



This free weekly bulletin lists the latest research on cerebral palsy (CP), as indexed in the NCBI PubMed (Medline) and Entrez (GenBank) databases.

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1: *Pediatr Phys Ther.* 2008 Fall;20(3):247-53.

The relationship of physical activity to health status and quality of life in cerebral palsy.

Bjornson KF, Belza B, Kartin D, Logsdon R, McLaughlin J, Thompson EA.

Pediatrics/Genetics and Developmental Medicine, University of Washington, Seattle, Washington, USA.
kristie.bjornson@seattlechildrens.org

PURPOSE: To compare the influence of functional level, ambulatory, and physical activity performance on self-reported health status and quality of life (QOL) of youth with cerebral palsy (CP) and with typical development. **METHODS:** A cross-sectional comparison cohort design was used in 81 youth with CP, ages 10 to 13 years and 30 youth with typical development. Participants wore the StepWatch monitor for 7 days and completed the Activity Scale for Kids, Child Health Questionnaire-Child Form, and Youth Quality of Life Questionnaire. Multiple regression analysis was used. **RESULTS:** Self-reported activity performance influenced self-reported physical (beta = 0.36), behavioral (beta = 0.32), and emotional (beta = 0.29) health. Functional level and performance did not influence QOL. **CONCLUSIONS:** Measures of ambulatory and physical activity and youth-reported health status separated from the measure of QOL seem helpful in defining the specific health issues of ambulatory youth with CP and have implications for physical activity intervention.

PMID: 18703962 [PubMed - in process]

2: *Pediatr Phys Ther.* 2008 Fall;20(3):233-41.

Assessment protocol for serial casting after botulinum toxin a injections to treat equinus gait.

Kelly B, MacKay-Lyons MJ, Berryman S, Hyndman J, Wood E.

School of Physiotherapy, Dalhousie University, Halifax, Nova Scotia, Canada.

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barara.kelly@iwk.nshealth.ca

PURPOSE: The purpose of this study was to investigate feasibility of an assessment protocol for a trial of post-Botox casting to treat equinus gait in cerebral palsy. **METHODS:** Ten children (ages, 26-75 months) were recruited. Nine were assessed 1 week before botulinum toxin-A injections and reassessed 1 week after removal of the final cast. The assessment protocol included Modified Ashworth Scale (MAS), Modified Tardieu Scale (MTS), Gross Motor Function Measure-66 (GMFM-66), Pediatric Evaluation of Disability Inventory (PEDI), and GAITRite. Feasibility was based on acceptability of the protocol, inter-rater reliability, and responsiveness of outcome measures. **RESULTS:** The assessment protocol was acceptable and practical. Inter-rater reliability for MAS, MTS, and GMFM ranged from moderate to excellent. Improvements were found in MTS and MAS scores for dorsiflexion and hamstring ($p < 0.01$), GMFM-66 ($p = 0.01$), and Pediatric Evaluation of Disability Inventory mobility ($p = 0.01$), self-care ($p = 0.01$), and social function ($p = 0.00$). GAITRite revealed reductions in speed ($p = 0.00$) and cadence ($p = 0.01$). **CONCLUSIONS:** Feasibility was confirmed. Recommendations include raising minimum age and delaying gait analysis.

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3: *Pediatr Phys Ther.* 2008 Fall;20(3):207-23.

Efficacy of ankle-foot orthoses on gait of children with cerebral palsy: systematic review of literature.

Figueiredo EM, Ferreira GB, Maia Moreira RC, Kirkwood RN, Fetters L.

