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Interventions and Management

1. *Eur J Paediatr Neurol.* 2013 Sep 16. pii: S1090-3798(13)00129-3. doi: 10.1016/j.ejpn.2013.08.001. [Epub ahead of print]

Comparing contents of outcome measures in cerebral palsy using the international classification of functioning (ICF-CY): A systematic review.

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The International Classification of Functioning children and youth version (ICF-CY) provides a universal framework for defining and classifying functioning and disability in children worldwide. To facilitate the application of the ICF in practice, ICF based-tools like the "ICF Core Sets" are being developed. In the context of the development of the ICF-CY Core Sets for children with Cerebral Palsy (CP), the aims of this study were as follows: to identify and compare the content of outcome measures used in studies of children with CP using the ICF-CY coding system; and to describe the most frequently addressed areas of functioning in those studies. We searched multiple databases likely to capture studies involving children with CP from January 1998 to March 2012. We included all English language articles that studied children aged 2-18 years and described an interventional or observational study. Constructs of the outcome measures identified in studies were linked to the ICF-CY by two trained professionals. We found 231 articles that described 238 outcome measures. The outcome measures contained 2193 concepts that were linked to the ICF-CY and covered 161 independent ICF-CY categories. Out of the 161 categories, 53 (33.5%) were related to body functions, 75 (46%) were related to activities/participation, 26 (16.1%) were related to environmental factors, and 7 (4.3%) were related to body structures. This systematic review provides information about content of measures that may guide researchers and clinicians in their selection of an outcome measure for use in a study and/or clinical practice with children with CP.

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2. J Neurosci. 2013 Sep 18;33(38):15050-5. doi: 10.1523/JNEUROSCI.1968-13.2013.**Decrease in muscle contraction time complements neural maturation in the development of dynamic manipulation.**

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Developmental improvements in dynamic manipulation abilities are typically attributed to neural maturation, such as myelination of corticospinal pathways, neuronal pruning, and synaptogenesis. However the contributions from changes in the peripheral motor system are less well understood. Here we investigated whether there are developmental changes in muscle activation-contraction dynamics and whether these changes contribute to improvements in dynamic manipulation in humans. We compared pinch strength, dynamic manipulation ability, and contraction time of the first dorsal interosseous muscle in typically developing preadolescent, adolescent, and young adults. Both strength and dynamic manipulation ability increased with age ($p < 0.0001$ and $p < 0.00001$, respectively). Surprisingly, adults had a 33% lower muscle contraction time compared with preadolescents ($p < 0.01$), and contraction time showed a significant ($p < 0.005$) association with dynamic manipulation abilities. Whereas decreases in muscle contraction time during development have been reported in the animal literature, our finding, to our knowledge, is the first report of this phenomenon in humans and the first finding of its association with manipulation. Consequently, the changes in the muscle contractile properties could be an important complement to neural maturation in the development of dynamic manipulation. These findings have important implications for understanding central and peripheral contributors to deficits in manipulation in atypical development, such as in children with cerebral palsy.

[PMID: 24048835](#) [PubMed - in process]**3. Clin Rehabil. 2013 Sep 18. [Epub ahead of print]****The effectiveness of a physical activity stimulation programme for children with cerebral palsy on social participation, self-perception and quality of life: a randomized controlled trial.**

Van Wely L, Balemans AC, Becher JG, Dallmeijer AJ.

Department of Rehabilitation Medicine, MOVE Research Institute Amsterdam, VU University Medical Center, Amsterdam, The Netherlands.

