

Monday 23 August 2010

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. Phys Ther. 2010 Aug 19. [Epub ahead of print]

#### **The Move & PLAY Study: An Example of Comprehensive Rehabilitation Outcomes Research.**

Bartlett DJ, Chiarello LA, McCoy SW, Palisano RJ, Rosenbaum PL, Jeffries L, Fiss AL, Stoskopf B.

School of Physical Therapy, Faculty of Health Sciences, 1588 Elborn College, The University of Western Ontario, London, Ontario, Canada N6G 1H1.

This perspective article provides an example of a study planned using guidelines for comprehensive rehabilitation outcomes research, an approach that is believed to give service providers meaningful evidence to support practice. This line of investigation has been guided by the World Health Organization's International Classification of Functioning, Disability and Health. The short title of a study under way is Move & PLAY (Movement and Participation in Life Activities of Young Children). The article briefly describes the conceptual model, provides guidelines on how indicators and measures are selected, alludes to the details of selected measures, and describes processes of preparing for data collection, including obtaining ethics approval, preparing data collection booklets, training assessors and interviewers, and sampling. The aim of this investigation is to gain a better understanding of the multiple child, family, and service factors associated with changes in mobility, self-care, and play of preschool children with cerebral palsy as a result of using this research method. Comprehensive rehabilitation outcomes research holds promise in providing evidence that supports the complexities of planning rehabilitation services with clients with chronic conditions, such as children with cerebral palsy.

PMID: 20724418 [PubMed - as supplied by publisher]

### 2. BMC Pediatr. 2010 Aug 16;10(1):59. [Epub ahead of print]

#### **Use of manual and powered wheelchair in children with cerebral palsy: a cross-sectional study.**

Rodby-Bousquet E, Hagglund G.

**BACKGROUND:** Mobility is important for the cognitive and psychosocial development of children. Almost one third of children with cerebral palsy (CP) are non-ambulant. Wheelchairs can provide independent mobility, allowing them to explore their environment. Independent mobility is vital for activity and participation and reduces the dependence on caregivers. The purpose of this study was to describe the use of manual and powered wheelchair indoors and outdoors in relation to the degree of independent wheelchair mobility or need for assistance in a total population of children with CP. **METHODS:** A cross-sectional study was performed including all children aged 3-18 years with CP living in southern Sweden during 2008. Data was extracted from a register and health care programme for children with CP (CPUP). There were a total of 562 children (326 boys, 236 girls) in the register. Information on the child's use of manual and powered wheelchair indoors and outdoors and the performance in self-

propelling or need for assistance were analysed related to age, CP subtype and gross motor function. **RESULTS:** Wheelchairs for mobility indoors were used by 165 (29%) of the 562 children; 61 used wheelchair for independent mobility (32 using manual only, 12 powered only, 17 both) and 104 were pushed by an adult. For outdoor mobility wheelchairs were used by 228 children (41%); 66 used a wheelchair for independent mobility (18 using manual only, 36 powered only, 12 both) and 162 were pushed. The use of wheelchair increased with age and was most frequent in the spastic bilateral and dyskinetic subtypes. Most powered wheelchairs were operated by children at GMFCS level IV. **CONCLUSION:** In this total population of children with CP, aged 3-18 years, 29% used a wheelchair indoors and 41% outdoors. A majority using manual wheelchairs needed adult assistance (86%) while powered wheelchairs provided independent mobility in most cases (86%). To achieve a high level of independent mobility, both manual and powered wheelchairs should be considered at an early age for children with impaired walking ability.

PMID: 20712899 [PubMed - as supplied by publisher]

### 3. *Dev Med Child Neurol.* 2010 Aug 16. [Epub ahead of print]

#### **Self-care and mobility skills in children with cerebral palsy, related to their manual ability and gross motor function classifications.**

Ohrvall AM, Eliasson AC, Löwing K, Odman P, Krumlind-Sundholm L.

