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CP Research News

Monday 1 September 2008

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1: Dev Med Child Neurol. 2008 Sep;50(9):712-6.

Gastrointestinal and nutritional problems in severe developmental disability.

Somerville H, Tzannes G, Wood J, Shun A, Hill C, Arrowsmith F, Slater A, O'Loughlin EV.

The Children's Hospital at Westmead, Westmead, New South Wales, Australia.

The aim of this study was to describe the experience of 452 children and adults with a severe developmental disability who presented to a multidisciplinary clinic with swallowing, nutritional, and gastrointestinal problems. Data were obtained by chart review. Two hundred and ninety-four children (age range 7mo-19y, 173 males, 121 females) and 158 adults (age range 18-53y; 90 males, 68 females) were assessed over 5 years. One hundred and eighty-two children and 86 adults had cerebral palsy. Approximately 90% were wheelchair dependent and totally dependent on caregivers for feeding; 60% had epilepsy. Pulmonary aspiration was identified by oesophageal videofluoroscopy in 41% of 174 children and 47% of 34 adults. Chronic oesophagitis and *Helicobacter pylori* were found in 57% of 182 children and 76% of 66 adults undergoing endoscopy. Chronic suppurative lung disease was identified by computerized axial tomography in 94% of 62 children and all six adults studied. Most patients improved with simple interventions. However, gastrostomy was recommended in 140 children and performed in 91, and in 10 adults but performed in seven, whereas fundoplication was recommended in 111 children and performed in 74, and in six adults but performed in two. In conclusion, chronic oesophagitis, pulmonary aspiration, and chronic lung disease were identified in many patients with a severe developmental disability.

PMID: 18754923 [PubMed - in process]



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2: Dev Med Child Neurol. 2008 Sep;50(9):702-5.

Does sex influence outcome in ambulant children with bilateral spastic cerebral palsy?

Gough M, Shafafy R, Shortland A.

One Small Step Gait Laboratory, Guy's and St Thomas' NHS Foundation Trust, London, UK.

To investigate the effect of sex on the phenotype of bilateral spastic cerebral palsy (CP) we reviewed the gait analysis data of 116 children (78 males, mean age 8y 1mo [SD 3y 1mo] and 38 females, mean age 8y 9mo [3y 1mo]) with bilateral spastic CP (Gross Motor Function Classification System [GMFCS] Levels I [four males, six females]; II [41 males, 19 females]; III [26 males, 12 females]; and IV [7 males, 1 female]) who had been referred for gait analysis to inform treatment. Although there were no differences between males and females in terms of gestational age, chronological age, or GMFCS level, males were more likely to have had nonoperative intervention before the referral ($p=0.024$), had a greater degree of knee flexion in stance phase when walking ($p=0.003$), and had a higher Gillette Gait Index ($p<0.001$) when compared with females. Males were also more likely to have surgery recommended on the basis of gait analysis ($p<0.001$). Sex seems to influence the development of the musculoskeletal system and mobility in ambulant children with bilateral spastic CP, and this may need to be considered when planning intervention or when assessing the outcome of intervention.

PMID: 18754921 [PubMed - in process]

3: Dev Med Child Neurol. 2008 Sep;50(9):696-701.

Adolescents with cerebral palsy: stability in measurement of quality of life and health-related quality of life over 1 year.

Livingston MH, Rosenbaum PL.

McMaster University, Hamilton, Ontario, Canada.

This study assessed stability of measurement of quality of life (QOL) and health-related quality of life (HRQOL) over the course of 1 year among 185 adolescents (mean age 16y, SD 1y 9mo) with cerebral palsy (CP). Participants were classified on the Gross Motor Function Classification System as level I ($n=55$), II ($n=30$), III ($n=27$), IV ($n=46$), or V ($n=27$). QOL was assessed by self- ($n=125$) or proxy-report ($n=60$) with the Short Version of the Quality of Life Instrument for People with Developmental Disabilities (QOL Instrument), which describes domains of Being, Belonging, and Becoming. HRQOL was captured through parent proxy-reports with the Health Utilities Index Mark 3 (HUI3). Generalizability coefficients (G) for domain and Overall QOL scores on the QOL Instrument ranged from 0.50 to 0.73, indicating that between 50 and 73% of the variance was stable over 1 year. Stability on the HUI3 was excellent ($G>0.90$) for ambulation and overall utility scores; moderate ($G=0.70-0.90$) for speech, vision, dexterity, cognition, and hearing; and low for pain ($G=0.48$) and emotion ($G=0.24$). Correlations between scores on the two instruments were moderate even when adjustments were made for the lack of perfect stability over 1 year. This supports the notion that QOL and HRQOL are different aspects of life experience among adolescents with CP.

PMID: 18754920 [PubMed - in process]

4: Dev Med Child Neurol. 2008 Sep;50(9):690-5.

Relationship between parental PODCI questionnaire and School Function Assessment in measuring performance in children with CP.

Gates PE, Otsuka NY, Sanders JO, McGee-Brown J.

CCRC, Shriners Hospitals for Children, Louisiana, MO, USA.