Objective: To determine the effects of a six-month physical activity stimulation programme on social participation, self-perception and quality of life in children with cerebral palsy. Design: Multicentre randomized controlled trial with concealed allocation, blinded assessments and intention-to-treat analysis. Setting: Paediatric physiotherapy practices, special schools for children with a disability, and the child's own home. Subjects: Forty-nine children with spastic cerebral palsy (28 male), aged 7-13 years, able to walk with and without walking aids. Interventions: The intervention group followed a six-month physical activity stimulation programme involving counselling through motivational interviewing, home-based physiotherapy and four months of fitness training. The control group continued regular paediatric physiotherapy. Main measures: Outcomes included social participation in domestic life, social participation in recreation and leisure (Life-Habits for Children questionnaire and Children's Assessment of Participation and Enjoyment questionnaire), self-perception (Harter's Self-Perception Profile for Children) and parent-reported quality of life (Cerebral Palsy Quality of Life Questionnaire). Assessments were performed at baseline, at six months (except quality of life) and at twelve months. Results: Intervention resulted in a positive effect on social participation in domestic life at twelve months (mean between-group difference = 0.9, 95% confidence interval (CI) = 0.1 to 1.7 [1-10 scale], $P = 0.03$), but not at six months. No significant effects were found for social participation in recreation and leisure, self-perception at six months and twelve months or for quality of life at twelve months. Conclusions: The combination of counselling, home-based physiotherapy and fitness training was not effective in improving social participation in recreation and leisure, self-perception or quality of life, but did show a potential for improving social participation in domestic life over the longer term.

[PMID: 24047644](#) [PubMed - as supplied by publisher]

4. Res Dev Disabil. 2013 Sep 11;34(11):4017-4024. doi: 10.1016/j.ridd.2013.08.032. [Epub ahead of print]**A physical fitness follow-up in children with cerebral palsy receiving 12-week individualized exercise training.**

Jeng SC, Yeh KK, Liu WY, Huang WP, Chuang YF, Wong AM, Lin YH.

Department of Physical Therapy and Graduate Institute of Rehabilitation Science, College of Medicine, Chang Gung University, 259 Wen-Hwa 1st Road, Kwei-Shan, Tao-Yuan 333, Taiwan.

Physical fitness in children with cerebral palsy (CP) is lower than in their peers. A 12-week individualized home-based exercise program completed by 11 children with CP 10 years earlier showed a favorable effect on physical fitness performance. We follow-up the physical fitness of those 11 children with CP, and compare their physical fitness and health-related quality of life (HRQoL) to children with CP without exercise training matched with age and motor levels. Eleven children with CP in the 2003 program as a follow-up group (FUG) and 12 volunteers recruited as a control group (CG) participated in this study. Physical fitness measures, including cardiopulmonary endurance, muscle strength, body mass index (BMI), flexibility, agility, balance, and the SF-36 Taiwan version, were assessed in both groups. After 10 years, the FUG showed better physical fitness in cardiopulmonary endurance and muscle strength ($p < .05$). Compared to the CG, the FUG demonstrated better muscle strength, agility, and balance ($p < .05$). However, the HRQoL did not show a significant difference between the FUG and the CG. Individualized home-based exercise training is beneficial for children with CP. Over 10 years, the FUG was more devoted to physical activity than was the CG. Physical exercise may not directly affect the HRQoL in this study.

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[PMID: 24036390](#) [PubMed - as supplied by publisher]

5. Disabil Rehabil. 2013 Sep 13. [Epub ahead of print]**Effect of balance training on postural balance control and risk of fall in children with diplegic cerebral palsy.**

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Purpose: The purpose of this study was to evaluate the effects of balance training on postural control and fall risk in children with diplegic cerebral palsy. **Methods:** Thirty spastic diplegic cerebral palsied children (10-12 years) were included in this study. Children were randomly assigned into two equal-sized groups: control and study groups. Participants in both groups received a traditional physical therapy exercise program. The study group additionally received balance training on the Biodex balance system. Treatment was provided 30 min/d, 3 d/week for 3 successive months. To evaluate the limit of stability and fall risk, participated children received baseline and post-treatment assessments using the Biodex balance system. Overall directional control, total time to complete the test, overall stability index of the fall risk test and total score of the pediatric balance scale were measured. **Results:** Children in both groups showed significant improvements in the mean values of all measured variables post-treatment ($p < 0.05$). The results also showed significantly better improvement in the measured parameters for the study group, as compared to the control group ($p < 0.05$). **Conclusion:** Balance training on Biodex system is a useful tool that can be used in improving postural balance control in children with diplegic cerebral palsy. Implications for Rehabilitation Postural problems play a central role in the motor dysfunction of children with diplegic cerebral palsy. Balance control is important in the competence in the performance of most functional skills. The Biodex Balance System is an important balance assessment and training tool. Balance training in children with cerebral palsy can improve performance in postural control.