Department of Woman and Child Health, Astrid Lindgren Children's Hospital, Karolinska Institutet, Stockholm, Sweden.

**Aim:** The aim of this study was to investigate the acquisition of self-care and mobility skills in children with cerebral palsy (CP) in relation to their manual ability and gross motor function. **Method:** Data from the Pediatric Evaluation of Disability Inventory (PEDI) self-care and mobility functional skill scales, the Manual Ability Classification System (MACS), and the Gross Motor Function Classification System (GMFCS) were collected from 195 children with CP (73 females, 122 males; mean age 8y 1mo; SD 3y 11mo; range 3-15y); 51% had spastic bilateral CP, 36% spastic unilateral CP, 8% dyskinetic CP, and 3% ataxic CP. The percentage of children classified as MACS levels I to V was 28%, 34%, 17%, 7%, and 14% respectively, and classified as GMFCS levels I to V was 46%, 16%, 15%, 11%, and 12% respectively. **Results:** Children classified as MACS and GMFCS levels I or II scored higher than children in MACS and GMFCS levels III to V on both the self-care and mobility domains of the PEDI, with significant differences between all classification levels ( $p < 0.001$ ). The stepwise multiple regression analysis verified that MACS was the strongest predictor of self-care skills (66%) and that GMFCS was the strongest predictor of mobility skills (76%). A strong correlation between age and self-care ability was found among children classified as MACS level I or II and between age and mobility among children classified as GMFCS level I. Many of these children achieved independence, but at a later age than typically developing children. Children at other MACS and GMFCS levels demonstrated minimal progress with age. **Interpretation:** Knowledge of a child's MACS and GMFCS level can be useful when discussing expectations of, and goals for, the development of functional skills.

PMID: 20722662 [PubMed - as supplied by publisher]

### 4. *J Neuroeng Rehabil.* 2010 Aug 13;7(1):40. [Epub ahead of print]

#### **A robotic wheelchair trainer: design overview and a feasibility study.**

Marchal-Crespo L, Furumasu J, Reinkensmeyer DJ.

**BACKGROUND:** Experiencing independent mobility is important for children with a severe movement disability, but learning to drive a powered wheelchair can be labor intensive, requiring hand-over-hand assistance from a skilled therapist. **METHODS:** To improve accessibility to training, we developed a robotic wheelchair trainer that steers itself along a course marked by a line on the floor using computer vision, haptically guiding the driver's hand in appropriate steering motions using a force feedback joystick, as the driver tries to catch a mobile robot in a game of "robot tag". This paper provides a detailed design description of the computer vision and control system. In addition, we present data from a pilot study in which we used the chair to teach children without motor impairment aged 4-9 ( $n = 22$ ) to drive the wheelchair in a single training session, in order to verify that the wheelchair could enable learning by the non-impaired motor system, and to establish normative values of learning rates. **Results and Discussion:**

Training with haptic guidance from the robotic wheelchair trainer improved the steering ability of children without motor impairment significantly more than training without guidance. We also report the results of a case study with one 8-year-old child with a severe motor impairment due to cerebral palsy, who replicated the single-session training protocol that the non-disabled children participated in. This child also improved steering ability after training with guidance from the joystick by an amount even greater than the children without motor impairment. **CONCLUSIONS:** The system not only provided a safe, fun context for automating driver's training, but also enhanced motor learning by the non-impaired motor system, presumably by demonstrating through intuitive movement and force of the joystick itself exemplary control to follow the course. The case study indicates that a child with a motor system impaired by CP can also gain a short-term benefit from driver's training with haptic guidance.

PMID: 20707886 [PubMed - as supplied by publisher]

##### **5. Neurology. 2010 Aug 17;75(7):669.**

**Practice parameter: pharmacologic treatment of spasticity in children and adolescents with cerebral palsy (an evidence-based review): report of the quality standards subcommittee of the american academy of neurology and the practice committee of the child neurology society.**

Anne Whelan M, Delgado Frcpc Faan MR.