Little data exists assessing the relationship between functional limitations in children with cerebral palsy (CP) and their participation in everyday activities. This prospective study evaluates the relationship between the Pediatric Outcomes Data Collection Instrument (PODCI), a functional health-related quality of life instrument for children and their parents, and the School Function Assessment (SFA), a school-based functional assessment. One hundred and two children with CP (80.4% diplegia; 10.8% hemiplegia; 3.9% triplegia; 2.0% quadriplegia; 2.9% unspecified; 60 males, 42 females, mean age 11 years 8 months (SD 3y 3mo, range 6-8y), Gross Motor Function Classification System levels I to IV (13.7% Level I 50% Level II 35.3% Level III 1% Level IV), had complete PODCI and SFA assessments. Significant relationships were noted among multiple PODCI subscales and subscales of the SFA, as well as among individual questions. PODCI predicted performance in all 31 subscales of the SFA when comorbidity subscales were included ($r = 0.35-0.64$). The PODCI in-clinic questionnaire provides an accurate reflection of the child's actual participation in the community setting, as assessed by the SFA. PODCI can reliably be used to help ensure that outcomes assessed in the clinic setting reflect function within the community, and can be used to help with treatment planning, goal setting, and improved patient care.

PMID: 18754919 [PubMed - in process]

5: Dev Med Child Neurol. 2008 Sep;50(9):684-9.

Gross motor functional abilities in preterm-born children with cerebral palsy due to periventricular leukomalacia.

van Haastert IC, de Vries LS, Eijssermans MJ, Jongmans MJ, Helders PJ, Gorter JW.

Department of Neonatology, University Medical Center Utrecht, Utrecht, the Netherlands.

To describe the impact of periventricular leukomalacia (PVL) on gross motor function, data on 59 children (37 males, 22 females) with a gestational age (GA) of 34 weeks or less with cerebral palsy (CP) due to PVL grade I (n=20), II (n=13), III (n=25), and IV (n=1) were studied; (mean GA 29wk 4d [SD 4wk 6d]; mean birthweight 1318g [SD 342]). Two independent raters used the Gross Motor Function Classification System (GMFCS) at four time points: T1, mean corrected age (CA) 9 months 15 days (SD 2mo 6d); T2, mean CA 16 months (SD 1mo 27d); T3, mean CA 24 months 27 days (SD 2mo 3d); and T4, median age 7 years 6 months (range 2y 2mo-16y 8mo). Interrater reliability and stability across time with respect to the total cohort were $\kappa \geq 0.86$ and $\rho \geq 0.74$ respectively. The association between PVL and gross motor outcome at T4 was strong (positive and negative predictive values 0.92 and 0.85 respectively). The proportion of children who remained in the same GMFCS level increased from 27% (T1-T4) to 53% (T2-T4) and 72% (T3-T4). PVL grade I to II, as diagnosed in the neonatal period, has a better functional mobility prognosis than PVL grade III-IV. These findings have implications for habilitation counselling and intervention strategies.

PMID: 18754918 [PubMed - in process]

6: Dev Med Child Neurol. 2008 Sep;50(9):655-63.

Magnetic resonance imaging and developmental outcome following preterm birth: review of current evidence.

Hart AR, Whitby EW, Griffiths PD, Smith MF.

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Preterm birth is associated with an increased risk of developmental difficulties. Magnetic resonance imaging (MRI) is increasingly being used to identify damage to the brain following preterm birth. It is hoped

this information will aid prognostication and identify neonates who would benefit from early therapeutic intervention. Cystic periventricular white matter damage has traditionally been associated with abnormal motor developmental and cerebral palsy, but its presence on MRI does not preclude normal cognitive development. This has led to increasing interest in the identification of diffuse periventricular white matter damage with conventional and sophisticated MRI. However, the correlation between these appearances and developmental outcome remains unclear. Measurements of the size, volumes, and growth rates of many regions of the brain, such as the corpus callosum, ventricular system, cortex, deep grey matter, and cerebellum, are all also altered following preterm birth, but there is insufficient evidence to use this data in the clinical setting. This article is a review of the current evidence on MRI and developmental outcome, suggesting possible indications for the use of MRI following preterm birth.

PMID: 18754914 [PubMed - in process]

7: Dev Med Child Neurol. 2008 Sep;50(9):643.

Life goes on: a call to action.

Chambers H.

President, American Academy for Cerebral Palsy and Developmental Medicine.

PMID: 18754908 [PubMed - in process]

8: J Pediatr Orthop. 2008 Sep;28(6):684-7.

The impact of intrathecal baclofen on the natural history of scoliosis in cerebral palsy.

Shilt JS, Lai LP, Cabrera MN, Frino J, Smith BP.

