

Monday 21 February 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".

To subscribe, please email Robyn Cummins [rcummins@cerebralpalsy.org.au](mailto:rcummins@cerebralpalsy.org.au) with 'Subscribe to CP Research News' in the subject line, and your name and email address in the body of the email.

You may unsubscribe at any time by emailing Robyn with your 'unsubscribe' request.

## Interventions

### 1. **Disabil Rehabil Assist Technol. 2011 Feb 11. [Epub ahead of print]**

#### **Predicting equipment needs of children with cerebral palsy using the Gross Motor Function Classification System: a cross-sectional study.**

Novak I, Smithers-Sheedy H, Morgan C.

Cerebral Palsy Institute, Sydney, Australia.

**Background.** Children with cerebral palsy (CP) routinely use assistive equipment to improve their independence. Specialist equipment is expensive and therefore not always available to the child when needed. **Aim.** The aim of this study was to determine whether the assistive equipment needs of children with CP and the associated costs could be predicted. **Method.** A cross-sectional study using a chart audit was completed. Two hundred forty-two children met eligibility criteria and were included in the study. Data ed from files pertained to the child's CP, associated impairments and assistive equipment prescribed. The findings were generated using linear regression modeling. **Results.** Gross Motor Function Classification System (GMFCS) level [B<sub>1</sub>=3.01 (95% CI, 2.36-3.57), p=? 0.000] and the presence of epilepsy [B<sub>2</sub>=2.35 (95% CI, 0.64-4.06), p=?0.008] predicted the prescription of assistive equipment. The more severely affected the gross motor function impairment, the more equipment that was required and the more the equipment cost. **Interpretation.** The equipment needs of children with CP can be predicted for the duration of childhood. This information may be useful for families and for budget and service planning.

PMID: 21314294 [PubMed - as supplied by publisher]

### 2. **J Clin Neurosci. 2011 Feb 10. [Epub ahead of print]**

#### **Myositis ossificans of bilateral hip joints in a patient with diplegic cerebral palsy.**

Juneja M, Jain R, Mishra D, Gautam VK.

Department of Pediatrics, Maulana Azad Medical College, New Delhi, India; Lok Nayak Hospital, Delhi Gate, Daryaganj, New Delhi, India.

Myositis ossificans (MO) occurs in association with musculoskeletal trauma, traumatic and non-traumatic neurologic conditions, joint surgery and rarely as a hereditary disorder. We report a 6-year-old boy with diplegic cerebral palsy who developed MO of his bilateral hip joints after initiating physiotherapy. He responded well to conservative management.

Copyright © 2010 Elsevier Ltd. All rights reserved.

PMID: 21316244 [PubMed - as supplied by publisher]

### 3. J Neurophysiol. 2011 Feb 16. [Epub ahead of print]

#### **Contributors to excess antagonist activity during movement in children with secondary dystonia due to cerebral palsy.**

Kukke SN, Sanger TD.

1Stanford University.

Children with secondary dystonia due to cerebral palsy exhibit abnormal upper extremity postures and slow voluntary movement. However, the interaction between abnormal postures and abnormal movement in dystonia is still unclear. Some mechanisms by which postures are maintained in dystonia include stretch reflexes, overflow of muscle activation to other muscles, and direct coactivation of antagonist muscles. This study explores the independent contributions of each of these postural mechanisms to abnormal biceps brachii (antagonist) activity during elbow extension, which slows movement. A linear model of biceps activation as a function of velocity-dependent reflexes, triceps-dependent overflow and direct drive to the biceps was fitted to experimental data from eleven children and young adults with secondary dystonia due to cerebral palsy and eleven age-matched control subjects. Subjects performed elbow extension movements against each of four levels of resistance without perturbations or in each of two perturbation conditions. Results show that biceps activity in children with dystonia consists of significant contributions of reflex activation, overflow from triceps and direct muscular drive. Additionally, stretch reflexes during movement are shown to be elevated at three latencies after stretch. These findings suggest that there are postural mechanisms involved in stabilizing the elbow along its slow trajectory during movement and provide a quantitative basis for the selection of treatments targeting specific impairments in children with secondary dystonia due to cerebral palsy.

