



Monday 4 July 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".

To subscribe, please complete the online form at www.cpresearch.org/subscribe/researchnews. You can bookmark this form on the home screen of your smart phone and also email the link to a friend.

To unsubscribe, please email Robyn Cummins rcummins@cerebralpalsy.org.au with 'Unsubscribe to CP Research News' in the subject line, and your name and email address in the body of the email.

Interventions

1. *Dev Med Child Neurol.* 2011 Jun 29. doi: 10.1111/j.1469-8749.2011.03995.x. [Epub ahead of print]

The influence of age at single-event multilevel surgery on outcome in children with cerebral palsy who walk with flexed knee gait.

Svehlík M, Steinwender G, Kraus T, Saraph V, Lehmann T, Linhart WE, Zwick EB.

Paediatric Orthopaedic Unit, Department of Paediatric Surgery, Medical University of Graz, Graz, Austria. Orthopaedic and Traumatology Department for Children and Adults, Charles University, Prague, Czech Republic. Institute of Medical Statistics, Computer Sciences and Documentation, Jena University Hospital, Jena, Germany.

Aim: Information on the timing and long-term outcome of single-event multilevel surgery in children with bilateral spastic cerebral palsy (CP) walking with flexed knee gait is limited. Based on our clinical experience, we hypothesized that older children with bilateral spastic CP would benefit more from single-event multilevel surgery than younger children. Moreover, any improvement in older children could be maintained with fewer additional surgery events. **Method:** We performed a retrospective analysis of the long-term outcomes of single-event multilevel surgery. Thirty-two children (17 males, 15 females) who had received single-event multilevel surgery between 1995 and 2000 with a mean age at the time of surgery of 10 years 6 months (range 5y 8mo-15y 6mo; SD 3y 1mo) and in Gross Motor Function Classification System level II (n=12) or III (n=20) were included in the study. The inclusion criteria required that all children were ambulatory with spastic bilateral CP, had a flexed knee gait, had a full set of data for single-event multilevel surgery preoperatively and at 1 year and 10 years postoperatively, had not had previous surgery on their lower limbs, had not had any treatment with botulinum toxin A before gait assessment, and had not received intrathecal baclofen medication. The follow-up time lasted for over 10 years until the participants reached adulthood (mean age at the last follow-up 21 years 4 months, SD 3y 4mo). Data were collected on six separate occasions: preoperatively, at 1 year, at 2 to 3 years, at 5 years, at 7 to 8 years, and at 10 or more years postoperatively. The primary outcome was the Gait Deviation Index, and the secondary outcomes were the number and type of initial and additional surgeries. A linear mixed model and Spearman's rank correlation coefficient were used to prove the hypothesis. **Results:** The older the child was at the time of the surgery, the better the long-term result ((Age,Time) =0.15; p=0.03). We did not find any correlation between age at the time of surgery and the number of bony or soft-tissue procedures performed initially as well as during the 10 years of follow-up. **Interpretation:** Children with CP who require single-event multilevel surgery at an older age fare better in the long term than those who are younger at the time of surgery. The pubertal growth spurt is discussed as a contributing factor to gait deterioration.

© The Authors. *Developmental Medicine & Child Neurology* © 2011 Mac Keith Press.

PMID: 21711455 [PubMed - as supplied by publisher]

2. Dev Med Child Neurol. 2011 Jun 27. doi: 10.1111/j.1469-8749.2011.04038.x. [Epub ahead of print]

The influence of age on timing of single-event multilevel surgery: are adolescents with cerebral palsy comparable to a younger cohort?

Hoffinger S.

Department of Pediatric Orthopaedics, Children's Hospital and Research Center Oakland, Oakland, CA, USA.

PMID: 21707609 [PubMed - as supplied by publisher]

3. J Neurosurg Pediatr. 2011 May;7(5):557-62.

Short- and long-term effects of selective dorsal rhizotomy on gross motor function in ambulatory children with spastic diplegia.

van Schie PE, Schothorst M, Dallmeijer AJ, Vermeulen RJ, van Ouwkerk WJ, Strijers RL, Becher JG. Department of Rehabilitation Medicine, VU University Medical Center, Amsterdam, The Netherlands. pem.vanschie@vumc.nl

OBJECT: The primary aim of this prospective cohort study was to evaluate the short-term (1 year) and long-term (mean 6 years) effects of selective dorsal rhizotomy (SDR) on gross motor function and spasticity in ambulatory children with spastic diplegia. Secondary aims were to investigate side effects, additional treatment during follow-up (botulinum toxin type A injections or orthopedic surgery), and parental satisfaction. **METHODS:** Thirty-three children who had undergone SDR at a mean age of 6 years and 7 months (± 2 years) were included. There were 7 children at Gross Motor Function Classification System (GMFCS) Level I, 7 at Level II, and 19 at Level III. Gross motor function was assessed with the Gross Motor Function Measure-66 (GMFM-66). Spasticity was measured according to a modified Tardieu scale. Side effects, additional treatment, and parental satisfaction were recorded using a parental questionnaire and medical records. **RESULTS:** At 1-year follow-up, mean GMFM-66 scores improved significantly by 4.3 ± 4.1 points. Children at GMFCS Levels I and II showed significantly more improvement (7.2 points) on the GMFM-66 compared with children at GMFCS Level III (2.9 points). On long-term follow-up (mean 6 years ± 22 months), mean GMFM-66 scores improved significantly by 6.5 ± 5.9 points, without a difference between children at GMFCS Levels I and II and Level III. No relapse of spasticity was noted. Ten children (30%) needed orthopedic surgery and 13 children (39%) received botulinum toxin type A treatment after SDR. Twenty (91%) of the 22 parents who answered the questionnaire at long-term follow-up believed that their child's functioning had improved after SDR. **CONCLUSIONS:** Selective dorsal rhizotomy resulted in short- and long-term improvements in gross motor function, without relapse of spasticity. However, the majority of the children still needed additional surgery or botulinum toxin A treatment.