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BACKGROUND: Intrathecal baclofen (ITB) is an effective treatment of spasticity in patients with cerebral palsy. However, several recent reports have raised concerns that the treatment may be associated with a rapid progression of scoliosis. The objective of this study was to further examine the effect of ITB treatment on the progression of scoliosis in patients with cerebral palsy. **METHODS:** Spastic cerebral palsy patients who were ITB candidates were followed radiographically. Baseline Cobb angles of the primary curve were measured during the period of ITB pump insertion and at the most recent follow-up visit. Each patient was matched with a control patient by the diagnosis of cerebral palsy, age, sex, topographic involvement, and initial Cobb angle. The mean rate of change in Cobb angle was compared between ITB and control patients using paired t test. A multiple linear regression model was used to examine the difference, controlling for age, sex, topographic involvement, and initial Cobb angle. **RESULTS:** Fifty ITB patients and 50 controls were included in the analysis. There was no statistically significant difference between the mean change in Cobb angle in ITB patients (6.6 degrees per year) compared with the matched control patients (5.0 degrees per year, $P = 0.39$). The results from the multiple regression analysis also failed to show a statistically significant difference (0.92 degrees per year difference between ITB patients and controls, $P = 0.56$). **CONCLUSIONS:** The progression of scoliosis in cerebral palsy patients with ITB treatment is not significantly different from those without ITB treatment. The findings suggest that patients receiving ITB experience a natural progression of scoliosis similar to the natural history reported in the literature. **LEVEL OF EVIDENCE:** Level III.

PMID: 18724209 [PubMed - in process]

9: J Pediatr Orthop. 2008 Sep;28(6):679-83.**Quantitative and qualitative functional evaluation of upper extremity tendon transfers in spastic hemiplegia caused by cerebral palsy.**

Van Heest AE, Ramachandran V, Stout J, Wervey R, Garcia L.

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BACKGROUND: The purpose of this study was to determine if upper extremity function and joint positioning improved after tendon transfer surgery in patients with spastic hemiplegia caused by cerebral palsy. **METHODS:** Thirteen patients with spastic hemiplegia underwent tendon transfer surgery at a mean age of 10.8 years (range, 7-24 years). Before surgery, all patients were evaluated with a standardized motion laboratory analysis protocol. At a mean follow-up of 3.6 years (range, 1-10 years), 13 patients returned for a repeat motion laboratory analysis using the same protocol. The motion laboratory studies were then compared quantitatively, comparing times for completion of the Jebsen-Taylor hand test, and qualitatively for elbow, forearm, wrist, finger, and thumb positions using the validated Shriner's Hospital Upper Extremity Evaluation protocol. **RESULTS:** In timed testing on the Jebsen-Taylor hand function test, 5 patients improved, 5 patients remained the same, and 3 patients worsened. No statistically significant change in timed testing was noted for any of the 6 subtests. A qualitative assessment of limb position during completion of tasks showed a significant improvement in position for the elbow ($P < 0.01$), forearm ($P < 0.02$), wrist ($P < 0.02$), and fingers ($P < 0.02$). There was no significant change in thumb position ($P < 0.85$). **CONCLUSIONS:** Tendon transfers, especially for wrist extension, can be beneficial in improving upper extremity joint positioning in children with spastic hemiplegia. However, significant impairment in hand function persists.

Publication Types:
Research Support, Non-U.S. Gov't

PMID: 18724208 [PubMed - in process]

10: J Pediatr Orthop. 2008 Sep;28(6):674-8.**Rectus femoris transfer in children with cerebral palsy: evaluation of transfer site and preoperative indicators.**

Muthusamy K, Seidl AJ, Friesen RM, Carollo JJ, Pan Z, Chang FM.

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BACKGROUND: Rectus femoris transfer (RFT) is a treatment option for children with cerebral palsy (CP) who exhibit a stiff-knee gait pattern. The rectus femoris muscle is transferred to different sites to overcome problems such as tripping and falling. Indications for RFT often include preoperative decreased knee range of motion (KROM) during swing phase, reduced peak knee flexion in swing (PKFSW), abnormal rectus femoris firing patterns on electromyography recordings, and a positive Duncan-Ely test. This study investigated the effect of different RFT sites on kinematic outcome variables and evaluated the relationship between commonly used preoperative surgical indicators and postoperative changes in kinematics. **METHODS:** Thirty-eight patients with CP, who underwent RFT, with preoperative and postoperative instrumented gait analyses, were evaluated and divided by transfer site: semitendinosus, sartorius, and gracilis. Preoperative and postoperative comparisons were made for 5 knee kinematic variables: range of motion (KROM), peak flexion at loading response, peak extension at terminal stance, PKFSW, and peak extension at terminal swing. Analysis was performed in accordance to different transfer sites and overall postoperative change. **RESULTS:** When all limbs were analyzed together for the 5 outcome variables, it was found that patients experienced significant ($P < 0.05$) improvements in sagittal-plane kinematics in 3 of the outcome variables: KROM, PKFSW, and peak extension at terminal swing. Patients had a significant improvement in postoperative KROM when the preoperative KROM

was less than 80% of normal. Electromyography pattern and Duncan-Ely test were not found to be useful indicators of surgical success. **CONCLUSION:** The authors recommend RFT in children with CP who exhibit a stiff-knee gait, regardless of transfer site. **LEVEL OF EVIDENCE:** Level 3.

Publication Types:
Research Support, Non-U.S. Gov't

PMID: 18724207 [PubMed - in process]

11: J Pediatr Orthop. 2008 Sep;28(6):626-31.

Guided growth for fixed knee flexion deformity.

