

Monday 5 July 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. *BMC Neurol.* 2010 Jul 1;10(1):57. [Epub ahead of print]

Growth in Children with Cerebral Palsy during five years after Selective Dorsal Rhizotomy: a practice-based study.

Westbom L, Lundkvist Josenby A, Wagner P, Nordmark E.

BACKGROUND: Overweight is reported as a side effect of SDR. The aims were to study the development of weight, height and body mass index (BMI) during five years after SDR. **METHODS:** This prospective, longitudinal and practice-based study included all 56 children with CP spastic diplegia undergoing SDR from the start in March 1993 to April 2003 in our hospital. The preoperative Gross Motor Function Classification System (GMFCS) levels were I-II in 17, III in 15, IV-V in 24 children. Median age at SDR was 4.3 years (range 2.4-7.4 years). Weight and height/recumbent length were measured. Swedish growth charts for typically developing children generated weight, height and BMI z-scores for age and gender. **RESULTS:** The preoperative median z-scores were for height -1.92 and for body mass index (BMI) -0.22. Five years later, the median BMI z-score was increased by +0.57 ($p < 0.05$). The occurrence of thinness (BMI < -2 SD) was decreased (n.s.) and obesity (BMI $> +2$ SD) increased ($p < 0.05$). Baseline BMI and age at the start of follow-up influenced the BMI change during the five years ($p < 0.001$ and $p < 0.05$ respectively). The individual growth was highly variable, but a tendency towards increasing stunting with age was seen in severe gross motor dysfunction (GMFCS levels IV-V) and the opposite, a slight catch-up of height in children with walking ability (GMFCS levels I-III). **CONCLUSIONS:** These are the first available subtype- and GMFCS-specific longitudinal growth data for children with CP spastic diplegia. Their growth potential according to these data should be regarded as a minimum, as some children were undernourished. It is unknown whether the spasticity reduction through SDR increased the weight gain velocity, or if the relative weight increase was part of the general "obesity epidemic". For some children the weight increase was highly desirable. In others, it resulted in overweight and obesity with risk of negative health effects. Weight and height should be monitored to enable early prevention of weight aberrations also causing problems with mobility, activity and participation.

PMID: 20594320 [PubMed - as supplied by publisher]

2. *Disabil Rehabil.* 2010 Jul 1. [Epub ahead of print]

Visual guidance of interceptive actions in children with spastic unilateral cerebral palsy is influenced by the side of the lesion.

van Kampen PM, Ledebt A, Deconinck FJ, Savelsbergh GJ.

Institute for Biomedical Research into Human Movement and Health, Manchester Metropolitan University, Manchester, UK.

Purpose. To determine the type of visual information used by children with spastic unilateral cerebral palsy (SUCP) in order to intercept a ball and to verify whether this information was dependent on the side of the lesion. More specifically, it was examined whether the interception was controlled on the basis of a time or a distance strategy, initiating the catch when the ball is at a fixed time interval or at a fixed distance from the point of interception. **Methods.** Three groups of children were included. Children with either a left sided (LHL) or a right sided lesion (RHL) and children without a lesion [typically developing (TD)] intercepted a ball from a conveyor belt. In order to intercept the ball successfully they had to walk and to reach for the ball at the interception point 4 m away. **Results.** Children with LHL had a longer decision time and started their reach movement earlier. In 56% of the children with LHL a distance strategy was observed, while in the TD and the children with RHL predominantly a time strategy was found. **Conclusions.** The side of the lesion influences the visual information used to initiate interceptive actions.

PMID: 20594115 [PubMed - as supplied by publisher]

3. Eur J Phys Rehabil Med. 2010 Jul 1. [Epub ahead of print]

The perception of involved professionals towards research feasibility and usefulness: lessons from the Multi-Site Trial on Efficacy of Constraint Induced Movement Therapy in Children with Hemiplegia.

Rizzotto MR, Visonà Dalla Pozza L, Turconi AC, Tornetta L, Andreucci E, Zambonin F, Fedrizzi E, Facchin P.

Epidemiology and Community Medicine Unit, Pediatrics department, Padua University, Padua, Italy - melissa.rosarizzotto@unipd.it.

