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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. *Child Care Health Dev.* 2011 Jun 22. doi: 10.1111/j.1365-2214.2011.01271.x. [Epub ahead of print]

Children's and parents' beliefs regarding the value of walking: rehabilitation implications for children with cerebral palsy.

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Background: Walking for children with cerebral palsy (CP) has physiological and functional benefits, but also holds symbolic significance that largely remains unexplored. The aims of this pilot study were to describe beliefs about the value of walking held by children with CP and their parents, and to examine how these beliefs inform rehabilitation choices and perceptions of 'success'. **Methods:** A critical qualitative design was employed. Six parents and six children with CP (Gross Motor Function Classification System III or IV, aged 9 to 18 years) each participated in a private interview. Analyses examined the relationship between dominant social beliefs regarding walking and participants' accounts. **Results:** Parents' accounts revealed that all adopted a stance of doing something/trying anything as part of being a 'good parent' and maintaining hope. Tapering of walking interventions contributed to feelings of guilt and doubt. Children primarily viewed walking as exercise rather than functional. Their accounts also demonstrated how they internalized negative attitudes towards disability and judged themselves accordingly. **Conclusions:** The results of this pilot study provide provisional evidence regarding how dominant social values regarding walking and disability are taken up by parents and children. They suggest that rehabilitation programmes need to consider how they may unintentionally reinforce potentially harmful choices, and how best to engage families in discussions of their evolving values and treatment priorities. Further research is needed with a larger sample.

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2. *J Rehabil Med.* 2011 May;43(6):493-9.

Virtual reality for enhancement of robot-assisted gait training in children with central gait disorders.

Brütsch K, Koenig A, Zimmerli L, Mérimat-Koeneke S, Riener R, Jäncke L, van Hedel HJ, Meyer-Heim A.

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OBJECTIVE: To examine the effect of various forms of training interventions, with and without virtual reality, on the initiation and maintenance of active participation during robot-assisted gait training. **DESIGN:** Intervention study at the Rehabilitation Centre Affoltern a. A., University Children's Hospital, Zurich. **SUBJECTS:** Ten patients (5 males, mean age 12.47 years, standard deviation 1.84 years) with different neurological gait disorders and 14 healthy children (7 males, mean age 11.76 years, standard deviation 2.75 years). **METHODS:** All participants walked in the driven gait orthosis Lokomat® in 4 different randomly-assigned conditions. Biofeedback values calculated during swing phases were the primary outcome measure and secondary outcomes were derived from a questionnaire assessing the participant's motivation. **RESULTS:** Findings revealed a significant main effect for training condition in all participants ($p < 0.001$), for patients ($p < 0.05$) and for healthy controls ($p < 0.01$). Overall, both virtual reality-assisted therapy approaches were equally the most effective in initiating the desired active participation in all children, compared with conventional training conditions. Motivation was very high and differed between the groups only in the virtual navigation condition. **CONCLUSION:** Novel virtual reality-based training conditions represent a valuable approach to enhance active participation during robot-assisted gait training in patients and healthy controls.

PMID: 21491072 [PubMed - indexed for MEDLINE]

3. Gait Posture. 2011 Feb;33(2):274-8. Epub 2010 Dec 24.

Immediate effects of therapeutic music on loaded sit-to-stand movement in children with spastic diplegia.

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The effects of patterned sensory enhancement (PSE) music on muscle power and movement control in children with spastic diplegia (SD) during loaded sit-to-stand (LSTS) were investigated. Twenty-three children with SD aged 5 to 12 years were recruited. Individualized PSE was composed by a music therapist based on each subject's sit-to-stand (STS) movement with 50% 1-repetition maximum load. Each subject performed LSTS continuously for eight repetitions under randomly assigned music or no-music (Control) conditions while the kinematic and kinetic data were measured simultaneously. For the music condition, PSE music was played only during the first five repetitions (PSE condition), and the following three repetitions were referred to as the Continuation condition. Paired t- or Wilcoxon signed rank tests were used to compare the variables between the PSE and Control conditions, and between the Continuation and Control conditions. Compared to the Control condition, greater peak knee extensor power ($P=0.009$), greater total extensor power ($P=0.015$), and better center-of-mass smoothness ($P=0.01$), but less movement time ($P=0.003$) were found in the PSE condition. Significant effects of the PSE music on the above variables were also found for Continuation condition. The current results showed that individualized PSE music helped improve the performance of LSTS in children with SD. The associated biomechanical features also continued to exist in subsequent movement cycles after the music had ceased. These findings suggest that therapy using LSTS combined with PSE music may be beneficial for rehabilitating children with SD.

