

Monday 7 March 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. Augment Altern Commun. 2011 Mar;27(1):5-15.**

#### **Use of listening strategies for the speech of individuals with dysarthria and cerebral palsy.**

Hustad KC, Dardis CM, Kramper AJ.

University of Wisconsin, Madison, Wisconsin, USA.

This study examined listeners' endorsement of cognitive, linguistic, segmental, and suprasegmental strategies employed when listening to speakers with dysarthria. The study also examined whether strategy endorsement differed between listeners who earned the highest and lowest intelligibility scores. Speakers were eight individuals with dysarthria and cerebral palsy. Listeners were 80 individuals who transcribed speech stimuli and rated their use of each of 24 listening strategies on a 4-point scale. Results showed that cognitive and linguistic strategies were most highly endorsed. Use of listening strategies did not differ between listeners with the highest and lowest intelligibility scores. Results suggest that there may be a core of strategies common to listeners of speakers with dysarthria that may be supplemented by additional strategies, based on characteristics of the speaker and speech signal.

PMID: 21355809 [PubMed - in process]

### **2. Augment Altern Commun. 2010 Sep;26(3):158-76.**

#### **A conceptual review of writing research in augmentative and alternative communication.**

Koppenhaver D, Williams A.

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Studies addressing the cognitive processes of writing (i.e., planning, translating, reviewing, monitoring) as applied to individuals with complex communication needs were reviewed. Studies meeting inclusion criteria were identified through searching multiple electronic databases and summarized according to participants, cognitive process(es) addressed, tasks and measures, and principal findings. Twenty-five studies were identified in peer-reviewed journals, 12 of them descriptive studies of spelling abilities in augmentative communication, five addressing spelling intervention, and eight addressing other writing processes. Implications for intervention and future research are discussed.

PMID: 20874079 [PubMed - indexed for MEDLINE]

### 3. J Bone Joint Surg Am. 2011 Mar;93(5):451-60.

#### Single-event multilevel surgery in children with spastic diplegia: a pilot randomized controlled trial.

Thomason P, Baker R, Dodd K, Taylor N, Selber P, Wolfe R, Graham HK.

Hugh Williamson Gait Laboratory, Royal Children's Hospital, Melbourne, 50 Flemington Road, Parkville, Victoria 3052, Australia. pam.thomason@rch.org.au.

**BACKGROUND:** Single-event multilevel surgery is considered the standard of care to improve gait and functioning of children with spastic diplegic cerebral palsy. However, the evidence base is limited. This pilot study is the first randomized controlled trial of single-event multilevel surgery, to our knowledge. **METHODS:** Nineteen children (twelve boys and seven girls with a mean age of nine years and eight months) with spastic diplegia were enrolled. Eleven children were randomized to the surgical group and eight, to the control group. The control group underwent a program of progressive resistance strength training. The randomized phase of the trial concluded at twelve months. The control group then exited the study and progressed to surgery, whereas the surgical group continued to be followed in a prospective cohort study. The primary outcome measures were the Gait Profile Score (GPS) and the Gillette Gait Index (GGI). Secondary outcome measures were gross motor function (Gross Motor Function Measure-66 [GMFM-66]), functional mobility (Functional Mobility Scale [FMS]), time spent in the upright position, and health-related quality of life (Child Health Questionnaire [CHQ]). **RESULTS:** A total of eighty-five surgical procedures were performed, with a mean of eight procedures per child (standard deviation, four). The surgical group had a 34% improvement in the GPS and a 57% improvement in the GGI at twelve months. The control group had a small nonsignificant deterioration in both indices. The between-group differences for the change in the GPS (-5.5; 95% confidence interval, -7.6 to -3.4) and the GGI (-218; 95% confidence interval, -299 to -136) were highly significant. The differences between the groups with regard to the secondary outcome measures were not significant at twelve months. At twenty-four months after surgery, there was a 4.9% increase in the GMFM-66 score and improvements in the FMS score, time spent in the upright position, and the physical functioning domain of the CHQ in the surgical group. **CONCLUSIONS:** This study provides Level-II evidence that single-event multilevel surgery improves the gait of children with spastic diplegic cerebral palsy twelve months after surgery. Improvements in other domains, including gross motor function and quality of life, were not observed until twenty-four months after surgery.

**LEVEL OF EVIDENCE:** Therapeutic Level II. See Instructions to Authors for a complete description of levels of evidence.

