

Monday 4 October 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. Arch Phys Med Rehabil. 2010 Oct;91(10):1593-601.

Reliability of center of pressure measures for assessing the development of sitting postural control in infants with or at risk of cerebral palsy.

Kyvelidou A, Harbourne RT, Shostrom VK, Stergiou N.

University of Nebraska at Omaha, 68182-0216, USA.

OBJECTIVE: To establish the test-retest reliability of linear and nonlinear measures, including intra- and intersession reliability, when used to analyze the center of pressure (COP) time series during the development of infant sitting postural control in infants with or at risk for cerebral palsy (CP). **DESIGN:** Longitudinal study. **SETTING:** University hospital laboratory. **PARTICIPANTS:** Infants with or at risk for CP (N=18; mean age \pm SD at entry into the study, 13.7 \pm 3.6mo). **INTERVENTIONS:** Not applicable. **MAIN OUTCOME MEASURES:** Infant sitting COP data were recorded for 3 trials at each session (2 sessions for each month within 1 week) for 4 consecutive months. The linear COP parameters of the root mean square, the range of sway for both the anterior-posterior and the medial-lateral directions, and the sway path were calculated. In addition, the nonlinear parameters of approximate entropy, Lyapunov exponent (LyE), and the correlation dimension for both directions were also calculated. Intra- and intersession reliability was computed by the intraclass correlation coefficient (ICC). **RESULTS:** Regarding nonlinear measures, LyE showed high intra- and intersession ICC values in comparison with all other parameters evaluated. Intrasession and intersession reliability increased overall in the last 2 months of data collection and as sitting posture improved. **CONCLUSIONS:** Our results suggested that the methodology presented is a reliable way of examining the development of sitting postural control in infants with or at risk for CP, and the reliability results generally parallel values found in sitting postural behavior in typical infants. Therefore, this methodology may be helpful in examining efficacy of therapy protocols directed at advancing sitting postural control in infants with motor developmental delays.

PMID: 20875520 [PubMed - in process]PMCID: PMC2948026 [Available on 2011/10/1]

2. Arch Phys Med Rehabil. 2010 Oct;91(10):1577-81.

Energy expenditure in adults with cerebral palsy playing Wii Sports.

Hurkmans HL, van den Berg-Emons RJ, Stam HJ.

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OBJECTIVE: To determine energy expenditure of adults with bilateral spastic cerebral palsy while playing Wii Sports tennis and boxing. **DESIGN:** Cross-sectional study. **SETTING:** University medical center. **PARTICIPANTS:**

Five men and 3 women with bilateral spastic cerebral palsy and ambulatory ability (Gross Motor Function Classification System level I or II) participated. The mean participant age \pm SD was 36 ± 7 years. Exclusion criteria were comorbidities that affected daily physical activity and fitness, contraindications to exercise, or inability to understand study instructions owing to cognitive disorders or language barriers.

INTERVENTION: Participants played Wii Sports tennis and boxing, each for 15 minutes in random order. **MAIN OUTCOME MEASURE:** By using a portable gas analyzer, we assessed energy expenditure by oxygen uptake (V_{O_2}) while sitting and during Wii Sports game play. Energy expenditure is expressed in metabolic equivalents (METs), which were calculated as V_{O_2} during Wii Sports play divided by V_{O_2} during sitting. **RESULTS:** Mean \pm SD energy expenditure during Wii Sports game play was 4.5 ± 1.1 METs for tennis and 5.0 ± 1.1 METs for boxing ($P=.024$). All participants attained energy expenditures greater than 3 METs, and 2 participants attained energy expenditures greater than 6 METs while playing Wii Sports tennis or boxing. **CONCLUSIONS:** Both Wii Sports tennis and boxing seem to provide at least moderate-intensity exercise in adults with bilateral spastic cerebral palsy (GMFCS level I or II). These games, therefore, may be useful as treatment to promote more active and healthful lifestyles in these patients. Further research is needed to determine the energy expenditures of other physically disabled patient groups while playing active video games, and to determine the effectiveness of these games in improving health and daily activity levels.

PMID: 20875517 [PubMed - in process]

3. Arch Phys Med Rehabil. 2010 Oct;91(10):1571-6.

Influence of task on interlimb coordination in adults with cerebral palsy.

Langan J, Doyle ST, Hurvitz EA, Brown SH.