PMID: 21529199 [PubMed - indexed for MEDLINE]

4. BMC Neurol. 2011 Jun 28;11(1):80. [Epub ahead of print]

Upper Limb Children Action-Observation Training (UP-CAT): a randomised controlled trial in hemiplegic cerebral palsy.

Sgandurra G, Ferrari A, Cossu G, Guzzetta A, Biagi L, Tosetti M, Fogassi L, Cioni G.

BACKGROUND: Rehabilitation for children with hemiplegic cerebral palsy (HCP) aimed to improve function of the impaired upper limb (UL) uses a wide range of intervention programs. A new rehabilitative approach, called Action-Observation Therapy, based on the recent discovery of mirror neurons, has been used in adult stroke but not in children. The purpose of the present study is to design a randomised controlled trial (RCT) for evaluating the efficacy of Action-Observation Therapy in improving UL activity in children with HCP. **METHODS:** The trial is designed according to CONSORT Statement. It is a randomised, evaluator-blinded, match-pair group trial. Children with HCP will be randomised within pairs to either experimental or control group. The experimental group will perform an Action-Observation Therapy, called UP-CAT (Upper Limb-Children Action-Observation Training) in which they will watch video sequences showing goal-directed actions, chosen according to children UL functional level, combined with motor training with their hemiplegic UL. The control group will perform the same tailored actions after watching

computer games. A careful revision of psychometric properties of UL outcome measures for children with hemiplegia was performed. Assisting Hand Assessment was chosen as primary measure and, based on its calculation power, a sample size of 12 matched pairs was established. Moreover, Melbourne and ABILHAND-Kids were included as secondary measures. The time line of assessments will be T0 (in the week preceding the onset of the treatment), T1 and T2 (in the week after the end of the treatment and 8 weeks later, respectively). A further assessment will be performed at T3 (24 weeks after T1), to evaluate the retention of effects. In a subgroup of children enrolled in both groups functional Magnetic Resonance Imaging, exploring the mirror system and sensory-motor function, will be performed at T0, T1 and T2. **DISCUSSION:** The paper aims to describe the methodology of a RCT for evaluating the efficacy of Action-Observation Therapy in improving UL activity in children with hemiplegia. This study will be the first to test this new type of treatment in childhood. The paper presents the theoretical background, study hypotheses, outcome measures and trial methodology. Trial Registration: NCT01016496.

PMID: 21711525 [PubMed - as supplied by publisher]

5. Biomed Eng Online. 2011 Jun 28;10(1):57. [Epub ahead of print]

Development and mechanical testing of a short intramedullary nail for fixation of femoral rotational osteotomy in cerebral palsy patients.

Pagnano RG, Okubo R, Volpon JB.

BACKGROUND: Rotational osteotomy is frequently indicated to correct excessive femoral anteversion in cerebral palsy patients. Angled blade plate is the standard fixation device used when performed in the proximal femur, but extensile exposure is required for plate accommodation. The authors developed a short locked intramedullary nail to be applied percutaneously in the fixation of femoral rotational osteotomies in children with cerebral palsy and evaluated its mechanical properties. **METHODS:** The study was divided into three stages. In the first part, a prototype was designed and made based on radiographic measurements of the femoral medullary canal of ten-year-old patients. In the second, synthetic femoral models based on rapid-prototyping of 3D reconstructed images of patients with cerebral palsy were obtained and were employed to adjust the nail prototype to the morphological changes observed in this disease. In the third, rotational osteotomies were simulated using synthetic femoral models stabilized by the nail and by the AO-ASIF fixed-angle blade plate. Mechanical testing was done comparing both devices in bending-compression and torsion. **RESULTS:** The authors observed proper adaptation of the nail to normal and morphologically altered femoral models, and during the simulated osteotomies. Stiffness in bending-compression was significantly higher in the group fixed by the plate (388.97 +/- 57.25 N/mm) than in that fixed by the nail (268.26 +/- 38.51 N/mm) as torsional relative stiffness was significantly higher in the group fixed by the plate (1.07 +/- 0.36 Nm/degrees) than by the nail (0.35 +/- 0.13 Nm/degrees). **CONCLUSIONS:** Although the device presented adequate design and dimension to fit into the pediatric femur, mechanical tests indicated that the nail was less stable than the blade plate in bending-compression and torsion. This may be a beneficial property, and it can be attributed to the more flexible fixation found in intramedullary devices.

PMID: 21711560 [PubMed - as supplied by publisher]

6. J Biomech. 2011 Jun 22. [Epub ahead of print]

Accuracy of generic musculoskeletal models in predicting the functional roles of muscles in human gait.

Correa TA, Baker R, Kerr Graham H, Pandy MG.

Department of Mechanical Engineering, University of Melbourne, Victoria 3010, Australia.

Biomechanical assessments of muscle function are often performed using a generic musculoskeletal model created from anatomical measurements obtained from cadavers. Understanding the validity of using generic models to study movement biomechanics is critical, especially when such models are applied to analyze the walking patterns of persons with impaired mobility. The aim of this study was to evaluate the accuracy of scaled-generic models in determining the moment arms and functional roles of the lower-limb muscles during gait. The functional role of a muscle was described by its potential to contribute to the acceleration of a joint or the acceleration of the whole-body center of mass. A muscle's potential acceleration was defined as the acceleration induced by a unit of muscle force. Dynamic simulations of walking were generated for four children with cerebral palsy and five age-matched

controls. Each subject was represented by a scaled-generic model and a model developed from magnetic resonance (MR) imaging. Calculations obtained from the scaled-generic model of each subject were evaluated against those derived from the corresponding MR-based model. Substantial differences were found in the muscle moment arms computed using the two models. These differences propagated to calculations of muscle potential accelerations, but predictions of muscle function (i.e., the direction in which a muscle accelerated a joint or the center of mass and the magnitude of the muscle's potential acceleration relative to that of other muscles) were consistent between the two modeling techniques. Our findings suggest that scaled-generic models and image-based models yield similar assessments of muscle function in both normal and pathological gait.

