speeds. In contrast to TD or DI children, the HE group did not show an increase in arm swing length with increasing walking speed. Their leg swing length was larger on the non-hemiplegic than on the hemiplegic side but only at the preferred walking speed. The DI children exhibited smaller leg swings at both walking speeds. Since arm swing is used both by DI (to increase speed) and by HE children (to compensate for the reduced movement on the affected side) it is argued that these movements are important and should be allowed (or even encouraged) in gait training procedures (such as treadmill training).

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PMID:21531534 [PubMed - as supplied by publisher]

4. Arch Phys Med Rehabil. 2011 May;92(5):774-9.

Effects of hippotherapy on gait parameters in children with bilateral spastic cerebral palsy.

Kwon JY, Chang HJ, Lee JY, Ha Y, Lee PK, Kim YH.

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Kwon J-Y, Chang HJ, Lee JY, Ha Y, Lee PK, Kim Y-H. Effects of hippotherapy on gait parameters in children with bilateral spastic cerebral palsy.

OBJECTIVES: To evaluate the effects of hippotherapy on temporospatial parameters and pelvic and hip kinematics of gait in children with bilateral spastic cerebral palsy. **DESIGN:** Nonrandomized prospective controlled trial. **SETTING:** Outpatient therapy center. **PARTICIPANTS:** Children (N=32) with bilateral spastic cerebral palsy, Gross Motor Function Classification System level 1 or 2. **INTERVENTION:** Hippotherapy (30min twice weekly for 8 consecutive weeks). **MAIN OUTCOME MEASURES:** Temporospatial parameters and pelvic and hip kinematic parameters in 3-dimensional motion analysis, Gross Motor Function Measure (GMFM)-88, and score for dimensions D (standing) and E (walking, running, jumping) of the GMFM, GMFM-66, and Pediatric Balance Scale (PBS). **RESULTS:** Hippotherapy significantly improved walking speed, stride length, and pelvic kinematics (average pelvic anterior tilt, pelvic anterior tilt at initial contact, pelvic anterior tilt at terminal stance). Scores for dimension E of the GMFM, GMFM-66 and PBS also increased. **CONCLUSIONS:** Hippotherapy provided by licensed health profession-

als using the multidimensional movement of the horse may be used in conjunction with standard physical therapy for improvement of gait and balance in children with bilateral spastic cerebral palsy.

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PMID:21530725[PubMed - in process]

5. Spinal Cord. 2011 May 3. [Epub ahead of print]

Validity of the test-table-test for Nordic skiing for classification of paralympic sit-ski sports participants.

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Study design: Cross-sectional study. Objectives: To assess the interrater reliability and validity of the test-table-test (TTT) with which paralympic sports participants involved in Nordic sit-ski sports may be classified. Setting: Movement laboratory in a rehabilitation centre, The Netherlands. Methods: Thirty-three persons with a spinal cord injury caudally to Th2, a leg amputation, poliomyelitis affecting the trunk and/or lower extremities, or cerebral palsy participated. Subjects were classified according to a classification system for Nordic skiing (that is, five subclasses between LW10 and LW12) by two raters, involving, among others, a combination of four balance tests called TTT. The validity of the TTT was investigated using a gold standard, involving balance perturbation tests on a force plate and centre of pressure (CoP) displacement measurements. Results: As for the interrater reliability, Spearman's rank-correlation coefficient was 0.95 ($P < 0.001$). As regards the validity of the TTT, correlation coefficients ranging from 0.61 to 0.74 ($P < 0.001$) were found when comparing the data with the gold standard. Conclusion: Interrater reliability was high in both scoring and classification. With regard to TTT validity, strong positive correlations between CoP displacement and TTT classification were found. Overall, the results of this study show that the TTT is a reliable and valid test. However, the relations between TTT and CoP displacement in the LW10 and LW10.5 subclasses found in this study are somewhat vague, which could be due to the small number of participants in these subclasses. For the LW10 and LW10.5 subclasses further refinement of the four tests within the TTT is warranted. Spinal Cord advance online publication, 3 May 2011; doi:10.1038/sc.2011.30.