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BACKGROUND: Fixed knee flexion deformity (FKFD) is an insidious problem that may complicate the management of patients with neuromuscular compromise due to cerebral palsy, spina bifida, arthrogryposis, and other conditions. The energy costs associated with crouch gait may become prohibitive and, with the inexorable progression of fixed knee flexion, secondary pain may ensue as a result of fragmentation of the patella and/or tibial tubercle. Concomitant or compensatory flexion deformity of the hips and lumbar lordosis may develop, along with "pseudo equinus" of the ankles. Recommended treatments for FKFD have included bracing; physical therapy; and, in recalcitrant cases, distal femoral osteotomy, posterior release, or frame distraction. However, these latter modalities are fraught with potential complications including neurovascular damage, loss of fixation, undercorrection malunion, fracture, and recurrent deformity. Considering that FKFD is often bilateral, the complication risks for a given patient are doubled. In a previous study, the senior author reported successful hemiepiphysiodesis of the distal anterior femur using staples. However, further experience has demonstrated some of the limitations of stapling including relatively slow correction and occasional hardware migration. This led to the development of a more versatile and reliable solution using a pair of anterior tension band plates. **METHODS:** In this retrospective clinical study, we are reporting this new technique of promoting gradual correction through guided growth of the distal femur, using a pair of anterior 8-plates. The correction is accomplished simultaneously and bilaterally, without immobilization, and may be combined with other operative procedures as indicated. We reviewed the charts, radiographs in a group of patients treated accordingly. **RESULTS:** In this group of 18 patients with 29 deformities, we noted correction averaging 1.3 degrees (range, 0.0 [1 patient]-4.8 degrees), with minimal complications. No inadvertent coronal plane deformities were created. Upon full correction, the plates were removed so as to avoid recurvatum. **CONCLUSION:** As an alternative to posterior capsulotomy or supracondylar extension osteotomy, we have found that guided growth is an effective and safe method of gradually correcting FKFD in growing children and adolescents. **LEVEL OF EVIDENCE:** 4 (retrospective clinical series).

PMID: 18724198 [PubMed - in process]

12: Pediatr Neurol. 2008 Sep;39(3):189-95.

Brainstem auditory outcomes and correlation with neurodevelopment after perinatal asphyxia.

Jiang ZD, Liu XY, Shi BP, Lin L, Bu CF, Wilkinson AR.

Department of Pediatrics, Children's Hospital, Fudan University, Shanghai, China; Neonatal Unit, Department of Paediatrics, University of Oxford, John Radcliffe Hospital, Oxford, England, United Kingdom.

We used brainstem auditory-evoked responses and neurodevelopmental assessment to detect abnormalities and correlations between such responses and neurodevelopmental outcomes in 78 children (aged 4-12 years) who survived perinatal asphyxia. Twenty children had brainstem auditory-evoked re-

sponse abnormalities, including increased threshold, reduced wave V amplitude, decreased V/I amplitude ratio, and prolonged I-V interval. Thirty-seven exhibited neurodevelopmental deficits, including cerebral palsy and developmental delay. The remaining 41 exhibited no deficits. Brainstem auditory-evoked response abnormalities were evident in 15 of 37 (40.5%) children with neurodevelopmental deficits, but in only 5 of 41 (12.2%) with no deficits, which differed significantly ($\chi^2 = 8.2$, $P < 0.05$). The sensitivity, specificity, positive predictive value, and false-negative rate of brainstem auditory-evoked responses to reflect neurodevelopmental outcomes were 40.5%, 87.8%, 75.0%, and 59.5%, respectively. These findings suggest that in children who survive perinatal asphyxia, brainstem auditory impairment occurs more frequently in those with versus those without neurodevelopmental deficits. Brainstem auditory-evoked responses display a moderate correlation with clinically determined neurodevelopmental outcomes. Despite limitations, brainstem auditory-evoked response is valuable for assessing auditory and neurodevelopmental outcomes after perinatal asphyxia.

PMID: 18725064 [PubMed - in process]

13: Yonsei Med J. 2008 Aug 31;49(4):545-52.

Is electrical stimulation beneficial for improving the paralytic effect of botulinum toxin type a in children with spastic diplegic cerebral palsy?

Rha DW, Yang EJ, Chung HI, Kim HB, Park CI, Park ES.

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Purpose: The purpose of the present study was to investigate whether electrical stimulation (ES) improves the paralytic effect of botulinum toxin type A (BTX-A) and evaluate the differences between low frequency (LF) and high frequency (HF) ES in children with spastic diplegic cerebral palsy (CP). **Materials and Methods:** Twenty-three children with spastic diplegia CP who had BTX-A injections into both gastrocnemius muscles were assessed. Following the toxin injection, electrical stimulation was given to 1 side of the injected muscles and a sham-stimulation to the other side for 30 min a day for 7 consecutive days [HFES (25Hz) to 11 children, LFES (4Hz) to 12 children]. The compound motor action potentials (CMAP) from the gastrocnemius muscle were assessed before injection and at 5 time points (days 3, 7, 14, 21, and 30) after injection. The clinical assessments of spasticity were performed before and 30 days after injection. **Results:** The CMAP area became significantly lower in both LFES and HFES sides from 3 days after injection compared to baseline values. In other words, the CMAP area of the sham-stimulated side showed a significant decrease at 7 or 14 days after injection. However, there were no significant differences in clinical assessment of spasticity between the stimulated and sham-stimulated sides. **Conclusion:** Short-term ES in both LF and HF to the spastic muscles injected with BTX-A might induce earlier denervating action of BTX-A. However, it does not necessarily lead to clinical and electrophysiological benefits in terms of reduction of spasticity.

