Cerebral Palsy INSTITUTE

CP Research News

Monday 10 January 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" and cover the period 20 December 2010 to 9 January 2011.

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Interventions

1. Dev Med Child Neurol. 2011 Jan;53(1):7-9. doi: 10.1111/j.1469-8749.2010.03843.x.

The contribution of spasticity to the movement disorder of cerebral palsy using pathway analysis: does spasticity matter?

Lin JP.

Guy's & St Thomas' Hospitals Foundation Trust, Paediatric Neurology, London, UK.

Comment on:

* Dev Med Child Neurol. 2011 Jan;53(1):68-73.

PMID: 21171216 [PubMed - in process]

Publication Types:

* Comment

2. Dev Med Child Neurol. 2010 Nov;52(11):e259-66. doi: 10.1111/j.1469-8749.2010.03778.x.

Variation at local government level in the support for families of severely disabled children and the factors that affect it.

Forsyth R, McNally R, James P, Crossland K, Woolley M, Colver A.

Institute of Neuroscience, Newcastle University, Newcastle upon Tyne, UK Institute of Health and Society, Newcastle University, Newcastle upon Tyne, UK Equinox Training Consultancy, Appleby-in-Westmorland, UK Formerly at Family Fund, York, UK.

Aim: The aim of this study was to examine geographical variability in the support for families caring for children with severe disabilities as well as the relationships between this variability and local government social and educational performance indicators. Method: Data were collected from a cross-sectional, self-completed postal survey of the families of 5862 children and young people (aged 0-24y, mean 10y 7mo; 68% male) with severe disabilities resulting in a variety of impairments (21% with autism spectrum disorders, 16% with learning disabilities,* 13% with emotional and behavioural difficulties, and 13% with cerebral palsy [CP]). Data on the severity of intrinsic impairment were assessed using the Health Utilities Index, and the need for support was assessed from the results of a novel parent-completed questionnaire, the European Child Environment Questionnaire (ECEQ). These responses were related to data published by local authorities on educational and social policy. Results: Higher levels of unmet need and lack of support, as reported by parents of children and young people with severe disabilities, are associated with greater impairment but not with socioeconomic deprivation. After controlling for

impairment and diagnosis, variation at local government level is of the order of 1 to 1.5 ECEQ standard deviation scores. The best- and the worst-performing local authorities - in terms of the averages of the 'support' scores reported by their surveyed residents - cluster in urban areas. For children with CP, a positive correlation was found between the reported unmet educational support requirements in each local authority area and rates of mainstream school placement for children with special educational needs. This indicates that the placement of children with disabilities into mainstream schools is associated with reported unmet need (r=0.60; p=0.01). In the case of children with autism spectrum diagnoses, the provision of additional basic educational support in mainstream primary education was associated with lower average local authority scores for unmet need, suggesting that this support was appreciated by residents (r=-0.75; p=0.005). Interpretation: Parent-reported unmet need in the care of children with disabilities shows significant geographical variation after adjustments for severity, type of impairment, and socioeconomic deprivation. Associations between some aspects of reported unmet need and local authority performance indicators suggest that support for families of children with severe disabilities may be improved by policy changes at local government level.

PMID: 21175456 [PubMed - in process]

3. Dev Med Child Neurol. 2010 Dec 17. doi: 10.1111/j.1469-8749.2010.03853.x. [Epub ahead of print]

Correspondence of classifications between parents of children with cerebral palsy aged 2 to 6 years and therapists using the Gross Motor Function Classification System.

Jewell AT, Stokes AI, Bartlett DJ.

School of Physical Therapy, Faculty of Health Science, The University of Western Ontario, London, Ontario, Canada.

Aim: The aim of this study was to determine the agreement and reliability of parent report using a lay version of the Gross Motor Function Classification System (GMFCS) among children with cerebral palsy in the two youngest age bands. Method: Data were obtained from the Canadian section of the Movement and Participation in Life Activities of Young Children study database. One hundred and thirty-two parents of two groups of children participated: children aged 2 to 4 years (35 males, 26 females; mean age 3y 2mo; SD 5mo) and children aged 4 to 6 years (39 males, 32 females; mean age 4y 11mo; SD 6mo) at the final data collection point. Therapists classified motor function using the GMFCS and parents used the GMFCS Family Report Questionnaire, with parents and therapists being masked to the others' responses. Agreement between respondents was determined using precise agreement and Cohen's unweighted kappa statistic. Reliability between respondents was determined using the intraclass correlation coefficient (ICC). Results: Overall, precise agreement was 77%, chance-corrected agreement was κ=0.70 (95% confidence interval [CI] 0.61-0.79), and reliability was ICC=0.95 (95% CI 0.93-0.96). Interpretation: These values indicate substantial agreement and reliability between parents of children aged 2 to 6 years and therapists. Some parents had a tendency to rate their children as more functionally limited than did therapists, leading us to question whose the true criterion standard' rating should be.

PMID: 21166672 [PubMed - as supplied by publisher]

4. Dev Med Child Neurol. 2010 Dec 17. doi: 10.1111/j.1469-8749.2010.03852.x. [Epub ahead of print]

Bone density and size in ambulatory children with cerebral palsy.

Wren TA, Lee DC, Kay RM, Dorey FJ, Gilsanz V.

Children's Orthopaedic Center, Children's Hospital Los Angeles, Los Angeles, CA, USA Department of Pediatrics, Children's Hospital Los Angeles, Los Angeles, CA, USA Department of Radiology, Children's Hospital Los Angeles, Los Angeles, CA, USA.

Aim: To examine the relation of axial and appendicular bone properties in ambulatory children with cerebral palsy

(CP) to functional (Gross Motor Function Classification System [GMFCS]) level. Method: Quantitative computed tomography measurements were compared among 37 children with CP (12 children in GMFCS level I, five in level II, 18 in level III, two in level IV; five with hemiplegia, 23 with diplegia, two with triplegia, seven with quadriplegia; mean age 9y 4mo, SD 1y 6mo; 18 males, 19 females) and 37 children in a comparison group (same age and sex distributions). Linear regression was used to evaluate differences in volumetric cancellous bone density (vBMD) and geometric properties of the L3 vertebra and tibia, adjusting for height, weight, and sex as covariates. Results: The comparison group had larger vertebrae than the children with CP (p=0.02) owing to smaller vertebral size in GMFCS levels III and IV, but there was no difference in vertebral vBMD (p=0.49). In the tibia, bone volumetric density (p=0.09) and size (p=0.02) decreased with increasing GMFCS level. GMFCS level had a greater effect on bone size in females than in males (p<0.07). Interpretation: Children with CP of all levels may have less bone in their tibias, whereas spine deficits differentially affect more involved children. Because even small bone deficits may manifest as osteoporosis later in life, it is important to study bone acquisition in all children with CP.

PMID: 21166671 [PubMed - as supplied by publisher]

5. Dev Med Child Neurol. 2010 Dec 17. doi: 10.1111/j.1469-8749.2010.03844.x. [Epub ahead of print]

Distribution of motor types in cerebral palsy: how do registry data compare?

Reid SM, Carlin JB, Reddihough DS.

Department of Paediatrics, University of Melbourne, Melbourne, Victoria, Australia Developmental Disability Research, Murdoch Childrens Research Institute, Melbourne, Victoria, Australia Clinical Epidemiology and Biostatistics Unit, Murdoch Childrens Research Institute, Melbourne, Victoria, Australia Developmental Medicine, Royal Children's Hospital, Melbourne, Victoria, Australia.

Aim: The aim of this study was to describe the distribution of types of motor disorder (motor type) in a population-based registry of children with cerebral palsy (CP), to examine any trends in motor type distribution over time, and to make comparisons with other populations. Method: Individuals born in Victoria, Australia, between 1970 and 2003 with congenital CP were identified from the Victorian Cerebral Palsy Register, 3297 of whom were included in the study (1840 males, 1457 females). Those who had a hypotonic motor type, those whose brain abnormality was believed to have developed after 28 days of life, and those with missing data were excluded from the study. The proportions of each motor type were calculated and plotted by year of birth. Logistic regression analyses were used to assess the mean change in odds per year of birth. A systematic review of the international literature was undertaken and comparison data were extracted based on previously devised criteria. The degree of heterogeneity was assessed and comparisons were made according to geographical region and reporting period. Results: In Victoria, the predominant motor types for individuals with CP born between 1970 and 2003 were spasticity (91%), ataxia (5%), and dyskinesia (4%). There was no clear trend for any motor type over time. The mean proportions from two other large data sets were similar but there was considerable heterogeneity between 29 individual CP registries, mainly because of differences in the classification of mixed motor types. Interpretation: A more objective method for determining the predominant motor type is required to make the classification of motor type in CP more consistent and reliable.

PMID: 21166669 [PubMed - as supplied by publisher]

6. Dev Med Child Neurol. 2010 Dec;52(12):1098. doi: 10.1111/j.1469-8749.2010.03833.x.s.

Geytenbeek J, Harlaar L, Stam M, Ket H, Becher JG, Oostrom K, Vermeulen J.

Department of Rehabilitation Medicine, VU University, Amsterdam, the Netherlands. The EMGO Institute for Health and Care Research, VU University, Amsterdam, the Netherlands. Department of Paediatric Neurology, VU University Medical Center, Neuroscience Campus Amsterdam, Amsterdam, the Netherlands. Medical Library, VU University, Amsterdam, the Netherlands. Department of Paediatric Psychology, VU University Medical Center, Neuroscience Campus Amsterdam, Amsterdam, the Netherlands.