Department of Physical Therapy, Escola de Educação Física, Fisioterapia e Terapia Ocupacional, Universidade Federal de Minas Gerais, Brazil. elyonara@ufmg.br

PURPOSE: To perform a literature review evaluating the quality of current research on the influence of ankle-foot orthoses (AFOs) on gait in children with cerebral palsy (CP). **METHODS:** A qualitative systematic review of intervention studies including the following words/phrases in the title/abstract: children with CP, AFO, gait and inferential statistical analysis, and outcomes related to gait. Databases searched included PubMed, Cochrane Library, PEDro, OTSeeker, Lilacs, and Scielo. Level of evidence was graded using the PEDro Scale. **RESULTS:** Two between-group and 18 within-group studies met the inclusion criteria indicating a low level of evidence. Between-group studies each scored 4 on the PEDro Scale, and 17 within-group studies scored 3 and 1 scored 2, indicating low quality. Standard terminology for AFOs was not used and only 6 studies described functional status using appropriate instruments. **CONCLUSIONS:** Studies using high quality methods are still needed to support evidence-based decisions regarding the use of AFOs for this population.

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4: *Phys Ther.* 2008 Aug 14. [Epub ahead of print]

Roles of Reflex Activity and Co-contraction During Assessments of Spasticity of the Knee Flexor and Knee Extensor Muscles in Children With Cerebral Palsy and Different Functional Levels.

Pierce SR, Barbe MF, Barr AE, Shewokis PA, Lauer RT.

Shriners Hospitals for Children, Philadelphia, Pennsylvania, and Assistant Professor, Institute for Physical Therapy Education, Widener University, One University Place, Chester, PA 19013 (USA).

BACKGROUND AND PURPOSE: Spasticity is a common impairment in children with cerebral palsy (CP). The purpose of this study was to examine differences in passive resistive torque, reflex activity, coactivation, and reciprocal facilitation during assessments of the spasticity of knee flexor and knee extensor muscles in children with CP and different levels of functional ability. **SUBJECTS:** Study partici-

pants were 20 children with CP and 10 children with typical development (TD). The 20 children with CP were equally divided into 2 groups: 10 children classified in Gross Motor Function Classification Scale (GMFCS) level I and 10 children classified in GMFCS level III. METHODS: One set of 10 passive movements between 25 and 90 degrees of knee flexion and one set of 10 passive movements between 90 and 25 degrees of knee flexion were completed with an isokinetic dynamometer at 15 degrees /s, 90 degrees /s, and 180 degrees /s and concurrent surface electromyography of the vastus lateralis and medial hamstring muscles. RESULTS: Children in the GMFCS level III group demonstrated significantly more peak knee flexor torque with passive movements at 180 degrees /s than children with TD. Children in the GMFCS level I and level III groups demonstrated significantly more repetitions with medial hamstring muscle activity, vastus lateralis muscle activity, and co-contraction than children with TD during the assessment of knee flexor spasticity at a velocity of 180 degrees /s. DISCUSSION AND CONCLUSION: Children with CP and more impaired functional mobility may demonstrate more knee flexor spasticity and reflex activity, as measured by isokinetic dynamometry, than children with TD. However, the finding of increased reflex activity with no increase in torque in the GMFCS I group in a comparison with the TD group suggests that reflex activity may play a less prominent role in spasticity.

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5: Phys Ther. 2008 Aug 8. [Epub ahead of print]

Use of a Low-Cost, Commercially Available Gaming Console (Wii) for Rehabilitation of an Adolescent With Cerebral Palsy.

Deutsch JE, Borbely M, Filler J, Huhn K, Guarrera-Bowlby P.

Doctoral Programs in Physical Therapy, Department of Rehabilitation and Movement Science, School of Health-Related Professions, University of Medicine and Dentistry of New Jersey, Stanley S. Bergen Building, 65 Bergen St, SSB 723, Newark, NJ 07101-3001 (USA).