PMID: 21325680 [PubMed - as supplied by publisher]

### 4. J Oral Pathol Med. 2011 Feb 16. doi: 10.1111/j.1600-0714.2011.01008.x. [Epub ahead of print]

#### **Autonomic nervous system in individuals with cerebral palsy: a controlled study.**

Ferreira MC, Pastore C, Imada R, Guaré R, Leite M, Poyares D, Santos MT.

Universidade Cruzeiro do Sul Universidade Paulista Instituto do Coração, Hospital das Clínicas, Universidade de São Paulo Universidade Cruzeiro do Sul Psychobiology Department, Universidade Federal de Sao Paulo Persons with Disabilities Division, Universidade Cruzeiro do Sul, Sao Paulo, SP, Brazil.

**Background:** Disturbances in homeostatic functions have been observed in individuals with cerebral palsy (CP), possibly resulting from autonomic dysfunction. Salivary flow rate and saliva composition are controlled by the autonomic nervous system, and CP individuals exhibit alterations in salivary parameters that suggest autonomic impairment. This study aimed to investigate cardiac parameters as indicative of autonomic disturbances, possibly associated with salivary changes observed in CP individuals. **Methods:** Ninety individuals with CP were compared with 35 sibling volunteers with no neurological damage (CG). Twenty-four-hour ECG/Holter monitoring (SEER® Light; GE Medical Systems, Milwaukee, WI, USA) and 12-lead electrocardiographic recordings were performed on the CP and control groups. Total saliva was collected, and the salivary flow rate and total protein concentration were determined. **Results:** Cerebral palsy (CP) individuals presented a significant reduction in salivary flow rate ( $P < 0.01$ ) and increased protein concentrations ( $P < 0.01$ ) compared to CG. Twenty-four-hour Holter ECG analysis showed differences for high frequency (HF), low frequency (LF) and LF/HF ratio between the groups, with the CP group presenting higher HF and LF values and lower LF/HF. Electrocardiographic parameters showed a statistically significant difference for heart rate, and its correlates, and mean corrected QT interval between the groups studied ( $P < 0.05$ ). Snoring was frequent among CP patients. ECG and autonomic changes were independently associated with CP. **Conclusion:** Individuals with cerebral palsy present cardiovascular changes principally manifested as disturbed sympathovagal balance. These autonomic dysfunctions could contribute to the salivary changes observed.

© 2011 John Wiley & Sons A/S.

PMID: 21323740 [PubMed - as supplied by publisher]

#### 4. Nurs N Z. 2010 Dec-2011 Jan;16(11):18-9.

##### Young man with cerebral palsy knows his own mind.

Taylor J.

Iris Community Living Service.

PMID: 21329062 [PubMed - in process]

#### 5. Twin Res Hum Genet. 2011 Feb;14(1):79-87.

##### Monozygotic Twins Concordant and Discordant for DCD: Two Sides to the Story.

Pearsall-Jones JG, Piek JP, Steed L, McDougall MR, Levy F.

1 School of Psychology and Speech Pathology, Curtin Health Innovation Research Institute, Curtin University, Australia; The Centre for Cerebral Palsy, Perth, Australia.

Being an identical twin does not necessarily mean having identical perceptions of family functioning, nor of the twin relationship. Using the co-twin control design, the aim of this study was to explore perceptions of family dynamics and the twin relationship in monozygotic (MZ) twins discordant and concordant for Developmental Coordination Disorder (DCD). It was hypothesized that, as has been found in twins discordant for cerebral palsy, twins without DCD would perceive family functioning as less healthy than would their co-twins with DCD. It was also hypothesized that the twin relationship would be regarded generally as mutually supportive. Questionnaire data on 866 sets of MZ twins aged 6 to 17 years were used to identify seven sets discordant, and two sets concordant for DCD. Quantitative (General Functioning Scale of the Family Assessment Device - FAD), and qualitative (semi-structured interview) measures were used to assess family dynamics and the twin relationship. In discordant sets, six of seven twins without DCD rated family functioning at a less healthy level than did their co-twins with DCD. All twins in the DCD concordant sets rated their family functioning at a healthy level. From the semi-structured interviews, emergent themes included friendship, support, minimal sibling rivalry, and minor difficulties. It was concluded that, overall, the twin relationship was regarded as close and mutually supportive, with an ambivalent polarity between the best and most difficult aspects of being an identical twin. Implications for research, policy and clinical practice are discussed.