Aim: To identify the use and utility of language comprehension tests for unintelligible or non-speaking children with severe cerebral palsy (CP). Method: Severe CP was defined as severe dysarthria (unintelligible speech) or anarthria (absence of speech) combined with severe limited mobility, corresponding to Gross Motor Function Classification System levels IV to V. An electronic search in the databases of PubMed, PsychInfo, Embase, and CINAHL was made of studies published between January 1965 and December 2008. Indexing terms and free-text terms for 'cerebral palsy', 'language', and 'instrumentation' were used. Studies were included when (1) the focus was to investigate comprehension of spoken language of children (0-18y) with severe CP, and (2) language tests were described. Results: Twelve standardized tests and five experimental instruments were identified. All standardized tests were developed for children without limited mobility. Only the Peabody Picture Vocabulary Test - Revised was frequently used and feasible for older children with severe CP (>9y). The other tests were used occasionally. To establish utility, adaptations of standardized test procedures were necessary. Interpretation: Language comprehension tests for children with severe CP are scarce. A language comprehension test specifically designed for these children is warranted. Cite this as: Dev Med Child Neurol 52: e267-e277.

PMID: 21175466 [PubMed - in process]

7. Dev Med Child Neurol. 2010 Dec;52(12):1076. doi: 10.1111/j.1469-8749.2010.03805.x. Epub 2010 Oct 21.

Gastrostomy feeding in cerebral palsy: enough and no more.

Somerville H, O'Loughlin E.

Department of Gastroenterology, The Children's Hospital Westmead, Sydney, Australia.

PMID: 21175462 [PubMed - in process]

8. Disabil Rehabil. 2010 Dec 20. [Epub ahead of print]

Group aquatic training improves gait efficiency in adolescents with cerebral palsy.

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Purpose. To evaluate the effect and feasibility of a 10-week group aquatic training programme on gait efficiency in adolescents with cerebral palsy (CP). The secondary purpose was to determine the exercise intensity during aquatic training in a heterogeneous group of adolescents with CP and to investigate the impact of the training programme on the musculoskeletal system. Method. Twelve ambulatory adolescents with spastic CP were recruited. They participated in 20 aquatic training sessions (45 min twice a week). Three physical therapists and a sports teacher supervised the training sessions. Participants wore a heart rate monitor to assess sessions' intensity and a floatation device as appropriate. The primary outcome measure was gait efficiency as measured by the gait energy expenditure index (EEI). The secondary measures were (1) gait spatiotemporal parameters, (2) maximal isometric knee strength and (3) gross motor function. Results. Ten adolescents completed the training programme. No adverse effect was reported. Average exercise intensity was mild to moderate for more than half of the training session. A significant reduction of the EEI and the heart rate during walking was observed following the

training programme. No significant change was observed on secondary outcome measures. Conclusions. Group aquatic training increases gait efficiency in adolescents with CP. This improvement is related to systemic cardiorespiratory adaptations. Group aquatic training programme is feasible in adolescents presenting CP at different levels of severity.

PMID: 21171841 [PubMed - as supplied by publisher]

10. Gait Posture. 2010 Dec 20. [Epub ahead of print]

Video gait analysis for ambulatory children with cerebral palsy: Why, when, where and how!

Harvey A, Gorter JW.

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PURPOSE: This paper outlines the application of video gait analysis (VGA) for children with cerebral palsy (CP) when full instrumented three dimensional gait analysis (3DGA) is either not indicated or not available. SCOPE: Gait analysis is an important part of the assessment of ambulant children with CP for diagnosing gait deviations and for evaluating change. Many regard 3DGA as the most informative method of assessing gait, however, it is not always accessible, practical, or feasible and the detail obtained is not always indicated. VGA in conjunction with other carefully selected outcome measures can provide a comprehensive gait assessment in situations where 3DGA is not available or not indicated. Indications for VGA use include: documenting change in gait pattern over time, frequent monitoring in the rehabilitation phase following treatments and interventions (including surgery, spasticity management, serial casting and intensive therapy), monitoring orthotic changes, and for very young children and those with behavioural/cognitive issues that preclude them from cooperating with a 3DGA. Simple and inexpensive VGA systems can be set up in most settings. In an effort to make the process more objective and reliable a number of observational gait scales have been developed. Of these the Edinburgh Gait Score (EGS) has the strongest psychometric properties and is the most comprehensive by including both the coronal and the sagittal planes. CONCLUSION: While 3DGA remains an important part of complex clinical decision-making, there is also an increasingly important role for VGA. Guidelines need to be developed for its use within the field of gait analysis.

PMID: 21177107 [PubMed - as supplied by publisher]

11. Gait Posture. 2010 Dec 17. [Epub ahead of print]

Muscle strength and walking ability in Diplegic Cerebral Palsy: Implications for assessment and management.

Thompson N, Stebbins J, Seniorou M, Newham D.

Oxford Gait Laboratory, Nuffield Orthopaedic Centre, Oxford, UK; Division of Applied Biomedical Research, King's College, London, UK.

Muscle weakness is a recognised problem in children with Cerebral Palsy (CP). Changes in the understanding of motor control, and progress in the treatment of spasticity, have led to a greater appreciation that spastic muscles re also weak. In recent years weakness has been identified in isolated muscle groups, but studies quantifying the degree and distribution of weakness in multiple muscles remain limited. This study evaluated isometric lower limb muscle strength in 50 ambulant children with CP/Spastic Diplegia (mean age 11 years 7 months) at GMFCS levels I (n=14), II (n=26) and III (n=10). Muscle strength was compared with 15 control children (mean age 11 years 1 month) using the same protocol. Six muscle groups in both lower limbs were measured using a digital dynamometer. All lower limb muscles were significantly weaker in the CP children than in healthy children ($p<0.05$) except for the hip extensors. Muscle strength ranged from 43% to 90% of control values depending on the muscle group, with the knee extensors measured at 30° being the relatively weakest group. There was a significant difference in strength between GMFCS levels in 4/6 muscle groups with a progressive reduction in strength in all muscle groups with increasing walking difficulty from GMFCS levels I to III. The greatest difference in strength between in-

dependent walkers and those dependent on walking aids was in the hip abductors and knee extensors at 30°, hich are key muscle groups in sagittal and coronal plane walking stability. This has implications in targetting strength training to maximise functional outcomes.

PMID: 21169021 [PubMed - as supplied by publisher]

12. Gait Posture. 2010 Dec 16. [Epub ahead of print]

Muscle strength and kinetic gait pattern in children with bilateral spastic CP.

Eek MN, Tranberg R, Beckung E.

Queen Silvia Childrens Hospital, Department of Paediatrics, Institute of Clinical Sciences, Sahlgrenska Academy, University of Gothenburg, Sweden; Department of Othopaedics, Institute of Clinical Sciences, Sahlgrenska Academy, University of Gothenburg, Sweden.

Cerebral palsy is often associated with an abnormal gait pattern. This study put focus on relation between muscle strength and kinetic gait pattern in children with bilateral spastic cerebral palsy and compares them with a reference group. In total 20 children with CP and 20 typically developing children participated. They were all assessed with measurement of muscle strength in eight muscle groups in the legs and a 3-dimensional gait analysis including force data. It was found that children with CP were not only significantly weaker in all muscle groups but also walked with slower velocity and shorter stride length when compared with the reference group. Gait moments differed at the ankle level with significantly lower moments in children with CP. Gait moments were closer to the maximal muscle strength in the group of children with CP. Furthermore a correlation between plantarflexing gait moment and muscle strength was observed in six of the eight muscle groups in children with CP, a relation not found in the reference group. A similar pattern was seen between muscle strength and generating ankle power with a rho=0.582-0.766. The results of this study state the importance of the relationship of the overall muscle strength pattern in the lower extremity, not only the plantarflexors.

PMID: 21168334 [PubMed - as supplied by publisher]

13. J Allied Health. 2010 Winter;39(4):280-6.

Effects of an experiential learning program on the clinical reasoning and critical thinking skills of occupational therapy students.

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This study examined the effects of participation in a 1-week, experiential, hands-on learning program on the critical thinking and clinical reasoning skills of occupational therapy students. A quasi-experimental, nonrandomized pre- and post-test design was used with a sample of 25 students. The students had completed three semesters of didactic lecture coursework in a master's level OT educational program prior to participation in a hands-on therapy program for children with hemiplegic cerebral palsy. Changes in critical thinking and clinical reasoning skills were evaluated using the following dependent measures: Self-Assessment of Clinical Reflection and Reasoning (SACRR) and the California Critical Thinking Skills Test (CCTST). Changes in pretest and posttest scores on the SACRR and the CCTST were statistically significant (p>0.05) following completion of the experiential learning program. This study supports the use of hands-on learning to develop clinical reasoning and critical thinking skills in healthcare students, who face ever more diverse patient populations upon entry-level practice. Further qualitative and quantitative investigations are needed to support the results of this study and determine which components of

experiential learning programs are essential for developing clinical reasoning and critical thinking skills in future allied health professionals.

PMID: 21184024 [PubMed - in process]

15. J Rehabil Res Dev. 2010;47(9):863-76.

Symptom burden in individuals with cerebral palsy.

Hirsh AT, Gallegos JC, Gertz KJ, Engel JM, Jensen MP.