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PMID: 21185725 [PubMed - indexed for MEDLINE]

4. Clin Biomech (Bristol, Avon). 2011 Jun 18. [Epub ahead of print]

Improvement of hand function in children with cerebral palsy via an orthosis that provides wrist extension and thumb abduction.

Barroso PN, Vecchio SD, Xavier YR, Sesselmann M, Araújo PA, Pinotti M.

BACKGROUND: The present study examines the hand movements of children with cerebral palsy during functional tests and compares the children's performance with and without the aid of an orthosis that provides wrist extension and thumb abduction. **METHODS:** The range of motion of the trapeziometacarpal joint was assessed for 32 participants via a reflexive markers image system. Observed motions included flexion-extension and abduction-adduction motions performed in the course of four tests for manual ability; the rest position, lateral and tripod pinches and cy-

lindrical grasp. Muscle strength and manual ability were evaluated using dynamometry and the Jebsen-Taylor test. FINDINGS: The range of motion tests for the rest position, lateral and tripod pinches and cylindrical grasp demonstrated improvements from 17% to 42% ($P<0.001$) for flexion/extension and from 36% to 54% for abduction/adduction ($P<0.001$) with the use of the orthosis. Dynamometry measurements showed that the improvement in muscle strength obtained through use of the orthosis was 50% ($P<0.001$). Improvements in the time required to perform the movements as determined using the Jebsen-Taylor test varied from 13% to 24% ($P<0.01$) for the four considered tests of manual ability. INTERPRETATION: The orthosis improved the range of motion of the trapeziometacarpal joint, muscle strength and manual ability. The combination of the three techniques may provide the basis for a quantitative assessment of hand dysfunction/improvement in cerebral palsy that will ultimately guide health professionals in their clinical interventions.

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5. BMC Med Inform Decis Mak. 2011 Jun 18;11(1):43. [Epub ahead of print]

Determinants of use and non-use of a web-based communication system in cerebral palsy care: evaluating the association between professionals' system use and their a priori expectancies and background.

Gulmans J, Vollenbroek-Hutten MM, van Gemert-Pijnen LJ, van Harten WH.

BACKGROUND: Previously we described parents' and professionals' experiences with a web-based communication system in a 6-month pilot in three Dutch cerebral palsy care settings. We found that half of the participating professionals had not used the system, and of those who had used the system one third had used it only once. The present study aimed to evaluate whether professionals' system use was associated with their a priori expectancies and background. METHODS: Professionals who had not used the system ($n=54$) were compared with professionals who had used the system more than once ($n=46$) on the basis of their questionnaire responses before the pilot, their affiliation and the number of patients which they represented in the study. The questionnaire items comprised professionals' expectancies regarding the system's performance and ease of use, as well as the expected time availability and integration into daily care practice. RESULTS: Overall, users had higher a priori expectancies than non-users. System use was associated with expected ease of use ($p=.046$) and time availability ($p=.005$): 50% of the users (vs. 31% of the non-users) expected that the system would be easy to use and 93% of the users (vs. 72% of the non-users) expected that they would be able to reserve a time slot each week for responding to submitted questions. With respect to professionals' affiliation, system use was associated with professionals' institution ($p=.003$) and discipline ($p=.001$), with more (para-)medical professionals among users (93% vs. 63% among non-users), and more education professionals among non-users (37% vs. 7% among users). In addition, users represented more patients (mean 2, range 1-8) than non-users (mean 1.1, range 1-2) ($p=.000$). CONCLUSIONS: Professionals' system use was associated with expected ease of use and time availability, professionals' affiliation and the number of represented patients, while no association was found with expected performance of the system. To achieve higher adoption rates in the future, it is important to further develop the technology by optimizing the system's ease of use and interoperability and including advanced consultation options. In addition, better identified end users should be more extensively informed about the system's possibilities through tailored education.