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6. Gait Posture. 2013 Sep 1. pii: S0966-6362(13)00587-0. doi: 10.1016/j.gaitpost.2013.08.029. [Epub ahead of print]

Spatio-temporal gait analysis in children with cerebral palsy using, foot-worn inertial sensors.

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A child's natural gait pattern may be affected by the gait laboratory environment. Wearable devices using body-worn sensors have been developed for gait analysis. The purpose of this study was to validate and explore the use of foot-worn inertial sensors for the measurement of selected spatio-temporal parameters, based on the 3D foot trajectory, in independently walking children with cerebral palsy (CP). We performed a case control study with 14 children with CP aged 6-15 years old and 15 age-matched controls. Accuracy and precision of the foot-worn device were measured using an optical motion capture system as the reference system. Mean accuracy±precision for both groups was 3.4±4.6cm for stride length, 4.3±4.2cm/s for speed and 0.5±2.9° for strike angle. Longer stance and shorter swing phases with an increase in double support were observed in children with CP ($p=0.001$). Stride length, speed and peak angular velocity during swing were decreased in paretic limbs, with significant differences in strike and lift-off angles. Children with cerebral palsy showed significantly higher inter-stride variability (measured by their coefficient of variation) for speed, stride length, swing and stance. During turning trajectories speed and stride length decreased significantly ($p<0.01$) for both groups, whereas stance increased significantly ($p<0.01$) in CP children only. Foot-worn inertial sensors allowed us to analyze gait spatiotemporal data outside a laboratory environment with good accuracy and precision and congruent results with what is known of gait variations during linear walking in children with CP.

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7. Gait Posture. 2013 Aug 31. pii: S0966-6362(13)00581-X. doi: 10.1016/j.gaitpost.2013.08.023. [Epub ahead of print]

Automated event detection algorithms in pathological gait.

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Accurate automated event detection is important in increasing the efficiency and utility of instrumented gait analysis. Published automated event detection algorithms, however, have had limited testing on pathological populations, particularly those where force measurements are not available or reliable. In this study we first postulated robust definitions of gait events that were subsequently used to compare kinematic based event detection algorithms across difficult pathologies. We hypothesized that algorithm accuracy would vary by gait pattern, and that accurate event detection could be accomplished by first visually classifying the gait pattern, and subsequently choosing the most appropriate algorithm. Nine published kinematic event detection algorithms were applied to an existing instrumented pediatric gait database (primarily cerebral palsy pathologies), that were categorized into 4 visually distinct gait patterns. More than 750 total events were manually rated and these events were used as a gold standard for comparison to each algorithm. Results suggested that for foot strike events, algorithm choice was dependent on whether the foot's motion in terminal swing was more horizontal or vertical. For horizontal foot motion in swing, algorithms that used horizontal position, resultant sagittal plane velocity, or horizontal acceleration signals were most robust; while for vertical foot motion, resultant sagittal velocity or vertical acceleration excelled. For toe off events, horizontal position or resultant sagittal plane velocity performed the best across all groups. We also tuned the resultant sagittal plane velocity signal to walking speed to create an algorithm that can be used for all groups and in real time.