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The current study sought to (1) determine the relative frequency and severity of eight symptoms in adults with cerebral palsy (CP), (2) examine the perceived course of these eight symptoms over time, and (3) determine the associations between the severity of these symptoms and psychosocial functioning. Eighty-three adults with CP completed a measure assessing the frequency, severity, and perceived course of eight symptoms (pain, weakness, fatigue, imbalance, numbness, memory loss, vision loss, and shortness of breath). Respondents also completed measures of community integration and psychological functioning. The results indicated that pain, fatigue, imbalance, and weakness were the most common and severe symptoms reported. All symptoms were reported to have either stayed the same or worsened, rather than resolved, over time. The symptoms were more closely related to social integration than to home integration, productive activity, or psychological functioning. Memory loss was a unique predictor of social integration in the multivariate context. This study highlighted several common and problematic symptoms experienced by adults with CP. Additional research is needed to identify the most effective treatments for those symptoms that affect community integration and psychological functioning as a way to improve the quality of life of individuals with CP.

PMID: 21174251 [PubMed - in process]

16. Otolaryngol Pol. 2010 Jun;64(7):22-6.

Auditory skills in multi-handicapped children with cochlear implants [Article in Polish]

Lachowska M, Rózycka J, Łukaszewicz Z, Konecka A, Niemczyk K.Katedra i Klinika Otolaryngologii Warszawskiego Uniwersytetu Medycznego. magdalena.lachowska@wum.edu.pl

AIM: The study aimed to assess the auditory skills in multi-handicapped children with cochlear implants. MATERIAL AND METHODS: The study assessed 34 children, who were implanted due to the bilateral profound sensorineural hearing loss. Apart from the hearing loss, all of the subjects suffered from additional impairments (mild motor disabilities, cerebral palsy, cognitive disability, specific learning disability, behavioral disorders, sight impairment), 29 (85.29%) from more than one. Cochlear implantation took place in the Department of Otolaryngology at the Medical University of Warsaw in Poland. The age at implantation ranged from 1.3 to 7.5 years old (mean 3.2 years, SD 1.64). The retrospective review of medical charts, audiology and speech pathology records was based on Champions profile with evaluation at 6, 12, 18-24 months, and 3 years after implantation. When a patient had been referred for developmental evaluation by psychologist, this source of information was also used. RESULTS: All of the subjects suffered from additional impairments, and most of them presented more than one additional disability. Individually and as a group, these patients respond well to cochlear implantation. The study population showed improvement in communication code in 31 patients (91.18%), and no improvement in 3 patients (two of them had 6 months follow up and one 12 months follow-up). Also progress in auditory skills was noted in the study population, which was measured as the awareness in environmental sounds--Categories of Auditory Performance (CAP). CONCLUSIONS: Multi-handicapped children receive benefit from cochlear implantation. The rate of this improvement is slow but offers better quality of life due to better auditory-communication skills, better self-independence and social integration. The results of implantation in presented group of patients is encouraging.

PMID: 21171306 [PubMed - in process]

17. Pediatr Phys Ther. 2010 Fall;22(3):336.

Pain assessment and management in children with neurologic impairment: a survey of pediatric physical therapists.

Bartels B, Helders PJ.

Faculty of Medicine, Division of Pediatrics, Utrecht University, Child Development and Exercise Center, University Children's Hospital and Medical Center, Utrecht, The Netherlands.

Comment on:

* Pediatr Phys Ther. 2010 Fall;22(3):330-5.

PMID: 20699787 [PubMed - indexed for MEDLINE]

18. Pediatr Phys Ther. 2010 Fall;22(3):330-5.

Pain assessment and management in children with neurologic impairment: a survey of pediatric physical therapists.

Swiggum M, Hamilton ML, Gleeson P, Roddey T, Mitchell K.

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Comment in:

* Pediatr Phys Ther. 2010 Fall;22(3):336.

PURPOSE: This study explored pain assessment measures and interventions used by physical therapists in the treatment of children with neurologic impairment. METHODS: Following extensive literature review on pain assessment and intervention, a survey was developed, pilot tested, and posted on the listserv of the Pediatric Section of the American Physical Therapy Association. RESULTS: Eighty percent of the respondents used subjective measures to assess pain, 70% used self-report scales, and 41% used behavioral and physiological measures. Behaviors frequently used included vocalizations, facial expression, and irritability. Rarely used cues included decreased attention, withdrawal, and changes in sleeping and eating behaviors. Therapists used research-supported pain interventions such as distraction and praise as well as potentially harmful distress producing measures such as procedural talk and reassurance. CONCLUSION: Further research is needed to determine the feasibility of using behavioral pain assessment measures during physical therapy sessions. Physical therapist continuing education regarding nonpharmaceutical pain interventions is indicated.

PMID: 20699786 [PubMed - indexed for MEDLINE]

19. Pediatr Phys Ther. 2010 Fall;22(3):321.

The gross motor function classification system: an update on impact and clinical utility.

Michaels MB, Bossola K.

School of Physical Therapy, Slippery Rock, University, Slippery Rock, Pennsylvania, USA.

Comment on:

* Pediatr Phys Ther. 2010 Fall;22(3):315-20.

PMID: 20699784 [PubMed - indexed for MEDLINE]

20. Rev Bras Fisioter. 2010 Oct;14(5):417-425.

Caracterization of adults with cerebral palsy. [Article in Portuguese]

Margre AL, Reis MG, Morais RL.

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BACKGROUND: Cerebral Palsy (CP) is a group of permanent disorders of the development of movement and posture that cause functional limitation and are attributed to non-progressive disorders which occur in the fetal or infant brain. In recent years, with the increase in life expectancy of individuals with CP, several studies have described the impact of musculoskeletal disabilities and functional limitations over the life cycle. OBJECTIVE: To characterize adults with CP through sociodemographic information, classifications, general health, associated conditions, physical complications and locomotion. METHODS: Twenty-two adults with CP recruited from local rehabilitation centers in an inner town of Brazil participated in this study. A questionnaire was used to collect data on sociodemographic characteristics, comorbities, and physical complications. A brief physical therapy evaluation was carried out, and the Gross Motor Function Classification System (GMFCS) and the Manual Ability Classification System (MACS) were applied. Data were analyzed through descriptive statistics. RESULTS: The mean age was 28.7 (SD 10.6) years, 86.4% of participants lived with parents, and 4.5% were employed. Most of the sample consisted of spastic quadriplegic subjects, corresponding to levels IV and V of the GMFCS and MACS. Different comorbidities and important physical complications such as scoliosis and muscle contractures were present. More than half of the participants were unable to walk. CONCLUSIONS: Most participants demonstrated important restrictions in social participation and lower educational level. Adults with CP can be affected by several physical complications and progressive limitations in gait.

PMID: 21180868 [PubMed - as supplied by publisher]

21. Rev Bras Fisioter. 2010 Oct;14(5):404-410.

Analysis of partial body weight support during treadmill and overground walking of children with cerebral palsy. [Article in Portuguese]

Matsuno VM, Camargo MR, Palma GC, Alveno D, Barela AM.

Laboratório de Análise do Movimento, Instituto de Ciências da Atividade Física e Esporte, Universidade Cruzeiro do Sul, São Paulo, SP, Brasil.

OBJECTIVE: To analyze the spatial-temporal characteristics and joint angles during overground walking without body weight support (BWS) and with 0% and 30% BWS, and during treadmill walking with the same BWS in children with cerebral palsy. METHODS: Six children with hemiplegic and spastic cerebral palsy (7.70 ± 1.04 years old) were videotaped during overground walking at a comfortable speed with no BWS, with 0% and 30% BWS, and during treadmill walking with 0% and 30% BWS. Reflective markers were placed over main bony landmarks in both body sides to register the coordinates "x", "y", "z". RESULTS: During overground walking, children walked faster and presented longer and faster strides, longer duration of single-stance and swing periods, and shorter duration of double-stance period, than treadmill walking, regardless of BWS use. The hip was the only joint that presented a difference between body sides and experimental conditions; i.e. range of motion (ROM) was reduced in the plegic side when compared to the nonplegic side, and during overground walking without BWS when compared to 30% BWS. CONCLUSION: Children with hemiplegic and spastic cerebral palsy were able to walk overground and on a treadmill with different percentages of BWS, and their performance was superior during overground walking, regardless of BWS use.

PMID: 21180866 [PubMed - as supplied by publisher]

23. Zhongguo Zhong Xi Yi Jie He Za Zhi. 2010 Sep;30(9):935-7.

Effects of mild warming moxibustion on acupoints Shenque (RN8) and Guanyuan (RN4) for prevention and treatment of recurrent respiratory tract infection in children with cerebral palsy [Article in Chinese]

Zhang HY, Lu SF, Xiao N.

Department of Rehabilitation, Children's Hospital of Chongqing Medical University, Chongqing.

OBJECTIVE: To investigate the clinical effect of mild warming moxibustion (MWM) on acupoints Shenque (RN8) and Guanyuan (RN4) for treatment of recurrent respiratory tract infection (RRTI) in children with cerebral palsy (CP). METHODS: Sixty-four CP patients with RRTI were randomly and equally assigned to two groups, all received conventional rehabilitation treatment, but in acute infection stage, MWM was applied on the treated group, and intravenous dripping of immunoglobulin was given to the control group, all for 3 months. The frequency of RRTI attacking (Fre), the mean cough alleviating time (T-CA) and rale disappearing time (T-RA) during infection, as well as the serum levels of immune globulins during the post-treatment 1-year follow-up period were observed. RESULTS: The effectiveness in the treated group was better than that in the control group, showing in aspects of Fre (2.38 +/- 0.64 times vs. 6.50 +/- 0.84 times), T-CA (3.92 +/- 1.32 days vs. 6.48 +/- 2.18 days) and T-RA (4.66 +/- 1.82 days vs. 7.64 +/- 1.44 days), significant difference was shown between groups ($P < 0.01$). The serum levels of IgG, IgM and IgA all raised in both two groups ($P < 0.05$), comparison of immunoglobulin levels between groups showed that they were lower immediately after treatment, but higher at the end of the 1-year follow-up in the treated group than those in the control group. CONCLUSION: MWM on acupoints Shengue and Guanyuan has a better and long-term clinical effect for treatment of RRTI in children with CP.