Copyright © 2011 Elsevier Ltd. All rights reserved.

PMID: 21703627 [PubMed - as supplied by publisher]

7. Dev Med Child Neurol. 2011 Jun 27. doi: 10.1111/j.1469-8749.2011.04009.x. [Epub ahead of print]

Controlled study of the effects of continuous intrathecal baclofen infusion in non-ambulant children with cerebral palsy.

Morton RE, Gray N, Vloeberghs M.

Department of Paediatrics, Derbyshire Children's Hospital, Derby, and Queens Medical Centre, Nottingham Department of Physiotherapy, Queens Medical Centre, Nottingham Department of Paediatric Neurosurgery, Queens Medical Centre, Nottingham, UK.

Aim: To measure changes in children with severe spastic cerebral palsy (CP) after continuous intrathecal baclofen (ITB) infusion over 18 months and to compare the results with those of a comparison group awaiting treatment. **Method:** Thirty-eight children with severe spastic CP considered suitable for ITB were assessed when first seen, just before insertion of an intrathecal pump, and 9 months and 18 months later. Eighteen children waited around 9 months for a pump (group 1: nine males, nine females; mean age 9y 11mo [SD 3y 7mo], nine in Gross Motor Function Classification System [GMFCS] level IV, nine in level V). This baseline period was used as a control for comparison with the first and second 9-month periods after the pump for the remaining 20 children (group 2: 11 males, nine females; mean age 10y 2mo [SD 3y 1mo], nine in GMFCS level IV, 11 in level V). The main outcome measure was the Pediatric Evaluation of Disability Inventory (PEDI); other assessments were of function, ease of care, quality of life, and costs of new equipment. **Results:** No significant change was found in the PEDI between group 1 while awaiting treatment and group 2 in the two periods afterwards, nor in the Lifestyle Assessment Questionnaire or the cost of new equipment. Significant changes were found in group 2 in the first 9 months according to the modified Ashworth score (difference between mean values for groups -1.7, standard error 0.58; $p=0.008$), Penn Spasm score (-1.3, 0.37; $p=0.001$), mean joint range of movement (8.3° , 2.8; $p=0.005$), and Caregiver Questionnaire (-19.7, 5.1; $p=0.01$), and in the second 9 months for the Modified Ashworth Scale score (-0.62, 0.12; $p=0.001$). **Interpretation:** ITB in children with severe spastic CP over the first 18 months improves their quality of life in terms of comfort and ease of care. It has less effect on function, participation in society, or the overall cost of new equipment.

© The Authors. Developmental Medicine & Child Neurology © 2011 Mac Keith Press.

PMID: 21707598 [PubMed - as supplied by publisher]

8. Dev Med Child Neurol. 2011 Jun 27. doi: 10.1111/j.1469-8749.2011.04026.x. [Epub ahead of print]

The effects of continuous intrathecal baclofen infusion in non-ambulant children with cerebral palsy.

Miller F.

Alfred I duPont Hospital for Children - Pediatric Orthopedics, Wilmington, DE, USA.

PMID: 21707603 [PubMed - as supplied by publisher]

9. Neurorehabil Neural Repair. 2011 Jun 23. [Epub ahead of print]**Bimanual Training and Constraint-Induced Movement Therapy in Children With Hemiplegic Cerebral Palsy: A Randomized Trial.**

Gordon AM, Hung YC, Brandao M, Ferre CL, Kuo HC, Friel K, Petra E, Chinnan A, Charles JR.

BACKGROUND: Constraint-induced movement therapy (CIMT) promotes hand function using intensive unimanual practice along with restraint of the less-affected hand. CIMT has not been compared with a treatment with equivalent dosing frequency and intensity in children with cerebral palsy (CP). **OBJECTIVES:** The authors report a randomized trial comparing CIMT and a bimanual intervention (hand-arm intensive bimanual therapy; HABIL) that maintains the intensity of practice associated with CIMT but where children are engaged in functional bimanual tasks. **METHODS:** A total of 42 participants with hemiplegic CP between the ages of 3.5 and 10 years (matched for age and hand function) were randomized to receive 90 hours of CIMT or an equivalent dosage of functional bimanual training (HABIL) conducted in day-camp environments. A physical therapist blinded to treatment allocation tested hand function before and after treatment. The primary outcomes were changes in Jebsen-Taylor Test of Hand Function (JTTHF) and Assisting Hand Assessment (AHA) scores. Secondary measures included the Goal Attainment Scale (GAS). **RESULTS:** Both the CIMT and HABIL groups demonstrated comparable improvement from the pretest to immediate posttest in the JTTHF and AHA ($P < .0001$), which were maintained at 6 months. GAS, however, revealed greater progress toward goals for the HABIL group ($P < .0001$), with continued improvement across test sessions for both groups ($P < .0001$). **CONCLUSIONS:** Both CIMT and bimanual training lead to similar improvements in hand function. A potential benefit of bimanual training is that participants may improve more on self-determined goals.

PMID: 21700924 [PubMed - as supplied by publisher]

10. Res Dev Disabil. 2011 Jun 21. [Epub ahead of print]**An ecological approach of Constraint Induced Movement Therapy for 2-3-year-old children: A randomized control trial.**

Eliasson AC, Shaw K, Berg E, Kruminde-Sundholm L.

Neuropediatric Unit, Department of Women's and Children's Health, Karolinska Institutet, 171 76 Stockholm, Sweden; Habilitation and Health Services, Stockholm County Council, Box 17914, 118 95 Stockholm, Sweden.