PMID:21537336 [PubMed - as supplied by publisher]

6. J Formos Med Assoc. 2011 Apr;110(4):215-22.

Pharmacotherapy of spasticity in children with cerebral palsy.

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Spasticity is a common disability in children with cerebral palsy. Pharmacological and non-pharmacological treatments, including physical therapy, occupational therapy, orthotics, rhizotomy, and orthopedic surgery, all play important roles in the management of spasticity. The purpose of this article is to provide an overview of available medications for treatment of spasticity in children with cerebral palsy. Common medications include benzodiazepines, dantrolene sodium, baclofen, tizanidine, botulinum toxins, phenol, alcohol and intrathecal baclofen. In general, oral medications and intrathecal baclofen are used for treating generalized spasticity, whilst chemodenervation agents (botulinum toxins, phenol, and alcohol) are used to treat localized spasticity. There is more sufficient evidence for the recommendation of botulinum toxin A as an effective anti-spasticity treatment in children with cerebral palsy. However, more data concerning safety and long-term effects of botulinum toxin A is needed. Further study is needed to determine which kinds of medications can cause substantial improvement in daily activity, participation level, self-competence, or quality of life in children with cerebral palsy.

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PMID:21540003[PubMed - in process]

7. Res Dev Disabil. 2011 Apr 29. [Epub ahead of print]

Effect of translucency on transparency and symbol learning for children with and without cerebral palsy.

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Based on the concept of iconicity, the iconicity hypothesis was emphasized for decades. The aims of this study were to explore the effect of translucency on transparency and symbol learning for children with and without cerebral palsy. Twenty children with cerebral palsy and forty typical peers participated in the study. Ten symbols with high translucency and ten with low translucency were used as experimental material. The results of transparency testing demonstrated the positive relationship between translucency and transparency. The effect of translucency on symbol learning was supported partially, all children with and without CP could learn the low translucent symbols only after two teaching sessions, or three sessions at most. The authors also provided some suggestions for further study based the results of this study.

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PMID:21531118 [PubMed - as supplied by publisher] Related citations

8. Dev Med Child Neurol. 2011 Apr;53(4):292-3. doi: 10.1111/j.1469-8749.2010.03906.x.

Is it time to remove the restraints?

Gordon AM.

Department of Biobehavioral Sciences, Teachers College, Columbia University, New York, NY, USA.

Comment on

Dev Med Child Neurol. 2011 Apr;53(4):313-20.

PMID:21401580 [PubMed - indexed for MEDLINE]

9. J Pediatr Orthop B. 2011 Apr 29. [Epub ahead of print]

A case of slipped upper femoral epiphysis in a nonambulant patient with cerebral palsy.

Quick TJ, Williamson DM.

The Great Western Hospital, Swindon, UK.

PMID:21537202 [PubMed - as supplied by publisher]

Epidemiology / Aetiology / Diagnosis & Early Treatment

10. J Cereb Blood Flow Metab. 2011 May 4. [Epub ahead of print]

In vivo magnetization transfer MRI shows dysmyelination in an ischemic mouse model of periventricular leukomalacia.

Fatemi A, Wilson MA, Phillips AW, McMahon MT, Zhang J, Smith SA, Arauz EJ, Falahati S, Gummadavelli A, Bogdala H, Mori S, Johnston MV.