BACKGROUND: In the last decades, the world of rehabilitation has been more and more calling for clear evidence to support intervention and numerous research programs have been developed. At stake, relatively little research on opinions and attitude of rehabilitation personnel involved in research conducted in real clinical settings has been carried out. **AIM:** To explore the opinion of professionals involved in a national clinical trial on research. **DESIGN:** Multicentre cross-sectional study. **SETTING:** 19 rehabilitation centres/services (4 research institutes, 15 local rehabilitation services). **POPULATION:** All professional participating to a multi-centre clinical trial on the effects of Constraint Induced Movement Therapy on children with hemiplegic cerebral palsy. **METHODS:** A 15-questions questionnaire inquiring feasibility, usefulness, products, costs, judgement and perceptions about clinical research in rehabilitation was administered. **RESULTS:** Among those working in one of the 19 rehabilitation centres part of the multicentric study, 76 professionals were asked to fill in the questionnaire. 68 professionals answered (89.4% of response rate). More than 75% of the sample thinks that its rehabilitation centre is suited to develop clinical research. Research results useful for the development of their daily activities (new tools for the assessment of children, to demonstrate the efficacy of a new treatment option and to learn a new way of working, and to strengthen the ties within the working team). Research is costly in terms of personal time and effort, but it can modify the rehabilitation praxis (assessment tools, the relationship with colleagues/patients). 98% of the interviewees declared the willingness to participate to other research projects. **CONCLUSION AND CLINICAL REHABILITATION IMPACT:** This survey highlights the importance of conducting research in local rehabilitation services, not only in terms of generation of new evidences, but also in terms of building networks, sharing experiences and knowledge, connecting with centers of excellence and providing a specific training for research conduction.

PMID: 20592684 [PubMed - as supplied by publisher]

4. Neurologist. 2010 Jul;16(4):238-48.

The role of the neurologist in the longitudinal management of normal pressure hydrocephalus.

Wilson RK, Williams MA.

From the Sandra and Malcolm Berman Brain & Spine Institute of Sinai Hospital of Baltimore, Baltimore, MD.

BACKGROUND: Since normal pressure hydrocephalus (NPH) was first described in 1965, neurologists have been involved in the initial diagnostic evaluation for it but have rarely followed patients specifically to monitor response to therapy after shunt surgery. **REVIEW SUMMARY:** The potential role for the neurologist in the longitudinal management of NPH has broadened, partly because of improvement in the tools used to diagnose and treat NPH and partly because of progress in understanding how NPH mimics and interacts with other common disorders of the

elderly. The interplay of Alzheimer dementia, vascular dementia, Parkinson disease, and spinal stenosis with NPH presents the clinician with a patient profile that may be challenging to assess. Neurologists also face a broad differential spectrum of less common neurologic diseases that may present with similar signs (including ventriculomegaly) and symptoms; these diseases include frontotemporal dementia, progressive supranuclear palsy, Lewy body disease, corticobasal degeneration, Huntington disease, spongiform encephalopathy, and multiple-system atrophy. **CONCLUSIONS:** The neurologist is in a unique position to differentiate NPH from alternative diagnoses, to suggest management strategies for patients with concomitant NPH and another neurologic disorder, and to participate in longitudinal management of NPH.

PMID: 20592567 [PubMed - in process]

5. Neurorehabil Neural Repair. 2010 Jul-Aug;24(6):575-83.

The effects of internet-based home training on upper limb function in adults with cerebral palsy.

Brown SH, Lewis CA, McCarthy JM, Doyle ST, Hurvitz EA.

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BACKGROUND: While adults with hemiplegic cerebral palsy (CP) can have significant upper limb dysfunction, the effects of movement-based training has not been investigated. **OBJECTIVE:** This uncontrolled trial assessed the effects of a home and internet-based upper limb intervention program targeting motor and sensory function. **METHODS:** Twelve adults, aged 21 to 57 yrs, GMFCS levels I-III with asymmetric upper limb involvement participated in the Upper Limb Training and Assessment (ULTrA) program. Clinical and functional measures included the Motor Activity Log (MAL), the Nine-Hole Peg test, and grip strength. An upper limb training system consisting of a laptop, webcam, target light board, and hand manipulation/ discrimination devices was installed in each participant's home. Training occurred 40 min/day, 5 days/wk for 8 wks and included both unilateral and bilateral reach movements as well as a series of hand sensorimotor tasks such as card turning, stereognosis, and tactile discrimination. Data generated during each session were transmitted to the laboratory via the Internet. **MAIN OUTCOME MEASURES:** were movement time, interlimb delay time, and performance on hand sensorimotor tasks. **RESULTS:** Following training, affected limb reach movement time decreased significantly for unilateral and bilateral tasks. Interlimb delay during sequential reaching also decreased. Significant improvement in hand manipulation tasks was also seen. Compliance was excellent and there were no adverse effects. **CONCLUSION:** The ULTrA program had beneficial effects for adults with CP and is safe and convenient to use. This system contrasts sharply with programs with similar intent that require participant travel and hours of therapist-based intervention.