BACKGROUND AND PURPOSE: The purpose of this retrospective and prospective case report is to describe the feasibility and outcomes of using a low-cost, commercially available gaming system (Wii) to augment the rehabilitation of an adolescent with cerebral palsy. Patient and Setting The patient was an adolescent with spastic diplegic cerebral palsy classified as GMFCS level III who was treated during a summer session in a school-based setting. Intervention The patient participated in 11 training sessions, 2 of which included other players. Sessions were between 60 and 90 minutes in duration. Training was performed using the Wii sports games software, including boxing, tennis, bowling, and golf. He trained in both standing and sitting positions. OUTCOMES: Three main outcome measures were used: (1) visual-perceptual processing, using a motor-free perceptual test (Test of Visual Perceptual Skills, third edition); (2) postural control, using weight distribution and sway measures; and (3) functional mobility, using gait distance. Improvements in visual-perceptual processing, postural control, and functional mobility were measured after training. DISCUSSION AND CONCLUSION: The feasibility of using the system in the school-based setting during the summer session was supported. For this patient whose rehabilitation was augmented with the Wii, there were positive outcomes at the impairment and functional levels. Multiple hypotheses were proposed for the findings that may be the springboard for additional research. To the authors' knowledge, this is the first published report on using this particular low-cost, commercially available gaming technology for rehabilitation of a person with cerebral palsy.

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6: Early Hum Dev. 2008 Aug 6. [Epub ahead of print]

Quantitative aspects of the early motor repertoire in preterm infants: Do they predict minor neurological dysfunction at school age?

Bruggink JL, Einspieler C, Butcher PR, Stremmelaar EF, Prechtl HF, Bos AF.

Department of Pediatrics, Division of Neonatology, Beatrix Children's Hospital, University Medical Center Groningen, University of Groningen, The Netherlands.

BACKGROUND: Qualitative aspects of the motor repertoire, at 11-16 weeks post-term are predictive for minor neurological dysfunction (MND) at 7 to 11 years of age. Predictive value of quantitative aspects is unknown so far. **AIM:** To investigate whether quantitative aspects of the motor repertoire between 6 and 24 weeks post-term also have predictive value for neurological outcome at 7 to 11 years of age. **STUDY DESIGN:** Prospective cohort study. **SUBJECTS:** Preterm infants from whom several quantitative aspects of the motor repertoire were assessed between 6 and 24 weeks post-term. **OUTCOME MEASURES:** Neurological outcome at 7-11 years of age was assessed according to Touwens' neurological examination. Children were classified as neurologically normal, or as having complex MND or cerebral palsy (CP). **RESULTS:** Eighty-two children were included. At 7 to 11 years of age 15 children (18%) had developed CP, 49 (60%) were neurologically normal, and 18 (22%) had MND. Multiple logistic regression analysis showed that, when the qualitative aspects of the motor repertoire known to predict neurological outcome were taken into account, only the asymmetric tonic neck (ATN) posture provided additional predictive value. In case of normal fidgety movements (FMs) accompanied by an abnormal concurrent motor repertoire, the presence of an obligatory ATN increased the risk for developing complex MND to 75%; absence of an obligatory ATN reduced the risk to 15% ($p < 0.05$). **CONCLUSIONS:** Quantitative aspects of the motor repertoire at 11-16 weeks post-term, in particular the presence of an obligatory ATN posture, contribute to the prediction of neurological outcome at 7 to 11 years of age.

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7: J Dev Behav Pediatr. 2008 Aug;29(4):315-23.

Evaluation of neuromotor function in infancy-A systematic review of available methods.

Heineman KR, Hadders-Algra M.

Developmental Neurology, University Medical Center Groningen, Groningen, The Netherlands.