PMID: 18729296 [PubMed - in process]

14: J Infect Dis. 2008 Aug 28. [Epub ahead of print]

Shiga Toxin 2 Affects the Central Nervous System through Receptor Globotriaosylceramide Localized to Neurons.

Obata F, Tohyama K, Bonev AD, Kolling GL, Keepers TR, Gross LK, Nelson MT, Sato S, Obrig TG.

1Departments of Medicine (Nephrology) and Microbiology, University of Virginia Health Science Center, Charlottesville; 2Department of Pharmacology, University of Vermont College of Medicine, Burlington; 3Center for Electron Microscopy and Bioimaging Research, Laboratory for Nanoneuroanatomy, and 4Department of Microbiology, Iwate Medical University, Morioka, Japan.

Affinity-purified Shiga toxin (Stx) 2 given intraperitoneally to mice caused weight loss and hind-limb paralysis followed by death. Globotriaosylceramide (Gb(3)), the receptor for Stx2, was localized to neurons of the central nervous system (CNS) of normal mice. Gb(3) was not found in astrocytes or endothelial cells of the CNS. In human cadaver CNS, we found Gb(3) in neurons and endothelial cells. Mouse Gb(3) localization was confirmed by immunoelectron microscopy. In Stx2-exposed mice, anti-Stx2-gold immunoreaction was positive in neurons. During paralysis, after Stx2 injection, multiple glial nuclei were observed surrounding motoneurons by electron microscopy. Also revealed was a lamellipodia-like process physically inhibiting the synaptic connection of motoneurons. Ca(2+) imaging of cerebral astrocytic endfeet in Stx2-treated mouse brains suggested that the toxin increased neurotransmitter release from neurons. In this article, we propose that the neuron is a primary target of Stx2, affecting neuronal function and leading to paralysis.

PMID: 18754742 [PubMed - as supplied by publisher]

15: N Engl J Med. 2008 Aug 28;359(9):895-905.

A randomized, controlled trial of magnesium sulfate for the prevention of cerebral palsy.

Rouse DJ, Hirtz DG, Thom E, Varner MW, Spong CY, Mercer BM, Iams JD, Wapner RJ, Sorokin Y, Alexander JM, Harper M, Thorp JM Jr, Ramin SM, Malone FD, Carpenter M, Miodovnik M, Moawad A, O'Sullivan MJ, Peaceman AM, Hankins GD, Langer O, Caritis SN, Roberts JM; Eunice Kennedy Shriver NICHD Maternal-Fetal Medicine Units Network.

Collaborators (205)

Hauth J, Northen A, Nelson KG, Peralta-Carcelen M, Hill-Webb T, Tate S, Lee C, Bailey K, Chopko S, Rector R, Biasini FJ, Anderson K, Guzman A, Jensen M, Bodnar A, Adams L, Fullmer L, Thompson M, Williams L, Steffen M, Miller A, Leveno K, Sherman ML, Dax J, Faye-Randall L, Melton C, Heyne R, Hicks P, Broyles RS, Flores E, Orduno P, Cordova B, Dooley C, Boatman C, VanBuren G, Milluzzi C, Santori C, Collin M, Fundzak M, Nielsen B, Johnson F, Landon MB, Latimer C, Curry V, Meadows S, Cordero L, Timan C, Giannone P, Brenner S, Selegue R, Sciscione A, DiVito MM, Desai S, Esterly K, Duran C, Paul D, Herman A, DiVito P, Sherman M, O'Shea A, Talucci M, Gringlas M, Higley AM, Gaines E, Colley N, Higley EA, Sibai BM, Ramsey R, Mabie B, Kao L, Cassie M, Petersen M, Talati A, Whitaker T, Bada H, McKeever J, Werkman S, Rowland J, Pollard L, Norman GS, Steffy B, Dombrowski MP, Delaney-Black V, Johnson Y, Driscoll D, Goldston L, Boyes K, Meis P, Swain M, Klinepeter K, O'Shea M, Heller C, Steele L, Kiger M, Kreeger J, Waldrep E, Rhodes K, Allred D, Halfond R, Hounshell G, Hall N, Barr L, Moise KJ Jr, Brody S, Dorman K, Milowic K, Marshall D, Bernhardt J, Bostic L, Gilstrap LC 3rd, Day MC, Gildersleeve E, Ortiz F, Kerr M, Morris BH, Chavarria M, Bradt P, Legé-Humbert S, Dieterich S, Pemberton V, Bousleiman S, Paley C, Lee J, Paley L, Carmona V, Tillinghast J, Allard D, McCarten K, Vohr B, Noel L, Mejia C, Watson V, Leonard M, Leach T, Elder N, Girdler W, Steichen J, Gratton T, Lindheimer M, Jones P, Roizen N, Gray L, Wicks C, Rossi A, Plesha-Troyke S, Doyle F, Alfonso C, Scott M, Washington R, Fajardo-Hiriart S, Londono A, Rocha-Rodriguez G, Worth A, Griffin W, Allison M, Diaz A, Frade-Eguaras S, Mallett G, Simon P, deRegnier R, de Ungria M, Mestan K, Ramos-Brinson M, Bethel L, Weissbourd M, Shivers M, Goodrum LA, Saade GR, Munn M, Moss J, Brandon J, Olson GL, Harirah HM, Martin E, Dallas D, Santiago T, Stratton B, Shipley E, Smith K, Xenakis E, Conway D, Berkus M, Castro R, Odom M, Skiver D, Ramirez N, Miller E, McLerran C, Matula-Linkhart K, Cotroneo M, Milford C, Hofkosh D, Kamon T, Milford C, Weiner S, Jones-Binns B, Hoover M, Fischer M, McLaughlin S, Brunette K, Fricks E, Pagliaro S, McNellis D, Katz C, Howell K.