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8. Spine (Phila Pa 1976). 2013 Sep 15;38(20):1764-9. doi: 10.1097/BRS.0b013e31829eca52.**Laminoplasty and pedicle screw fixation for cervical myelopathy associated with athetoid cerebral palsy: minimum 5-year follow-up.**

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Study design. Retrospective case series. **Objective.** To evaluate the outcomes following laminoplasty and posterior spinal fusion utilizing pedicle screws for cervical myelopathy associated with athetoid cerebral palsy. **Summary of Background data.** A variety of surgical procedures have been reported including decompression without fusion, spinal fusion by anterior, posterior or circumferential approach in this population. However, involuntary neck movements bring risk of postoperative neurological deterioration due to progression of kyphosis, pseudoarthrosis or adjacent segmental degeneration. **Methods.** A consecutive series of 17 patients who underwent midline T-saw laminoplasty and posterior spinal fusion using pedicle screws were retrospectively reviewed. There were 8 female and 9 male with a mean age at the time of surgery of 52 years. The mean follow-up was 71 months. Radiographic measures were made in change of Cobb angle of sagittal plane from C2 to C7 and accuracy of pedicle screws. Barthel index (BI) which shows independence in activities of daily life and the Japanese Orthopaedic Association (JOA) score were also evaluated. **Results.** Preoperative Cobb angle of sagittal plane from C2 to C7 measured 11.0 ± 14.5 degrees of kyphosis which improved to 1.5 ± 12.7 degrees postoperatively ($p < 0.05$). Solid posterior bony fusion was achieved in all cases without rigid orthosis such as Halo vest. There were two cases of adjacent segmental instability, which required additional surgery. Nineteen (13%) out of the 138 screws showed deviation from the pedicle with postoperative computed tomography. However, there were no neurovascular complications during or after the surgery in any cases. Postoperative JOA score and BI significantly improved in $32 \pm 16\%$, and $48 \pm 26\%$ respectively. **Conclusions.** laminoplasty and pedicle screw fixation provided strong internal fixation and improved neurological function and activities of daily living for cervical myelopathy associated with athetoid cerebral palsy.

[PMID: 24042720](#) [PubMed - in process]**9. Biomed Tech (Berl). 2013 Sep 7. pii: /j/bmte.2013.58.issue-s1-D/bmt-2013-4120/bmt-2013-4120.xml. doi: 10.1515/bmt-2013-4120. [Epub ahead of print]****Outcome of 23h Bracing for Tip-toe-walking Children with Cerebral Palsy.**

Kranzl A, Grasl C, Csepan R, Grill F.

[PMID: 24042745](#) [PubMed - as supplied by publisher]**10. Zhongguo Zhen Jiu. 2013 Jul;33(7):595-9.****Impacts on tiptoe deformity and intelligent development in spasmodic cerebral palsy treated with acupuncture at naoqing xue (extra) [Article in Chinese]**

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OBJECTIVE: To assess the impacts on tiptoe deformity and intelligent development in spasmodic cerebral palsy treated with acupuncture at Naoqing Xue (Extra). **METHODS:** One hundred and forty-six children with spasmodic cerebral palsy were randomized into a Naoqing Xue group (74 cases) and a control group (72 cases). On the basic treatment (scalp acupuncture, sport therapy), in the Naoqing Xue group, acupuncture at Naoqing Xue (Extra) was applied. In the control group, acupuncture was given at Jiexi (ST 41), Yanglingquan (GB 34) and Sanyinjiao (SP 6). In the two groups, acupuncture was given once every two days, 10 treatments made one session, at the interval of 15 days between two sessions. Three sessions of treatment were given continuously. Before treatment and after 3

sessions of treatment, the angle measurement of ankle passive dorsiflexion, comprehensive spasm scale (CSS) and Gesell intelligence test were adopted for the rehabilitation assessment. Additionally, 30 min after the end of the first acupuncture treatment, the angle measurement of ankle passive dorsiflexion and CSS were applied to assess the immediate effect of the therapeutic methods of the two groups. RESULTS: The immediate effect of the angle measurement of ankle passive dorsiflexion and CSS as well as the effect after 3 sessions of treatment in the Naoqing Xue group were all superior to those in the control group (all $P < 0.05$). In 3 sessions of treatment, the development quotients of social adaptive behavior and personal social activation function in Gesell intelligence test in the Naoqing Xue group were all higher than those in the control group (all $P < 0.05$). The development quotients of major movement, fine motion and language were not different significantly as compared with those in the control group ($P > 0.05$). CONCLUSION: Acupuncture at Naoqing Xue (Extra) relieves tiptoe deformity and promotes intelligent development for the children with spasmodic cerebral palsy.