PMID: 21179732 [PubMed - in process]

24. Zhongguo Zhong Xi Yi Jie He Za Zhi. 2010 Sep;30(9):928-30.

Comparative research and follow-up study on treatment of spastic cerebral palsy with Jiaji (EX-B2) point needling [Article in Chinese]

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OBJECTIVE: To observe the clinical effects of Jiaji (EX-B2) needling for treatment of spastic cerebral palsy (SCP). METHODS: Sixty-two SCP patients were randomized into two groups, the treatment group treated by needling, and the control group treated by sham-acupuncture, once every day for 60 times totally. The clinical effect was assessed with scoring by the modified Ashworth's scale (MAS), gross motor function measuring scale (GMFM) and WeeFIM at the end of treatment (T1), half-year (T2) and 1-year (T3) after treatment. RESULTS: Clinical effectiveness assessment showed that MAS scores in the treatment group reduced significantly and steadily at all the time points ($P < 0.01$), while in the control group, it reduced significantly at T1 ($P < 0.01$), but raised again at T2 and T3 to higher than that in the treatment group ($P < 0.05$, $P < 0.01$), approaching the baseline level ($P > 0.05$). GMFM and WeeFIM scores increased in both groups at all the three assessing time points ($P < 0.01$), but the increments in the treatment group were higher than those in the control group respectively ($P < 0.01$, $P < 0.05$). CONCLUSION: Jiaji (EX-B2) needling could achieve good clinical therapeutic effects on SCP.

PMID: 21179730 [PubMed - in process]

25. Arch Phys Med Rehabil. 2011 Jan;92(1):146-60.

Psychosocial factors and adjustment to chronic pain in persons with physical disabilities: a systematic review.

Jensen MP, Moore MR, Bockow TB, Ehde DM, Engel JM.

Department of Rehabilitation Medicine, University of Washington School of Medicine, Seattle, WA.

OBJECTIVE: To systematically review the research findings regarding the associations between psychosocial factors and adjustment to chronic pain in persons with physical disabilities. DATA SOURCES: A key word literature search was conducted using articles listed in PubMed, PsychInfo, and CINAHL up to March 2010, and manual searches were made of all retrieved articles to identify published articles that met the review inclusion criteria. STUDY SELECTION: To be included in the review, articles needed to (1) be written in English, (2) include adults with a physical disability who report having pain, (3) include at least 1 measure of a psychosocial predictor domain, (4) include at least 1 criterion measure of pain or patient functioning, and (5) report the results of associations between the psychosocial factors and criterion measures used in the study. Twenty-nine studies met the inclusion criteria. DATA EXTRACTION: Three reviewers tabulated study details and findings. DATA SYNTHESIS: The disability groups studied included spinal cord injury (SCI), acquired amputation, cerebral palsy (CP), multiple sclerosis (MS), and muscular dystrophy (MD). Psychosocial factors were shown to be significantly associated with pain and dysfunction in all disability groups. The psychosocial factors most closely associated with pain and dysfunction across the samples included (1) catastrophizing cognitions; (2) task persistence, guarding, and resting coping responses; and (3) perceived social support and solicitous responding social factors. Pain-related beliefs were more strongly associated with pain and dysfunction in the SCI, CP, MS, and MD groups than in the acquired amputation group. CONCLUSIONS: The findings support the importance of psychosocial factors as significant predictors of pain and functioning in persons with physical disabilities. Clinical trials to test the efficacy of psychosocial treatments for pain and dysfunction are warranted, as are studies to determine whether psychosocial factors have a causal influence on pain and adjustment in these populations.

PMID: 21187217 [PubMed - in process]

26. Arch Phys Med Rehabil. 2011 Jan;92(1):46-50.

Reasons for hospital admissions among youth and young adults with cerebral palsy.

Young NL, McCormick AM, Gilbert T, Ayling-Campos A, Burke T, Fehlings D, Wedge J. School of Rural and Northern Health, Laurentian University, Sudbury, ON, Canada.

OBJECTIVE: To identify the most common reasons for acute care hospital admissions among youth (age range, 13-17.9y) and young adults (age range, 23-32.9y) with cerebral palsy (CP). DESIGN: We completed a secondary analysis of data from the Canadian Institute for Health Information (CIHI) to determine the most frequently observed reasons for admissions and the associated lengths of stay (LOS). SETTING: Participants were identified from 6 children's treatment centers in Ontario, Canada. PARTICIPANTS: Health records data from youth with CP (n=587) and young adults with CP (n=477) contributed to this study. INTERVENTIONS: Not applicable. MAIN OUTCOME MEASURES: The most common reasons for hospital admission, relative frequencies of admissions for each reason, and mean LOS were reported. RESULTS: The analysis of CIHI records identified epilepsy and pneumonia as the top 2 reasons for admissions in both age groups. Both age groups were commonly admitted because of infections other than pneumonia and urinary tract infections (UTIs), gastrointestinal (GI) problems such as malabsorption, and mental illness. The reasons that were unique to youth included orthopedic and joint-related issues, other respiratory problems, and scoliosis. In young adults, mental illness was the third most common reason for admission, followed by lower GI or constipation problems, malnutrition or dehydration, upper GI problems, fractures, and UTIs. CONCLUSIONS: This article provides important clinical information that can be used in the training of physicians and health care providers, and to guide future planning of ambulatory care services to support the clinical management of persons with CP over their lifespan.

PMID: 21187204 [PubMed - in process]

27. Disabil Rehabil Assist Technol. 2010 Dec 28. [Epub ahead of print]

Feasibility of three electronic instruments in studying the benefits of adaptive seating.

McDonald RL, Wilson GN, Molloy A, Franck LS.

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Purpose. This pilot study assesses the suitability of three electronic instruments for the potential to objectively and consistently measure the effectiveness of adaptive seating for children with neuromotor disorders such as cerebral palsy and muscular dystrophy. Method. A MiniMicroactigraph, an XSens accelerometer and an Xsensor pressure mapping system were assessed for their ability to measure change in five participants' stability, movement and posture when seating in a flat CAPS II chair and a contoured CAPS II chair. Results. The accelerometer and pressure mapping system showed a difference in amount of movement and body/seat interface between two contrasting seated surfaces on all children, demonstrating potential for use in future research. The results of the actigraph were inconclusive, but did highlight the importance of instrument placement for future studies that utilise this technology. Conclusion. The three instruments have potential suitability for use in future, more comprehensive studies of adaptive seating. It is recommended that future studies explore the additional features of these instruments for their potential to provide objective data regarding the effects of adaptive seating on children's postural alignment and support, pressure management, stability, functional ability and comfort.

PMID: 21189059 [PubMed - as supplied by publisher]

28. Gait Posture. 2010 Dec 27. [Epub ahead of print]

Botulinum toxin A injections do not improve surface EMG patterns during gait in children with cerebral palsy-A randomized controlled study.

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Children with cerebral palsy who walk with knee flexion during midstance are treated with intramuscular injections of botulinum toxin A (BTX-A) to prevent them from potential deterioration and to improve their mobility. The present study evaluates the effect of this treatment on the muscle activation patterns of the rectus femoris, medial hamstrings and gastrocnemius medialis during gait. Twenty-two children (aged 4-11 years) with cerebral palsy, who walked with knee flexion, were randomly assigned to an intervention group (multilevel BTX-A injections combined with comprehensive rehabilitation) or a control group (usual care). Sagittal and frontal video recordings were made of gait, together with simultaneous surface electromyography recordings of the rectus femoris, medial hamstring and gastrocnemius medialis muscles, before and six weeks after treatment. Abnormal muscle activation patterns were quantified, after gain-normalisation, according to the root mean square difference (RMSD), which is the difference relative to normal patterns. Six weeks after the treatment the RMSD of the gastrocnemius medialis muscles in the intervention group changed significantly, showing a deterioration ($p<0.05$). This study demonstrated that BTX-A injections do not result in an improvement in lower limb muscle activation patterns during gait. In spite of this lack of direct effect on muscle activation patterns, the combination of BTX-A injections and comprehensive rehabilitation was effective in improving gait kinematics.

PMID: 21190858 [PubMed - as supplied by publisher]

29. Gait Posture. 2010 Dec 23. [Epub ahead of print]

Association between isometric muscle strength and gait joint kinetics in adolescents and young adults with cerebral palsy.

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The purpose of this study was to determine the association between isometric muscle strength of the lower limbs and gait joint kinetics in adolescents and young adults with cerebral palsy (CP). Twenty-five participants (11 males) with bilateral spastic CP, aged 14-22 years (mean: 18.9, sd: 2.0yr) and Gross Motor Function Classification System (GMFCS) level II (n=19) and III (n=6) were tested. Hand held dynamometry was used to measure isometric strength (expressed in Nm/kg) of the hip, knee, and ankle muscles using standardized testing positions and procedures. 3D gait analysis was performed with a VICON system to calculate joint kinetics in the hip, knee and ankle during gait. Ankle peak moments exceeded by far the levels of isometric strength of the plantar flexors, while the knee and hip peak moments were just at or below maximal isometric strength of knee and hip muscles. Isometric muscle strength showed weak to moderate correlations with peak ankle and hip extension moment and power during walking. Despite considerable muscle weakness, joint moment curves were similar to norm values. Results suggest that passive stretch of the muscle-tendon complex of the triceps surae contributes to the ankle moment during walking and that muscle strength assessment may provide additional information to gait kinetics.