PMID: 21314259 [PubMed - in process]

## Epidemiology / Aetiology / Diagnosis & Early Treatment

#### 6. Early Hum Dev. 2010 Nov;86(11):675-82.

##### Outcomes after central grey matter injury in term perinatal hypoxic-ischaemic encephalopathy.

Martinez-Biarge M, Diez-Sebastian J, Rutherford MA, Cowan FM.

Department of Paediatrics and Imaging Sciences, Imperial College London, UK. miriam.mbiarge@imperial.ac.uk

Central grey matter damage following perinatal hypoxia-ischaemia frequently leads to death or motor abnormality often with deficits in other developmental domains. Predicting these different outcomes is difficult yet very important for early management, planning and providing for needs on discharge and later and not least for parents to know how their children will be affected. The best single predictor of the pattern of outcomes for an individual infant is an early MRI scan. We present a guide for predicting outcome at 2 years in different developmental domains based on the severity of injury seen in the basal ganglia and thalami (BGT) on neonatal MRI.

Copyright © 2010 Elsevier Ltd. All rights reserved.

PMID: 20864278 [PubMed - indexed for MEDLINE]

## 7. Gait Posture. 2011 Feb 15. [Epub ahead of print]

### Gait analysis may help to distinguish hereditary spastic paraplegia from cerebral palsy.

Wolf SI, Braatz F, Metaxiotis D, Armbrust P, Dreher T, Döderlein L, Mikut R.

Department of Orthopaedic Surgery, University of Heidelberg, Schlierbacher Landstr. 200a, 69118 Heidelberg, Germany.

Hereditary spastic paraplegia (HSP) designates a group of genetic disorders typically leading to spasticity in the lower limbs and consequently to gait disorders. Although the symptoms are similar to those of cerebral palsy (CP), the correct diagnosis is important for treatment recommendations as one condition is progressive in nature whereas the other is not. Due to the heterogeneity of HSP, genetic testing is complex and in some genetic forms still not possible. The aim of this study was, therefore, to investigate if instrumented 3D-gait analysis could help distinguish between these two conditions. The gait pattern of 29 patients with HSP was compared with that of 29 typically developing subjects for reference. More than 3000 gait parameters were evaluated for their relevance to classify patients into diagnostic groups. Cluster analysis revealed that these gait features may classify only subgroups of symptoms as the gait pattern is very heterogeneous within each diagnosis group. However, prolonged hip extension, knee extension, and ankle plantar flexion were identified as indicators for HSP. In addition, large trunk tilt velocities appear unique in some cases of HSP. These indicators in gait pattern may contribute in establishing the diagnosis of HSP, which is important in predicting outcome when planning surgical treatment for functional improvements in these patients.

Copyright © 2011 Elsevier B.V. All rights reserved.

PMID: 21330136 [PubMed - as supplied by publisher]

## 8. Indian J Pediatr. 2011 Feb 12. [Epub ahead of print]

### Indomethacin Tocolysis and Neurodevelopmental Outcome.

Soraisham AS, Sauve R, Singhal N.

Division of Neonatology, Department of Pediatrics, Institute for Child and Maternal Health, University of Calgary, Calgary, Alberta, Canada, asoraish@ucalgary.ca.