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OBJECTIVE: To examine movement time and kinematic properties of unilateral and bilateral reaching movements in adults with cerebral palsy (CP), focusing on how different types of bilateral movements, simultaneous or sequential, may influence interlimb coordination. **DESIGN:** Quantitative study using between-group repeated-measures analyses. **SETTING:** Motor control laboratory at a research university. **PARTICIPANTS:** Adults with hemiplegic CP ($n=11$; mean age \pm SD, 33 ± 10 y; 4 men) and age-matched controls (mean age \pm SD, 32 ± 9 y; 4 men). **INTERVENTIONS:** Not applicable. **MAIN OUTCOME MEASURES:** Movement time (MT), maximum deviation from a straight trajectory to the target, and peak speed. **RESULTS:** Although adults with hemiplegic CP showed strong unilateral deficits, bilateral simultaneous reaching movements were temporally and spatially coupled. Movement of the less affected arm slowed to match the movement of the more affected arm. In contrast, bilateral sequential movements improved MTs of the less affected and more affected arms. **CONCLUSIONS:** Bilateral sequential movements were conducive to faster MT compared with unilateral or bilateral simultaneous movements. Training that includes bilateral sequential movements may be beneficial to adults with hemiplegic CP. Upper-limb movements are coordinated in a variety of ways to perform routine bilateral tasks. Some bilateral tasks, such as stacking boxes, require more symmetric movements of the upper limbs. Other bilateral tasks, such as opening the refrigerator with 1 hand while placing an item on the shelf with the other hand, emphasize coordinated sequential action between upper limbs. Despite the prevalence of integrative upper-limb use, the control of different forms of bilateral movement is not well understood. A more comprehensive knowledge of upper-limb bilateral movements may hold important implications for developing more effective upper-limb movement therapies.

PMID: 20875516 [PubMed - in process]

4. Orthop Clin North Am. 2010 Oct;41(4):595-605.

The adult with cerebral palsy.

Murphy KP.

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Advances in medical and surgical care over the past 20 years have resulted in children who formerly would have died at birth or infancy now surviving well into adulthood, many with permanent physical disabilities, including those

caused by cerebral palsy. Inadequate medical and surgical diagnoses and intervention are prevalent in the adult cerebral palsy population. Decreased physical activity and participation in physical therapy and fitness programs, along with loss of strength, contractures, and pain are common factors in the loss of functional weight bearing, self-care, and daily performance over time. Increased awareness of these problems is needed by adult health care providers who provide care to these individuals and also by pediatric providers who may be able to intervene and prevent some of the long-term problems. Early identification and intervention in the child and younger adult remain the ideal in the pursuit of optimal musculoskeletal function and lifestyle throughout the adult years.

PMID: 20868887 [PubMed - in process]

5. Orthop Clin North Am. 2010 Oct;41(4):579-93.

The foot and ankle in cerebral palsy.

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Clinical decision making for the management of foot deformities in children with cerebral palsy is based on the collection and integration of data from 5 sources: the clinical history, physical examination, plain radiographs, observational gait analysis, and quantitative gait analysis (which includes kinematic/kinetic analyses, dynamic electromyography, and dynamic pedobarography). The 3 most common foot segmental malalignments in children with CP are equinus, equinoplanovalgus, and equinocavovarus. The 2 most common associated deformities are ankle valgus and hallux valgus. Foot and ankle deformities caused by dynamic overactivity and imbalance of muscles are best treated with pharmacologic or neurosurgical interventions designed to manage muscle tone and spasticity, or muscle tendon unit transfers. Deformities caused by fixed or myostatic soft tissue imbalance without fixed skeletal malalignment are best treated with muscle tendon unit lengthening surgery. Deformities characterized by structural skeletal malalignment associated with fixed or myostatic soft tissue imbalance are best treated with a combination of soft tissue and skeletal surgeries.

PMID: 20868886 [PubMed - in process]

6. Orthop Clin North Am. 2010 Oct;41(4):549-59.

Management of hip deformities in cerebral palsy.

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Hip abnormalities affect most children with cerebral palsy. Dedicated surveillance programs have been shown to be effective means of identifying hips at risk and preventing pathologic dislocation. Patients who are ambulatory and correlate with Gross Motor Function Classification Score I and II experience deformities that affect mobility and gait, but rarely dislocations. Marginal and nonambulatory patients have an increasing risk of dislocation. Once subluxation has been identified, early surgical intervention is indicated. Long-term postoperative follow-up is needed to monitor for recurrence. Individuals who recur or who do not respond to initial soft tissue releases benefit from bony surgery. Comprehensive reconstruction of the hip has become the predominant treatment approach when acetabular and proximal femoral dysplasia is present. The painful arthritic dislocated hip has numerous treatment options. Hip arthroplasty procedures show promising results and may supplant other salvage options in the future.