PMID: 21185726 [PubMed - as supplied by publisher]

30. Phys Occup Ther Pediatr. 2010 Dec 29. [Epub ahead of print]

"If I Knew Then What I Know Now": Parents' Reflections on Raising a Child with Cerebral Palsy.

Reid A, Imrie H, Brouwer E, Clutton S, Evans J, Russell D, Bartlett D.

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In this study we investigated experiences of parents of children with cerebral palsy (CP) to identify areas in which health care providers and educators could improve practice. A second objective was to create educational material for parents of young children newly diagnosed with CP. A purposive sample of nine parents, who previously participated in the Adolescent Study of Quality of Life, Mobility, and Exercise, was recruited through phone. During an interview, parents reflected on the experience of raising a child with CP from birth to young adulthood. These interviews were audiotaped, transcribed, and coded using the International Classification of Functioning, Disability and Health-informed model and analyzed to identify major themes. Parents elaborated upon what was helpful and what could be changed to improve their children's and families' experiences through supports, advocacy, and education at different levels. The results informed the development of tips for parents and children with CP to enhance their families' experiences and interactions with health care providers, educators, and others.

PMID: 21189101 [PubMed - as supplied by publisher]

31. Natl Med J India. 2010 Jul-Aug;23(4):222-3.

The challenge of cerebral palsy in India.

Alur M.

Able Disabled All People Together (formerly The Spastics Society of India), Opp. Afghan Church, Upper Colaba Road, Colaba, Mumbai 400005, Maharashtra.

PMID: 21192517 [PubMed - in process]

32. Odontostomatol Trop. 2010 Jun;33(130):5-9.

Caries experience and oral hygiene status of cerebral palsy children in Riyadh.

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The purpose of this study was to determine the caries experience and oral hygiene (OH) status of cerebral palsy (CP) children in Riyadh area. One hundred and forty CP children [82 (58.6%) males & 58 (41.4%) females] were examined for dental caries and OH status in dental clinic of the Disabled Children's Association Center, Riyadh. The children were divided into three age groups; first group 3-6 years old (41 children), second group 7-9 years old (52 children) and third group 10-12 years old (47 children). The mean DMFS (decayed, missing and filled surfaces) score for the first group was 18.8 (+/- 16.3), with the DS component of 10.9 (+/- 7.5), MS component of 3.7 (+/- 10.4) and FS component of 4.1 (+/- 8.9). For the second group the mean DMFS was 23.4 (+/- 17.7) with DS component of 15.4 (+/-12.1), MS component of 4.1 (+/-9.0) and FS component of 3.8 (+/- 8.5). The corresponding values for the third group were 20.5 (+/- 14.0), 12.4 (+/- 9.7), 5.1 (+/- 12.4) and 2.9 (+/- 5.5) respectively. There was no statistically significant difference ($p > 0.05$) in caries experience between the three age groups. Very few (5.7%) CP children were rated as having good OH. There was a strong association between poor oral hygiene status and high DMFS score. It can be concluded that the caries experience of CP children in Riyadh is very high, and that very few of these children have good oral hygiene.

PMID: 21188916 [PubMed - in process]

33. Building Brain–Machine Interfaces to Restore Neurological Functions.

Lebedev MA, Crist RE, Nicolelis MAL.

In: Nicolelis MAL, editor. Methods for Neural Ensemble Recordings. 2nd edition. Boca Raton (FL):

CRC Press; 2008. Chapter 11.

Frontiers in Neuroscience.

Excerpt: Modern research on brain–machine interfaces (BMI) is a highly multidisciplinary field that has been developing at a stunning pace since the first experiment conducted 8 years ago that demonstrated direct control of a robotic manipulator by ensembles of neurons recorded in cortical and subcortical areas in awake, behaving rats (Chapin, Moxon et al. 1999). Since this pioneering study, an exponentially growing stream of research publications has provoked an enormous interest in BMIs among scientists from different fields and the lay public. This level of interest stems from both the use of BMIs to investigate the way large and distributed neural circuits operate in behaving animals and the perceived potential that BMI technology can realize for restoration of motor behaviors and other functions in patients suffering from devastating neurological conditions. In theory, the group of patients that can benefit from BMI systems includes people who lost mobility as a consequence of neurodegenerative disorders, such as amyotrophic lateral sclerosis (ALS), severe trauma and irreversible spinal cord injuries, stroke, and cerebral palsy. As the risk–benefit factor of invasive BMIs improves, it is conceivable that the same technology may be accepted by patients with less severe degrees of body paralysis or even by amputees. Future BMI technologies will not be limited to systems for restoration of mobility. We expect that systems for restoration of speech and restoration of communication between brain areas will likely emerge. These future neuroprostheses are expected to be seamlessly integrated with the human body as much as possible and to use the most advanced developments in robotics, material science, computational algorithms, and electrical engineering. Notwithstanding these high expectations, much work has to be done to develop solutions for numerous issues that preclude an immediate translation of laboratory demonstrations into practical clinical applications. Most of BMI research has been conducted in monkeys and rats, and clinical trials in humans are only starting. In this chapter, we highlight the major obstacles faced by BMI research and lay out a roadmap that can transform experimental advances into clinical applications that will benefit millions of people worldwide in the next decade. This roadmap is based on a critical analysis of previous studies conducted in both experimental animals and human subjects. The milestones that we propose take into account the experience accumulated during the last 5 years by a multiuniversity consortium led by the Duke University Center for Neuroengineering.

PMID: 21204440 [PubMed]Books & Documents

34. Arch Pediatr. 2010 Dec 31. [Epub ahead of print]

Impact on parents of cerebral palsy in children: A literature review. [Article in French]

Guyard A, Fauconnier J, Mermet MA, Cans C.

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Cerebral palsy is the commonest cause of motor impairment in childhood. Parents of children with this particular neurodevelopmental disorder face many problems encountered by disabled children's parents. The aim of the present paper is to report the current knowledge on this parental impact, highlighting consensus and disagreement. A literature search was conducted using the key words "Cerebral palsy" and "Parents/Father/Mother" and "Adapt/Adjust/Cost/Economic/Impact/Well-being" in the Medline and PsycInfo databases searching for articles published between 1989 and 2009. Seven parental impact dimensions were distinguished: time spent, occupational restrictions, social relationships, family relationships, psychological well-being, physical health, and financial burden. Of 40 selected references, the studies were mostly cross-sectional, although longitudinal surveys highlighted the causal relationship between factors. Despite various methodologies, this review confirms that parents of CP children have greater risk of experiencing a sense of burden than parents of typically normally developing children. Time spent caring for the child appears to be an important factor that depends on the child's autonomy. The 7 impact dimensions seem to be related to each other and to child's and caregiver's characteristics. The severity of motor impairment is not unanimously viewed as a worsening factor: however, the child's behavioral problems influence the impact experienced by the parents. The level of intellectual impairment also has a negative influence on family relationships and on the parent's psychological well-being. The child's developmental stage seems to be related to the level of parental impact, but there is no agreement on the dimensions involved. We also observed that the mother and father do not experience this situation in the same way, probably because of the role played by each one in the family. The current literature lacks data on caregiver characteristics, identifying families at risk of burden, and the environmental context that would allow for a less negative impact on parents. In addition, the tools measuring the impact lack standardization. No questionnaire covering all 7 dimensions exists, but useful validated questionnaires for different dimensions were identified. We consider that the caregiver's occupation and physical health needs further research. The current knowledge is insufficient for proposing an overall model taking all the dimensions into account. Research is needed before a complete model of the CP child's impact on parents can be tested in view of providing guidelines to professionals for identifying families with a risk of maladaptation and suggesting solutions to decrease the negative impact.

PMID: 21196101 [PubMed - as supplied by publisher]

35. Chang Gung Med J. 2010 Nov-Dec;33(6):646-58.

A Preliminary Study of the Development, Validity, and Reliability of A Caregiver Questionnaire for the Health-related Quality of Life in Children with Cerebral Palsy.

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Background: In Taiwan, there is no disease-specific instrument to measure the health-related quality of life (HRQL) in children with cerebral palsy (CP). The goal of this preliminary study was to develop and test the validity and reliability of a caregiver questionnaire for HRQL in children with CP (CQ-HRQL-CP). Methods: The CQ-HRQL-CP included 4 dimensions, motor ability, pain and emotion, interaction and participation, and satisfaction and expectation. The questions were modified based on the content validity index (CVI). A purposive sampling of 45 parents of children with CP completed tests of the item discriminant validity and internal consistency.

Twenty of these parents were randomly recruited for further testing of the test-retest reliability. Results: The CVI of individual items and dimensions was 0.86~1. With regard to the item discriminant validity, items which correlated more strongly with other dimensions than with their own dimensions were deleted. The adjusted Cronbach's coefficient value was 0.87~0.99. The test-retest reliability, evaluated using an intraclass correlation coefficient (ICC(3,1)), was 0.86~0.99 for each dimension. Conclusions: The content validity, item discriminant validity, internal consistency, and test-retest reliability of this new CQ-HRQL-CP were acceptable. Further study of the concurrent validity of the CQ-HRQL-CP is needed.