[PMID: 24032188](#) [PubMed - in process]

11. Ayu. 2013 Jan;34(1):56-62. doi: 10.4103/0974-8520.115450.

Etiopathological study on cerebral palsy and its management by Shashtika Shali Pinda Sweda and Samvardhana Ghrita.

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According to World Health Organization (WHO) estimation, 10% of the global population has some form of disability due to different causes; in India, it is 3.8% of the population. Nearly 15-20% of the total physically handicapped children suffer from Cerebral Palsy (CP). For India, the estimated incidence is around 3/1000 live births; however, being a developing country, the expected actual figure may be much higher. Despite the advancement in modern technology and improved neonatal care, stagnant or increasing incidence of CP has been observed, which is of great concern. As far as management or preventive aspect is concerned, no satisfactory criteria have been developed to date. The present study is based on a positive hypothesis for the efficacy of Ayurvedic treatment. The study was carried out in 16 patients, 8 in each group, namely group A (Shashtika Shali Pinda Sweda externally and Samvardhana Ghrita internally) and group B (Samvardhana Ghrita internally) for 35 days duration. In group A, moderate improvement, mild improvement, and no improvement were observed in 50%, 37.5% and 12.5% of patients respectively. In group B, moderate improvement and mild improvement were observed in 75% and 25% of the patients respectively. Statistical significance of results on selected criteria showed the efficacy of the selected Ayurvedic treatment modality in relieving the signs and symptoms of CP. Although it is incurable, Ayurvedic science can provide a better direction by improving the quality of life of children with CP with better life expectancy.

[PMID: 24049406](#) [PubMed]

12. Int J Lang Commun Disord. 2013 Sep;48(5):477-85. doi: 10.1111/1460-6984.12026. Epub 2013 Jul 11.

Use of eye-pointing by children with cerebral palsy: what are we looking at?

Sargent J, Clarke M, Price K, Griffiths T, Swettenham J.

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BACKGROUND: Children with cerebral palsy often show significant communication impairment due to limited or absent speech. Further, motor impairment can restrict the use of movement, including pointing, to signal interest and intent. For some children, controlled gaze can be an effective 'point-substitute': such 'eye-pointing' can be used to request items, establish mutual interest in an event, or select vocabulary within an alternative or augmentative communication (ACC) system. However, in clinical practice there is a lack of clarity about how the term 'eye-pointing' is used, how 'eye-pointing' is recognized or how it relates to social development. AIMS: To present a clinical description of the term 'eye-pointing' with reference to children with severe cerebral palsy who cannot speak or finger-point. To consider this description within a wider discussion of the importance of gaze in communication development. METHODS & PROCEDURES: Cumulative clinical observations during assessment of children referred to a specialist multidisciplinary communication clinic have provoked discussion between the authors on

what factors precipitate use of the term 'eye-pointing' in young children with severe cerebral palsy. In particular, discussion has centred on whether use of the term is appropriate in individual cases and whether guidance is available about how gaze should be observed in this developmentally vulnerable group of children. A literature search was also conducted in order to explore whether the use and meaning of the term is established.