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Periventricular leukomalacia, PVL, is the leading cause of cerebral palsy in prematurely born infants, and therefore more effective interventions are required. The objective of this study was to develop an ischemic injury model of PVL in mice and to determine the feasibility of in vivo magnetization transfer (MT) magnetic resonance imaging (MRI) as a potential monitoring tool for the evaluation of disease severity and experimental therapeutics. Neonatal CD-1 mice underwent unilateral carotid artery ligation on postnatal day 5 (P5); at P60, in vivo T2-weighted (T2w) and MT-MRI were performed and correlated with postmortem histopathology. In vivo T2w MRI showed thinning of the right corpus callosum, but no significant changes in hippocampal and hemispheric volumes. Magnetization transfer MRI revealed significant white matter abnormalities in the bilateral corpus callosum and internal capsule. These quantitative MT-MRI changes correlated highly with postmortem findings of reduced myelin basic protein in bilateral white matter tracts. Ventriculomegaly and persistent astrogliosis were observed on the ligated side, along with evidence of axonopathy and fewer oligodendrocytes in the corpus callosum. We present an ischemia-induced mouse model of PVL, which has pathologic abnormalities resembling autopsy reports in infants with PVL. We further validate in vivo MRI techniques as quantitative monitoring tools that highly correlate with postmortem histopathology. *Journal of Cerebral Blood Flow & Metabolism* advance online publication, 4 May 2011; doi:10.1038/jcbfm.2011.68.

PMID:21540870 [PubMed - as supplied by publisher]

11. *Pediatr Radiol.* 2011 May 2. [Epub ahead of print]

Associations between regional brain volumes at term-equivalent age and development at 2 years of age in preterm children.

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Department of Pediatrics, Turku University Hospital, Turku, Finland.

BACKGROUND: Altered brain volumes and associations between volumes and developmental outcomes have been reported in prematurely born children. **OBJECTIVES:** To assess which regional brain volumes are different in very low birth weight (VLBW) children without neurodevelopmental impairments ([NDI] cerebral palsy, hearing loss, blindness and significantly delayed cognitive performance) compared with VLBW children with NDI, and to evaluate the association between regional brain volumes at term-equivalent age and cognitive development and neurological performance at a corrected age of 2 years. **MATERIALS AND METHODS:** The study group consisted of a regional cohort of 164 VLBW children, divided into one group of children without NDI (n = 148) and one group of children with NDI (n = 16). Brain (MRI) was performed at term-equivalent age, from which brain volumes were manually analysed. Cognitive development was assessed with the Bayley Scales of Infant Development II (BSID-II), and neurological performance with the Hammersmith Infant Neurological Examination at the corrected age of 2 years. **RESULTS:** The volumes of total brain tissue, cerebrum, frontal lobes, basal ganglia and thalami, and cerebellum were significantly smaller, and the volume of the ventricles significantly larger, in the children with NDI than in those without NDI. Even in children without NDI, a smaller cerebellar volume was significantly correlated with poor neurological performance at 2 years of corrected age. **CONCLUSION:** Volumetric analysis at brain MRI can provide an additional parameter for early prediction of outcome in VLBW children.

PMID:21534004[PubMed - as supplied by publisher]

12. Neurol Sci. 2011 Apr 30. [Epub ahead of print]

Septo-optic dysplasia-plus and dyskinetic cerebral palsy in a child.

Trabacca A, De Rinaldis M, Gennaro L, Losito L.

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Septo-optic dysplasia (SOD), also called De Morsier's syndrome, is a highly heterogeneous condition comprising a spectrum of central nervous system malformations that involves in various degrees the optic nerves, the hypothalamic-pituitary axis, and other midline structures such as the septum pellucidum and the corpus callosum. In a discrete number of cases, schizencephaly, agenesis of the corpus callosum or other cortical malformations are associated (SOD-plus). The authors present a 6-year-old boy with dyskinetic cerebral palsy (athetoid-dystonic subtype) associated with SOD-plus. Cranial magnetic resonance imaging (cMRI) revealed the total absence of septum pellucidum, optic nerve hypoplasia, hypoplasia of the corpus callosum and right occipital cortical dysplasia. The patient was diagnosed with septo-optic dysplasia-plus syndrome based on the cMRI findings. To the best of our knowledge, this is the first reported case in which defects of midline brain structures, like in SOD-plus, are associated with a significant hyperkinetic movement disorder such as dyskinesia.

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