PMID: 21368077 [PubMed - in process]

### 4. Clin Orthop Surg. 2011 Mar;3(1):24-33. Epub 2011 Feb 15.

#### Changes in Level of the Conus after Corrective Surgery for Scoliosis: MRI-Based Preliminary Study in 31 Patients.

Hong JY, Suh SW, Park JH, Hur CY, Hong SJ, Modi HN.

Department of Orthopaedics, Korea University Ansan Hospital, Ansan, Korea.

**BACKGROUND:** Detection of postoperative spinal cord level change can provide basic information about the spinal cord status, and electrophysiological studies regarding this point should be conducted in the future. **METHODS:** To determine the changes in the spinal cord level postoperatively and the possible associated factors, we prospectively studied 31 patients with scoliosis. All the patients underwent correction and posterior fusion using pedicle screws and rods between January 2008 and March 2009. The pre- and postoperative conus medullaris levels were determined by matching the axial magnetic resonance image to the sagittal scout image. The patients were divided according to the change in the postoperative conus medullaris level. The change group was defined as the patients who showed a change of more than one divided section in the vertebral column postoperatively, and the parameters of the change and non-change groups were compared. **RESULTS:** The mean pre- and postoperative Cobb's angle of the coronal curve was  $76.80^\circ \pm 17.19^\circ$  and  $33.23^\circ \pm 14.39^\circ$ , respectively. Eleven of 31 patients showed a lower conus medullaris level postoperatively. There were no differences in the pre- and postoperative magnitude of the coronal curve, lordosis and kyphosis between the groups. However, the postoperative degrees of correction of the coronal curve and lumbar lordosis were higher in the change group. There were also differences in the disease

entities between the groups. A higher percentage of patients with Duchene muscular dystrophy had a change in level compared to that of the patients with cerebral palsy (83.3% vs. 45.5%, respectively). **CONCLUSIONS:** The conus medullaris level changed postoperatively in the patients with severe scoliosis. Overall, the postoperative degree of correction of the coronal curve was higher in the change group than that in the non-change group. The degrees of correction of the coronal curve and lumbar lordosis were related to the spinal cord level change after scoliosis correction.

PMID: 21369475 [PubMed - in process]

##### **5. J Foot Ankle Surg. 2011 Mar-Apr;50(2):190-6.**

###### **Grice-green procedure for severe hindfoot valgus in ambulatory patients with cerebral palsy.**

Leidinger B, Heyse TJ, Fuchs-Winkelmann S, Paletta JR, Roedl R.

Surgeon, Orthopaedic Hospital Volmarstein, Department of Paediatric Orthopaedics, Volmarstein, Germany.

Grice-Green extra-articular subtalar arthrodesis is a treatment option for advanced valgus rearfoot deformity of neuromuscular origin in young patients. The purpose of this study was to evaluate long-term results of the procedure in ambulatory cerebral palsy patients. From January 1975 to December 1993, 57 operations were performed in 39 patients (22 males, 17 females) with a mean age of  $7.8 \pm 2.7$  (range 3.9-14.4) years for excessive symptomatic hindfoot valgus. Thirty-five patients (51 feet) were followed for a mean  $22.6 \pm 4.6$  (range 16.0-32.3) years. Preoperative GMFCS score, ambulation, hindfoot position, podoscopic view of the weight-bearing feet, and radiological examinations, along with complications and orthotic use, were compared. Based on a clinical rating scale, 39 results were excellent or good, 8 were fair, and 4 were poor. The poor results were attributed to hindfoot valgus recurrence or varus overcorrection. One case needed revisional surgery owing to slippage of the graft. Overall, the GMFCS score, level of ambulatory distance, and use of foot orthoses improved. Grice-Green subtalar arthrodesis did not result in early degenerative changes at the midterm follow-up. The procedure offers safe and long-lasting correction for severe and symptomatic hindfoot disorders in patients with cerebral palsy. Together with physiotherapy and orthotic use, it can improve ambulation. Whereas a slight hindfoot valgus in patients with cerebral palsy is tolerable without lack of function, overcorrection should be avoided.

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PMID: 21354003 [PubMed - in process]

##### **6. Dev Med Child Neurol. 2011 Feb 11. doi: 10.1111/j.1469-8749.2010.03891.x. [Epub ahead of print]**

###### **The value of subclassifying children with unilateral cerebral palsy.**

Cans C.