PMID: 20581338 [PubMed - in process]

7. Res Dev Disabil. 2010 Jun 28. [Epub ahead of print]

Mirror visual feedback induces lower neuromuscular activity in children with spastic hemiparetic cerebral palsy.

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The study examined the effects of mirror feedback information on neuromuscular activation during bimanual coordination in eight children with spastic hemiparetic cerebral palsy (SHCP) and a matched control group. The 'mirror box' creates a visual illusion, which gives rise to a visual perception of a zero lag, symmetric movement between the two arms. The study incorporated two additional visual feedback conditions by placing a glass or opaque screen between the arms. During bilateral symmetric circular arm movements mirror visual feedback induced lower neuromuscular intensities in the shoulder muscles of the less impaired arm of children with SHCP compared to the other visual conditions. In addition, the mirror lead to shorter relative durations of eccentric and concentric activity in the elbow muscles of the more impaired arm, whereas no effects of visual feedback were found in a matched control group. These results suggest that replacing veridical visual information of the more impaired arm with a mirror reflection of the less impaired arm improves the motor control of children with SHCP during interlimb coupling. The

effects of the availability of visual feedback in individuals with hemiparesis are discussed with reference to: (1) increase ipsilateral motor cortex excitability and (2) congruence between afferent (visual) feedback and the internal copy of the motor commands. Crown Copyright © 2010. Published by Elsevier Ltd. All rights reserved.

PMID: 20591615 [PubMed - as supplied by publisher]

8. Qual Life Res. 2010 Jun 27. [Epub ahead of print]

Health- and oral health-related quality of life among preschool children with cerebral palsy.

Du RY, McGrath C, Yiu CK, King NM.

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OBJECTIVES: To assess the health- and oral health-related quality of life of preschool children with cerebral palsy (CP) and to determine their inter-relationship between the two quality of life measures. **METHODS:** A total of 144 preschool children with and without CP were invited to participate in the case-control study. Health-related quality of life was assessed by the Pediatric Quality of Life Inventory Version 4.0 (PedsQL() 4.0) and oral health-related quality of life by the Early Childhood Oral Health Impact Scale (ECOHIS). Differences in PedsQL() 4.0 and ECOHIS scores were determined between the groups, and correlation between PedsQL and ECOHIS were explored. **RESULTS:** Significant differences in overall scores of PedsQL() 4.0 ($P < 0.001$) and in overall scores of ECOHIS ($P < 0.05$) were apparent between the two groups. In terms of health- and oral health-related quality of life, preschool children with CP fared worse than the age-gender-matched control group. There was a positive albeit weak correlation ($r = 0.203$, $P < 0.05$) between PedsQL() 4.0 and ECOHIS scores. **CONCLUSIONS:** Differences in health- and oral health-related quality of life exist among preschool children with CP. Correlation between health- and oral health-related quality of life could at best be described as weak.

PMID: 20582721 [PubMed - as supplied by publisher]

9. Dev Med Child Neurol. 2010 Jun 23. [Epub ahead of print]

Why are children with cerebral palsy more likely to have emotional and behavioural difficulties?

Colver A.

Newcastle University, Institute of Health and Society, Sir James Spence Building, Royal Victoria Infirmary, Newcastle, UK.

PMID: 20584049 [PubMed - as supplied by publisher]

10. Urology. 2010 Jun 23. [Epub ahead of print]

Lower Urinary Tract Dysfunction and Ultrasound Assessment of Bladder Wall Thickness in Children With Cerebral Palsy.

Silva JA, Gonsalves MD, Saverio AP, Oliveira IC, Carrerette FB, Damião R.

SARAH Network of Rehabilitation Hospitals, Rio de Janeiro Unit, Rio de Janeiro, Brazil.

