

Monday 28 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".

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Interventions

1. *J Rehabil Med.* 2011 Mar;43(4):359-63.

Home based computer-assisted upper limb exercise for young children with cerebral palsy: A feasibility study investigating impact on motor control and functional outcome.

Weightman A, Preston N, Levesley M, Holt R, Mon-Williams M, Clarke M, Cozens AJ, Bhakta B.

School of Mechanical Engineering, The University of Leeds.

OBJECTIVE: We developed a home-based rehabilitation exercise system incorporating a powered joystick linked to a computer game, to enable children with arm paresis to participate in independent home exercise. We investigated the feasibility and impact of using the system in the home setting. **METHODS:** Eighteen children with cerebral palsy (median age 7.5 years, age range 5-16 years) were recruited from local National Health Service and the exercise system was installed in their home for approximately 4 weeks. Baseline and post-intervention assessments were taken: Canadian Occupational Performance Measure (COPM); kinematic measurement of movement quality (indexed by duration and smoothness) measured using a motion tracking system when performing a standardized computer task. **RESULTS:** The system was used for a median time of 75 min (interquartile range (IQR) 17-271), equating to 606 outward and 734 inward movements. Pre-COPM, (median 4.2); post-COPM (median 6.0); $obs = 34$; $z = 3.62$, $p < 0.01$). Kinematic analysis of pre- and post-intervention movements on the standardized task showed decreased duration and increased smoothness. **CONCLUSION:** Some improvements in self-reported function and quality of movement are observed. This pilot study suggests that the system could be used to augment home-based arm exercise in an engaging way for children with cerebral palsy, although a controlled clinical trial is required to establish clinical efficacy. The feasibility of this technology has been demonstrated.

PMID: 21347508 [PubMed - in process]

2. *Gait Posture.* 2011 Feb 17. [Epub ahead of print]

The reliability of upper limb kinematics in children with hemiplegic cerebral palsy.

Jaspers E, Feys H, Bruyninckx H, Cutti A, Harlaar J, Molenaers G, Desloovere K.

Department of Rehabilitation Sciences, Faculty of Kinesiology and Rehabilitation Sciences, Katholieke Universiteit Leuven, Belgium.

This study describes the reliability of a protocol for upper limb three-dimensional movement analysis (UL-3DMA) in children with hemiplegic cerebral palsy (HCP). The UL-3DMA is based on the ISB-recommendations, and contains a set of functional and clinically relevant tasks. Tasks were selected to reflect the characteristic movement deficits seen in children with HCP. The protocol consists of three reach tasks (forwards, upwards, sideways); two reach-to-grasp tasks (with objects requiring different hand orientations); and three gross motor tasks. Within and between

session reliability was tested in a group of 12 children with HCP, aged 6-15 years. Reliability of movement duration/speed and joint angles at endpoint was assessed with the intraclass correlation coefficient; similarity of the waveforms with the coefficient of multiple correlation. Measurement errors were calculated for all parameters. Results indicated good within and between session reliability for movement duration/speed. Trunk, scapula, shoulder, elbow and wrist angles at endpoint generally showed moderately high to very high reliability. High levels of reliability were also found for scapula, shoulder and elbow waveforms and lower levels for the wrist and trunk. Within and between session measurement errors were below 5° and 7°, respectively, for most kinematic parameters. Joint angles in the transverse plane, as well as wrist flexion generally showed higher between session errors (7-10°). This study indicates that the proposed protocol is a reliable tool to quantify upper limb movements in children with HCP, providing a sound base for its clinical application. Further research is needed to establish the discriminative ability of the UL-3DMA.

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PMID: 21334208 [PubMed - as supplied by publisher]

3. NeuroRehabilitation. 2011 Jan 1;28(1):47-54.

Lycra arm splints in conjunction with goal-directed training can improve movement in children with cerebral palsy.

Elliott CM, Reid SL, Alderson JA, Elliott BC.

Department of Paediatric Rehabilitation, Princess Margaret Hospital for Children, Perth, Australia School of Paediatrics and Child Health, University of Western Australia, Perth, Australia School of Sport Science, Exercise and Health, University of Western Australia, Perth, Australia.

Objectives: To investigate the effects of lycra® arm splint wear on goal attainment and three dimensional (3D) kinematics of the upper limb and trunk in children with cerebral palsy (CP). **Design:** Randomised clinical trial whereby participants were randomised to parallel groups with waiting list control. **Participants:** Sixteen children with CP (hypertonia) aged 9 to 14 years. **Intervention:** Three months lycra arm splint wear combined with goal directed training. **Main outcome measure:** Goal attainment scale, and 3D upper limb and trunk kinematics across four upper limb movement tasks. **Results:** 17/18 children achieved their movement goals following three months of splinting. Selected joint kinematics improved on immediate splint application. Further improvements in joint kinematics were demonstrated following 3 months of splint wear, particularly in elbow extension, shoulder flexion and abduction and in thorax flexion. Only improvements in movement compensations at the thorax remained following removal of the splint. **Conclusions:** The lycra® arm splint, made a quantifiable change to the attainment of movement goals of importance to the child. Furthermore, improvements were demonstrated in selected maximum range of movement and joint kinematics during functional tasks at the elbow and shoulder joints and thorax segment in children with CP.