TIMC/ThEMAS-RHEOP, Grenoble University Hospital, Grenoble, France.

PMID: 21361915 [PubMed - as supplied by publisher]

##### **7. Disabil Rehabil Assist Technol. 2011;6(2):148-56.**

###### **Involving children in the development of assistive technology devices.**

Allsop M, Gallagher J, Holt R, Bhakta B, Wilkie R.

School of Mechanical Engineering, Institute of Engineering Systems and Design, University of Leeds, Leeds, UK.

**Purpose.** To investigate the implementation of a web-based survey for involving children in the design of assistive technology devices within the primary school environment. **Method.** Children were recruited within their normal school environment. They completed tasks within the survey that sought to gather their personal preferences about

assistive technology devices. From six primary schools, 257 children (mean age=9 years and 8 months, SD=1.51; 123 males, 134 females) including children with cerebral palsy (N=11), varying levels of deafness (N=7), global developmental delay (N=2) and Down's syndrome (N=1) participated. Observations were taken whilst the children completed the survey tasks. Results. All children were able to complete the tasks from the survey, although children with disabilities had higher completion times and most required a form of assistance from support assistants and/or sign language interpreters. Conclusions. The use of the web-based survey provided a novel means with which to involve children with and without disabilities in the design of assistive technology devices within a primary school environment. In order for the survey to be utilised more widely, issues that arose when involving children with disabilities need to be addressed.

PMID: 21370941 [PubMed - in process]

## **8. Ind Health. 2011 Mar 1. [Epub ahead of print]**

### **Effectual Points of View in Occupational Health Management for Persons with Cerebral Palsy - Interventional Case Approach in VDT Work-**

Tsujimura H, Taoda K, Kitahara T.

Division of Occupational and Environmental Health, Department of Social Medicine, Shiga University of Medical Science.

In our previous study, we elicited effectual points of view (POV) in occupational health management for visual display terminals (VDT) operators with disabilities. In order to validate the POV, two VDT operators with cerebral palsy newly-participated in our case study. Problems were ascertained, and in order to attempt to reduce the workload and improve operability, we performed intervention using ergonomic measures. Evaluations were conducted through observations of the equipment used and posture, as well as measurements of sitting pressure distribution and surface electromyogram. For Case 1 (a 33-yr-old male), a trunk support was introduced inside the armrest of his chair to maintain the trunk in a comfortable position. For Case 2 (21-yr-old woman), in order to improve her unstable sitting position, we changed her chair and adjusted it to an appropriate desk height. For both cases, we confirmed improvements in posture, sitting pressure distribution, myoelectric potential or operability. We were able to confirm that "maintaining of a comfortable trunk" and "alleviation of excessive bending, extension, and curvature of the spinal column and joints" obtained from the previous study as POV in health management are also effective in the present interventional cases.

PMID: 21372442 [PubMed - as supplied by publisher]

## **9. Chir Main. 2011 Feb 1. [Epub ahead of print]**

### **Surgical management of spasticity of the intrinsic muscles of the long fingers in adults after cerebral palsy, 68 operated hands. [Article in French]**

Saintyves G, Genet F, Allieu Y, Judet T, Denormandie P.

Service de chirurgie orthopédique et traumatologique, hôpital Raymond-Poincaré, 92380 Garches, France.

Between November 2001 and January 2008, 56 patients (68 hands) out of 110 patients operated for spastic hand deformities, presented with spasticity of the intrinsic muscles of the long fingers (interossei and the abductor pollicis brevis). All patients were adults (mean age 42.1 years). The surgical indication was discussed during multidisciplinary consultations with selective nerve blocks enabling us to distinguish between extrinsic and intrinsic pathologies on the one hand and muscular spasticity and tendon retractions on the other hand. The aim of the treatment was defined in a "contract" signed with the patient and/or his family. It was hygienic, aesthetic and analgesic in 15 cases, hygienic and analgesic in 32 cases and functional in 21 cases. Four hands were treated by neurectomy of the ulnar nerve's motor ramus, 54 by tenotomies of the interosseous muscles, 18 by tenotomy of the abductor digiti minimi, six by metacarpal disinsertion of the interosseous muscles. On a total of 67 hands operated associating surgery of the extrinsic and intrinsic flexors, 63 had good primary results as defined in the contract. We noted four relapses, two of which required revision. The authors emphasize the frequency of mixed spastic hands in adults after cerebral palsy. However modest the functional results may be, correction of hygienic and pain problems of

non-functional hands as well as aesthetic improvements make surgery of the mixed spastic hand a successful intervention, which should be shared.