OBJECTIVES: To evaluate lower urinary tract dysfunction (LUTD) based on questionnaire symptom scoring and ultrasound assessment of bladder wall thickness (BWT) in children with cerebral palsy (CP). **METHODS:** A total of 97 children with CP were enrolled in the study. The patients were either symptomatic or asymptomatic with respect to lower urinary tract symptoms. All children underwent a urinary questionnaire and renal ultrasonography. Ultrasound assessment of BWT was completed in 72 cases. **RESULTS:** A total of 47 patients were female and 50 were male. The mean age was 8 years 8 months (SD 3 years 1 month), with a range of 5-18 years. Urinary incontinence was present in 43 patients (44.3%). Based on the questionnaire, LUTD was found in 59 patients (60.8%). The mean BWT was 2.30 mm. There was no statistically significant difference between continent and incontinent chil-

dren (2.46 vs 2.19 mm) or between children with and without LUTD (2.43 vs 2.12 mm). CONCLUSIONS: LUTD is common in children with CP and occurred in 60.8% of the patients assessed. BWT did not correlate with the presence of bladder dysfunction or incontinence. Ultrasound assessment of BWT was not relevant for diagnosis of lower urinary tract dysfunction. Copyright © 2010 Elsevier Inc. All rights reserved.

PMID: 20579700 [PubMed - as supplied by publisher]

11. Fiziol Cheloveka. 2010 May-Jun;36(3):90-4.

On the conjugate hand reaction. Note IV. Changing rates of conjugate hand reaction to the sound and light signals modality for surgical interventions in the subcortical brain structures in humans [Article in Russian]

[No authors listed]

The results of the study on conjugate reaction time (BP) of hands (time of simple reaction) in 16 patients--with Parkinson's disease, cerebral palsy and spastic torticollis before and after surgery--are stated. The analysis of conjugate BP left arm and arm BP signals of sound and light modality with a warning signal to determine the morphological structures which depend on the friendly reaction was performed. Was found that part of the surveyed patients had no violations of conjugate BP, the other part had significant changes in the magnitude of the correlation coefficient, by which evaluated conjugate BP left and right hands. Violations of the correlation coefficient between BP left arm and right arm BP were observed or sound, or doth on the sound, and the light signal. Violations of the conjugate hand reaction were observed in the ventro-lateral talamotomii, subthalamotomii and pallidotomii.

PMID: 20586307 [PubMed - in process]

12. J Child Neurol. 2010 Apr;25(4):528; author reply 528-9.

Defective references/literature searches.

Miller DC.

Comment on:

J Child Neurol. 2009 Sep;24(9):1179-89.

PMID: 20382956 [PubMed - indexed for MEDLINE]

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.

13. Hum Mov Sci. 2010 Jun 29. [Epub ahead of print]

Developmental Coordination Disorder and cerebral palsy: Categories or a continuum?

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Developmental Coordination Disorder (DCD) is a movement disorder affecting between 1.7% and 6% of children aged 5-11 years. The Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition Text Revision codes DCD as an Axis I Clinical Disorder. If there is neurological involvement, as is the case for cerebral palsy, the movement disorder would be coded as an Axis III General Medical Condition. What little is known of the aetiology of DCD implicates neurological involvement. In a previous co-twin control study of monozygotic twins concordant and discordant for DCD, seven of the nine twins who met criteria for DCD on the McCarron Assessment of Neuromuscular Development experienced perinatal oxygen perfusion problems, while another experienced prenatal complications. This supported findings in an earlier study of a relationship between environmental factors and DCD, and strengthened the hypothesis that DCD and cerebral palsy have similar causal pathways and may fall on a continuum of movement disorder rather than being discrete categories. In the present paper, this hypothesis is tested by application of the nine principles identified by Sir Austin Bradford Hill as important when considering observed associations between two variables. Implications for prevention, clinical intervention, policy, and classification systems are discussed. Copyright © 2010. Published by Elsevier B.V.

PMID: 20594606 [PubMed - as supplied by publisher]

14. Dev Med Child Neurol. 2010 Jun 23. [Epub ahead of print]

Epilepsy in hemiplegic cerebral palsy due to perinatal arterial ischaemic stroke.

Neville B.

UCL Institute of Child Health, Neurosciences Unit, The Wolfson Centre, London, UK.

PMID: 20584048 [PubMed - as supplied by publisher]

15. Eur J Obstet Gynecol Reprod Biol. 2010 Jun 23. [Epub ahead of print]

Antenatal variables associated with severe adverse neurodevelopmental outcome among neonates born at less than 32 weeks.

Locatelli A, Andreani M, Pizzardi A, Paterlini G, Stoppa P, Ghidini A.