PMID: 21335677 [PubMed - in process]

4. Neurorehabil Neural Repair. 2011 Feb 22. [Epub ahead of print]

Combined Passive Stretching and Active Movement Rehabilitation of Lower-Limb Impairments in Children With Cerebral Palsy Using a Portable Robot.

Wu YN, Hwang M, Ren Y, Gaebler-Spira D, Zhang LQ.

BACKGROUND: Ankle impairments are closely associated with functional limitations in children with cerebral palsy (CP). Passive stretching is often used to increase the range of motion (ROM) of the impaired ankle. Improving motor control is also a focus of physical therapy. However, convenient and effective ways to control passive stretching and motivate active movement training with quantitative outcomes are lacking. **OBJECTIVE:** To investigate the efficacy of combined passive stretching and active movement training with motivating games using a portable rehabilitation robot. **METHODS:** Twelve children with mild to moderate spastic CP participated in robotic rehabilitation 3 times per week for 6 weeks. Each session consisted of 20 minutes of passive stretching followed by 30 minutes of active movement training and ended with 10 minutes of passive stretching. **Passive ROM (PROM), active ROM**

(AROM), dorsiflexor and plantarflexor muscle strength, Selective Control Assessment of the Lower Extremity, and functional outcome measures (Pediatric Balance Scale, 6-minute walk, and Timed Up-and-Go) were evaluated before and after the 6-week intervention. RESULTS: Significant increases were observed in dorsiflexion PROM ($P = .002$), AROM ($P = .02$), and dorsiflexor muscle strength ($P = .001$). Spasticity of the ankle musculature was significantly reduced ($P = .01$). Selective motor control improved significantly ($P = .005$). Functionally, participants showed significantly improved balance ($P = .0025$) and increased walking distance within 6 minutes ($P = .025$). CONCLUSIONS: Passive stretching combined with engaging in active movement training was of benefit in this pilot study for children with CP. They demonstrated improvements in joint biomechanical properties, motor control performance, and functional capability in balance and mobility.

PMID: 21343525 [PubMed - as supplied by publisher]

5. Disabil Rehabil. 2011 Feb 18. [Epub ahead of print]

Implementation of constraint-induced movement therapy for youngchildren with unilateral cerebral palsy in Jordan: a home-based model.

Al-Oraibi S, Eliasson AC.

Physical Therapy Department, Faculty of Allied Health Sciences, Hashemite University, Jordan.

Purpose. The aim of this study was to investigate the feasibility of implementing constraint-induced movement therapy (CIMT) in Jordan, a country with a different culture to that of the western world where CIMT has previously been investigated. **Method.** Twenty children with unilateral cerebral palsy (CP) were randomised to either CIMT or neurodevelopmental treatment (NDT). NDT is the usual treatment method in Jordan for children with CP and was used in the control group. Fourteen children fulfilled the treatment; mean age was 47 months (SD 19 months) in the CIMT group and 65 months (SD 26 months) in the NDT group. Jordanian therapists learned the CIMT method in a 2-day workshop. CIMT was based on 2-h per day for eight weeks, with the families being responsible for the training aside from a weekly session with the therapist, i.e. a home-based model. Children in the NDT group had 2 h of training per week by therapists. **Results.** Hand function, measured with Assisting Hand Assessment on a scale of 0-100 AHA-units, improved from 41.6 (12.6) to 48 (11.6) in the CIMT group and from 56 (18.7) to 56.6 (18.8) among controls. ANOVA show a group effect of treatment ($F(1,12) = 7.77$; $p = 0.016$). **Conclusions.** A treatment effect of CIMT can be seen after a 2-day workshop in a novel environment.

PMID: 21332299 [PubMed - as supplied by publisher]

6. J Neurophysiol. 2011 Feb 23. [Epub ahead of print]

Deficits in task-specific modulation of anticipatory postural adjustments in individuals with spastic diplegic cerebral palsy.

Tomita H, Fukaya Y, Ueda T, Honma S, Yamashita E, Yamamoto Y, Mori E, Shionoya K.