PMID: 21199610 [PubMed - in process]

36. Disabil Rehabil. 2010 Dec 31. [Epub ahead of print]

Comparing the priorities of parents and young people with cerebral palsy.

Maggs J, Palisano R, Chiarello L, Orlin M, Chang HJ, Polansky M.

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Purpose. Adolescence is a period of change and transition that may pose unique challenges for young people with cerebral palsy (CP). We compared statements of priorities, i.e. what adolescents (13-17) and youth (18-21) and their parents would like to be able to do to enable greater activity and participation. Methods. Participants were 198 parents and 135 young people with CP (45% males) from seven Children's Hospitals in the United States. The interviews were structured using The Canadian Occupational Performance Measure. Priority statements were categorised as Adult Tasks, Biology, Self-Identity or Physical Activity. Results. All parents identified more priorities for Biology and Adult Tasks ($p<0.001$). Adolescents identified the fewest priorities for Self-Identity ($p<0.01$). Youth identified, in descending order of frequency, priorities in Adult Tasks, Biology, Self-Identity and Physical Activity ($p<0.05$). In the parent-young people dyads when disagreements occurred, Self-Identity issues were identified more often by parents ($p<0.05$) and priorities for Physical Activity were identified more often by young people ($p<0.01$). Conclusions. The shared and differing priorities of parents and young people with CP may reflect different roles, perceptions and experiences. The findings have implications for healthcare professionals, providing a framework to compare and contrast the priorities of young people and their parents.

PMID: 21192775 [PubMed - as supplied by publisher]

37. Gait Posture. 2010 Dec 31. [Epub ahead of print]

Upper limb kinematics: Development and reliability of a clinical protocol for children.

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

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

This study proposed a child-friendly measurement procedure for the three-dimensional analysis of upper limb movements, based on a comprehensive movement protocol. Within and between session reliability was tested in a group of 10 typically developing children (TDC) (mean age 10.3±3.2years). The movement protocol was constructed for children with hemiplegic cerebral palsy (HCP) and contained three reach tasks (forwards, upwards, sideways), three reach-to-grasp tasks (with objects requiring different hand orientations) and three gross motor tasks. Upper limb kinematics were calculated following the ISB-guidelines. Reliability of movement duration/speed and endpoint joint angles was assessed with the intraclass correlation coefficient; similarity of the waveforms with the coefficient of multiple correlation; measurement errors were also calculated. Reliability coefficients were generally high for movement duration/speed and most kinematic parameters. Endpoint angles for scapular tilting, shoulder elevation plane and elevation, elbow flexion-extension and wrist ulnar-radial deviation showed highest reliability. Angular waveforms were best repeated for scapular medio-lateral rotation and pro-retraction, shoulder elevation plane and elevation, and elbow flexion-extension. Results also seemed task-dependent. This study indicated that the proposed procedure could be used reliably to quantify upper limb movements in TDC. However, to compose proper age-related standards for the different tasks, larger study samples are needed. This will also help with a

well-founded task-selection depending on the joints of interest. Finally, further research will need to establish the reliability in children with HCP.

PMID: 21196120 [PubMed - as supplied by publisher]

38. Med Ultrason. 2010 Dec;12(4):306-10.

Sonoelastography contribution in cerebral palsy spasticity treatment assessment, preliminary report: A systematic review of the literature apropos of seven patients.

Vasilescu D, Vasilescu D, Dudea S, Botar-Jid C, Sfrângeu S, Cosma D.

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This paper aims to present our experience of 7 cases of spastic children, using sonoelastography in assessing the muscle spasticity: the relaxed muscle structures appear mostly soft (green-yellow-red), while contracted or degenerated muscle fibers appear hard (blue). Using sonoelastographic findings we established the proper place for injecting the botulinum toxin (20 U/kg Dysport) into the affected muscle. The result was a precise, guided injection, with positive, therapeutic results. It is important consider several factors that can influence the evolution of the case: gray scale ultrasound appearance of the muscle, the patient age, the dosage and the fractionation of toxin.

PMID: 21210016 [PubMed - in process]

39. Neuropediatrics. 2010 Oct;41(5):209-16. Epub 2011 Jan 5.

Effect of Selective Dorsal Rhizotomy on Gait in Children with Bilateral Spastic Paresis: Kinematic and EMG-Pattern Changes.

Grunt S, Henneman WJ, Bakker MJ, Harlaar J, van der Ouwerkerk WJ, van Schie P, Reeuwijk A, Becher JG, Vermeulen RJ.

Department of Rehabilitation Medicine, VU University Medical Center, Amsterdam, the Netherlands.

INTRODUCTION: Selective dorsal rhizotomy (SDR) is an effective treatment for reducing spasticity and improving gait in children with spastic cerebral palsy. Data concerning muscle activity changes after SDR treatment are limited. PATIENTS AND METHODS: In 30 children who underwent SDR a gait analysis was performed before and 12-24 months postoperatively. Subjects walked on a 10-m walkway at comfortable walking speed. Biplanar video was registered and surface EMG was recorded. Sagittal knee angles were measured from video and observational gait assessments were performed using the Edinburgh gait assessment scale (EGAS). RESULTS: The EGAS significantly improved after SDR ($p<0.001$). There were significant improvements of the knee angle kinematics ($p<0.001$). Only slight changes in EMG activity were observed. The activity of the m. gastrocnemius (GM) decreased and a late peak appeared in stance, the activity of the m. semitendinosus (ST) increased in stance. The activity of the m. rectus femoris (RF) decreased in swing. CONCLUSION: SDR improved overall gait performance but EMG changes were only slight. Better timing of the GM in stance and reduced activity of RF in swing may have increased knee flexion in swing. Reduced hamstrings spasticity may have led to postural instability in the hip.

PMID: 21210336 [PubMed - in process]

Epidemiology / Aetiology / Diagnosis & Early Treatment

40. F1000 Med Rep. 2010 Nov 11;2:78.

The use of antenatal magnesium sulfate for neuroprotection for infants born prematurely.

Heyborne K, Bowes WA.

Cerebral palsy occurs in three to four infants per 1000 live births. Preterm birth prior to 34 weeks' gestation is a major risk factor. Five randomized controlled trials of antenatal magnesium sulfate (MgSO(4)) found a trend of reduced risk of cerebral palsy and mortality in preterm infants. Three meta-analyses using the data from the five randomized controlled trials, which included a total of 5235 prospectively evaluated fetuses, found that MgSO(4) given to women at risk of premature birth significantly reduced the risk of cerebral palsy by 30% without increasing the risk of perinatal or infant death. The implication for clinical practice is that MgSO(4) should be considered for use in patients at high risk of delivery before 34 weeks' gestation.

PMID: 21170373 [PubMed - in process]PMCID: PMC2998849Free PMC Article

41. J Perinatol. 2010 Dec 23. [Epub ahead of print]

Migraine and preterm birth.

Blair EM, Nelson KB.

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Objective: To investigate whether maternal migraine was associated with preterm birth. Study Design: Case-control sample within a population-based study of risk factors for cerebral palsy (CP). Infants without CP were matched for gestational age with those with CP. Maternal migraine was self-identified at first prenatal visit, most in the first trimester. Result: Infants without CP born to women with migraine had a higher rate of preterm birth (odds ratio (OR) =3.5, 95% confidence interval (CI) 1.5, 8.5), as did infants who died in the perinatal period (OR=7.3, 95% CI 0.98, 54), the difference marginal for nominal statistical significance. In all outcome groups, infants of women with migraine had a higher observed rate of suboptimal intrauterine growth. In term infants, the rate of maternal migraine was higher in those with CP than in controls (OR=2.18, 95% CI 0.92, 5.25). Pre-eclampsia was reported more frequently in women with migraine who gave birth to a child with CP or a perinatal death, particularly in those born preterm; OR=5.1 (1.3, 20) and OR=2.9 (1.1, 7.6), respectively, but not in women giving birth to a control whether term or preterm. Conclusion: Maternal migraine, as self-reported early in pregnancy, was associated with preterm birth in survivors without CP and in infants who died in the perinatal period. The combination of maternal migraine and pre-eclampsia was associated with CP and perinatal death. The association of maternal migraine with outcomes of pregnancy warrants further study.

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PMID: 21183924 [PubMed - as supplied by publisher]

42. Neurosci Lett. 2010 Dec 22. [Epub ahead of print]

Neuromagnetic activity in the somatosensory cortices of children with cerebral palsy.

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Children with cerebral palsy (CP) have altered tactile, proprioceptive and kinesthetic awareness. These sensory

impairments appear to be related to an aberrant organization of the somatosensory cortex. To date, the neuromagnetic responses of somatosensory cortices representing the foot have not been investigated in children with spastic diplegic CP. In this investigation, we used magnetoencephalography (MEG) to evaluate cortical differences in the earliest somatosensory responses elicited by foot stimulation in typically developing children and those with spastic diplegic CP who have a Gross Motor Function Classification Score of III-IV. All participants underwent unilateral tibial nerve stimulation of each foot as whole brain MEG data were acquired. Primary somatosensory cortical responses were modeled using an equivalent current dipole for each foot. The results presented in this study are the first to show that activation of the somatosensory cortices representing the foot in children with spastic diplegic CP is diminished, but not latent.

PMID: 21184811 [PubMed - as supplied by publisher]

43. Pediatrics. 2011 Jan;127(1):62-70. Epub 2010 Dec 27.

Early-Childhood Neurodevelopmental Outcomes Are Not Improving for Infants Born at <25 Weeks'

Gestational Age.