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PMID: 21367637 [PubMed - as supplied by publisher]

**10. J Intellect Disabil Res. 2011 Mar 3. doi: 10.1111/j.1365-2788.2011.01390.x. [Epub ahead of print]**

**Physical conditions and challenging behaviour in people with intellectual disability: a systematic review.**

de Winter CF, Jansen AA, Evenhuis HM.

Reinaerde, Organisation for People with Intellectual Disability, Den Dolder, the Netherlands Centre for Consultation and Expertise, Utrecht, the Netherlands Erasmus MC, General Practice, Intellectual Disability Medicine, Rotterdam, the Netherlands.

Background: Challenging behaviour is a major problem among people with intellectual disabilities. Physical factors may be an important cause. The aim of the present systematic review was to determine the physical conditions associated with challenging behaviour. Methods: A literature search was conducted in PubMed and the Cochrane systematic review database for empirical studies published between 1990 and 2008. The quality of all the studies that met the inclusion criteria was assessed using the SIGN-50 methodology checklists. Results: The search identified 45 studies, which looked at general medical conditions, motor impairment, epilepsy, sensory impairment, gastrointestinal disease, sleep disorders, dementia and others. There were four high-quality observational studies, seven well-conducted observational studies, 21 observational studies of low methodological quality and 13 non-analytical studies. There were significant and independent associations between challenging behaviours and urinary incontinence, pain related to cerebral palsy and chronic sleep problems, and between self-injurious behaviour and visual impairment. No association was found with hearing impairment, bowel incontinence, mobility impairment or epilepsy. Many other physical conditions were not addressed at all. Conclusion: Medical conditions can play a role in challenging behaviour, and this should be evaluated in the clinical setting. So far, the level of evidence is generally low, and longitudinal studies are completely lacking. We recommend a systematic approach to research examining the role of physical conditions in challenging behaviour, the ultimate aim being to establish a basis for the development of clinical guidelines.

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PMID: 21366751 [PubMed - as supplied by publisher]

**11. J Oral Pathol Med. 2011 Mar 2. doi: 10.1111/j.1600-0714.2011.01027.x. [Epub ahead of print]**

**Salivary osmolality and hydration status in children with cerebral palsy.**

Santos MT, Batista R, Guaré RO, Leite MF, Ferreira MC, Durão MS, Nascimento OA, Jardim JR.

Individuals with Special Needs Division, Universidade Cruzeiro do Sul, Director Dentistry Division Lar Escola São Francisco São Paulo, Brazil Centro de Ciências Biológicas e da Saúde, Universidade Cruzeiro do Sul, São Paulo, Brazil Universidade Paulista, São Paulo, Brazil Nephrology Division, Universidade Federal de São Paulo, Brazil Universidade Federal de São, Brazil Respiratory Diseases, Universidade Federal de São, Brazil.

Background: Unstimulated whole salivary parameters have been identified as potential markers of hydration status. Reduced salivary flow rate and increased salivary osmolality have been shown to be useful to identify dehydration, even when minimal loss of body water occurs. This study aimed to evaluate whether unstimulated salivary flow rate and salivary osmolality from individuals with cerebral palsy correlate with plasma and urine osmolality. Methods: Thirty-five male and female children, aged 9-13 years old, diagnosed with cerebral palsy were compared to 27 non-disabled children (10-12 years old). Unstimulated whole saliva was collected under slight suction and salivary flow rate (ml/min) was calculated. Plasma without venostasis and urine were also collected. Salivary, plasma and urine osmolality were measured using a freezing point depression osmometer. Results: Cerebral palsy children presented a reduction in salivary flow rate (50%) compared to the control group ( $P < 0.01$ ). Moreover, an increase in

salivary (50%), plasma (3%), and urine osmolality (20%) was also observed in the cerebral palsy children compared to the control group ( $P < 0.01$ ). Salivary flow rate was negatively correlated with the salivary, plasma and urine osmolality ( $P < 0.01$ ). Salivary osmolality correlated positively with plasma and urine osmolality ( $P < 0.01$ ). Conclusion: Cerebral palsy children seem to present impaired adequate hydration status. Since the possible hypo-hydration condition may be reflected in saliva fluid, which could compromise the protective function exerted by saliva, the earlier this condition is identified the greater the chances of administering preventive measures. Moreover, salivary osmolality is a reliable parameter that reflects changes in plasma and urine.