1 Toyohashi SOZO University.

We examined whether individuals with spastic diplegic cerebral palsy have the ability to utilize lower leg muscles in anticipatory postural adjustments (APAs) associated with voluntary arm movement while standing, as well as the ability to modulate APAs with changes in the degree of postural perturbation caused by arm movement. Seven individuals with spastic diplegia (SDCP(group), 12-22 years of age) and 7 age- and gender-matched individuals without disability (CONTROL(group)) participated in this study. Participants flexed both shoulders and lifted a load under 2 different load conditions, during which electromyographic activities of focal and postural muscles were recorded. Although the timing of anticipatory activation of the erector spinae and medial hamstring (MH) muscles was similar in the 2 participant groups, that of the gastrocnemius (GcM) muscle was significantly later in the SDCP(group) than in the CONTROL(group). An increase in anticipatory postural muscle activity with an increase in load was observed in MH and GcM in the CONTROL(group), but not in GcM in the SDCP(group). The degree of modulation in MH was significantly smaller in the SDCP(group) than in the CONTROL(group). An additional experiment confirmed that these differences in APAs between the 2 participant groups were unlikely to be due to their differences in initial standing posture before load lift. The present findings suggest that lower leg muscles play a minor role in APAs in

individuals with spastic diplegia. In addition, it is likely that these individuals have difficulty modulating anticipatory postural muscle activity with changes in the degree of postural perturbation.

PMID: 21346212 [PubMed - as supplied by publisher]

7. Rev Bras Fisioter. 2010 Dec;14(6):446-63.

A Dynamic Systems: constraints approach to rehabilitation.

Holt KG, Wagenaar RO, Saltzman E.

Sargent College of Health and Rehabilitation Sciences, Department of Rehabilitation Science, Boston University, Boston, USA.

BACKGROUND: Classification systems (Nagi, International Classification for Function [ICF]) have become popular for categorizing the level of ability (ICF) or disability (Nagi) associated with movement disorders. Nevertheless, these classifications do not explore the ways in which one level may influence other levels. For example, how might the weakness and stiffness associated with some cases of cerebral palsy result in a stereotypical toe-gait? In this overview we describe a dynamic systems/constraints (DS/C) approach to understand relationships between levels, and how the approach can be used to rationalize a novel process for the evaluation and treatment of movement disorders. **OBJECTIVES:** There are three specific aims in this paper: first to present a general systems approach to understanding behavior at different levels; second to present tools of, and the results of empirical work using the DS/C approach; third to discuss the clinical implications and results of clinical interventions motivated by DS/C analysis for children with cerebral palsy, and individuals with Parkinson disease.

PMID: 21340238 [PubMed - in process]

8. NeuroRehabilitation. 2011 Jan 1;28(1):37-46.

Orthotic management of cerebral palsy: Recommendations from a consensus conference.

Morris C, Bowers R, Ross K, Stevens P, Phillips D.

Cerebra Research Unit and PenCLAHRC, Peninsula Medical School, University of Exeter, Exeter, UK Honorary Principal Orthotist, Nuffield Orthopaedic Centre, Oxford, UK.

An international multidisciplinary group of healthcare professionals and researchers participated in a consensus conference on the management of cerebral palsy, convened by the International Society for Prosthetics and Orthotics. Participants reviewed the evidence and considered contemporary thinking on a range of treatment options including physical and occupational therapy, and medical, surgical and orthotic interventions. The quality of many of the reviewed papers was compromised by inadequate reporting and lack of transparency, in particular regarding the types of patients and the design of the interventions being evaluated. Substantial evidence suggests that ankle-foot orthoses (AFOs) that control the foot and ankle in stance and swing phases can improve gait efficiency in ambulant children (GMFCS levels I-III). By contrast, little high quality evidence exists to support the use of orthoses for the hip, spine or upper limb. Where the evidence for orthosis use was not compelling consensus was reached on recommendations for orthotic intervention. Subsequent group discussions identified recommendations for future research. The evidence to support using orthoses is generally limited by the brevity of follow-up periods in research studies; hence the extent to which orthoses may prevent deformities developing over time remains unclear. The full report of the conference can be accessed free of charge at www.ispoint.org.

PMID: 21335676 [PubMed - in process]

9. Phys Ther. 2011 Feb 24. [Epub ahead of print]**Validity and Reliability of Two Abbreviated Versions of the Gross Motor Function Measure.**

Brunton LK, Bartlett DJ.

Faculty of Health Sciences, The University of Western Ontario, 1011c Elborn College, 1201 Western Rd, London, Ontario, Canada N6G 1H1.

Background The "gold standard" for measuring gross motor function in children with cerebral palsy is the 66-item Gross Motor Function Measure (GMFM-66). **Objective** The purpose of this study was to estimate the validity and reliability of 2 abbreviated versions of the GMFM-66; one version involves an item set approach, and the other version involves a basal and ceiling approach. **Design** This was a measurement study comprising concurrent validity, comparability, and test-retest reliability components. **METHODS:** The study participants were 26 children who were 2 to 6 years of age and had cerebral palsy across all Gross Motor Function Classification System levels. In the first session, both abbreviated versions were administered by 2 independent raters; next, the full GMFM-66 was administered. In the second session, only the abbreviated versions were administered by the same raters. Concurrent validity, comparability of versions, and test-retest reliability were determined with intraclass correlation coefficients [ICC (2,1)]. **RESULTS:** Both versions demonstrated high levels of validity, with an ICC of .99 (95% confidence interval=0.972-0.997), reflecting associations with the GMFM-66. Both versions also were shown to be highly reliable, with ICCs of greater than .98 (95% confidence interval=0.965-0.994). **Limitations** A smaller-than-expected sample was recruited for this study and may be a potential limitation of the study. **CONCLUSION:** Both versions of the GMFM-66 can be used in clinical practice or research. However, the GMFM-66 with the basal and ceiling approach is recommended as the preferred abbreviated version.