The aim was to evaluate the effect of Eco-CIMT in young children with unilateral cerebral palsy in a randomized controlled crossover design. The training was implemented within the regular pediatric services, provided by the child's parents and/or preschool teacher and supervised by the child's regular therapist. **METHODS:** Twenty-five children (mean age 28.8 months [SD 11.2], 72% male) participated. Assisting Hand Assessment (AHA) was used as the outcome measure. The Eco-CIMT was provided for 2h a day over a period of two months. Children were randomized into two groups and started either with Eco-CIMT or as controls with a four-month washout period before crossing over. **RESULT:** A significant effect of Eco-CIMT was found when compared to the control period, and the estimated treatment effect was 5.47 (95% C.I. 2.93-8.02) (including both Group 1 and Group 2) ($p < 0.001$). The non-significant estimated carryover effect allowed us to collapse the two groups based on estimates from the ANOVA model. No clear relationship to hours of training, age or general attitudes of mastery was found. **CONCLUSION:** Eco-CIMT influenced development more than ordinary treatment at this age when Eco-CIMT was performed by parents and preschool teachers supervised by the child's ordinary therapist.

Copyright © 2011 Elsevier Ltd. All rights reserved.

PMID: 21700416 [PubMed - as supplied by publisher]

11. Can J Gastroenterol. 2011 May;25(5):265-8.**Gastrostomy tube insertion in children: the Edmonton experience.**

Ackroyd R, Saincher M, Cheng S, El-Matary W.

Division of Gastroenterology, Faculty of Medicine, University of Alberta, Edmonton, Alberta, USA.

BACKGROUND: Although gastrostomy tube insertion - whether endoscopic or open - is generally safe, procedure-related complications have been reported. **OBJECTIVE:** To compare gastrostomy tube insertion-related complications between percutaneous endoscopic gastrostomy and open gastrostomy at a single pediatric centre. **METHODS:** The charts of children (younger than 17 years of age at the time of tube insertion) who underwent endoscopic or open gastrostomy tube insertion from January 2005 to December 2007 at the Stollery Children's Hospital (Edmonton, Alberta) were examined. **RESULTS:** A total of 298 children underwent gastrostomy tube insertion over a period of three years. After excluding patients with incomplete charts, 160 children (91 boys, mean [\pm SD] age 3.18 ± 4.73 years) were included. Eighty-five children (mean age 4.50 ± 5.40 years) had their gastrostomy tube inserted endoscopically, while the remaining 75 (mean age 1.68 ± 3.27 years; $P < 0.001$) underwent an open procedure. The overall rate of major complications was 10.2% for the endoscopic technique and 8.6% for the open technique ($P = 0.1$). Major infections were higher in the endoscopic technique group, while persistent gastrocutaneous fistulas after tube removal were more common in the open technique group. **CONCLUSION:** Although the rate of major complications was similar between the endoscopic and open tube insertion groups, major infections were more common among children who underwent endoscopic gastrostomy. The decision for gastrostomy tube insertion was primarily based on clinical background.

PMID: 21647461 [PubMed - indexed for MEDLINE] PMCID: PMC3115007 [Available on 2012/5/1]

12. Klin Padiatr. 2011 Jan;223(1):5-9. Epub 2011 Jan 26.**Drooling in neuropediatric patients [Article in German]**

Steffen A, Ortfeld S, Schönweiler R.

Klinik für HNO-Heilkunde, Universität zu Lübeck. armin.steffen@uk-sh.de

Drooling is defined as an anterior salivary flow which can be insufficiently controlled due to dysphagia and orofacial motoric deficits. It leads to moistened lips, chin, hands and surrounding in diverse extent. Drooling can severely interfere social contacts and requires more nursing facilities. A multidisciplinary approach in diagnostics and therapy is essential. Key points are the evaluation of inhibited swallowing and of orofacial motoric deficits. In the therapy of drooling, scopolamine patches and oral stimulation plates are useful but within the last few years, the injection of botulinum toxin into the salivary glands produced positive effects, as this therapy is an effective, well tolerated and safe option in these children. Surgical corrections of the salivary glands are more and more reserved for isolated cases.

© Georg Thieme Verlag KG Stuttgart · New York.

PMID: 21271513 [PubMed - indexed for MEDLINE]

13. Dev Med Child Neurol. 2011 Jun 27. doi: 10.1111/j.1469-8749.2011.04014.x. [Epub ahead of print]**Parenting stress and children with cerebral palsy: a European cross-sectional survey.**

Parkes J, Caravale B, Marcelli M, Franco F, Colver A.

School of Nursing and Midwifery, Queen's University of Belfast, Belfast, UK | Ospedale Pediatrico Bambino Gesù, Rome, Italy | Azienda Sanitaria Locale Viterbo, Viterbo, Italy | Agenzia di Sanità Pubblica Regione Lazio, Rome, Italy | Institute of Health and Society, Newcastle University, Newcastle upon Tyne, UK.

Aim: The aim of this study was to describe stress in the parents of children with cerebral palsy and investigate as-

sociations with very high stress. Method: A cross-sectional survey was conducted of parents of 818 children aged 8 to 12 years from nine regions in Europe. Families were eligible to participate if they were living in one of the specified geographic areas. Parental stress was captured using the Parenting Stress Index Short Form, which has 36 items and takes 10 minutes to complete. Parents rate items on a 5-point Likert scale, with higher scores indicating higher stress. The Short Form yields scores on three subscales and a Total Stress score. A trained research associate administered the questionnaire in the child's home and visits lasted 90 to 120 minutes. All data collected were reported by parents unless otherwise stated. Results: The Total Stress score on the Parenting Stress Index was dichotomized into scores of less than 99 or 99 or more, the latter indicating 'very high' stress. Most respondents were mothers (94%), and 26% reported very high stress levels. The parents of children with communication impairment had higher odds for very high stress (odds ratio [OR] 1.9; 95% confidence interval [CI] 1.2-3.0) than those whose child had no such impairment; the parents of children with moderate or severe pain had higher odds for very high stress (OR 1.7 [95% CI 1.1-2.4] and 2.5 [95% CI 1.5-4.3] respectively) than those whose child had no pain; and the parents of children with an intellectual impairment had higher odds for very high stress (OR 1.8; 95% CI 1.2-2.9) than those whose child had none. There was no association between very high stress and motor impairment. The subscales 'parent-child dysfunctional interaction' and 'difficult child' contributed most to the Total Stress score. Interpretation: Parents of children with communication difficulties, intellectual impairment, or pain are at very high risk of stress. The final model explained 12% of the observed variation in very high stress.