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PMID: 21366696 [PubMed - as supplied by publisher]

## 12. J Rehabil Med. 2011 Feb 3. doi: 10.2340/16501977-0787. [Epub ahead of print]

### Physical and mental components of health-related quality of life and musculoskeletal pain sites over seven years in adults with spastic cerebral palsy.

Opheim A, Jahnsen R, Olsson E, Stanghelle JK.

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Objective: To analyse the number of musculoskeletal pain sites in adults with spastic cerebral palsy, to correlate these with physical and mental components of health-related quality of life, and to describe changes in pain site prevalence over 7 years and the factors improving or worsening the pain. Design: Seven-year follow-up of a national survey of adults with spastic cerebral palsy (CP). Subjects/patients: A total of 149 persons: 46% spastic bilateral CP, 54% unilateral CP, 51% females, mean age 40 years. Methods: Pain sites were recorded and physical and mental component summaries computed using Short Form 36. Results: The median number of pain sites was 3. The mental components showed little, if any correlation ( $r = -0.08$ ), but the physical components correlated negatively with the number of pain sites ( $r = -0.36$ ). Back, neck and foot/ankle pain were most common, with an increased prevalence of neck pain. A higher prevalence of hip and foot/ankle pain was found in spastic bilateral CP, and for all pain sites in females. Exertion and physiotherapy were the most important factors for increased and reduced pain, respectively. Conclusion: In contrast to the general population, there was hardly any correlation between the number of pain sites and psychological health. Improved pain management, evidence-based physiotherapy and rehabilitation programmes with a life-span perspective are recommended.

PMID: 21369676 [PubMed - as supplied by publisher]

## 13. Osteoporos Int. 2011 Mar 3. [Epub ahead of print]

### Relationships of muscle strength and bone mineral density in ambulatory children with cerebral palsy.

Chen CL, Lin KC, Wu CY, Ke JY, Wang CJ, Chen CY.

Physical Medicine and Rehabilitation, Chang Gung Memorial Hospital, 5 Fu-Hsing St. Kwei-Shan, Tao-Yuan, 333, Taiwan.

This work explores the relationships of muscle strength and areal bone mineral density (aBMD) in ambulatory children with cerebral palsy (CP). The knee extensor strength, but not motor function, was related to aBMD. Thus, muscle strength, especially antigravity muscle strength, was more associated with aBMD in these children than motor function. INTRODUCTION: Muscle strength is related to bone density in normal children. However, no studies have examined these relationships in ambulatory children with CP. This work explores the relationships of muscle strength and aBMD in ambulatory children with CP. METHODS: Forty-eight ambulatory children with spastic CP, aged 5-15 years, were classified into two groups based on Gross Motor Function Classification System levels: I ( $n = 28$ ) and II ( $n = 20$ ). Another 31 normal development (ND) children were recruited as the comparison group for the aBMD. Children with CP underwent assessments of growth, lumbar and distal femur aBMD, Gross Motor Function Measure-66 (GMFM-66), and muscle strength of knee extensor and flexor by isokinetic dynamometer. RESULTS: The distal femur aBMD, but not lumbar aBMD, was lower in children with CP than in ND children ( $p < 0.05$ ). Children with level I had greater knee flexor strength and GMFM-66 scores than those with level II ( $p < 0.001$ ). How-

ever, the knee extensor strength and distal femur and lumbar aBMD did not differ between two groups. Regression analysis revealed the weight and knee extensor strength, but not GMFM-66 scores, were related positively to the distal femur and lumbar aBMD (adjusted  $r(2) = 0.56-0.65$ ,  $p < 0.001$ ). **CONCLUSIONS:** These results suggest the muscle strength, especially antigravity muscle strength, were more associated with the bone density of ambulatory children with CP than motor function. The data may allow clinicians for early identifying the ambulatory CP children of potential low bone density.

PMID: 21369789 [PubMed - as supplied by publisher]

#### 14. *Spec Care Dentist*. 2011 Mar;**31(2):58-62**. doi: 10.1111/j.1754-4505.2011.00180.x.

##### **Oral health and oral motor function in children with cerebral palsy.**

de Carvalho RB, Mendes RF, Prado RR Jr, Neto JM.