PMID: 21350032 [PubMed - as supplied by publisher]

10. Rev Bras Fisioter. 2010 Dec;14(6):537-544.**Cross-cultural adaptation of the Gross Motor Function Classification System into Brazilian-Portuguese (GMFCS). [Article in Portuguese]**

Hiratuka E, Matsukura TS, Pfeifer LI.

Departamento de Terapia Ocupacional, Universidade Federal de São Carlos, São Carlos, SP, Brasil.

BACKGROUND: Due to the complexity of clinical symptoms of cerebral palsy and the difficulties in classifying it based upon the motor types and the topography of the body distribution only, Canadian researchers have proposed the Gross Motor Function Classification System (GMFCS). Although this classification system has been largely used in Brazil, it has not been cross culturally adapted yet.

OBJECTIVES: To perform the cross adaptation of the Gross Motor Function Classification System for the Cerebral Palsy (GMFCS) into Brazilian-Portuguese and to verify the reliability among observers of the adapted instrument in Brazilian children. **METHODS:** This study was performed in two stages; the first stage was related to the process of cross-cultural adaptation and the second stage tested the instrument. Translation, back-translation, semantic and content analysis, back-translation of the final version and the approval of the authors were used for the cross-cultural adaptation. The test of the instrument was performed in 40 children with cerebral palsy, who were evaluated by two raters to verify the reliability among the observers. **RESULTS:** The results showed that the stages of translation and back-translation did not present any difficulties and the semantic and conceptual equivalence was achieved. The reliability among the observers showed that the evaluations do not differ and that there is an excellent correlation and internal consistency of the construct with an ICC of 0.945 (95% CI 0.861 to 0.979) and a Cronbach α of 0.972. **CONCLUSIONS:** The final version of the GMFCS showed good potential of applicability for undergraduate students and professionals of the neuropediatric area.

PMID: 21340249 [PubMed - as supplied by publisher]

11. Stud Health Technol Inform. 2011;163:163-5.**Virtual reality system in conjunction with neurorobotics and neuroprosthetics for rehabilitation of motor disorders.**

De Mauro A, Carrasco E, Oyarzun D, Ardanza A, Frizera Neto A, Torricelli D, Pons JL, Gil A, Florez J.

eHealth and Biomedical Department, VICOMTech, San Sebastian, Spain.

Cerebrovascular accidents (CVA) and spinal cord injuries (SCI) are the most common causes of paralysis and paresis with reported prevalence of 12,000 cases per million and 800 cases per million, respectively. Disabilities that follow CVA (hemiplegia) or SCI (paraplegia, tetraplegia) severely impair motor functions (e.g., standing, walking, reaching and grasping) and prevent the affected individuals from healthy-like, full and autonomous participation in daily activities. Our research <fn rid="fn001" /><fn id="fn001">This research is part of the HYPER project funded by CONSOLIDER-INGENIO 2010, Spanish Ministry for Science and Innovation. </fn> focuses on the development of a new virtual reality (VR) system combined with wearable neurorobotics (NR), motor-neuroprosthetics (MNP) and brain neuro-machine interface (BNMI) to overcome the major limitations of current rehabilitation solutions.

PMID: 21335782 [PubMed - in process]

12. Sleep Med. 2011 Feb 18. [Epub ahead of print]**Sleep and quality of life in children with cerebral palsy.**

Sandella DE, O'Brien LM, Shank LK, Warschausky SA.

Department of Physical Medicine and Rehabilitation, University of Michigan, MI, USA.

OBJECTIVE: To examine the associations between sleep problems and quality of life (QoL) in children with cerebral palsy (CP). METHODS: Prospective correlational study using parent-report forms to measure QoL and sleep disorder symptoms. Two groups comprised of 41 children with CP and 91 typically developing (TD) controls age 8-12 years participated in a prospective correlational study. RESULTS: Measures were the PedsQL-4.0 Generic scales and the Pediatric Sleep Questionnaire, with subscales of interest including sleep disordered breathing (SDB), excessive daytime sleepiness (EDS), insomnia (INS) and snoring (SNOR). Hierarchical regression analyses indicated that EDS contributed unique variance in physical QoL, and INS contributed unique variance in psychosocial QoL in children with CP; for TD children, sleep disorder symptoms were infrequent and not associated with physical or psychosocial QoL. CONCLUSIONS: Findings highlight the importance of assessing sleep difficulties when addressing the needs of children with CP.