PMID: 20868884 [PubMed - in process]

7. Orthop Clin North Am. 2010 Oct;41(4):531-47.**Management of spinal deformity in cerebral palsy.**

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An understanding of the three-dimensional components of spinal deformity in children with cerebral palsy is necessary to recommend treatments that will positively affect these patients' quality of life. Management of these deformities can be challenging and orthopedic surgeons should be familiar with the different treatments available for this patient population. This article discusses the incidence, causes, natural history, and treatment of patients with scoliosis.

PMID: 20868883 [PubMed - in process]

8. Orthop Clin North Am. 2010 Oct;41(4):519-29.**Surgery of the upper extremity in cerebral palsy.**

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Functional activities of the upper extremity are limited in most individuals with a diagnosis of cerebral palsy (CP). However, surgical interventions are applied in less than 20% of pediatric patients with an upper extremity affected by CP. This article covers the surgical interventions used for the reconstruction of the upper limb in patients with CP. The optimal surgical approach for each deformity type is described. In addition, the various evaluation techniques of the upper extremity, the general principles of an operative treatment plan, and the appropriate postoperative care of these patients is presented.

PMID: 20868882 [PubMed - in process]

9. Orthop Clin North Am. 2010 Oct;41(4):507-17.**Assessment and treatment of movement disorders in children with cerebral palsy.**

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Cerebral palsy is the most common motor disability in childhood. Orthopedic care depends on the appreciation and the identification of muscle tone abnormalities and how they affect growth and development of the child. Abnormal muscle tone is a common diagnostic feature of cerebral palsy and can include hypotonia or hypertonia. Hypertonia is the most frequent tone abnormality in children with cerebral palsy. This article reviews hypertonia and provides information on discriminating between spasticity, dystonia, and rigidity. Medication and neurosurgical options for the management of hypertonia are presented and compared.

PMID: 20868881 [PubMed - in process]

10. Orthop Clin North Am. 2010 Oct;41(4):489-506.**The role of gait analysis in treating gait abnormalities in cerebral palsy.**

Chang FM, Rhodes JT, Flynn KM, Carollo JJ.

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Individuals with cerebral palsy (CP) cannot take a normal activity like walking for granted. CP is the most common pediatric neurologic disorder, with an incidence of 3.6 per 1000 live births. The current trend in the treatment of individuals with CP is to perform a thorough evaluation including a complete patient history from birth to present, a comprehensive physical examination, appropriate radiographs, consultation with other medical specialists, and analysis of gait.

PMID: 20868880 [PubMed - in process]

11. Orthop Clin North Am. 2010 Oct;41(4):469-88.**Examination of the child with cerebral palsy.**

Novacheck TF, Trost JP, Sohrweide S.

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This article describes the balanced combination of medical history, detailed physical examination, functional assessment, imaging, observational gait analysis, computerized gait analysis, and assessment of patient and family goals that are necessary to prepare treatment plans and accurately assess outcomes of treatment of children with cerebral palsy.

PMID: 20868879 [PubMed - in process]

12. Orthop Clin North Am. 2010 Oct;41(4):457-67.**Classification systems in cerebral palsy.**

Rethlefsen SA, Ryan DD, Kay RM.

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Because of increasing interest in conducting large-scale, multicenter investigations into the epidemiology of cerebral palsy and its prevention and treatment, efforts have been made to establish a standard definition and classification systems for cerebral palsy. In recent years there has also been increased focus on measurement of functional status of patients and new classifications for gross and fine motor function have been developed. The purpose of this article is to update the orthopaedic community on the current classification systems for patients with cerebral palsy. This information will be of value to surgeons in determining patients' suitability for certain treatments and will also assist them in reviewing current literature in cerebral palsy.

PMID: 20868878 [PubMed - in process]

13. Orthop Clin North Am. 2010 Oct;41(4):441-55.**Epidemiology of the cerebral palsies.**

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Half of the most severe cases of cerebral palsy (CP) survive to adulthood, but because this longevity is relatively recent, there is no empirical experience of their life expectancy past middle age. The last 2 decades have seen significant developments in the management of persons with CP, involving specialist services from an increasing number of disciplines that require coordination to maximize their effectiveness. This article provides an overview of CP. The author discusses definitions of CP, its epidemiology, pathologies, and range of possible clinical descriptions, and briefly touches on management and prevention.

PMID: 20868877 [PubMed - in process]

14. Orthop Clin North Am. 2010 Oct;41(4):ix-x.**Preface: orthopedic management of cerebral palsy.**

Chambers H.

PMID: 20868876 [PubMed - in process]

15. Qual Life Res. 2010 Sep 30. [Epub ahead of print]**The PedsQL in pediatric cerebral palsy: reliability and validity of the Chinese version pediatric quality of life inventory 4.0 generic core scales and 3.0 cerebral palsy module.**

Yang X, Xiao N, Yan J.