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The objective of this study was to evaluate the influence of the type of cerebral palsy (CP) and oral motor function (OMF) on the oral health status of children and adolescents with CP in Teresina, Piauí, Brazil. The sample consisted of 52 children with CP, aged 7 to 18 years. The data were statistically analyzed using chi-square tests. In 73.1% of the sample, the subjects' caregivers carried out the daily oral care. There was a significant association between the frequency of daily care and the subject's level of oral hygiene ( $p = .037$ ). A diagnosis of Class II malocclusion was made for 55.8% of the sample, and defects of enamel formation were found in 38.5% of the subjects. There was no significant correlation between DMFT (decayed, missing, filled teeth) and socioeconomic status of the subjects ( $r = .254$ ,  $p = .069$ ). A significant association was found between quadriplegia and OMF ( $\chi(2) = 7.88$ ,  $p = .019$ ). The type of CP and OMF did not influence the levels of plaque and caries indices in the children with CP, but increased frequency of toothbrushing did result in an improved oral hygiene index.

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PMID: 21371066 [PubMed - in process]

#### 15. *Res Dev Disabil*. 2011 Feb 23. [Epub ahead of print]

##### **Typical and atypical (cerebral palsy) development of unimanual and bimanual grasp planning.**

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In the present study we tested 13 children with cerebral palsy (CP) and 24 typically developing children (7-12 years old) in a unimanual and bimanual motor planning task. We focused on two research questions: (1) How does motor planning develop in children with and without CP and (2) Is motor planning facilitated when the task is performed with both hands? Participants had to grasp one or two vertical oriented cylinder(s) and transport it/them to a platform that had different heights. As a measure of motor planning, we registered the height at which participants grasped the cylinder. Here, anticipation of grasp height upon the height of the upcoming target(s) is reflective of proper forward motor planning as it leads to a comfortable posture at the end of the task. In the unimanual task the typically developing children showed a significant grasp height effect, which increased with age. In contrast, no grasp height effect, or age related changes therein were found for the children with CP, suggesting a compromised development of motor planning in these children. Interestingly, when children had to transport one cylinder to a high shelf and one cylinder to a low shelf, the more affected hand of the CP children clearly anticipated the grasp height to the upcoming target height. The less affected hand did not show such anticipation. Taken collectively, these findings suggest a delayed or compromised development of motor planning in children with CP compared to typically developing children. At the same time, the facilitated motor planning of the more affected arm in the bimanual task offers a

valuable entry point for intervention to improve motor planning in CP.

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PMID: 21353463 [PubMed - as supplied by publisher]

## Epidemiology / Aetiology / Diagnosis & Early Treatment

### 16. *J Pediatr.* 2011 Feb 24. [Epub ahead of print]

#### Decreasing Incidence and Severity of Cerebral Palsy in Prematurely Born Children.

van Haastert IC, Groenendaal F, Uiterwaal CS, Termote JU, van der Heide-Jalving M, Eijsermans MJ, Gorter JW, Helden PJ, Jongmans MJ, de Vries LS.

Department of Neonatology, Wilhelmina Children's Hospital/University Medical Center, Utrecht, Utrecht, The Netherlands M.J..

**OBJECTIVE:** To examine incidence and severity of cerebral palsy (CP), and associated factors among preterm survivors (gestational age <34 weeks), admitted to a neonatal intensive care unit from 1990-2005. **STUDY DESIGN:** Eighteen antenatal, perinatal and postnatal factors were analyzed. The cohort was divided in four birth periods: 1990-1993 (n = 661), 1994-1997 (n = 726), 1998-2001 (n = 723), and 2002-2005 (n = 850). The Gross Motor Function Classification System was used as primary outcome measure (mean age: 32.9 ± 5.3 months). Logistic regression analyses were used. **RESULTS:** CP incidence decreased from 6.5% in period I, to 2.6%, 2.9% and 2.2% (P < .001) in period II-IV, respectively. Simultaneously, cystic periventricular leukomalacia (c-PVL) decreased from 3.3% in period I to 1.3% in period IV (P = .004). Within the total cohort (n = 3287), c-PVL grade III decreased from 2.3% in period I to 0.2% in period IV (P = .003). The number of children with Gross Motor Function Classification System levels III-V decreased from period I to IV (P = .035). Independent risk factors for CP were c-PVL and severe intraventricular hemorrhage, whereas antenatal antibiotics, presence of an arterial line, Caesarean section, and gestational age were independent protective factors. **CONCLUSION:** CP incidence and severity decreased from 1990-1993 onward, which could be attributed to a reduction of 93% in severe c-PVL.