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PMID: 21334973 [PubMed - as supplied by publisher]

13. Aten Primaria. 2011 Feb 21. [Epub ahead of print]**Overburden of the carer of patients with infantile cerebral palsy and family functioning in the CRI Guadalajara, Jalisco. [Article in Spanish]**

Campos Sánchez DC, Gutiérrez Román EA, Sandoval Magaña MA, Rojas Sotelo RM.

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PMID: 21345524 [PubMed - as supplied by publisher]

14. Br J Surg. 2011 Feb 23. doi: 10.1002/bjs.7415. [Epub ahead of print]**Survival of children following Nissen fundoplication.**

Wockenforth R, Gillespie CS, Jaffray B.

Department of Paediatric Surgery, The Royal Victoria Infirmary, Queen Victoria Road, Newcastle upon Tyne NE2 2PY, UK.

BACKGROUND: Analyses of survival after fundoplication in childhood are often restricted to 30-day mortality, or to the neurologically impaired. The objective of this study was to report actuarial survival and variables associated with mortality for all children undergoing fundoplication. **METHODS:** This was a prospective observational study of fundoplication surgery by one surgeon; the endpoint was survival. Using a Cox proportional hazards model, gastrostomy, neurological status, tracheostomy, congenital cardiac disease, syndromic status, presence of congenital anomaly, other chronic disease, weight z-score at time of surgery, need for revisional fundoplication, use of laparoscopic surgery, gastric drainage procedures, age and sex were assessed for their influence on survival.

RESULTS: Two-hundred and thirty children underwent 255 fundoplications at a median age of 3.6 years. Forty-six children (20.0 per cent) died during a median follow-up of 2.8 (range 0.5-11.2) years. Statistical modelling showed gastrostomy (relative risk of death 11.04, $P < 0.001$), cerebral palsy (relative risk 6.58, $P = 0.021$) and female sex (relative risk 2.12, $P = 0.015$) to be associated with reduced survival. Revisional fundoplication was associated with improved survival (relative risk of death 0.37, $P = 0.037$). Survivors had significantly higher weight z-scores (-1.4 versus -2.9 for those who died; $P = 0.001$). The 5-year survival rate after fundoplication for children with cerebral palsy and gastrostomy was 59 per cent. **CONCLUSION:** Survival of children following fundoplication is related principally to the presence of a gastrostomy and neurological status. Estimates of children's life expectancy should take account of the poorer survival of neurologically impaired children who undergo fundoplication, presumably due to the related co-morbidities that lead to a gastrostomy. Copyright © 2011 British Journal of Surgery Society Ltd. Published by John Wiley & Sons, Ltd.

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PMID: 21351077 [PubMed - as supplied by publisher]

15. Chronic Illn. 2011 Feb 22. [Epub ahead of print]**Unintentional injury among low-income 5-year-olds with chronic health conditions.**

Schwebel DC, Brezausek CM.

Department of Psychology, University of Alabama at Birmingham, Birmingham, AL, USA.

BACKGROUND: Growing numbers of children suffer from chronic health conditions, and initial evidence suggests chronic illness may be associated with increased child injury risk. We examined injury risk among 5-year-olds with and without chronic health conditions.

METHODS: Data from a diverse US sample of 7954 low-income 5-year-olds participating in the National Head Start/Public School Early Childhood Transition Demonstration Study were analysed. Mothers reported demographics, presence/absence of eight chronic health conditions, and whether children had experienced injuries requiring professional medical attention in the past year. Primary analyses used ordinal logistic regression. **RESULTS:** Asthma, bronchitis, recurrent ear infections, hay fever/allergies and speech problems associated with increased injury risk (OR range = 1.20-1.49 in bivariate ordinal logistic regression, $ps < 0.01$). Children with cerebral palsy had reduced injury risk (OR = 0.37, 95% CI = 0.15-0.91, $p < 0.05$). Most findings held after including demographic covariates in multivariate models. **CONCLUSION:** Because a range of chronic health conditions associated with increased injury risk, the causal mechanism behind relations between chronic illness and injury risk may not be disease-specific. Instead, factors related to having chronic medical conditions-not any particular condition-might contribute. Possible mediators include impaired family functioning, impaired peer relations, and familiarity with the health system/health-seeking behaviours.

PMID: 21343221 [PubMed - as supplied by publisher]

16. PM R. 2011 Feb;3(2):98-104.**The function of parents and their children with cerebral palsy.**

Murphy N, Caplin DA, Christian BJ, Luther BL, Holobkov R, Young PC.

Department of Pediatrics, University of Utah School of Medicine, PO Box 581289, Salt Lake City, UT 84158.