Rehabilitation Centre, Children's Hospital, Chongqing Medical University, No.136 Zhongshan ErRoad, Yuzhong District, Chongqing, China.

PURPOSE: This investigation examines the reliability, validity, and sensitivity of the Chinese version Pediatric Quality of Life Inventory (PedsQL) 4.0 Generic Core Scales and 3.0 cerebral palsy (CP) Module in pediatric CP. **METHODS:** The study sample was comprised of 126 parents of children with CP between the ages of 2 and 12 years including 18 child respondents 5-12 years of age. Mean age of the 87 boys (69.0%) and 39 girls (31.0%) was 4 years 1 month (SD 2 years 2 month). **RESULTS:** Reliability was demonstrated for the PedsQL 4.0 ($\alpha = 0.86$ child, 0.89 parent) and CP Module ($\alpha = 0.91$ child, 0.96 parent). The PedsQL 4.0 distinguished between healthy children and children with CP. Construct validity of the CP Module was supported through an analysis of the intercorrelations between the Generic Core Scale scores and the CP Module Scale scores and exploratory factor analysis of PedsQL items. **CONCLUSIONS:** The findings provide support for the measurement properties of the Chinese version PedsQL 4.0 Generic Core Scales and 3.0 CP Module in pediatric CP.

PMID: 20882356 [PubMed - as supplied by publisher]

16. Disabil Rehabil. 2010 Sep 29. [Epub ahead of print]**DVD-based stories of people with developmental disabilities as resources for inter-professional education.**

Iacono T, Lewis B, Tracy J, Hicks S, Morgan P, R X00e9 Coch X00e9 K, McDonald R.

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Purpose. The use of DVD stories about people with developmental disabilities within inter-professional education (IPE) across healthcare disciplines was evaluated. **Methods.** First year healthcare students (n2009;=2009;241) from an IPE unit responded to an attitude scale before and after viewing and discussing a DVD portraying the life and healthcare needs of an adult with cerebral palsy; a third round of data collection occurred later. Qualitative data were obtained from four first year and six second year tutors who discussed student reactions to the DVD. Six first year and four second year students participated in focus groups following viewing of a second DVD, about a young girl with developmental disabilities and complex health needs. **Results.** ANOVA of the attitude scores did not show significant differences from pre- to post-viewing and discussion of the DVD, nor at a third round of data collection. Qualitative analysis revealed that the DVDs did cause students to shift assumptions, perceptions and understanding of the disabilities depicted, and to learn about their own and other professions. **Conclusions.** DVD scenarios of real people with developmental disabilities in real settings offer a means of providing IPE opportunities. The data also point to the need and directions for the development of a new attitudinal measure.

PMID: 20874660 [PubMed - as supplied by publisher]

17. Dev Med Child Neurol. 2010 Sep 28. doi: 10.1111/j.1469-8749.2010.03795.x. [Epub ahead of print]

Age-related changes in energy efficiency of gait, activity, and participation in children with cerebral palsy.

Kerr C, McDowell BC, Parkes J, Stevenson M, Cosgrove AP.

School of Nursing and Midwifery, Queen's University Belfast, Belfast, Northern Ireland. Gait Analysis Service, Belfast Health and Social Care Trust, Musgrave Park Hospital, Stockman's Lane, Belfast, Northern Ireland. Department of Epidemiology and Public Health, Queen's University Belfast, Belfast, Northern Ireland.

Aim: The aim of this study was to use a prospective longitudinal study to describe age-related trends in energy efficiency during gait, activity, and participation in ambulatory children with cerebral palsy (CP). **Method:** Gross Motor Function Measure (GMFM), Paediatric Evaluation of Disability Inventory (PEDI), and Lifestyle Assessment Questionnaire-Cerebral Palsy (LAQ-CP) scores, and energy efficiency (oxygen cost) during gait were assessed in representative sample of 184 children (112 male; 72 female; mean age 10y 9mo; range 4-16y) with CP. Ninety-four children had unilateral spastic CP, 84 bilateral spastic CP, and six had other forms of CP. Fifty-seven were classified as Gross Motor Function Classification System (GMFCS) level I, 91 as level II, 22 as level III, and 14 as level IV). Assessments were carried out on two occasions (visit 1 and visit 2) separated by an interval of 2 years and 7 months. A total of 157 participants returned for reassessment. **Results:** Significant improvements in mean raw scores for GMFM, PEDI, and LAQ-CP were recorded; however, mean raw oxygen cost deteriorated over time. Age-related trends revealed gait to be most inefficient at the age of 12years, but GMFM scores continued to improve until the age of 13 years, and two PEDI subscales to age 14 years, before deteriorating ($p < 0.05$). Baseline score was consistently the single greatest predictor of visit 2 score. Substantial agreement in GMFCS ratings over time was achieved ($\kappa(\text{lw}) = 0.74-0.76$). **Interpretation:** These findings have implications in terms of optimal provision and delivery of services for young people with CP to maximize physical capabilities and maintain functional skills into adulthood.