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BACKGROUND: Research suggests that fetal exposure to magnesium sulfate before preterm birth might reduce the risk of cerebral palsy. **METHODS:** In this multicenter, placebo-controlled, double-blind trial, we randomly assigned women at imminent risk for delivery between 24 and 31 weeks of gestation to receive magnesium sulfate, administered intravenously as a 6-g bolus followed by a constant infusion of 2 g per hour, or matching placebo. The primary outcome was the composite of stillbirth or infant death by 1 year of corrected age or moderate or severe cerebral palsy at or beyond 2 years of corrected age. **RESULTS:** A total of 2241 women underwent randomization. The baseline characteristics were similar in the two groups. Follow-up was achieved for 95.6% of the children. The rate of the primary outcome was

not significantly different in the magnesium sulfate group and the placebo group (11.3% and 11.7%, respectively; relative risk, 0.97; 95% confidence interval [CI], 0.77 to 1.23). However, in a prespecified secondary analysis, moderate or severe cerebral palsy occurred significantly less frequently in the magnesium sulfate group (1.9% vs. 3.5%; relative risk, 0.55; 95% CI, 0.32 to 0.95). The risk of death did not differ significantly between the groups (9.5% vs. 8.5%; relative risk, 1.12; 95% CI, 0.85 to 1.47). No woman had a life-threatening event. **CONCLUSIONS:** Fetal exposure to magnesium sulfate before anticipated early preterm delivery did not reduce the combined risk of moderate or severe cerebral palsy or death, although the rate of cerebral palsy was reduced among survivors. (ClinicalTrials.gov number, NCT00014989.) 2008 Massachusetts Medical Society

Publication Types:
Multicenter Study
Randomized Controlled Trial
Research Support, N.I.H., Extramural

PMID: 18753646 [PubMed - in process]

16: Arch Phys Med Rehabil. 2008 Aug 21. [Epub ahead of print]

Fatigue Resistance During a Voluntary Performance Task Is Associated With Lower Levels of Mobility in Cerebral Palsy.

Moreau NG, Li L, Geaghan JP, Damiano DL.

Departments of Physical Therapy, Washington University, St. Louis, MO.

Moreau NG, Li L, Geaghan JP, Damiano DL. Fatigue resistance during a voluntary performance task is associated with lower levels of mobility in cerebral palsy. **OBJECTIVES:** To investigate muscle fatigue of the knee flexors and extensors in people with cerebral palsy (CP) compared with those without motor disability during performance of a voluntary fatigue protocol and to investigate the relationship with functional mobility. **DESIGN:** A case-control study. **SETTING:** A biomechanics laboratory. **PARTICIPANTS:** Ambulatory subjects with CP (n=18; mean age, 17.5y) in Gross Motor Function Classification System (GMFCS) levels I, II, and III and a comparison group of age-matched subjects (n=16) without motor disability (mean age, 16.6y). **INTERVENTIONS:** Not applicable. **MAIN OUTCOME MEASURES:** The voluntary muscle fatigue protocol consisted of concentric knee flexion and extension at 60 degrees a second for 35 repetitions on an isokinetic dynamometer. Peak torque for each repetition was normalized by the maximum peak torque value. Muscle fatigue was calculated as the rate of decline in normalized peak torque across all repetitions, represented by the slope of the linear regression. Self-selected and fast gait velocities were measured as well as the Pediatric Outcomes Data Collection Instrument (PODCI). **RESULTS:** Greater fatigability (slope) was observed in the comparison group for both knee flexors and extensors than in the group with CP. Within CP, lower knee extensor fatigue (slope) was associated with lower functioning GMFCS levels and lower levels of activity and participation as measured by the PODCI transfers and basic mobility. **CONCLUSIONS:** Even after adjusting for maximum peak torque, the knee flexors and extensors of participants with CP were observed to be less fatigable than age-matched peers without motor disability. The lower rate of muscle fatigue was also associated with lower functional mobility in CP. These results may be related to strength or activation differences and/or muscle property alterations. Future investigations are warranted.

PMID: 18722588 [PubMed - as supplied by publisher]

17: Eur J Neurol. 2008 Aug 21. [Epub ahead of print]

Use of three-dimensional kinematic analysis following upper limb botulinum toxin A for children with hemiplegia.