OBJECTIVE: To determine associations between the function of parents and that of their children with cerebral palsy (CP) and the influence of the levels of the child's impairment, parenting stress, parent self-efficacy, and family functioning. **DESIGN:** Descriptive correlational cross-sectional survey. **SETTING:** Academic tertiary care children's hospital and pediatric specialty orthopedic hospital in the intermountain West. **PARTICIPANTS:** A total of 51 parents or guardians who provide the majority of daily care in their homes for their children with CP between the ages of 5 and 18 years. **METHODS:** Survey of a convenience sample of parents of children with CP. **MAIN OUTCOME MEASUREMENTS:** (1) Short-form 36 Health Survey v2.0 to measure parent mental and physical health; (2) Pediatric Quality of Life Inventory v4.0 to measure the physical, social, school, emotional and psychosocial function, and total quality of life of their children with CP; (3) Gross Motor Function Classification System to assess severity of the child's CP; (4) Parenting Stress Index; (5) Family Environment Scale, relationship dimension; and (6) Self-Efficacy for Parenting Tasks Index. **RESULTS:** Positive correlations were found between parent physical health and the physical function of their children with CP ($r = 0.32$) and between parent mental health and the emotional function ($r = 0.46$), psychosocial function ($r = 0.40$), and total health-related quality of life ($r = 0.38$) of their children. When adjusting for severity of CP, we found that parenting stress and parenting self-efficacy attenuated these relationships to varying degrees. **CONCLUSIONS:** A clear positive correlation was found between the function of parents and the function of their children with CP. Although a cross-sectional study does not demonstrate the direction of the relationship, it seems reasonable to conclude that clinicians who are attempting to directly maximize child function should also consider the potential value of interventions that support and improve parent function, particularly mental health.

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PMID: 21333947 [PubMed - in process]

17. Dev Med Child Neurol. 2011 Feb;53(2):108-19. doi: 10.1111/j.1469-8749.2010.03816.x. Epub 2010 Oct 21.**Localization of the motor endplate zone in human skeletal muscles of the lower limb: anatomical guidelines for injection with botulinum toxin.**

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AIM: Botulinum toxin gives a local tone reduction by blocking neurotransmission at the motor endplate (MEP). The importance of using MEP-targeted injections is demonstrated in animal models and in a clinical human study. The goal of this review is to present the available data on the localization of the MEP zone of frequently injected muscles of the lower limb and to compare this with current practice. **METHOD:** Current knowledge on the localization of the MEP zone is based on some older histological studies, and for some of the more frequently injected muscles also on more recent anatomical dissection. **RESULTS:** We find that for some muscles the MEP zone can be more precisely demarcated, and for many other muscles that its location is somewhat different than the currently injected areas in clinical practice. Optimal injection sites are presented for gastrocnemius, soleus, tibialis posterior, semitendinosus, semimembranosus, gracilis, biceps femoris, rectus femoris, adductor longus, brevis and magnus, and psoas muscles. **INTERPRETATION:** We propose optimal injection sites in relation to external anatomical landmarks for the frequently injected muscles of the human lower limb to facilitate the efficiency of botulinum toxin injections.

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PMID: 20964675 [PubMed - indexed for MEDLINE]

18. Dev Med Child Neurol. 2011 Feb;53(2):101-2. doi: 10.1111/j.1469-8749.2010.03870.x.

Botulinum toxin: does the black box warning justify change in practice?

Narayanan UG.

The Hospital for Sick Children, Bloorview Research Institute, University of Toronto, Toronto, Ontario, Canada.

Comment on:

Dev Med Child Neurol. 2011 Feb;53(2):125-30.

PMID: 21244406 [PubMed - indexed for MEDLINE]

19. Arch Dis Child. 2011 Feb 24. [Epub ahead of print]

Cranial osteopathy for children with cerebral palsy: a randomised controlled trial.

Wyatt K, Edwards V, Franck L, Britten N, Creanor S, Maddick A, Logan S.

Peninsula College of Medicine and Dentistry, University of Exeter, Exeter, UK.

Objectives: To estimate the effect of cranial osteopathy on the general health and wellbeing, including physical functioning, of children with cerebral palsy. **Design:** Pragmatic randomised controlled trial. **Participants:** 142 children from Greater London and the South West of England, aged 5-12 years with cerebral palsy. **Intervention:** Participants were randomised to six sessions of cranial osteopathy with a registered osteopath or a waiting list with partial attention control (parents invited to participate in two semistructured interviews). **Primary outcome measures:** Blind assessment of motor function by physiotherapists using the Gross Motor Function Measure-66 (GMFM-66) and quality of life using the Child Health Questionnaire (CHQ) PF50 at 6 months. **Secondary outcome measures:** Parents' assessment of global health and sleep at 6 months, pain and sleep diaries at 10 weeks and 6 months, CHQ PF50 at 10 weeks and quality of life of main carer (Short Form 36) at 10 weeks and 6 months. **Results:** Compared with children in the control group, children in the osteopathy group demonstrated no statistically significant differences in GMFM-66 (mean difference 4.9, 95% CI -4.4 to 14.1), CHQ Physical Summary: Score (mean difference 2.2, 95% CI -3.5 to 8.0) or CHQ Psychological Summary Score (mean difference 3.4, 95% CI -0.8 to 7.7). There were no significant differences between groups with respect to pain; sleep (either 'time asleep' or 'time to sleep'); or main carer's quality of life. Compared with children in the control group, carers of children receiving cranial osteopathy were nearly twice as likely to report that their child's global health had 'improved' at 6 months rather than 'decreased' or 'remained the same' (38% vs 18%; odds ratio 2.8, 95% CI 1.1 to 6.9). **Conclusions:** This trial found no statistically significant evidence that cranial osteopathy leads to sustained improvement in motor function, pain, sleep or quality of life in children aged 5-12 years with cerebral palsy nor in quality of life of their carers. Trial Registration ISRCTN45840554 <http://www.controlled-trials.com>.