PMID: 20875041 [PubMed - as supplied by publisher]

18. IEEE Trans Biomed Eng. 2010 Sep 27. [Epub ahead of print]

Acoustical Modeling of Swallowing Mechanism.

Sarraf Shirazi S, Kazem Moussavi Z.

In this paper a mathematical modeling of the swallowing sound generation is presented. To evaluate the model, its application on swallowing disorder (dysphagia) diagnosis is discussed. As a starting point, a simple linear time invariant model is assumed to represent the pharyngeal wall and tissue excited by a train of impulses. The modeling is approached by two different assumptions. In one approach it is assumed the impulse train, representing the neural activities to trigger swallow, is the same for both groups of control and dysphagic and it is the pharyngeal model that accounts for the difference between the two groups. On the other hand, in the second approach, it is assumed the pharyngeal response is the same for both groups but the neural activities to initiate the swallow are different between the two groups. The results show the second approach complies better with the physiological characteris-

tics of swallowing mechanism as it provides a much better discrimination between the swallowing sounds of control and dysphagic groups of this study. Though, it should be noted that our dysphagic group subjects were cerebral palsy and stroke patients. Hence, the model accounting for initiation of neural activities is reasonable to show better results.

PMID: 20876004 [PubMed - as supplied by publisher]

19. Arch Phys Med Rehabil. 2010 Sep;91(9):1478; author reply 1478-9.

The trouble with "body weight support" in treadmill training.

Wernig A, Wernig S.

Comment on:

Arch Phys Med Rehabil. 2010 Mar;91(3):333-9.

PMID: 20801272 [PubMed - indexed for MEDLINE]

20. Augment Altern Commun. 2010 Sep;26(3):191-202.

An Analysis of Reading and Spelling Abilities of Children Using AAC: Understanding a Continuum of Competence.

Dahlgren Sandberg A, Smith M, Larsson M.

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The over-representation of reading and spelling difficulties in children with complex communication needs has been well documented. However, most of the studies reported have indicated that at least some children using augmentative and alternative communication (AAC) can achieve and demonstrate effective literacy skills, highlighting the heterogeneity of this group. This paper presents findings from a cross-linguistic study of 14 Swedish and 14 Irish children with cerebral palsy who use AAC, outlining their performance on a range of phonological awareness, reading, and spelling tasks developed for the purposes of the study. All participants were referred to the study as functioning in the average range of intellectual ability. Of the 28 participants, eight were classified as good readers, on the basis of their success on tasks involving connected text; while 10 presented with single-word reading skills; and 10 were categorized as non-readers. This paper explores the similarities and differences within and across these groups, in terms of associated skills and experiences. While analyses of group data suggests some common abilities and difficulties, exploration of individual profiles highlights the heterogeneity of the participants' profiles, suggesting a need for detailed individual assessment and interventions.

PMID: 20874081 [PubMed - in process]

21. Dev Med Child Neurol. 2010 Sep;52(9):875-6. Epub 2010 May 10.

How doctors think--and treat with botulinum toxin.

Schroeder AS, Koerte I, Berweck S, Ertl-Wagner B, Heinen F.

PMID: 20491854 [PubMed - indexed for MEDLINE]

22. J Clin Ethics. 2010 Summer;21(2):104-11.**Consent to deep brain stimulation for neurological and psychiatric disorders.**

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Deep brain stimulation (DBS) of the globus pallidus interna and subthalamic nucleus has restored some degree of motor control in many patients in advanced stages of Parkinson's disease. DBS has also been used to treat dystonia, essential tremor (progressive neurological condition causing trembling), chronic pain, obsessive-compulsive disorder, Tourette's syndrome, major depressive disorder, obesity, cerebral palsy, and the minimally conscious state. Although the underlying mechanisms of the technique are still not clear, DBS can modulate underactive or overactive neural circuits and restore disrupted communication between and among groups of neurons in interacting regions of the brain. This can control and relieve many symptoms associated with a range of neurological and psychiatric disorders. But the procedures of implanting and stimulating the electrodes are brain-invasive and entail significant risks. Some patients receiving DBS have experienced intracerebral hemorrhage, infection, cognitive disturbances such as impulsive behavior, and affective disturbances such as mania. It is not known whether continuous electrical stimulation of the brain would reshape synaptic connectivity and permanently alter neural circuits in ways that may not be salutary. The risk of these effects indicates that DBS should be used only when a patient's condition is refractory to all other interventions and when there is a high probability that the technique will benefit the patient and improve his or her quality of life. If a patient's quality of life is poor and all other treatment options have been exhausted, then the likelihood of benefit can justify physicians' exposing patients to some risk. The clinical and ethical significance of the risk in DBS underscores the obligation of physicians to obtain fully informed consent from patients undergoing the procedure.