© The Authors. Developmental Medicine & Child Neurology © 2011 Mac Keith Press.

PMID: 21707599 [PubMed - as supplied by publisher]

14. Dev Med Child Neurol. 2011 Jun 27. doi: 10.1111/j.1469-8749.2011.04037.x. [Epub ahead of print]

Parent stress and children with cerebral palsy.

Vargus-Adams J.

Division of Pediatric Rehabilitation, Cincinnati Children's Hospital Medical Center, University of Cincinnati School of Medicine, Cincinnati, OH, USA.

PMID: 21707608 [PubMed - as supplied by publisher]

15. J Clin Nurs. 2011 Jun 27. doi: 10.1111/j.1365-2702.2011.03741.x. [Epub ahead of print]

Being concerned: caregiving for Taiwanese mothers of a child with cerebral palsy.

Huang YP, Kellett U, St John W.

Yu-Ping Huang, RN, MSN, PhD, Assistant Professor, Department of Nursing, Hungkuang University, Taiwan; Ursula Kellett, RN, PhD, Senior Lecturer, School of Nursing and Midwifery, Research Centre for Clinical and Community Innovation, Griffith University; Winsome St John, RN, PhD, Associate Professor, School of Nursing and Midwifery, Research Centre for Clinical and Community Innovation, Griffith University, Brisbane, Australia.

Aims and objectives. This article explores the Chinese social context and provides insight into Taiwanese mothers' challenging experiences when a disabled child is born into their families. **Background.** International research indicates that barriers to maternal caregiving for a disabled child revolve around challenging relationships. Giving birth to a disabled child creates a huge challenge for mothers in Chinese society. **Design.** Data were collected using in-depth interviews and journaling methods. A hermeneutic phenomenological approach, informed by the philosophical world views of Heidegger and Gadamer, provided theoretical guidance in revealing and interpreting mothers' experiences. **Method.** Interviews were carried out with a purposeful sample of 15 mothers who were primary caregivers for a child aged between 0-18 years who was diagnosed with cerebral palsy and used Mandarin or Taiwanese as their primary language. **Results.** Shared meanings revealed four modes of being concerned: (1) experiencing burden as a sole primary caregiver; (2) managing the challenges by balancing demands; (3) being marginalised by others; and (4) encountering limited or no professional support. **Conclusions.** Taiwanese mothers face the strain of managing barriers to caregiving in contexts in which their children are not supported or acknowledged as being important contributors to family and Chinese society at large. This study highlights how the family can be important to caregiving mothers in traditional Chinese family life. Poor support and dynamics will emerge when family mem-

bers regard disability as a loss of face or a stigma. Relevance to clinical practice. By learning from Taiwanese mothers who accommodate barriers to caregiving on a daily basis, nurses can seize the impetus to explore ways of reconceptualising nursing practice with families and people with disabilities. The aim is to explore ways that will ultimately align intentions and caring processes and foster coping and positive reward in caring, thereby creating a context that is stress reducing and therapeutic.

© 2011 Blackwell Publishing Ltd.

PMID: 21702863 [PubMed - as supplied by publisher]

16. J Adv Nurs. 2011 Jun 24. doi: 10.1111/j.1365-2648.2011.05748.x. [Epub ahead of print]

Recruitment bias and characteristics of participants with severe cerebral palsy in a cross-sectional survey.

Parkes J, Donnelly C, McDowell B, Duffy C.

Jackie Parkes BNurs PhD NDN Senior Lecturer and Manager of the Northern Ireland Cerebral Palsy Register School of Nursing & Midwifery, Nursing-Midwifery Research Unit, Queen's University Belfast, UK Collette Donnelly BSc MSc RN R&D Doctoral Fellowship Student School of Nursing & Midwifery, Nursing-Midwifery Research Unit, Queen's University Belfast, UK Brona McDowell BSc PhD Clinical Specialist Physiotherapist Gait Analysis Laboratory, Musgrave Park Hospital, Belfast Health and Social Care Trust, Belfast, UK Catherine Duffy MD FRCS Consultant Paediatric Orthopaedic Surgeon Musgrave Park Hospital, Belfast Health and Social Care Trust, Belfast, UK.

Aim. This article is a report of recruitment bias in a sample of 5-25-year-old patients with severe cerebral palsy. **Background.** The way in which study participants are recruited into research can be a source of bias. **Method.** A cross-sectional survey of 5-25-year-old patients with severe cerebral palsy using standardized questionnaires with parents/carers was undertaken in 2007/2008. A case register was used as the sampling frame, and 260 families were approached: 178/260 (68%) responded and 82/260 families never replied (non-respondents). Among responders: 127/178 (71%) opted in to the study, but only 123/127 were assessed, and 82/178 were opted out (or refused). Multivariable logistic regression giving odds ratios was used to study the association between participant characteristics and study outcomes (responders vs. non-responders; opting in vs. opting out; assessed vs. eligible, but not assessed). **Results.** Responders (compared with non-responders) were significantly more likely to have a family member with cerebral palsy who was male and resident in more affluent areas. Families who opted in (compared with those opting out and refusing) were more likely to have a family member with cerebral palsy and intellectual impairment and to reside in certain geographical areas. Families who were actually assessed (compared with all eligible, but not assessed) were more likely to have a family member with cerebral palsy and intellectual impairment. **Conclusion.** Several sources of bias were identified during recruitment for this study. This has implications for the interpretation and conclusions of surveys of people with disabilities and complex needs.