PMID: 21349889 [PubMed - as supplied by publisher]

Epidemiology / Aetiology / Diagnosis & Early Treatment

20. J Pediatr. 2011 Feb;158(2 Suppl):e1-4.

Interruption of placental blood flow during labor: potential systemic and cerebral organ consequences.

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Interruption of placental blood during labor, also termed "asphyxia," affects approximately 3 of every 1000 term infants. The systemic and cerebral consequences of asphyxia are in part related to circulatory adaptive responses, which in turn are modulated by the severity and duration of the insult. Long-term neurological outcome has been well categorized, whereas the systemic consequences remain unclear.

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PMID: 21238699 [PubMed - indexed for MEDLINE]

21. Obstet Gynecol. 2011 Mar;117(3):542-9.

Effectiveness of timing strategies for delivery of individuals with vasa previa.

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OBJECTIVE: To compare strategies for the timing of delivery in patients with ultrasonographic evidence of vasa previa. **METHODS:** A decision tree was designed comparing 11 strategies for delivery timing in a patient with vasa previa. The strategies ranged from a scheduled delivery at 32, 33, 34, 35, 36, 37, 38, or 39 weeks of gestation to a scheduled delivery at 36, 37, or 38 weeks of gestation only after amniocentesis confirmation of fetal lung maturity. Outcomes factored into the model included perinatal mortality, infant mortality, respiratory distress syndrome, mental retardation, and cerebral palsy. **RESULTS:** A scheduled delivery at 34 weeks of gestation was the preferred strategy and resulted in the highest quality-adjusted life-years under the base-case assumptions. Sensitivity analyses demonstrated that the optimal gestational age for delivery was dependent on certain estimates in the model, although in most circumstances remained at 34 or 35 weeks of gestation. Under all circumstances, strategies incorporating confirmation of fetal lung maturity failed to result in a better outcome than strategies that incorporated delivery at the same gestational age without amniocentesis. **CONCLUSION:** This decision analysis suggests that for women with a vasa previa, delivery at 34-35 weeks of gestation may balance the risk of perinatal death with the risks of infant mortality, respiratory distress syndrome, mental retardation, and cerebral palsy related to prematurity. At any given gestational age, incorporating amniocentesis for verification of fetal lung maturity does not improve outcomes.

LEVEL OF EVIDENCE: III.

PMID: 21343756 [PubMed - in process]

22. Pediatrics. 2011 Feb 21. [Epub ahead of print]

Racial, Ethnic, and Socioeconomic Disparities in the Prevalence of Cerebral Palsy.

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Objective: Racial and ethnic disparities in cerebral palsy have been documented, but the underlying mechanism is poorly understood. We determined whether low birth weight accounts for ethnic disparities in the prevalence of cerebral palsy and whether socioeconomic factors impact cerebral palsy within racial and ethnic groups. **Methods:** In a retrospective cohort of 6.2 million births in California between 1991 and 2001, we compared maternal and infant characteristics among 8397 infants with cerebral palsy who qualified for services from the California Department of Health Services and unaffected infants. **Results:** Overall, black infants were 29% more likely to have cerebral palsy than white infants (relative risk: 1.29 [95% confidence interval: 1.19-1.39]). However, black infants who were very low or moderately low birth weight were 21% to 29% less likely to have cerebral palsy than white infants of comparable birth weight. After we adjusted for birth weight, there was no difference in the risk of cerebral palsy between black and white infants. In multivariate analyses, women of all ethnicities who did not receive any prenatal care were twice as likely to have infants with cerebral palsy relative to women with an early onset of prenatal care. Maternal education was associated with cerebral palsy in a dose-response fashion among white and Hispanic women. Hispanic adolescent mothers (aged <18 years) had increased risk of having a child with cerebral palsy. **Conclusions:** The increased risk of cerebral palsy among black infants is primarily related to their higher risk of low birth weight. Understanding how educational attainment and use of prenatal care impact the risk of cerebral palsy may inform new prevention strategies.

PMID: 21339278 [PubMed - as supplied by publisher]

23. Pediatrics. 2011 Feb 21. [Epub ahead of print]

Population, Case-Control Study of Cerebral Palsy: Neonatal Predictors for Low-Risk Term Singletons.