PMID: 20866016 [PubMed - in process]

23. Ortop Traumatol Rehabil. 2010 Jul-Aug;12(4):347-52.**Evaluation of satisfaction with surgical treatment for musculoskeletal dysfunction in children with cerebral palsy.**

Borowski A, Kwapisz A, Dorman T, Grzegorzewski A, Synder M.

Department of Orthopaedics and Paediatric Orthopaedics, Medical University of Łódź, Poland.

Background: The variety of symptoms in cerebral palsy (CP) points to the advisability of using the term 'cerebral palsies' to underline the complex nature of the associated musculoskeletal dysfunctions. The incidence of CP is estimated at 1 to 5 in 1000 live born infants. This makes CP one of the main causes of hospitalization in paediatric orthopaedic wards. The complicated nature of the musculoskeletal dysfunctions entails the necessity of employing multiple surgical procedures: starting from multilevel soft tissue operations, to multiple corrective osteotomies, to spinal surgery with implantation of baclofen pumps for subarachnoid administration. The aim of the study was to evaluate the level of satisfaction following surgery in CP children. **Material and Methods** The study group was composed of 52 children (27 males and 25 females) surgically treated between 1988 and 2001. There were 18 children with hemiparesis, 19 with diparesis and 15 with tetraparesis. A subjective evaluation of the level of the satisfaction of the patient and the parent/guardian after the surgical treatment was carried out during a follow-up examination. **Results** Forty-three parents (82.6%) reported improvement after the surgery and declared that they would take the same decision again. Five parents reported no significant change in the quality of life of their children (9.6%), and two (3.8%) reported a deterioration. **Conclusion** 1. Multilevel soft tissue release in children with CP significantly improved their quality of life and was associated with a high level of parents'/guardians' satisfaction.

PMID: 20876928 [PubMed - in process]

24. Ortop Traumatol Rehabil. 2010 Jul-Aug;12(4):320-8.**Radiological evaluation of hip joint congruency in children with cerebral palsy.**

Borowski A, Kwapisz A, Grzegorzewski A, Synder M.

Orthopaedics and Paediatric Orthopaedics Department, Medical University of Łódź, Poland.

Background: Disturbed muscle balance in the hip joints of children with cerebral palsy (CP) shifts the pivoting point from the middle of the femoral head to the lesser trochanter. Forces that dislocate the femoral head progressively change acetabular shape, producing inadequate femoral head covering. The aim of the study was to carry out a radiological evaluation of hip congruency in children with CP after surgical treatment. **Material and Methods:** The study group consisted of CP patients operated on due to lower limb dysfunction between 1988 and 2001. All patients had undergone multilevel soft tissue release. A total of 52 children reported for follow-up examinations. There were 18 patients with hemiparesis (32%), 19 with diparesis (36%), and 15 with tetraparesis (29%). The age at surgery was between 2 and 19 y.o. (average age 7.33 y.o.). Radiological evaluation of the hip joints focused on changes in the migration index and the shaft-neck angle. **Results:** The mean migration index before surgery was 30.4% in the group of diparetic and tetraparetic children. At the last follow-up examination, the average migration index was 32.5% on the right side and 25.6% on the left side ($p>0.05$). There was a statistically significant decrease in the value of the migration index in children operated on before the age of 8 years ($p=0.007$). In children operated on after the age of 8, the change in the migration index value did not exceed 0.5% ($p>0.05$). **Conclusions** 1. The mean migration index did not change significantly in the study group of surgically treated CP children. 2. Surgery had no influence on the shaft-neck angle 3. Surgery prevented progression of the migration index.

PMID: 20876925 [PubMed - in process]

25. Can J Neurosci Nurs. 2010;32(3):17-24.**Selective dorsal rhizotomy in children: comparison of outcomes after single-level versus multi-level laminectomy technique.**

Ou C, Kent S, Miller S, Steinbok P.