© 2011 Blackwell Publishing Ltd.

PMID: 21707725 [PubMed - as supplied by publisher]

17. J Clin Neurosci. 2011 Apr;18(4):540, 591.

A patient with altered consciousness and spastic quadriplegia.

Seok HY, Youn SW, Jung KY.

Department of Neurology, Korea University Medical Center, Korea University College of Medicine, #126-1, Anam-Dong 5 Ga, Seongbuk-Gu, Seoul 136-705, Republic of Korea.

PMID: 21476222 [PubMed - indexed for MEDLINE]

18. J Neurosci Rural Pract. 2011 Jan;2(1):43-9.**Rehabilitation for cerebral palsy: Analysis of the Australian rehabilitation outcome dataset.**

Amatya B, Khan F.

Department of Rehabilitation Medicine, University of Melbourne, Royal Melbourne Hospital, Melbourne, Australia.

OBJECTIVE: To examine the outcome of inpatient rehabilitation for cerebral palsy (CP), using the Australian Rehabilitation Outcomes Center (AROC) database. **MATERIALS AND METHODS:** De-identified data from the AROC database was analyzed for all rehabilitation admissions during 2003 - 2008, using four classes for the functional level. The outcomes included: Functional Independence Measure (FIM) scores, FIM efficiency, hospital length of stay (LOS), and discharge destination. **RESULTS:** Of 141 case episodes 56.7% were female, mean age 48.5 years, 87.2% were discharged to the community and 64.5% (n = 91) were in the lowest functional classes (217, 218, and 219). The majority of CP patients were treated in the public hospital system (66.7% versus 33.3%), and had a slightly longer LOS compared with those treated in private facilities (22.6 versus 17.9 days, mean difference - 4.7 days, 95% CI - 9.2 to - 0.2, P = 0.041). The FIM for all classes (216 - 218) showed significant functional improvement during the admission (P = 0.001). As expected those in the most functionally impaired classes showed most change (FIM change: 16.6 in class 217, 15.3 in class 218). FIM efficiency was the highest in classes 217 compared to the other classes. The year-to-year trend demonstrated a mixed pattern for hospital LOS and was not significant (P = 0.492). **CONCLUSION:** The AROC dataset is a valuable research tool for describing rehabilitation outcomes. However, more specific information needs to be collected alongside the core AROC data, to allow a more meaningful evaluation of outcomes for CP rehabilitation.

PMID: 21716838 [PubMed - in process]

Epidemiology / Aetiology / Diagnosis & Early Treatment

19. Dev Med Child Neurol. 2011 Jun 29. doi: 10.1111/j.1469-8749.2011.04007.x. [Epub ahead of print]**Assessment of specific characteristics of abnormal general movements: does it enhance the prediction of cerebral palsy?**

Hamer EG, Bos AF, Hadders-Algra M.

Division of Developmental Neurology, Department of Paediatrics, University Medical Centre Groningen, Groningen. Division of Neonatology, Department of Paediatrics, University Medical Centre Groningen, Groningen, the Netherlands.

Aim: Abnormal general movements at around 3 months corrected age indicate a high risk of cerebral palsy (CP). We aimed to determine whether specific movement characteristics can improve the predictive power of definitely abnormal general movements. **Method:** Video recordings of 46 infants with definitely abnormal general movements at 9 to 13 weeks corrected age (20 males; 26 females; median gestational age 30wks; median birthweight 1200g) were analysed for the following characteristics: presence of fidgety, cramped synchronized, stiff, or jerky movements and asymmetrical tonic neck reflex pattern. Neurological condition (presence or absence of CP), gross motor development (Alberta Infant Motor Scales), quality of motor behaviour (Infant Motor Profile), functional mobility (Pediatric Evaluation of Disability Inventory), and Mental Developmental Index (Bayley Scales) were assessed at 18 months corrected age. Infants were excluded from participating in the study if they had severe congenital anomalies or if their caregivers had an insufficient knowledge of the Dutch language. **Results:** Of the 46 assessed infants, 10 developed spastic CP (Gross Motor Function Classification System levels I to V; eight bilateral spastic CP, two unilateral spastic CP). The absence of fidgety movements and the presence of predominantly stiff movements were associated with CP (Fisher's exact test, p=0.018 and p=0.007 respectively) and lower Infant Motor Profile scores (Mann-Whitney U test, p=0.015 and p=0.022 respectively); stiff and predominantly stiff movements were associated with lower Alberta Infant Motor Scales scores (Mann-Whitney U test, p=0.01 and p=0.004 respectively). Cramped synchronized movements and the asymmetrical tonic neck reflex pattern were not related to outcome. None of the movement characteristics were associated with Pediatric Evaluation of Disability Inventory scores or the Mental

Developmental Index. Interpretation: The assessment of fidgety movements and movement stiffness may improve the predictive power of definitely abnormal general movements for developmental outcome. However, the presence of fidgety movements does not preclude the development of CP.

© The Authors. Developmental Medicine & Child Neurology © 2011 Mac Keith Press.

PMID: 21711457 [PubMed - as supplied by publisher]

20. Neonatology. 2011 Jun 22;100(3):228-232. [Epub ahead of print]

Neurodevelopmental Outcomes at 18 Months' Corrected Age of Infants Born at 22 Weeks of Gestation.

Sugiura T, Kouwaki M, Togawa Y, Sugimoto M, Togawa T, Koyama N.