PMID: 21682911 [PubMed - as supplied by publisher]

6. Ther Clin Risk Manag. 2011;7:199-206. Epub 2011 May 30.

Effects of recombinant growth hormone (GH) replacement and psychomotor and cognitive stimulation in the neurodevelopment of GH-deficient (GHD) children with cerebral palsy: a pilot study.

Devesa J, Alonso B, Casteleiro N, Couto P, Castañón B, Zas E, Reimunde P.

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Cerebral palsy (CP) is the main cause of physical disability in childhood and is an important health issue that has a strong socioeconomic impact. There is no effective treatment for CP and therapeutic approaches report only partial benefits for affected people. In this study we assessed the effects of growth hormone (GH) treatment combined with

psychomotor and cognitive stimulation in the neurodevelopment of children with CP and GH deficiency (GHD). The study was carried out in 11 patients (7 boys and 4 girls; 4.12 ± 1.31 years) with GHD and CP who were treated with recombinant GH (rGH) and psychomotor and cognitive stimulation during 2 months. Battelle Developmental Inventory Screening Test (BDIST) was performed 2 months before commencing GH treatment, just before commencing GH administration, and after 2 months of combined treatment involving GH and cognitive stimulation. Psychomotor and cognitive status did not change during the period in which only cognitive stimulation was performed; however, significant improvements in personal and social skills, adaptive behavior, gross motor skills and total psychomotor abilities, receptive and total communication, cognitive skills and in the total score of the test ($P < 0.01$), and in fine motor skills and expressive communication ($P < 0.02$) were observed after the combined treatment period. Therefore, GH replacement together with psychomotor and cognitive stimulation seem to be useful for the appropriate neurodevelopment of children with GHD and CP.

PMID: 21691590 [PubMed - in process] PMCID: PMC3116807

7. *Prescrire Int.* 2011 Mar;**20(114):68.**

Botulinum toxin type A in children. New indication for limb spasticity.

[No authors listed]

PMID: 21648226 [PubMed - indexed for MEDLINE]

Epidemiology / Aetiology / Diagnosis & Early Treatment

8. *Acta Obstet Gynecol Scand.* 2011 Jun 17. doi: 10.1111/j.1600-0412.2011.01217.x. [Epub ahead of print]

Risk factors for cerebral palsy in children born at term.

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Objective. To provide an overview of current research on risk factors for cerebral palsy (CP) in children born at term and hypothesize how new findings can affect the content of the CP registers worldwide. **Data .** A systematic search in PubMed for original articles, published from 2000 to 2010 regarding risk factors for CP in children born at term was conducted. **Methods of study selection.** Factors from the prenatal, perinatal and neonatal period considered as possible contributors to the causal pathway to CP in children born at term were regarded as risk factors. Full text review was made of 266 articles. **Results.** Sixty-two articles met the criteria for an original report on risk factors for CP in children born at term. Perinatal adverse events including stroke were the focus of most publications, followed by genetic studies. Malformations, infections, perinatal adverse events and multiple gestation were risk factors associated with CP. The evidence regarding for example thrombophilic factors and non-CNS abnormalities was inconsistent. **Conclusion.** Information on maternal and neonatal infections, umbilical cord blood gases at birth, mode of delivery and placental status should be collected in a standardized way in CP registers. Information on social factors such as education level, family income and area of residence is also of importance. More research is needed to understand the risk factors of CP and specifically of how they relate to causal pathways of cerebral palsy.