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Children with cerebral palsy may experience spasticity, which may negatively impact their quality of life. One proven treatment for such spasticity is selective dorsal rhizotomy (SDR), whereby a partial sectioning of the dorsal roots from L2 to S1 is performed. SDR can be performed where the nerve root exits the intervertebral foramina via multi-level laminectomies, or at the level of the conus via a single-level laminectomy. At British Columbia Children's Hospital (BCCH), SDRs were performed via multi-level laminectomies until 2005, when the single-level technique was adopted. The single-level procedure is technically more challenging and takes longer, but requires a smaller incision and involves less muscle dissection. Functional outcomes at one-year follow-up are similar for the two methods of surgery. It was hypothesized that post-operative pain would be less, mobilization faster and hospital stay shorter using the single-level technique. Using a retrospective case series analysis, we compared nine patients who had had single-level SDR to 18 matched controls who had undergone SDR using the multi-level technique. There were no significant differences in post-operative pain, duration of opioid infusion, or time to mobilization. Length of hospital stay was significantly decreased after the single level procedure: 3.4 versus 5.2 days ($p = 0.01$).

PMID: 20865831 [PubMed - in process]

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.

26. Orthop Clin North Am. 2010 Oct;41(4):441-55.

Epidemiology of the cerebral palsies.

Blair E.

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Half of the most severe cases of cerebral palsy (CP) survive to adulthood, but because this longevity is relatively recent, there is no empirical experience of their life expectancy past middle age. The last 2 decades have seen significant developments in the management of persons with CP, involving specialist services from an increasing number of disciplines that require coordination to maximize their effectiveness. This article provides an overview of CP. The author discusses definitions of CP, its epidemiology, pathologies, and range of possible clinical descriptions, and briefly touches on management and prevention.

PMID: 20868877 [PubMed - in process]

27. Biochem J. 2010 Sep 28;431(2):207-16.

Botulinum neurotoxin serotype D attacks neurons via two carbohydrate-binding sites in a ganglioside-dependent manner.

Strotmeier J, Lee K, Völker AK, Mahrhold S, Zong Y, Zeiser J, Zhou J, Pich A, Bigalke H, Binz T, Rummel A, Jin R.

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The extraordinarily high toxicity of botulinum neurotoxins primarily results from their specific binding and uptake into neurons. At motor neurons, the seven BoNT (botulinum neurotoxin) serotypes A-G inhibit acetylcholine release leading to flaccid paralysis. Uptake of BoNT/A, B, E, F and G requires a dual interaction with gangliosides and the synaptic vesicle proteins synaptotagmin or SV2 (synaptic vesicle glycoprotein 2), whereas little is known about the cell entry mechanisms of the serotypes C and D, which display the lowest amino acid sequence identity compared with the other five serotypes. In the present study we demonstrate that the neurotoxicity of BoNT/D depends on the presence of gangliosides by employing phrenic nerve hemidiaphragm preparations derived from mice expressing the gangliosides GM3, GM2, GM1 and GD1a, or only GM3 [a description of our use of ganglioside nomenclature is given in Svennerholm (1994) Prog. Brain Res. 101, XI-XIV]. High-resolution crystal structures of the 50 kDa cell-binding domain of BoNT/D alone and in complex with sialic acid, as well as biological analyses of single-site BoNT/D mutants identified two carbohydrate-binding sites. One site is located at a position previously identified in BoNT/A, B, E, F and G, but is lacking the conserved SXWY motif. The other site, co-ordinating one molecule of sialic acid, resembles the second ganglioside-binding pocket (the sialic-acid-binding site) of TeNT (tetanus neurotoxin).

PMID: 20704566 [PubMed - in process]

28. Neonatology. 2010 Sep 28;99(3):177-187. [Epub ahead of print]**Chorioamnionitis: Important Risk Factor or Innocent Bystander for Neonatal Outcome?**

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Chorioamnionitis as a major risk factor for spontaneous preterm birth, especially at earlier gestational ages, contributes to prematurity-associated mortality and morbidity. A gestation-independent effect of chorioamnionitis on neonatal outcome is much more difficult to assess. The influence of chorioamnionitis on neonatal outcome has become less evident with advances in neonatal care. A short-term beneficial effect of histological, but not clinical chorioamnionitis on incidence and severity of respiratory distress syndrome in preterm infants is evident. This maturational effect is accompanied by a susceptibility of the lung for further postnatal injury, which predisposes for bronchopulmonary dysplasia. Chorioamnionitis is associated with cystic periventricular leukomalacia, intraventricular hemorrhage and cerebral palsy in preterm infants, but its association with noncystic white matter disease is not clear yet. Prenatal inflammation/infection has been shown a risk factor for neonatal sepsis. A single course of antenatal steroids can be regarded safe in clinical as well as histological chorioamnionitis.