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PMID: 21367430 [PubMed - as supplied by publisher]

### 17. *Gynecol Obstet Fertil.* 2011 Feb 25. [Epub ahead of print]

#### Cerebral palsy and perinatal asphyxia (II - Medicolegal implications and prevention). [Article in French]

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Obstetric litigation is a growing problem in developed countries and its escalating cost together with increasing medical insurance premiums is a major concern for maternity service providers, leading to obstetric practice cessation by many practitioners. Fifty-four to 74% of claims are based on cardiocardiographic (CTG) abnormalities and their interpretation followed by inappropriate or delayed reactions. A critical analysis is performed about the nine criteria identified by the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics in their task force on Neonatal Encephalopathy and Cerebral Palsy: four essential criteria defining neonatal asphyxia and five other suggesting an acute intrapartum event sufficient to cause cerebral palsy in term newborns. The importance of placental histologic examination is emphasized in order to confirm sudden catastrophic events occurring before or during labor or to detect occult thrombotic processes affecting the fetal circulation, patterns of decreased placenta reserve and adaptive responses to chronic hypoxia. It may also exclude intrapartum hypoxia by revealing some histologic patterns typical of acute chorioamnionitis and fetal inflammatory response or compati-

ble with metabolic diseases. Magnetic resonance imaging (MRI) of the infant's damaged brain is very contributive to elucidate the mechanism and timing of asphyxia in conjunction with the clinical picture, by locating cerebral injuries predominantly in white or grey matter. Intrapartum asphyxia is sometimes preventable by delivering weak fetuses by cesarean sections before birth, by avoiding some "sentinel" events, and essentially by responding appropriately to CTG anomalies and performing an efficient neonatal resuscitation. During litigation procedures, it is necessary to have access to a readable CTG, a well-documented partogram, a complete analysis of umbilical cord gases, a placental pathology and an extensive clinical work-up of the newborn infant including cerebral MRI. Malpractice litigation in obstetric care can be reduced by permanent CTG education, respect of national CTG guidelines, use of adjuncts such as fetal blood sampling for pH or lactates, regular review of adverse events in Clinical Risk Management (CRM) groups and periodic audits about low arterial cord pH in newborns, admission to neonatal unit, the need for assisted ventilation and the decision-to-delivery interval for emergency operative deliveries. Considering the fast occurrence of fetal cerebral hypoxic injuries, and thus despite an adequate management, many intrapartum asphyxias will not be preventable. Conversely, well-documented hypoxic-ischemic brain insults during the antenatal period do not automatically exclude intrapartum suboptimal obstetric care.

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PMID: 21354846 [PubMed - as supplied by publisher]

### **18. J Electrocardiol. 2011 Mar-Apr;44(2):138-41.**

#### **Characterization of the electrocardiographic pattern of individuals with cerebral palsy.**

Pastore CA, Samesima N, Imada R, Reis M, Santos MT, Ferreira MC, Grupi C, Fumagalli F, Wagenfuhr J, Chammas M.