Mackey AH, Miller F, Walt SE, Waugh MC, Stott NS.

Department of Surgery, University of Auckland, Auckland, New Zealand.

Background and purpose: To examine whether three-dimensional (3-D) kinematic analysis can detect changes in upper limb tasks (reach and hand-to-mouth) in children with hemiplegia, following upper limb botulinum toxin A injections. **Methods:** Ten children with hemiplegic cerebral palsy (7 males, 3 females, aged 9-17 years). Subjects received botulinum toxin A (Botox) injections into elbow forearm muscles combined with 6 weeks of occupational therapy. Participants completed a 3-D kinematic analysis of two upper limb tasks, Melbourne Assessment of Unilateral Upper Limb Function and modified Ashworth scores measured at baseline, 2, 6 and 12 weeks post-injection. **Results:** Post-injections, elbow flexor muscle tone was reduced for 12 weeks ($p < 0.05$). Group differences in active range of motion during 3-D analysis tasks could not be demonstrated at any time post-intervention. However, individual analyses found that at 2 weeks post-injection, three subjects had >15 degrees increases in active elbow extension and six subjects showed an increase of >25 degrees in forearm supination during performance of the reach and hand-to-mouth tasks, respectively. **Conclusions:** 3-D kinematics can detect changes in active movements during functional tasks following botulinum toxin A injections, suggesting this could be a potential objective outcome measure in a clinical trial.

PMID: 18727674 [PubMed - as supplied by publisher]

18: Dev Med Child Neurol. 2008 Aug;50(8):640.

'Botulinum toxin A injection for children with spastic cerebral palsy'.

Yajie W, Baoqin G.

Department of Pediatrics, TianTan Hospital Affiliated to the Capital University of Medical Science, Beijing 100050, China.

PMID: 18754907 [PubMed - in process]

19: Dev Med Child Neurol. 2008 Aug;50(8):625-30.

Dysphagia in children with severe generalized cerebral palsy and intellectual disability.

Calis EA, Veugelers R, Sheppard JJ, Tibboel D, Evenhuis HM, Penning C.

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This study assessed the clinical indicators and severity of dysphagia in a representative sample of children with severe generalized cerebral palsy and intellectual disability. A total of 166 children (85 males, 81 females) with Gross Motor Function Classification System Level IV or V and $IQ < 55$ were recruited from 54 daycare centres. Mean age was 9 years 4 months (range 2y 1mo-19y 1mo). Clinically apparent presence and severity of dysphagia were assessed with a standardized mealtime observation, the Dysphagia Disorders Survey (DDS), and a dysphagia severity scale. Additional measures were parental report on feeding problems and mealtime duration. Of all 166 participating children, 1% had no dysphagia, 8% mild dysphagia, 76% moderate to severe dysphagia, and 15% profound dysphagia (receiving nil by mouth), resulting in a prevalence of dysphagia of 99%. Dysphagia was positively related to severity of motor impairment, and, surprisingly, to a higher weight for height. Low frequency of parent-reported feeding problems indicated that actual severity of dysphagia tended to be underestimated by parents. Proactive identification of dysphagia is warranted in this population, and feasible using a structured mealtime observation. Children with problems in the pharyngeal and esophageal phases, apparent on the DDS, should be referred for appropriate clinical evaluation of swallowing function.

PMID: 18754902 [PubMed - in process]

20: Dev Med Child Neurol. 2008 Aug;50(8):618-24.

Parent and professional reports of the quality of life of children with cerebral palsy and associated intellectual impairment.

White-Koning M, Grandjean H, Colver A, Arnaud C.

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To examine parent-professional agreement in proxy-reports of child quality of life (QoL) and the factors associated with low child QoL in children with cerebral palsy (CP) and associated intellectual impairment. Professional (teacher, therapist, or residential carer) and parent reports of QoL for 204 children (127 males, 77 females, mean age 10y 4mo [SD 1y 6mo]; range 8-12y) with CP and IQ \leq 70 were obtained in 2004 to 2005 in nine European regions, using the KIDSCREEN questionnaire. Parent-professional agreement was studied using correlation and mean differences; multilevel logistic regression was used to determine factors influencing QoL reports and agreement. The mean parent-reported scores of child QoL were significantly higher than the professional reports in the Psychological well-being domain and significantly lower for Social support. The average frequency of disagreement (parent-professional difference $>0.5SD$ of scores) over all domains was 62%. High levels of stress in parenting negatively influenced parent reports of child QoL compared with professional reports, while child pain was associated with professionals rating lower than parents. Proxies do not always agree when reporting the QoL of children with severe disabilities. Parental well-being and child pain should be taken into account in the interpretation of QoL reports in such children.

PMID: 18754901 [PubMed - in process]

21: Dev Med Child Neurol. 2008 Aug;50(8):567.

Dysphagia is prevalent in children with severe cerebral palsy.

Reilly S, Morgan A.

Royal Children's Hospital, Murdoch Childrens Research Institute, and Department of Paediatrics, University of Melbourne Melbourne, Australia.