PMID: 20881433 [PubMed - as supplied by publisher]

29. J Matern Fetal Neonatal Med. 2010 Sep 27. [Epub ahead of print]**Caffeine impact on neonatal morbidities.**

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Caffeine is a silver bullet in neonatology. This ubiquitous trimethylxanthine, pervasively used in the human diet and beverages, significantly impacts on major acute neonatal morbidities including apnea of prematurity, bronchopulmonary dysplasia, patent ductus arteriosus with or without surgical ligation and post-operative apnea. Potential uses in respiratory distress syndrome as suggested by improved lung function in primate models is supported by the decreased time on mechanical ventilation and need for oxygen therapy. Improved later outcomes at 18 to 22 months include clinically significant decreases in cerebral palsy, cognitive impairment, and severe retinopathy of prematurity in those babies who received caffeine during the neonatal period compared to non-caffeine treated placebo neonates. Ongoing and future research studies focus on optimizing current dose regimens to determine whether benefits can be maximized while maintaining an impressive safety profile. Molecular pharmacologic studies focused on the molecular and the biochemical mechanisms underlying the protective effects of caffeine are also being done to optimize treatment regimes and to target potential molecular pathways leading to further decreases in acute and long term neonatal morbidities. Since its use in newborns three decades ago, caffeine is now one of the safest, most cost-beneficial and effective therapies in the newborn.

PMID: 20873976 [PubMed - as supplied by publisher]

30. Eur J Paediatr Neurol. 2010 Sep 22. [Epub ahead of print]**Population-based study of neuroimaging findings in children with cerebral palsy.**

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BACKGROUND: Neuroimaging is currently recommended as a standard evaluation in children with cerebral palsy (CP). **AIMS:** Utilizing imaging findings from a population-based registry (REPACQ), the frequency and proportion of cerebral radiologic abnormalities in children CP over a four year birth cohort was investigated. **METHODS:** Descrip-

tions of CT and MRI studies were extracted from the Registry dataset and classified into 10 distinct categories. RESULTS: Two hundred and thirteen children had imaging available (119 males, 94 females, mean age of 44 months [SD.±14 months] at Registry inscription). Eighty seven percent of participants had documented cerebral abnormalities, the most common of which were periventricular white matter injury (PVWMI) (19.2%), diffuse gray matter injury (14.6%), cerebral vascular accident (CVA) (11.7%), and cerebral malformation (11.3%). Also, 18.8% of participants had non-specific radiologic findings and 13.1% of participants had normal imaging results. Severe CP (i.e. GMFCS Level IV-V) and spastic quadriplegic CP were significantly associated with the neuroimaging findings of gray matter injury, while spastic hemiplegic CP was association with CVA, and dyskinetic and spastic diplegic CP were both associated with normal and non-specific neuroimaging findings. CONCLUSIONS: Specific patterns of neuroimaging findings in children with CP were found to be associated with neurological subtype, CP severity (i.e. GMFCS Level) and other categorical variables.

PMID: 20869285 [PubMed - as supplied by publisher]

31. Alcohol Alcohol. 2010 Sep 29. [Epub ahead of print]

Cerebral Palsy and Alcohol Consumption during Pregnancy: Is There a Connection?

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PMID: 20880958 [PubMed - as supplied by publisher]

32. Stem Cell Res. 2010 Aug 31. [Epub ahead of print]

Transplantation of magnetically labeled mesenchymal stem cells in a model of perinatal brain injury.

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Periventricular white matter injury (PVWMI) in preterm infants is a leading cause of cerebral palsy. Mesenchymal stem cell (MSC) transplantation in experimental models of adult demyelinating conditions is reported to reduce neurological deficits so we investigated their potential for treating developmental PVWMI. Neonatal rat MSCs, when cultured and labeled in vitro with fluorescent, micrometer-sized paramagnetic iron oxide particles (MPIO), retained their differentiation potential. Rats received bilateral intracerebral injections of ibotenic acid at postnatal day 5 causing PVWMI-like lesions with localized hypomyelination and sensorimotor deficits. MPIO-labeled MSCs were transplanted near the lesion in the right hemisphere 1day postlesioning. Animals receiving cell transplants showed significantly increased antimyelin immunoreactivity in the corpus callosum, and improved reaching and retrieval skills, compared to animals receiving conditioned medium only. In separate experiments, in vivo MRI demonstrated that MPIO-labeled cells migrated away from the injection site toward lesioned areas in both hemispheres, confirmed by microscopy postmortem, but double-labeling studies found little evidence of differentiation into neural phenotypes. MSC transplantation led to significantly more forebrain cell proliferation, assayed by bromodeoxyuridine incorporation, than in controls. MSC transplants may have been neuroprotective and indirectly contributed to brain repair.

PMID: 20875955 [PubMed - as supplied by publisher]