**OBJECTIVE:** To compare the neurodevelopmental outcomes, at 30-42 months adjusted age, between infants exposed to antenatal indomethacin and those unexposed to antenatal indomethacin. **METHODS:** This was a retrospective cohort study. The study cohort consisted of all nonanomalous infants with birth weight  $\geq$ 1250 g and/or gestational age  $\geq$ 28 wks born between 2000 and 2003, who completed neurodevelopmental assessments between 30-42 months adjusted age. The authors compared the neurodevelopmental outcomes of infants exposed and unexposed to antenatal indomethacin. **RESULTS:** Of the 321 infants, 75 infants (23%) exposed to antenatal indomethacin were lower in gestational age (26.4 vs 27.8 wks). In univariate analysis, infants exposed to antenatal indomethacin had significantly increased incidence of patent ductus arteriosus (PDA) (60% vs. 39%), surgical PDA ligation (40% vs. 18%) and bronchopulmonary dysplasia (81% vs. 60%). There was no significant difference in cerebral palsy, cognitive delay, deafness, blindness and major disability between the two groups. In multivariable logistic regression analysis, antenatal indomethacin exposure was not associated with cerebral palsy (OR, 0.70; 95% CI, 0.22-2.18), cognitive delay (OR, 0.56; 95% CI, 0.28-1.12) or neurodevelopmental disability (OR, 0.50; 95% CI, 0.21-1.19). **CONCLUSIONS:** Neurodevelopmental outcome of preterm infants exposed to antenatal indomethacin is equivalent to those unexposed to antenatal indomethacin, despite being born earlier.

PMID: 21318396 [PubMed - as supplied by publisher]

**9. Int J Nurs Stud. 2011 Feb 15. [Epub ahead of print]****The health of children and young people with cerebral palsy: A longitudinal, population-based study.**

McCullough N, Parkes J, Kerr C, McDowell BC.

School of Nursing and Midwifery, Queen's University Belfast, 10 Malone Road, Belfast, Northern Ireland, BT9 5BN, United Kingdom.

**BACKGROUND:** Cerebral palsy (CP) is a chronic condition about which little is known in relation to the long term stability of and factors influencing health. **OBJECTIVES:** To describe the health status of 4-17 year olds with ambulant CP, compare with the general population and identify factors predicting change in health over time. **DESIGN:** A longitudinal, clinical survey. **SETTING:** A regional hospital-based Gait Analysis Laboratory. **PARTICIPANTS:** Those aged 4-17 years and able to walk at least 10m independently were identified from a case register of people with CP. A total of 184 subjects took part (38% of all eligibles in the region); 154 (84%) returned for a second assessment on average 2.5 years later. **METHODS:** The Child Health Questionnaire (Parent-form-50) was completed by 184 parents at time 1, and 156 at time 2. **RESULTS:** Children and young people with CP have significantly poorer health across a number of domains when compared to children in the general child population. Over time improvements occurred in behaviour ( $p=0.01$ ), family activities ( $p<0.001$ ) and physical functioning ( $p=0.05$ ). Linear regression showed that gross motor function ( $p<0.001$ ) and cerebral palsy subtype ( $p<0.05$ ) were associated with changes in physical functioning; age was associated with changes in behaviour ( $p=0.007$ ) and family activities ( $p=0.01$ ); and communication ability was significantly associated with changes in family activities ( $p=0.005$ ). **CONCLUSIONS:** Children and young people with CP have poorer health than their able bodied peers but relatively stable health over 2.5 years. Where change occurred, it was for the better.

Copyright © 2011 Elsevier Ltd. All rights reserved.

PMID: 21329925 [PubMed - as supplied by publisher]

**10. Neonatal Netw. 2011 Jan-Feb 1;30(1):29-35.****Induced hypothermia for neonatal hypoxic-ischemic encephalopathy: pathophysiology, current treatment, and nursing considerations.**

Cooper DJ.

Hypoxic-ischemic encephalopathy (HIE) can lead to devastating neurodevelopmental consequences such as cerebral palsy, seizure disorders, and significant developmental delays. HIE in the newborn is often the result of a hypoxic event, such as uterine rupture, placental abruption, or cord prolapse. Biphasic brain injury occurs in HIE. The first phase involves activation of the sympathetic nervous system as a compensatory mechanism. The second phase, known as reperfusion brain injury, occurs hours later. Induced hypothermia, a neuroprotective strategy for treating HIE, targets the second phase to prevent reperfusion injury. NICU nurses are in a unique position to detect patient instability and to maintain the therapeutic interventions that contribute to the healing process. This article highlights the significant role nurses play in the management of infants diagnosed with HIE who are treated with induced hypothermia.

PMID: 21317095 [PubMed - in process]

**11. Conn Med. 2010 Nov-Dec;74(10):623-5.****Connecticut and its cerebral palsied children. 1960.**

Fuldner RV.