PMID: 20713958 [PubMed - in process]

##### **6. Intellect Dev Disabil. 2010 Aug;48(4):245-58.**

**"It's Our Job": Qualitative Study of Family Responses to Ableism.**

Neely-Barnes SL, Graff JC, Roberts RJ, Hall HR, Hankins JS.

Forty-five parents of children with autism, cerebral palsy, Down syndrome, and sickle cell disease participated in 8 focus groups. Parents discussed how they, the child with the disability, and the siblings addressed community perceptions about the child's disability. Themes evolving from the interviews included (a) support and lack of support, (b) inclusion and exclusion, and (c) the family members' roles during their interactions with the community. Parents viewed their roles in the community as (a) advocating, (b) educating, (c) informing, (d) ignoring, and (e) hiding. The relationship between themes is presented, and the relationship between themes and parent empowerment is discussed as well as the ways in which the themes reflect underlying ableism.

PMID: 20722475 [PubMed - in process]

##### **7. Electromyogr Clin Neurophysiol. 2010 Jul-Aug;50(5):239-44.**

**Analysis of postural oscillation in children with cerebral palsy.**

Nobre A, Monteiro FF, Golin MO, Biasotto-Gonzalez D, Corrêa JC, Oliveira CS.

Universidade Nove de Julho - UNINOVE, SP, Brazil.

It is believed that static balance undergoes changes in children with cerebral palsy (CP). Thus, we analyzed postural oscillation in 19 children with the aim of comparing balance between healthy children and those with CP. The sample was divided into two groups--one with 10 children diagnosed with diparetic CP (CPG) and a control group (CG) with nine healthy children, all capable of remaining in an orthostatic position without support and obeying spoken commands. The assessment of postural oscillation was performed with the children barefoot, arms alongside the body and looking toward a fixed point while standing on an unrestricted base for the feet. Data collection was performed using a TEKScan force platform with 30-second duration for each condition. The children had an average age of 7.9 years (+/- 2.07) in the CPG and 7.5 years (+/- 1.58) for the CG. Postural oscillation data in the anterior-posterior and medial-lateral directions were analyzed using the Data Analysis and Technical Graphics Origin 6.0 program. Statistical analysis of the mean oscillation value in the conditions of eyes open and eyes closed did not differ significantly between groups. However, there was a significant difference in mean anterior-posterior oscillation.

lation between groups ( $p = 0.00$ ). The groups behaved similarly with regard to the visual deprivation. We conclude that children with CP exhibit less postural oscillation in comparison to healthy children under the same conditions.

PMID: 20718335 [PubMed - in process]

#### **8. J Hand Surg Eur Vol. 2010 Sep;35(7):588-9.**

##### **Radial wedge osteotomy for IIB Kienbock's disease in cerebral palsy: a case report.**

Senda H, Terada S, Okamoto H.

Department of Orthopaedic Surgery, Rinko Hospital Department of Orthopaedic Surgery, Ogaki Municipal Hospital, and Department of Orthopaedic Surgery Nagoya City University, Japan.

PMID: 20719889 [PubMed - in process]

## **Epidemiology / Aetiology / Diagnosis & Early Treatment**

*Please note: This is not yet a comprehensive outline of cerebral palsy prevention literature. It is expected that more research will be included when the search terms are expanded to include key terms other than "cerebral palsy". It is a work-in-progress and it will be expanded in coming months.*

#### **9. Dev Sci. 2010 Sep 1;13(5):692-705.**

##### **Ophthalmological, cognitive, electrophysiological and MRI assessment of visual processing in preterm children without major neuromotor impairment.**

O'Reilly M, Vollmer B, Vargha-Khadem F, Neville B, Connelly A, Wyatt J, Timms C, de Haan M.

Developmental Cognitive Neuroscience Unit, UCL Institute of Child Health, London, UK.