Department of Obstetrics and Gynecology, San Gerardo Hospital; University of Milano Bicocca, Monza, Italy.

OBJECTIVE: To determine the association between antenatal factors and severe adverse neurodevelopmental outcome (ANDO) in preterm infants. **STUDY DESIGN:** Neurodevelopmental follow-up was performed in a cohort of babies born at <32.0 weeks' gestation with birth weight <1500 grams between 1999 and 2006. Logistic regression analysis was used to relate obstetric, perinatal and neonatal ultrasonographic predictors to severe ANDO, defined as cerebral palsy or neurodevelopmental impairment, including sensory damage and adjusted development quo-

tient <70. RESULTS: 88.6% (195/220) of surviving babies underwent follow up for a median of 24 months (range 12-96); 45 of them (23%) had ANDO, which was severe in 28 (14.3%). Abnormal ultrasonographic findings (intraventricular hemorrhage grades 3 or 4, periventricular leukomalacia, or ventriculomegaly) were observed in 18 cases (9.2%) and they were significantly associated with severe ANDO (OR 11.8 95% CI 4.0-34.0). Only gestational age at delivery (OR 0.80 95% CI 0.66-0.97), but not intrauterine infection, was independently related to severe ANDO. Infants with severe ANDO born before 28 weeks presented lower umbilical artery pH (7.24 \pm 0.1 vs 7.31 \pm 0.06, $p=0.005$) and a significantly higher rate of cesarean delivery (85.7% vs 50%, OR 6 95%CI 1.3-26.3, $p=0.03$) compared with infants without severe ANDO. CONCLUSION: Gestational age at delivery and low umbilical artery pH at less than 28 weeks, but not intrauterine infection, are independent risk factors for severe ANDO in babies with birth weight <1500g. Copyright © 2010 Elsevier Ireland Ltd. All rights reserved.

PMID: 20579800 [PubMed - as supplied by publisher]

16. Am J Hum Genet. 2010 Jun 11;86(6):881-91. Epub 2010 May 20.

Dominant-negative mutations in alpha-II spectrin cause West syndrome with severe cerebral hypomyelination, spastic quadriplegia, and developmental delay.

Saito H, Tohyama J, Kumada T, Egawa K, Hamada K, Okada I, Mizuguchi T, Osaka H, Miyata R, Furukawa T, Haginoya K, Hoshino H, Goto T, Hachiya Y, Yamagata T, Saitoh S, Nagai T, Nishiyama K, Nishimura A, Miyake N, Komada M, Hayashi K, Hirai S, Ogata K, Kato M, Fukuda A, Matsumoto N.

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A de novo 9q33.3-q34.11 microdeletion involving STXBP1 has been found in one of four individuals (group A) with early-onset West syndrome, severe hypomyelination, poor visual attention, and developmental delay. Although haploinsufficiency of STXBP1 was involved in early infantile epileptic encephalopathy in a previous different cohort study (group B), no mutations of STXBP1 were found in two of the remaining three subjects of group A (one was unavailable). We assumed that another gene within the deletion might contribute to the phenotype of group A. SPTAN1 encoding alpha-II spectrin, which is essential for proper myelination in zebrafish, turned out to be deleted. In two subjects, an in-frame 3 bp deletion and a 6 bp duplication in SPTAN1 were found at the initial nucleation site of the alpha/beta spectrin heterodimer. SPTAN1 was further screened in six unrelated individuals with WS and hypomyelination, but no mutations were found. Recombinant mutant (mut) and wild-type (WT) alpha-II spectrin could assemble heterodimers with beta-II spectrin, but alpha-II (mut)/beta-II spectrin heterodimers were thermolabile compared with the alpha-II (WT)/beta-II heterodimers. Transient expression in mouse cortical neurons revealed aggregation of alpha-II (mut)/beta-II and alpha-II (mut)/beta-III spectrin heterodimers, which was also observed in lymphoblastoid cells from two subjects with in-frame mutations. Clustering of ankyrinG and voltage-gated sodium channels at axon initial segment (AIS) was disturbed in relation to the aggregates, together with an elevated action potential threshold. These findings suggest that pathological aggregation of alpha/beta spectrin heterodimers and abnormal AIS integrity resulting from SPTAN1 mutations were involved in pathogenesis of infantile epilepsy. Copyright 2010 The American Society of Human Genetics. Published by Elsevier Inc. All rights reserved.

PMID: 20493457 [PubMed - indexed for MEDLINE]