PMID: 21189721 [PubMed - indexed for MEDLINE]



**12. Pediatrics. 2011 Feb 14. [Epub ahead of print]****Prediction of Neurodevelopmental and Sensory Outcome At 5 Years in Norwegian Children Born Extremely Preterm.**

Leversen KT, Sommerfelt K, Rønnestad A, Kaaresen PI, Farstad T, Skranes J, Støen R, Elgen IB, Rettedal S, Eide GE, Irgens LM, Markestad T.

Departments of Clinical Medicine and.

**Objective:** To examine the prevalence of neurodevelopmental disability and the predictive value of pre-, peri-, and postnatal data on neurologic, sensory, cognitive, and motor function in children born extremely preterm. **Methods:** This was a prospective observational study of all infants born in Norway between 1999 and 2000 with gestational ages between 22 and 27 weeks or birth weights between 500 and 999 g. Cognitive function was assessed with the Wechsler Preschool and Primary Scale of Intelligence-Revised, motor function with the Movement Assessment Battery for Children, and severity of cerebral palsy with the Gross Motor Function Classification for Cerebral Palsy. Disabilities were described as mild, moderate, or severe. **Results:** Of 371 eligible children, 306 (82%) were examined at a mean (SD) age of 5 years and 10 (4) months. For gestational age less than 28 weeks ( $n = 239$ ), 26 (11%) children had cerebral palsy alone ( $n = 21$ ) or in combination with blindness ( $n = 3$ ) or deafness ( $n = 2$ ); 1 was blind and 1 was deaf. Of the remaining children, the mean full-scale IQ was  $94 \pm 15$ , and significant predictors were (values given as the difference in IQ points [95% confidence intervals]) high maternal education (9.6 [5.7-13.4]), preeclampsia (-7.7 [-12.7 to -2.7]), and retinopathy of prematurity higher than grade 2 (-17.5 [-27.1 to -8.0]). Movement Assessment Battery for Children scores were positively associated with gestational age and prenatal steroids and negatively associated with being small for gestational age, male gender, and having retinopathy of prematurity. Moderate to severe neurodevelopmental disability was more common for gestational ages 25 weeks or less (28 of 87 children) than for 26 to 27 weeks (12 of 152 children;  $P < .001$ ) and 28 weeks or more (7 of 67 children;  $P = .001$ ). **Conclusions:** The outcome was poorer for children with gestational ages of 25 weeks or less compared with those with gestational ages between 26 and 27 weeks. For those without cerebral palsy, blindness, or deafness, however, gestational age had a limited association with cognitive and motor function.

PMID: 21321031 [PubMed - as supplied by publisher]

**13. Afr Health Sci. 2010 Sep;10(3):218-25.****Epilepsy in rural Ugandan children: seizure pattern, age of onset and associated findings.**

Duggan M.

Springview Cottage, More Hall Lane, Bolsterstone, Sheffield S36 3ST, UK.

**INTRODUCTION:** Much information on childhood epilepsy in sub Saharan Africa is hospital based. A survey was considered necessary before integrating epilepsy management into a Ugandan community programme. **METHOD:** Using an 'outreach' method, children with recurrent seizures were offered assessment at 19 sites in Rukungiri District. A brief history and neurological and developmental assessment was carried out on each child. A clinical diagnosis of epilepsy, including seizure type, was given to 440 of 618 children <18 years with 178 exclusions. **RESULTS:** The age-specific prevalence of epilepsy in children < 15 years was 2.04‰ (95% CI 1.94‰ to 2.24 ‰) based on 395 cases in an <15 years population of 193,126. Percentage distribution by seizure type was:- generalised tonic-clonic (53%), complex partial seizures CPS (27%), simple partial and miscellaneous seizures (6% each), with some diagnostic overlap between seizure types. Cerebral palsy, evident or evolving, was most strongly associated with CPS. A positive perinatal or infantile history was noted in 12 and 6% respectively, and 50.2% of seizures began in infancy. **CONCLUSIONS:** The prevalence of epilepsy is similar in Gambian children. The high contribution from early-onset CPS, resembles Kenyan reports of malaria-associated CPS, suggesting a causal association with malaria.

PMID: 21327131 [PubMed - in process]