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9. J Child Neurol. 2011 Jun 21. [Epub ahead of print]**Neurodevelopmental Outcomes in Very Low-Birth-Weight Infants in Korea: 1998-2007 vs 1989-1997.**

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The authors reviewed the medical records of very low-birth-weight infants admitted from 1998 to 2007 and compared neurodevelopmental outcomes with their previously reported data from 1989 to 1997. The recent group included 824 infants, and the previous group included 471 infants. Neurodevelopmental outcomes were classified into cerebral palsy and non-cerebral palsy neurodevelopmental impairment. In the recent group, the survival rate was significantly higher (79.4% vs 66.2%), the rate of cerebral palsy was lower (7.9% vs 10.5%), and the rate of non-cerebral palsy neurodevelopmental impairment was higher (6.0% vs 4.5%) but not significant. The survival rate increased significantly over time, but there was no significant change in neurodevelopmental outcomes over time. Multivariate analysis indicated that abnormal neurosonographic findings, using assisted ventilation, vaginal delivery, and abnormal brainstem auditory evoked potential, were associated with increased risk for cerebral palsy.

PMID: 21693650 [PubMed - as supplied by publisher]

10. J Pediatr Gastroenterol Nutr. 2011 Jun 20. [Epub ahead of print]**A study on early developing celiac disease in children with cerebral palsy.**

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OBJECTIVE: We have previously reported on increased levels of antibodies against gliadin (AGA) and/or transglutaminase 2 (TG2) in children with cerebral palsy (CP), but without having increased prevalence of celiac disease (CD). The aim of this study was to evaluate whether these children have mucosal signs of early developing celiac disease, HLA DQ2/DQ8 and antibodies against deamidated gliadin peptides (DGP). **PATIENTS AND METHODS:** Stored blood samples from 16 children with CP were analysed regarding HLA DQ2/DQ8 and anti-DGP antibodies. HLA DQ2/DQ8 were analysed by polymerase chain reaction-sequence specific oligonucleotide probes (PCR-SSOP). Anti-DGP antibodies were analysed with enzyme-linked immunosorbent assay. Small bowel biopsies from 15 of these children were available for immunohistochemistry regarding IgA co-localized with TG2, densities of $\alpha/\beta+$ and $\gamma/\delta+$ intraepithelial lymphocytes (IELs). **RESULTS:** Mucosal IgA-deposits co-localised with TG2 were found in the small bowel biopsy from one patient with serum IgA-class anti-TG2 antibodies, HLA DQ2 and gastrointestinal complaints. Another two children had slightly increased numbers of mucosal $\alpha/\beta+$ and/or $\gamma/\delta+$ IELs. In total, 10/16 was HLA DQ2 and/or DQ8 positive. Anti-DGP antibodies were detected in sera from 4/16 children. **CONCLUSIONS:** In this study, one child with CP had IgA co-localizing with TG2 in the small bowel mucosa suggesting CD at an early stage. However, although the majority of children with CP and elevated levels of CD-related seromarkers are HLA DQ2 and/or DQ8 positive, they neither have classical nor early developing CD.

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11. Med Hypotheses. 2011 Jun 15. [Epub ahead of print]**Functional recovery in cerebral palsy may be potentiated by administration of selective serotonin reuptake inhibitors.**

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Cerebral palsy is a disorder of movement and posture caused by a non-progressive lesion to the brain. The incidence of cerebral palsy is over 2 per 1000 live births in Europe. Management of cerebral palsy is primarily supportive - none of the current treatments offered attempt to correct the primary problem of a brain lesion. Neurological problems may be treated by upregulating cerebral plasticity. Evidence suggests that this is the mechanism of action of selective serotonin reuptake inhibitors (SSRIs) in the treatment of depression. Encouraging evidence of motor improvements in stroke patients treated with SSRIs suggest the possibility of similar improvements in cerebral palsy. Patients with less severe cerebral palsy show more evidence of plasticity than patients with more severe forms. Evidence should initially come from animal models, and thereafter case reports and case series in selected cases, before progression to large scale trials. SSRIs would have to be used in conjunction with cooling, which prevents secondary damage. Due consideration is needed to prevent harmful side-effects.

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