Hintz SR, Kendrick DE, Wilson-Costello DE, Das A, Bell EF, Vohr BR, Higgins RD; for the NICHD Neonatal Research Network.

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OBJECTIVE: We compared neurodevelopmental outcomes at 18 to 22 months' corrected age of infants born with extremely low birth weight at an estimated gestational age of <25 weeks during 2 periods: 1999-2001 (epoch 1) and 2002-2004 (epoch 2). PATIENTS AND METHODS: We conducted a multicenter, retrospective analysis of the Eunice Kennedy Shriver National Institute of Child Health and Human Development Neonatal Research Network. Perinatal and neonatal variables and outcomes were compared between epochs. Neurodevelopmental outcomes at 18 to 22 months' corrected age were evaluated with neurologic exams and Bayley Scales of Infant Development II. Logistic regression analyses determined the independent risk of epoch for adverse outcomes. RESULTS: Infant survival was similar between epochs (epoch 1, 35.4%, vs epoch 2, 32.3%; P = .09). A total of 411 of 452 surviving infants in epoch 1 and 405 of 438 surviving infants in epoch 2 were evaluated at 18 to 22 months' corrected age. Cesarean delivery (P = .03), surgery for patent ductus arteriosus (P = .004), and late sepsis (P = .01) were more common in epoch 2, but postnatal steroid use was dramatically reduced (63.5% vs 32.8%; P < .0001). Adverse outcomes at 18 to 22 months' corrected age were common in both epochs. Moderate-to-severe cerebral palsy was diagnosed in 11.1% of surviving infants in epoch 1 and 14.9% in epoch 2 (adjusted odds ratio [OR]: 1.52 [95% confidence interval (CI): 0.86-2.71]; P = .15), the Mental Developmental Index was <70 in 44.9% in epoch 1 and 51% in epoch 2 (OR: 1.30 [95% CI: 0.91-1.87]; P = .15), and neurodevelopmental impairment was diagnosed in 50.1% of surviving infants in epoch 1 and 58.7% in epoch 2 (OR: 1.4 [95% CI: 0.98-2.04]; P = .07). CONCLUSIONS: Early-childhood outcomes for infants born at <25 weeks' estimated gestational age were unchanged between the 2 periods.

PMID: 21187312 [PubMed - as supplied by publisher]

44. Korean J Pediatr. 2010 Jun;53(6):694-700. Epub 2010 Jun 23.

Effect of severe neonatal morbidities on long term outcome in extremely low birthweight infants.

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PURPOSE: To assess the validity of individual and combined prognostic effects of severe bronchopulmonary dysplasia (BPD), brain injury, retinopathy of prematurity (ROP), and parenteral nutrition associated cholestasis (PNAC). METHODS: We retrospectively analyzed the medical records of 80 extremely low birthweight (ELBW) in-

fants admitted to the neonatal intensive care unit (NICU) of the Severance Children's Hospital, and who survived to a postmenstrual age of 36 weeks. We analyzed the relationship between 4 neonatal morbidities (severe BPD, severe brain injury, severe ROP, and severe PNAC) and poor outcome. Poor outcome indicated death after a postmenstrual age of 36 weeks or survival with neurosensory impairment (cerebral palsy, delayed development, hearing loss, or blindness) between 18 and 24 months of corrected age. RESULTS: Each neonatal morbidity correlated with poor outcome on univariate analysis. Multiple logistic regression analysis revealed that the odds ratios (OR) were 4.9 (95% confidence interval [CI], 1.0-22.6; P=0.044) for severe BPD, 13.2 (3.0-57.3; P<.001) for severe brain injury, 5.3 (1.6-18.1; P=0.007) for severe ROP, and 3.4 (0.5-22.7; P=0.215) for severe PNAC. Severe BPD, brain injury, and ROP were significantly correlated with poor outcome, but not severe PNAC. By increasing the morbidity count, the rate of poor outcome was significantly increased (OR 5.2; 95% CI, 2.2-11.9; P<.001). In infants free of the above-mentioned morbidities, the rate of poor outcome was 9%, while the corresponding rates in infants with 1, 2, and more than 3 neonatal morbidities were 46%, 69%, and 100%, respectively. CONCLUSION: In ELBW infants 3 common neonatal mornidifies, severe BPD, brain injury and ROP, strongly predicts the risk of poor outcome.

PMID: 21189940 [PubMed - in process]

45. Rev Fac Cien Med Univ Nac Cordoba. 2010 Mar;67(1):15-23.

Efficacy and securyty of therapeutic hypothermia for hypoxic ischemic encephalopathy: a meta-analysis. [Article in Spanish]

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Background: Animal and human experimental models suggest that therapeutic hypothermia could reduce neurological disabilities in asphyxiated newborn without adverse events. The objective of this study was review the effectiveness and safety of hypothermia as treatment for hypoxic ischemic encephalophaty. Methods: MEDLINE, COCHRANE LIBRARY, Academic Google and LILACS databases were searched. Randomized controlled trials with main outcomes of death, neurodevelopmental disability and adverse events were eligible for inclusion in the meta-analysis. Results: Tree studies were included with 751 patients. Combined results of death reduction was not significant (RR 0.83 CI95% 0.67 to 1.04). Severe to moderate neurodevelopmental disability (RR 0.70 CI95% 0.55 to 0.89) and cerebral palsy (RR 0.66 CI95% 0.50 to 0.89) were reduced significantly in newborns receiving hypothermia compared with controls. Cardiac arrhythmias (RR 3.51 CI95% 1.29 to 9.54) and coagulation disorders (RR 1,23 CI95% 1.03 a 1.48) were more common adverse events with hypothermia. Conclusions: Hypothermia is effective in reducing neurological disability and cerebral palsy. Cardiac arrhythmias and coagulation disorders were more common with hypothermia, however they were clinically benign.

PMID: 21192128 [PubMed - as supplied by publisher]

46. BJOG. 2011 Jan;118(1):1-5. doi: 10.1111/j.1471-0528.2010.02782.x.

Antenatal magnesium sulphate may prevent cerebral palsy in preterm infants--but are we convinced? Evaluation of an apparently conclusive meta-analysis with trial sequential analysis.

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PMID: 21197681 [PubMed - in process]

47. Brain. 2010 Dec;133(Pt 12):3552-63. Epub 2010 Nov 19.

Humans use internal models to construct and update a sense of verticality.

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Internal models serve sensory processing, sensorimotor integration and motor control. They could be a way to construct and update a sense of verticality, by combining vestibular and somatosensory graviception. We tested this hypothesis by investigating self-orientation relative to gravity in 39 normal subjects and in subjects with various somatosensory losses showing either a complete deafferentation of trunk and lower limbs (14 paraplegic patients after complete traumatic spinal cord injury) or a gradient in the degree of a hemibody sensory loss (23 hemiplegic patients after stroke). We asked subjects to estimate, in the dark, the direction of the Earth vertical in two postural conditions-upright and at lateral whole body tilt. For upright conditions, verticality estimates were not different from the direction of the Earth vertical in normal (0.24° ± 1; P = 0.42) and paraplegic subjects (0.87° ± 0.9; P = 0.14). The within-subject variability was much greater in hemiplegic than in normal subjects (2.05° ± 1.15 versus 1.06° ± 0.4; P < 0.01) and greater in paraplegic than in normal subjects (1.13° ± 0.4 versus 0.72° ± 0.4; P < 0.01). These findings indicate that, even if vestibular graviception is intact, somaesthetic graviception contributes to the sense of verticality, leading to a more robust judgement about the direction of verticality when vestibular and somaesthetic graviception yield congruent information. As expected, when normal subjects were tilted, their verticality estimates were biased in the direction of the body tilt (5.55° ± 3.9). This normal modulation of verticality perception (Aubert effect), was preserved in hemiplegics on the side of the normoaesthetic hemibody (ipsilesional) (6.09° ± 6.3), and abolished both in paraplegics (1.06° ± 2.5) and in hemiplegics (0.04° ± 6.7) on the side of hypoaesthetic hemibody (contralesional). This incongruence did not exist in deafferented paraplegics who exclusively used vestibular graviception with a similar efficacy no matter what the lateral body position. The Aubert effect was not an on-off phenomenon since the degree of hemiplegics' somatosensory loss correlated with the modulation of verticality perception when they were tilted to the side of hypoaesthetic hemibody (r = -0.55; P < 0.01). The analysis of anatomical correlates showed that the Aubert effect required the integrity of the posterolateral thalamus. This study reveals the existence of a synthesis of vestibular and somaesthetic graviception for which the posterolateral thalamus plays a major role. This corresponds to a primary property of internal models and yields the neural bases of the Aubert effect. We conclude that humans construct and update internal models of verticality in which somatosensory information plays an important role.

PMID: 21097492 [PubMed - indexed for MEDLINE]

48. Brain Dev. 2010 Dec 29. [Epub ahead of print]

Profile of developmental delay in children under five years of age in a highly consanguineous community: A hospital-based study - Jordan.