Many studies report chronic deficits in visual processing in children born preterm. We investigated whether functional abnormalities in visual processing exist in children born preterm but without major neuromotor impairment (i.e. cerebral palsy). Twelve such children (< 33 weeks gestation or birthweight < 1000 g) without major neuromotor impairment and 12 born full-term controls were assessed at 8-12 years of age by means of ophthalmological assessment (visual acuity, colour vision, stereopsis, stereoacuity, visual fields, ocular motility, motor fusion), cognitive tests of visual-motor, visual-perceptual and visual-spatial skills and pattern-reversal visual evoked potentials (PR-VEPs). All participants also underwent magnetic resonance imaging (MRI) of the brain and neuromotor assessments. No significant differences were found between the groups on the ophthalmological, visual cognitive, neurological, neuromotor or MRI measures. The P100 component of the PR-VEP showed a significantly shorter latency in the preterm compared with the full-term participants. Whilst this P100 finding suggests that subtle abnormalities may exist at the neurophysiological level, we conclude that visual dysfunction is not systematically associated with preterm birth in the context of normal neurological status.

PMID: 20712735 [PubMed - in process]

#### **10. Arch Pediatr. 2010 Aug 16. [Epub ahead of print]**

##### **Evaluation of language at 6 years in children born prematurely without cerebral palsy: Prospective study of 55 children. [Article in French]**

Charollais A, Stumpf MH, Beaugrand D, Lemarchand M, Radi S, Pasquet F, Khomsi A, Marret S.

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**OBJECTIVES:** Very premature birth carries a high risk of neurocognitive disabilities and learning disorders. Acquiring sufficient speech skills is crucial to good school performance. **METHODS:** A prospective study was conducted in 2006 to evaluate speech development in 55 children born very prematurely in 2000 at the Rouen Teaching Hospital (Rouen, France), free of cerebral palsy, compared to 6-year-old born at full term. A computerized speech assessment tool was used (Bilan Informatisé du Langage Oral, BILO II). **RESULTS:** In the premature-birth group, 49 % of 6-year-old had at least 1 score below the 25th percentile on 1 of the 8 BILO II tests. Significant speech impairments were noted for 2 components of speech, namely, comprehension and phonology. Oral comprehension scores no higher than the 10th percentile were obtained by 23 % of prematurely born children ( $P < 0.02$  vs controls). On word repetition tasks used to test phonology, 21 % of prematurely born children obtained scores no higher than the 10th percentile ( $P < 0.01$  vs controls). An evaluation of sensorimotor language prerequisites (constraints) in 30 of the 55 prematurely born children showed significant differences with the controls for word memory, visual attention, and buccofacial praxis. **CONCLUSION:** The speech development impairments found in 6-year-old born very prematurely suggest a distinctive pattern of neurodevelopmental dysfunction that is consistent with the motor theory of speech perception.

PMID: 20719486 [PubMed - as supplied by publisher]

#### 11. Turk J Pediatr. 2010 May-Jun;52(3):278-84.

##### The role of magnetic resonance imaging in early prediction of cerebral palsy.

Hnatyszyn G, Cyrylowski L, Czeszynska MB, Walecka A, Konefal H, Szmigiel O, Gizewska M, Dawid G.

Department of Neonatology, Pomeranian Medical University, Szczecin, Poland.

This work was undertaken to assess the usefulness of magnetic resonance imaging (MRI) of the brain for early prognosis of cerebral palsy. The study group included 47 neonates (24 term and 23 preterm) with symptoms of perinatal asphyxia. MRI examinations in term neonates were performed during the first month of life but not before the second week of life, while in preterm neonates MRI data were acquired between 38 and 40 weeks from conception. MRI of the brain demonstrated hypoxic-ischemic findings in all neonates born with perinatal asphyxia who later progressed to cerebral palsy. These results support the hypothesis that MRI performed in the neonatal period plays an essential role in predicting cerebral palsy in both term and preterm neonates, regardless of their gestational age.

PMID: 20718186 [PubMed - in process]