**BACKGROUND:** Dentists of Lar São Francisco observed during dental treatment that children with cerebral palsy (CP) had increased heart rate (HR) and lower production of saliva. Despite the high prevalence of CP found in the literature (2.08-3.6/1000 individuals), little is known about the electrocardiographic (ECG) characteristics, especially HR, of individuals with CP. **OBJECTIVE:** This study aimed to investigate the hypothesis that individuals with CP have a higher HR and to define other ECG characteristics of this population. **METHODS:** Ninety children with CP underwent clinical examination and 12-lead rest ECG. Electrocardiographic data on rhythm, HR, PR interval, QRS duration, P/QRS/T axis, and QT, QTc and T(peak-end) intervals (minimum, mean, maximum, and dispersion) were measured and analyzed then compared with data from a control group with 35 normal children. Fisher and Mann-Whitney U tests were used, respectively, to compare categorical and continuous data. **RESULTS:** Groups cerebral palsy and control did not significantly differ in age ( $9 \pm 3 \times 9 \pm 4$  years) and male gender (65%  $\times$  49%). Children with CP had a higher HR ( $104.0 \pm 20.6 \times 84.2 \pm 13.3$  beats per minute;  $P < .0001$ ), shorter PR interval ( $128.8 \pm 15.0 \times 138.1 \pm 15.1$  milliseconds;  $P = .0018$ ), shorter QRS duration ( $77.4 \pm 8.6 \times 82.0 \pm 8.7$  milliseconds;  $P = .0180$ ), QRS axis ( $46.0^\circ \pm 26.3^\circ \times 59.7^\circ \pm 24.8^\circ$ ;  $P = .0024$ ) and T-wave axis ( $34.3^\circ \pm 28.9^\circ \times 42.9^\circ \pm 17.1^\circ$ ;  $P = .034$ ) more horizontally positioned, and greater mean QTc ( $418.1 \pm 18.4 \times 408.5 \pm 19.4$  milliseconds;  $P = .0110$ ). All the electrocardiogram variables were within the reference range for the age group including those with significant differences. **CONCLUSION:** Children with CP showed increased HR and other abnormal ECG findings in the setting of this investigation. Further studies are needed to explain our findings and to correlate the increased HR with situations such as dehydration, stress, and autonomic nervous disorders.

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### **19. Pediatrics. 2011 Mar;127(3):e654-e660. Epub 2011 Feb 28.**

#### **Neurodevelopmental Outcomes of Triplets or Higher-Order Extremely Low Birth Weight Infants.**

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**BACKGROUND:** Extremely low birth weight twins have a higher rate of death or neurodevelopmental impairment than singletons. Higher-order extremely low birth weight multiple births may have an even higher rate of death or neurodevelopmental impairment. **METHODS:** Extremely low birth weight (birth weight 401-1000 g) multiple births born in participating centers of the Neonatal Research Network between 1996 and 2005 were assessed for death or neurodevelopmental impairment at 18 to 22 months' corrected age. Neurodevelopmental impairment was defined by the presence of 1 or more of the following: moderate to severe cerebral palsy; mental developmental index score or psychomotor developmental index score less than 70; severe bilateral deafness; or blindness. Infants who died within 12 hours of birth were excluded. Maternal and infant demographic and clinical variables were compared among singleton, twin, and triplet or higher-order infants. Logistic regression analysis was performed to establish the association between singletons, twins, and triplet or higher-order multiples and death or neurodevelopmental impairment, controlling for confounding variables that may affect death or neurodevelopmental impairment. **RESULTS:** Our cohort consisted of 8296 singleton, 2164 twin, and 521 triplet or higher-order infants. The risk of death or neurodevelopmental impairment was increased in triplets or higher-order multiples when compared with singletons (adjusted odds ratio: 1.7 [95% confidence interval: 1.29-2.24]), and there was a trend toward an increased risk when compared with twins (adjusted odds ratio: 1.27 [95% confidence: 0.95-1.71]). **CONCLUSIONS:** Triplet or higher-order births are associated with an increased risk of death or neurodevelopmental impairment at 18 to 22 months' corrected age when compared with extremely low birth weight singleton infants, and there was a trend toward an increased risk when compared with twins.

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## **20. Prescrire Int. 2010 Dec;19(111):282-3.**

### **Routine antibiotics for preterm labour: risk of cerebral palsy.**

[No authors listed]

Epidemiological studies have suggested a link between maternal infection and preterm delivery. In 2001, however, the Oracle II trial, including about 6000 pregnant women, showed that routine antibiotic administration (erythromycin or amoxicillin + clavulanic acid) in cases of spontaneous preterm labour without membrane rupture or clear signs of infection had no immediate benefits for the newborn child. A systematic review subsequently confirmed this finding. In 2008, follow-up of 3196 of the children born to mothers enrolled in this study, up to the age of 7 years, showed a statistically significant increase in cerebral palsy among children whose mothers had received erythromycin or amoxicillin + clavulanic acid. In practice, antibiotics should not be routinely prescribed to women with preterm labour but without membrane rupture or signs of infection, due to an increased risk of cerebral palsy. The probable benefits outweigh the risks when a significant bacterial infection is diagnosed.

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## **21. Rev Obstet Gynecol. 2010 Fall;3(4):194.**

### **Cerebral palsy and gestational age.**

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