Department of Pediatrics, Toyohashi Municipal Hospital, Aichi, Japan.

Background: Increased survival rates for extremely low birth weight infants have been reported. However, survival rates and prognoses of extremely preterm infants, such as infants born at 22 weeks of gestation, are still poor. **Objective:** To investigate such infants' long-term outcomes, developmental assessments were performed. **Methods:** Seven infants with gestational age of 22 weeks were delivered in our hospital from 2005 to 2008. One infant was a stillbirth despite resuscitation in the delivery room. Six infants, 4 boys and 2 girls, with a gestational age of 22 weeks (range 22(3)/(7)-22(6)/(7) weeks), were admitted to the neonatal intensive care unit (NICU). Birth weights ranged from 514 to 710 g. None of the infants suffered from sepsis, necrotizing enterocolitis, or severe intraventricular hemorrhage. **Results:** The survival rate was 85.7% (6/7) as a percentage of deliveries and 100% (6/6) as a percentage of NICU admissions. None of the infants suffered from deafness, blindness, cerebral palsy, or epilepsy. Six infants were available for developmental assessments at 18 months' corrected age. Three infants showed normal developmental quotients, and 3 infants showed developmental delay. **Conclusion:** In our study, all infants admitted to the NICU at a gestational age of 22 weeks were discharged from the hospital alive. This might suggest that infants after 22 weeks' gestation be considered eligible for active treatment in Japan, though considering the size of the material, generalizability of the results cannot be considered guaranteed.

Copyright © 2011 S. Karger AG, Basel.

PMID: 21701211 [PubMed - as supplied by publisher]

21. Childs Nerv Syst. 2011 Jun 24. [Epub ahead of print]

Very long-term follow-up of adults treated in infancy for hydrocephalus.

Persson EK, Lindquist B, Uvebrant P, Fernell E.

Department of Habilitation, Halmstad County Hospital, Halmstad, Sweden.

PURPOSE: The purpose of this study is to perform a population-based, very long-term follow-up of adults who had been shunt treated for hydrocephalus in infancy. **METHODS:** The 72 children with hydrocephalus born in 1967-1978 in western Sweden, who had participated in a follow-up at school age, were re-examined at 30-43 years of age. The 29 with mental retardation were described in terms of developmental level and survival, whereas the remaining 43 were invited to take part in a follow-up and 28 accepted. The assessments included a semi-structured interview pertaining to medical issues, academic achievements and social function. **RESULTS:** Six children had died, i.e. a mortality rate of 8%. Mental retardation was present in 29 (40%), severe (IQ <50) in 13 and mild (IQ 50-70) in 16. Four of the 28 (14%) had cerebral palsy and 8 (28%) had other motor problems. Five (18%) had epilepsy and nine (32%) had visual impairments. A total of 20 (71%) reported some kind of health problem. Repeated revisions of the shunt had been performed in 23 (82%). Many worried about their shunt and requested a systematic medical follow-up. Nineteen subjects (68%) lived with a partner and 16 (57%) were parents. The majority had completed secondary school and 9 (32%) had completed university studies, while 18 (64%) worked full time, equal to the general population. **CONCLUSION:** In general, the group of normally gifted individuals with hydrocephalus, who had been shunt treated during infancy, was functioning well as adults and participated in society to the same extent as other people.

PMID: 21701870 [PubMed - as supplied by publisher]

22. Nat Neurosci. 2011 Jun 26. doi: 10.1038/nn.2855. [Epub ahead of print]

Axin2 as regulatory and therapeutic target in newborn brain injury and remyelination.

Fancy SP, Harrington EP, Yuen TJ, Silbereis JC, Zhao C, Baranzini SE, Bruce CC, Otero JJ, Huang EJ, Nusse R, Franklin RJ, Rowitch DH.

Departments of Pediatrics and Neurosurgery, Eli and Edythe Broad Institute for Stem Cell Research and Regeneration Medicine and Howard Hughes Medical Institute, University of California, San Francisco, California, USA.

Permanent damage to white matter tracts, comprising axons and myelinating oligodendrocytes, is an important component of brain injuries of the newborn that cause cerebral palsy and cognitive disabilities, as well as multiple sclerosis in adults. However, regulatory factors relevant in human developmental myelin disorders and in myelin regeneration are unclear. We found that AXIN2 was expressed in immature oligodendrocyte progenitor cells (OLPs) in white matter lesions of human newborns with neonatal hypoxic-ischemic and gliotic brain damage, as well as in active multiple sclerosis lesions in adults. Axin2 is a target of Wnt transcriptional activation that negatively feeds back on the pathway, promoting β -catenin degradation. We found that Axin2 function was essential for normal kinetics of remyelination. The small molecule inhibitor XAV939, which targets the enzymatic activity of tankyrase, acted to stabilize Axin2 levels in OLPs from brain and spinal cord and accelerated their differentiation and myelination after hypoxic and demyelinating injury. Together, these findings indicate that Axin2 is an essential regulator of remyelination and that it might serve as a pharmacological checkpoint in this process.

PMID: 21706018 [PubMed - as supplied by publisher]

23. Dev Med Child Neurol. 2011 Jun 27. doi: 10.1111/j.1469-8749.2011.03996.x. [Epub ahead of print]

Developing and validating the Communication Function Classification System for individuals with cerebral palsy.

Hidecker MJ, Paneth N, Rosenbaum PL, Kent RD, Lillie J, Eulenberg JB, Chester Jr K, Johnson B, Michalsen L, Evatt M, Taylor K.

Department of Speech-Language Pathology, University of Central Arkansas, Conway, AR, USA; Department of Epidemiology, Michigan State University, East Lansing, MI, USA; CanChild Centre for Childhood Disability Research, McMaster University, Hamilton, ON, Canada; Waisman Center, University of Wisconsin, Madison, WI, USA; Department of Communication, Michigan State University, East Lansing, MI, USA; Communicative Sciences & Disorders, Michigan State University, East Lansing, MI, USA; Speech House, Seattle, WA, USA; Department of Speech-Language Pathology, Rush University, Chicago, IL, USA.