OBJECTIVE: Neuromotor function in infancy can be evaluated in various ways. Assessment instruments are used for early detection of children with a high risk for developmental disorders. Early detection enables clinicians to provide intervention at a young age when plasticity of the nervous system is high. The assessments may also be used to monitor intervention. The present article will review the psychometric properties of methods to assess neuromotor function in infancy. **METHOD:** A literature search was performed in PubMed, Medline, and PsycINFO (1966-2007) on instruments to assess neuromotor functioning of infants. **RESULTS:** Fifteen instruments were included and classified into 4 groups: (1) Comprehensive neurological examinations ($n = 4$). These techniques are widely used, though little is known about their reliability. Their validity in predicting major developmental disorders such as cerebral palsy is good; their predictive validity for minor motor disorders is moderate at best. (2) Procedures with standardized scoring ($n = 7$). These have good reliability, but only moderate predictive validity for major developmental disorders. No data available for prediction of minor developmental disorders. (3) Observation of milestones ($n = 2$). Its predictive validity for major developmental disorders is only moderate, whereas reliability is good. (4) Assessment of quality of motor behavior or motor patterns ($n = 2$). These instruments have the best predictive validity for major and minor developmental motor disorders, but current methods are only useful under the age of 4 months. **CONCLUSION:** Prediction of developmental outcome at an early age is difficult. In medical evaluations of high-risk infants, the best predictions are achieved through a combination of multiple, complementary tools, that is, achieved milestones, neurological examination and assessment of the quality of motor behavior.

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8: Aging Clin Exp Res. 2008 Apr;20(2):103-8.**Upper limb movements and cerebral plasticity in post-stroke rehabilitation.**

Masiero S, Carraro E.

Rehabilitation Unit, Department of Rehabilitation Medicine, University of Padua, 35128 Padua, Italy. stef.masiero@unipd.it

Rehabilitative interventions for the plegic/paretic upper limb of stroke survivors are more effective if they are early, intensive, and provide multisensory stimulation. Various rehabilitative approaches have been proposed to date, but little has been published on clinical efficacy. The mechanism underlying recovery of neurological injury after stroke is still incompletely understood, but more than one process is probably involved and cerebral plasticity undoubtedly plays a key role. The goal of this review was to identify which movements and type of therapeutic arm exercises may influence cerebral plasticity in plegic/paretic stroke survivors. Evidence suggests that plasticity is stimulated more by the arm's movement trajectory than by its final position in space. Rehabilitation should be based on simple, repetitive, unidirectional or, better still, complex and multidirectional movements in all spatial planes, such as circular or spiral movements. It should also incorporate a feedback system, since this seems to bring about earlier and better motor and functional outcomes.

PMID: 18431076 [PubMed - indexed for MEDLINE]

9: Medicina (Kaunas). 2008;44(7):553-63.**Mothers' experience with their developmentally disordered children: specificity of internal representations [Article in Lithuanian]**

Pukinskaite R, Praninskiene R.

Department of Psychology, Mykolas Romeris University, Vilnius, Lithuania. rmpukinskaite@mruni.eu

The purpose of the present study was to examine mothers' internal representations of experience with their developmentally disordered children. Maternal perceptions of children have been considered important in clinical work with developmentally disordered children and their families. Using developmental disability sample of 17-34-month-old children, we compared mothers' representations of their children in clinically referred and not referred groups, using the Working Model of the Child Interview. Twenty mothers of children with developmental disorders and twenty matched controls participated. Six (30%) children of experiment group had a diagnosis of cerebral palsy; 5 (25%) were diagnosed with Down's syndrome, while the remaining 9 (45%) had a diagnosis of mixed specific developmental disorder. Many children with disability also were diagnosed with heart disease, epilepsy, and hydrocephalus. Maternal representations' measures were compared to their self-perceived impact of child disability on family, their sensitivity to child, and some demographic and family characteristics. Compared to controls, mothers of children with developmental disability had representations of their children that were significantly more likely to be classified distorted or disengaged ($\chi^2=7.24$; $df=2$; $P<0.05$). More severe disability status was significantly associated with mothers' disengaged representations, fear for safety of children, and intensity of involvement in care giving ($P<0.05$). The study did not confirm relationships between maternal representation classifications and their self-perceived impact of child disability on family. No differences were found concerning mothers' emotional empathy index in clinical and control groups. The differences in mean emotional empathy scores were related to many aspects of maternal internal representations and to some areas of self-perceived stress. The results of Working Model of the Child Interview did not correlate with child age and gender, birth order, and parents' level of education.

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