PMID: 18754892 [PubMed - in process]

22: J Paediatr Child Health. 2008 Jul-Aug;44(7-8):468-9; author reply 469.

Comment on:

J Paediatr Child Health. 2007 Jun;43(6):499-501.

Re: Botulinum neurotoxin A: an unusual systemic effect 43 (2007) 499-501.

Scheinberg A, O'Flaherty S, Waugh MC, Baxter A, Gurd K.

Publication Types:

Comment

Letter

PMID: 18638338 [PubMed - indexed for MEDLINE]

23: J Pediatr Orthop. 2008 Apr-May;28(3):392.

Comment on:

J Pediatr Orthop. 2005 Jul-Aug;25(4):479-83.

"Kinematic and kinetic evaluation of the ankle joint before and after tendo Achilles lengthening in patients with spastic diplegia".

Rethlefsen SA, Kay RM.

Publication Types:
Comment
Letter

PMID: 18362810 [PubMed - indexed for MEDLINE]

24: J Pediatr Orthop. 2008 Apr-May;28(3):320-3.

Quantifying postoperative bone loss in children.

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BACKGROUND: Postoperative bone density loss is an accepted phenomenon that has not been objectively quantified. The extent of this bone loss is documented using preoperative and postoperative dual energy x-ray absorptiometry scans to demonstrate the magnitude of the problem and to underline the need for prevention and treatment. **METHODS:** Children undergoing lower extremity surgery who required a minimum of 4 weeks of either non-weight bearing or cast immobilization postoperatively were recruited to undergo preoperative and postoperative dual energy x-ray absorptiometry scans of lumbar spine and both distal femora. Percent change in bone mineral density (BMD) as well as Z-scores in preoperative and postoperative scans were compared, as were operated and nonoperated limbs, using paired t tests. **RESULTS:** Fifteen of 18 subjects completed the second scan. Children lost up to 34% BMD in the cancellous region of the operated leg (average, 16.5%), up to 28% in transitional bone (average, 11.5%), and up to 16% (average, 4.8%) in the cortical region ($P < 0.05$). The Z-scores fell 1.0 SD for cancellous, 0.75 transitional, and 0.45 cortical. **CONCLUSIONS:** That children can lose up to 34% of BMD in 4 to 6 weeks is sobering. A 1 SD drop in T score, in adults, can infer a 2-fold increase in fracture risk. This may be insignificant in a healthy child with good BMD, but to a chronically ill child, a doubling of fracture risk may lead to insufficiency fracture. Avoiding the problem and proactive treatment are the goals. **LEVEL OF EVIDENCE:** Level I, prospective diagnostic study.

Publication Types:
Research Support, Non-U.S. Gov't

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25: Aust J Physiother. 2008;54(3):185-9.

Electrical simulation in addition to passive stretch has a small effect on spasticity and contracture in children with cerebral palsy: a randomised within-participant controlled trial.

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Question: Does electrical stimulation in addition to passive stretching reduce spasticity and contracture more than passive stretching alone in children with cerebral palsy? Design: Randomised within-participant controlled trial with concealed allocation, assessor blinding, and intention-to-treat analysis. Participants: Eleven (one dropout) children with cerebral palsy and bilateral knee flexor spasticity aged 13 years (SD 1). Intervention: One leg in each participant received the experimental intervention for four weeks which consisted of 30 min of electrical stimulation of the quadriceps 3 times per week and passive stretching of the hamstrings 5 times per week. The other leg received the control intervention for four weeks which consisted of passive stretching of the hamstrings 5 times per week. Outcome measures: Spasticity of the hamstrings was measured using the modified Ashworth scale. Contracture was measured as maximum passive knee extension using goniometry. Results: The mean difference in decrease in the modified Ashworth score due to the addition of electrical stimulation to the stretching regimen was 0.8 points (95% CI 0.1 to 1.5). The mean difference in increase in passive knee extension due to the addition of electrical stimulation to the stretching regimen was 4 degrees (95% CI 0 to 7). Conclusion: Electrical stimulation combined with passive stretching is marginally more effective than passive stretching alone for spastic limbs of children with cerebral palsy.

PMID: 18721122 [PubMed - in process]

26: NeuroRehabilitation. 2008;23(3):245-52.

Mirror therapy activates outside of cerebellum and ipsilateral M1.

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Mirror therapy is effective in the rehabilitation of patients with hemiparesis, but its mechanism is not clear. In this study, a patient with brain tumor (patient 1) who underwent mirror therapy after surgery and showed drastic recovery of hand paresis, a patient with visual memory disturbance (patient 2), and five normal volunteers performed tasks related to mirror therapy in fMRI study. In patient 1 and all normal volunteers, right and left hand clenching with looking at a mirror (eye open) activated outside of cerebellum, while right and left hands clenching with eye closed activated inside of cerebellum. In patient 2, mirror therapy did not activate outside of cerebellum. In patient 1, and 3 out of 5 normal volunteers, the area of right (affected) M1 activated by right and left hands clenching with eye open was more than that by right and left hands clenching with eye closed, and that right M1 was activated by right hand clenching with eye open. In conclusion, mirror therapy facilitate the paresis of patients by activating ipsilateral M1 and outside of cerebellum, which is possibly related to visual memory function.

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