Aim: The purpose of this study was to create and validate the Communication Function Classification System (CFCS) for children with cerebral palsy (CP), for use by a wide variety of individuals who are interested in CP. This paper reports the content validity, interrater reliability, and test-retest reliability of the CFCS for children with CP. **Method:** An 11-member development team created comprehensive descriptions of the CFCS levels, and four nominal groups comprising 27 participants critiqued these levels. Within a Delphi survey, 112 participants commented on the clarity and usefulness of the CFCS. Interrater reliability was completed by 61 professionals and 68 parents/relatives who classified 69 children with CP aged 2 to 18 years. Test-retest reliability was completed by 48 professionals who allowed at least 2 weeks between classifications. The participants who assessed the CFCS were all relevant stakeholders: adults with CP, parents of children with CP, educators, occupational therapists, physical therapists, physicians, and speech-language pathologists. **Results:** The interrater reliability of the CFCS was 0.66 between two professionals and 0.49 between a parent and a professional. Professional interrater reliability improved to 0.77 for classification of children older than 4 years. The test-retest reliability was 0.82. **Interpretation:** The CFCS demonstrates content validity and shows very good test-retest reliability, good professional interrater reliability, and moderate parent-professional interrater reliability. Combining the CFCS with the Gross Motor Function Classification System and the Manual Ability Classification System contributes to a functional performance view of daily life for individuals with CP, in accordance with the World Health Organization's International Classification of

Functioning, Disability and Health.

© The Authors. *Developmental Medicine & Child Neurology* © 2011 Mac Keith Press.

PMID: 21707596 [PubMed - as supplied by publisher]

24. *Dev Med Child Neurol.* 2011 Jun 27. doi: 10.1111/j.1469-8749.2011.04035.x. [Epub ahead of print]

Developing the Communication Function Classification System for individuals with cerebral palsy.

Cockerill H.

Evelina Children's Hospital, Guy's and St Thomas' NHS Foundation Trust, London, UK.

PMID: 21707607 [PubMed - as supplied by publisher]

25. *Pediatrics.* 2011 Jun 27. [Epub ahead of print]

Adults With Chronic Health Conditions Originating in Childhood: Inpatient Experience in Children's Hospitals.

Goodman DM, Hall M, Levin A, Watson RS, Williams RG, Shah SS, Slonim AD.

Division of Critical Care, Northwestern University Feinberg School of Medicine and Children's Memorial Hospital, Chicago, Illinois;

Objective: To describe the rate of increase of the population of adults seeking care as inpatients in children's hospitals over time. **Patients and Methods:** We analyzed data from January 1, 1999, to December 31, 2008, from patients hospitalized at 30 academic children's hospitals, including growth rates according to age group (pediatric: aged <18 years; transitional: aged 18-21 years; or adult: aged >21 years) and disease. **Results:** There were 3 343 194 hospital discharges for 2 143 696 patients. Transitional patients represented 2.0%, and adults represented 0.8%, totaling 59 974 patients older than 18 years. The number of unique patients, admissions, patient-days, and charges increased in all age groups over the study period and are projected to continue to increase. Re use was disproportionately higher in the older ages. The growth of transitional patients exceeded that of others, with 6.9% average annual increase in discharges, 7.6% in patient-days, and 15% in charges. Chronic conditions occurred in 87% of adults compared with 48% of pediatric patients. Compared with pediatric patients, the rates of increase of inpatient-days increased significantly for transitional age patients with cystic fibrosis, malignant neoplasms, and epilepsy, and for adults with cerebral palsy. Annual growth rates of charges increased for transitional and adult patients for all diagnoses except cystic fibrosis and sickle cell disease. **Conclusions:** The population of adults with diseases originating in childhood who are hospitalized at children's hospitals is increasing, with varying disease-specific changes over time. Our findings underscore the need for proactive identification of strategies to care for adult survivors of pediatric diseases.

PMID: 21708805 [PubMed - as supplied by publisher]

26. *Res Dev Disabil.* 2011 Jun 25. [Epub ahead of print]

Unmet health care needs in children with cerebral palsy: A cross-sectional study.

Jackson KE, Krishnaswami S, McPheeters M.

Vanderbilt University School of Medicine, Vanderbilt University Medical Center, 2525 West End Ave., Ste. 600, Nashville, TN 37203-1738, United States.

Children with potentially severe health conditions such as cerebral palsy (CP) are at risk for unmet health care needs. We sought to determine whether children with CP had significantly greater unmet health care needs than children with other special health care needs (SHCN), and whether conditions associated with CP increased the

odds of unmet health care needs. We analyzed data from the National Survey of Children with Special Health Care Needs, 2005-2006, using multivariate logistic regression to calculate the adjusted odds of children with CP having one or more unmet health care needs compared to children with other SHCN. We also determined the association of CP-related conditions with unmet health care needs in children with CP. After weighting to national averages, our sample represented 178,536 children with CP (1.9%), and 9,236,794 with children with other SHCN (98.1%). Although having CP increased the odds that children had unmet health care needs (OR=1.46, 95% CI [1.07-1.99]), the presence of a "severe" health condition weakened the association. Gastrointestinal problems and emotional problems increased the odds that children with CP would have unmet health care needs above that of children without the associated conditions ($p \leq .01$). Children with CP are similar to children with other SHCN and may benefit from collaborative programs targeting severe chronic conditions. However, children with CP and associated conditions have increased odds of unmet health care needs in comparison to children without those problems.

Copyright © 2011 Elsevier Ltd. All rights reserved.

PMID: 21705193 [PubMed - as supplied by publisher]