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Objectives: For singletons with cerebral palsy (CP) who were born at term, the goals were (1) to determine the proportion not admitted to a NICU, (2) to compare clinical descriptions of those admitted to NICUs and those not admitted, and (3) to identify neonatal predictors of CP among those not admitted to a NICU. **Methods:** A total-population case (N = 442) control (N = 468) study of, singleton, term-born infants with CP, as ascertained from the Western Australian Cerebral Palsy Register, was performed. **Results:** All types of CP were represented among the 67% of term infants with CP (N = 295) who were not admitted to a NICU, which also included 54% of the subjects with the most severe impairments. Independent neonatal predictors were abnormalities of tone (odds ratio [OR]: 7.3 [95% confidence interval [CI]: 2-26.8]), temperature regulation (OR: 4.1 [95% CI: 1.2-14]), consciousness (OR: 3.7 [95% CI: 2-7]), and fontanelles (OR: 4.4 [95% CI: 0.8-23]), requirement for resuscitation (OR: 2.9 [95% CI: 2.2-12.9]), and birth defects (OR: 5.1 [95% CI: 2.4-10]). The risk of CP increased with the number of factors, but 58% of subjects who were not admitted to a NICU exhibited none of these factors. **Conclusions:** Neonatal predictors of CP among term infants not admitted to a NICU were identified. However, 39% of all term singletons with CP were not admitted to a NICU and exhibited none of these predictors.

PMID: 21339270 [PubMed - as supplied by publisher]

24. Res Dev Disabil. 2011 Feb 22. [Epub ahead of print]

Motor disorder and anxious and depressive symptomatology: A monozygotic co-twin control approach.

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The aim of this study was to investigate the relationship between poor motor ability and anxious and depressive symptomatology in child and adolescent monozygotic twins. The co-twin control design was used to explore these mental health issues in MZ twins concordant and discordant for a motor disorder, and controls. This methodology offers the unique opportunity to control for genetic effects and shared environmental influences, and permits the investigation of non-shared environmental influences. The Developmental Coordination Disorder Questionnaire was used to identify 23 sets of twins discordant for a motor disorder, 23 sets concordant for a motor disorder, and 773

sets of twins with no motor disorder from a total sample of 2122 Australian sets of twins. The Strengths and Weaknesses of ADHD Symptoms and Normal Behaviour questionnaire was used to exclude participants with high Attention Deficit Hyperactivity Disorder symptomatology. Anxious and depressive symptomatology were assessed using Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR) based questionnaires on Generalised Anxiety Disorder and Sad Affect. Results indicated significantly higher levels of anxious and depressive symptomatology in twins with a motor disorder in discordant pairs compared to their co-twins without a motor disorder, and controls. There were significantly higher levels of anxious symptomatology in twins with a motor disorder in discordant sets than in sets of twins concordant for a motor disorder. There were significantly higher levels of anxious symptomatology in concordant twins than in controls. Implications of these findings are discussed with emphasis on understanding and recognising the relationship between a motor disorder and anxious and depressive symptomatology in clinical practice for children and adolescents with these disorders.

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25. Restor Neurol Neurosci. 2011 Jan 1;29(1):17-22.

Safety and feasibility of autologous umbilical cord blood transfusion in 2 toddlers with cerebral palsy and the role of low dose granulocyte-colony stimulating factor injections.

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Purpose: Cerebral palsy (CP) with a prevalence of 2.1 per 1,000 live births generates variable degrees of incurable developmental disability. The aim of the present report was to provide insight in the safety and feasibility of autologous umbilical cord blood (UCB) transfusion with low dose Granulocyte Colony Stimulating Factor (G-CSF) injections in improving the functional outcome of children with cerebral palsy. Methods: Two toddlers with diagnosed CP were given autologous umbilical cord blood (UCB) transfusion accompanied by low dose subcutaneous granulocyte colony stimulating factor (G-CSF) injections. Results: Gross Motor Function Classification System (GMFCS) improvements were seen in both without any side effects being noted to date. Conclusion: In this first report, autologous UCB based intervention in tandem with low dose sc G-CSF administration seems to be feasible and safe with encouraging functional outcome improvements in children with CP.

PMID: 21335665 [PubMed - in process]

26. Zh Nevrol Psikiatr Im S S Korsakova. 2011;111(1):74-77.

Mechanisms of genome instability in children with periventricular leucomalacia that resulted in cerebral palsy. [Article in Russian]

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The activity of free-radical oxidation and the level of genome instability in children with periventricular leucomalacia that resulted in cerebral palsy have been studied. Genome destabilization, i.e., the elevation of erythrocyte micronuclei in the peripheral blood, has been reported. There was a correlation of a number of cells with cytogenetic rearrangements with the activity of antioxidant defense enzymes and the malonaldehyde level. It has been shown that genome instability occurs during the activation of endogenous mutagenesis and reduction of antiradical and antimutagenic defense. Having, along with the neurotrophic effect, antiradical and antimutagenic effects, cortexin is capable to inhibit the pronounced processes of free-radical oxidation and endogenous mutagenesis in patients with periventricular leucomalacia that resulted in spastic dyplergia exerting.

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