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AIM: To assess etiologies and risk factors for global developmental delay (GDD) in children. PATIENTS AND METHODS: Between January 2006 and 2007, a retrospective study was carried out at the Child Neurology Clinic of Jordan University Hospital on all 229 children under five years of age presenting with GDD. To assess risk factors for GDD, 229 age-matched healthy children were included as controls. RESULTS: A definite etiology for GDD could be determined in 102 (44.5%) patients, while 127 (55.5%) patients remained undiagnosed .The most common category for the GDD was cerebral palsy (CP) seen in 72 patients (31.4%), of which the underlying etiology was determined in 50 patients (69.5%). The second most common category was metabolic disorders where a definite metabolic cause was reached in 15 (6.5%) patients and a possible metabolic cause was suspected in 16 (6.9%) cases. Other etiologies included other monogenic disorders in 12 (5.2%) patients, brain malformations in 7 (3.0%) patients, chromosomal abnormalities in 6 (2.6%) patients, and autism in 12 (5.2%) patients. History of perinatal complications and consanguinity were major risk factors (p<0.05). CONCLUSION: To our knowledge this is the first and largest study on GDD in a highly consanguineous Arab population. Cerebral palsy and metabolic disorders

were the most common causes of GDD in Jordan, while perinatal complications and consanguinity were the major risk factors contributing to GDD.

PMID: 21194858 [PubMed - as supplied by publisher]

49. Dev Med Child Neurol. 2011 Jan;53(1):10-1. doi: 10.1111/j.1469-8749.2010.03803.x.

Prevalence of speech and communication disorders in children with CP.

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Comment on:

Dev Med Child Neurol. 2011 Jan;53(1):74-80.

PMID: 21171218 [PubMed - indexed for MEDLINE]

50. Front Neurol. 2010 Nov 30;1:150.

Neural evidence for compromised motor imagery in right hemiparetic cerebral palsy.

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In the present event-related potential (ERP) study we investigated the neural and temporal dynamics of motor imagery in participants with right-sided hemiparetic cerebral palsy (HCP; n=10) and in left-handed control participants (n=10). A mental rotation task was used in which participants were required to judge the laterality of hand pictures. At a behavioral level participants with HCP were slower in making hand laterality judgments compared to control subjects, especially when presented with pictures representing the affected hand. At a neural level, individuals with HCP were characterized by a reduced rotation-related negativity (RRN) over parietal areas, that was delayed in onset with respect to control participants. Interestingly, participants that were relatively mildly impaired showed a stronger RRN for the rotation of right-hand stimuli than participants that were more strongly impaired in their motor function, suggesting a direct relation between the motor imagery process and the biomechanical constraints of the participant. Together, the results provide new insights in the relation between motor imagery and motor capabilities and indicate that participants with HCP may be characterized by a compromised ability to use motor imagery.

PMID: 21206766 [PubMed - in process]

51. J Biomed Biotechnol. 2011;2011:609813. Epub 2010 Dec 13.

Perinatal hypoxic-ischemic encephalopathy.

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Perinatal hypoxic-ischemic encephalopathy (HIE) is an important cause of brain injury in the newborn and can result in long-term devastating consequences. Perinatal hypoxia is a vital cause of long-term neurologic complications varying from mild behavioural deficits to severe seizure, mental retardation, and/or cerebral palsy in the newborn. In the mammalian developing brain, ongoing research into pathophysiological mechanism of neuronal injury and therapeutic strategy after perinatal hypoxia is still limited. With the advent of promising therapy of hypothermia in

HIE, this paper reviews the pathophysiology of HIE and the future potential neuroprotective strategies for clinical potential for hypoxia sufferers.

PMID: 21197402 [PubMed - in process]PMCID: PMC3010686

52. J Child Neurol. 2010 Dec 30. [Epub ahead of print]

Lame From Birth: Early Concepts of Cerebral Palsy.

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Deformations have been attributed to supernatural causes since antiquity. Cerebral palsy was associated with God's wrath, witchcraft, the evil eye, or maternal imagination. Greek scholars recommended prevention by tight swaddling, a custom that persisted into modern times. In the Middle Ages, the midwife's negligence was held responsible as was difficult teething. Morgagni described in 1769 that the neonatal brain can liquefy, and Bednar described leukomalacia in 1850 as a distinct disorder of the newborn. In 1861, Little associated cerebral palsies with difficult or protracted labor and neonatal asphyxia, but he was challenged by Freud, who in 1897 declared that most cases are prenatal in origin. In 1868, Virchow demonstrated inflammatory changes, a view recently confirmed by Leviton and Nelson. Although a causal relationship of cerebral palsy to the birth never has been established, the habit to put the blame for cerebral palsy on someone remained a frequent attitude.

PMID: 21193777 [PubMed - as supplied by publisher]

53. J Neurosurg Pediatr. 2011 Jan;7(1):52-63.

Posterior fossa craniotomy for trapped fourth ventricle in shunt-treated hydrocephalic children: long-term outcome.

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Objective: Trapped fourth ventricle (TFV) is a rare late complication of postinfectious or posthemorrhagic hydrocephalus. This entity is distinct from a large fourth ventricle because TFV entails pressure in the fourth ventricle and posterior fossa due to abnormal inflow and outflow of CSF, causing significant symptoms and signs. As TFV is mostly found in children who were born prematurely and have cerebral palsy, diagnosis and treatment options are a true challenge. Methods Between February 1998 and February 2007, 12 children were treated for TFV in Dana Children's Hospital by posterior fossa craniotomy/craniectomy and opening of the TFV into the spinal subarachnoid space. The authors performed a retrospective analysis of relevant data, including pre- and postoperative clinical characteristics, surgical management, and outcome. Results Thirteen fenestrations of trapped fourth ventricles (FTFVs) were performed in 12 patients. In 6 patients with prominent arachnoid thickening, a stent was left from the opened fourth ventricle into the spinal subarachnoid space. One patient underwent a second FTFV 21 months after the initial procedure. No perioperative complications were encountered. All 12 patients (100%) showed clinical improvement after FTFV. Radiological improvement was seen in only 9 (75%) of the 12 cases. The follow-up period ranged from 2 to 9.5 years (mean 6.11 ± 2.3 years) after FTFV. Conclusions Fenestration of a TFV via craniotomy is a safe and effective option with a very good long-term outcome and low rate of morbidity.

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54. Pediatr Pulmonol. 2010 Dec 30. [Epub ahead of print]

Low birth weight and respiratory hospitalizations in adolescence.

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OBJECTIVE: Some low birth weight survivors are at increased risk of respiratory disease. We studied whether low birth weight was associated with hospitalization for respiratory illness in adolescence and to what degree bronchopulmonary dysplasia, cerebral palsy, and other comorbidities accounted for this association. METHODS: We performed a population-based retrospective cohort study using Washington State birth certificates from 1987 to 1994 to identify exposed (low birth weight) and unexposed (normal birth weight) subjects. Normal birth weight subjects were randomly selected from birth certificates, frequency matched to low birth weight subjects by birth year. Deaths prior to age 12 were excluded. The primary exposure was low birth weight: subcategorized as moderately-low-birth weight (1,500-2,499 g) and very-low-birth weight (<1,500 g). The primary outcome was the first respiratory related hospitalization between the ages of 12-20. Respiratory hospitalizations were defined by ICD-9 discharge diagnosis codes. RESULTS: After adjustment, the hazard ratio for hospitalization was 1.39 for moderately-low-birth weight (95% CI 1.17-1.65, P<0.001) and 2.52 for very-low-birth weight (1.80-3.53, P<0.001). Controlling for bronchopulmonary dysplasia attenuated the risk for very-low-birth weight to 1.76 (1.17-2.64; P=0.006). A similar attenuation was seen after controlling for cerebral palsy [HR 1.49 (1.02-2.18), P=0.04], suggesting that some of the risk is mediated through these diagnoses. Among moderately-low-birth weight survivors, controlling for these diagnoses had less of an effect. CONCLUSIONS: Low birth weight was associated with an increased risk of respiratory hospitalizations in adolescence. Comorbidities explained some of this risk. However, low birth weight remained independently associated with an increased risk of hospitalization.

PMID: 21194168 [PubMed - as supplied by publisher]

55. Zhongguo Dang Dai Er Ke Za Zhi. 2010 Dec;12(12):933-935.

Clinical analysis of 322 cases of non-epileptic cerebral palsy. [Article in Chinese]

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OBJECTIVE: To study the clinical features of non-epileptic seizures associated with cerebral palsy (CP) in children. METHODS: A total of 1 198 children with CP (age: 9 months to 6 years) were enrolled. The children with paroxysmal events were monitored by 24 hrs video-EEG (VEEG) to make sure the seizures were epileptic or non-epileptic. The symptoms, age, CP types and EEG features were observed in children with non-epileptic CP. RESULTS: Five hundred and seventy-eight children (48.24%) presented paroxysmal events. The seizures were epileptic in 231 children (19.28%) and non-epileptic in 322 cases (26.88%). In the 322 cases of non-epileptic CP, the paroxysmal events were of various kinds, including non-epileptic seizure tonic, seizure shake head, shrug shoulder or head hypsokinesis, cry or scream, panic attacks, sleep myoclonic and stereotyped movement. One hundred and fifty-eight (49.1%) out of the 322 children demonstrated nonspecific EEG abnormalities. One hundred and eleven children (34.5%) were misdiagnosed as epilepsy in primary hospitals. The CP children less than one year old showed higher frequency of non-epileptic seizures than the age groups over 1 year and 3 to 6 years. The frequency of non-epileptic seizures was the highest in children with spastic CP (168 cases, 52.2%), followed by dyskinetic CP (69 cases, 21.4%) and mixed type CP (65 cases, 20.2%). CONCLUSIONS: The paroxysmal events in children with CP partially are non-epileptic seizures and it is important to differentiate non-epileptic from epileptic seizures. The frequencies of non-epileptic seizures may be associated with a child's age and CP type.

PMID: 21172125 [PubMed - as supplied by publisher]