CONCLUSIONS & IMPLICATIONS: In interactions with non-speaking children, determining whether a child is using eye-gaze communicatively requires observation and interpretation of several factors. These processes will be informed by reflection on what is known about other aspects of the child's communication and interaction skills. Within the literature, the term 'eye-pointing' is sometimes used when describing the communication functions of individuals using augmentative and alternative communication (AAC) systems, and is occasionally qualified by a definition. No papers have been found that set out a clinical description universally applicable to children with severe motor impairment. Moreover, guidance is lacking on how possible episodes of 'eye-pointing' might be confidently distinguished from other episodes of directed gaze in young, developing communicators. The discussion of the term makes reference to the importance of gaze in early communication development, and explores factors that might influence gaze and its interpretation in young children with cerebral palsy. A description of eye-pointing for this group is offered. The authors suggest that this will bring practical benefits to those supporting the communication development of children with severe cerebral palsy.

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13. Percept Mot Skills. 2013 Apr;116(2):512-27.

Does verbal and gestural expression ability predict comprehension ability in cerebral palsy?

Pueyo R, Ariza M, Narberhaus A, Ballester-Plané J, Laporta-Hoyos O, Junqué C, Vendrell P.

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Some people with cerebral palsy have motor and associated impairments that may hinder verbal and gestural expression to various extents. This study explores whether the ability to produce verbal or gestural expressions may be related to the comprehension of verbal communications and gestures. The influence of severity of motor impairment, general cognitive performance, and age on comprehension ability was also explored. Forty people with cerebral palsy were assigned to different groups according to their verbal and gestural expression abilities. A neuropsychological assessment of comprehension abilities and general cognitive performance was carried out. Multiple linear regression analysis was applied to identify the possible influence of expression abilities on comprehension abilities and also to detect the possible contribution of severity of motor impairment, general cognitive performance, and age. Results indicate that verbal and gestural comprehension was mainly predicted by general cognitive performance. Severity of motor impairment and age did not contribute to predicting comprehension abilities. Only verbal grammar comprehension was significantly predicted by verbal expression ability. Verbal expression ability may be an important marker for cerebral palsy therapies. In non-ambulant patients with bilateral cerebral palsy, impaired gestural expression should not be taken as an indicator of impaired gestural comprehension.

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14. J Dev Behav Pediatr. 2013 Sep;34(7):478-85. doi: 10.1097/DBP.0b013e3182a39878.

Hearing difficulties in children with special health care needs.

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OBJECTIVE: To determine characteristics of children with special health care needs (CSHCN) with hearing difficulties including patterns of hearing aid use, comorbidity, and social and communication function. **METHODS:**

Bivariate and multivariable analysis of cross-sectional data on 40,723 children aged from birth to 17 years from the 2005-2006 National Survey of Children with Special Health Care Needs, including 1,982 (5%) with parent-reported hearing difficulties. RESULTS: Among CSHCN, 383 (1%) used hearing aids, representing 20% of those with reported hearing difficulties. Odds of hearing aid use increased with age, primary language other than English, and lower income. More than half (58%) of the aided children reported hearing difficulties even with their aid. Among CSHCN with cerebral palsy, 13% had reported hearing difficulties and 3% used hearing aids. Equivalent figures for children with Down syndrome were 24% and 4%, mental retardation/developmental delay 12% and 5%, and autism spectrum disorder 9% and 2%. Overall, two-thirds of CSHCN with hearing difficulties had one or more sensory/developmental comorbidities; CSHCN with both hearing difficulties and a sensory/developmental comorbidity had highest odds of learning difficulties, speaking/communication difficulties, feeling anxious/depressed, acting out/bullying, and difficulty making friends. CSHCN with hearing difficulties alone, or sensory/developmental conditions alone had intermediate odds, after socio-demographic adjustment. CONCLUSIONS: Sensory/developmental comorbidities are common among CSHCN with hearing difficulties, and they are associated with higher odds of poorer social, communication, and educational function. Services for CSHCN must be equipped to address a range of hearing difficulties as well as sensory/developmental comorbidities and to improve social/emotional functioning as well as learning and communication.

[PMID: 24042079](#) [PubMed - in process]

15. Res Dev Disabil. 2013 Sep 11;34(11):4025-4033. doi: 10.1016/j.ridd.2013.08.022. [Epub ahead of print]

Determinants of school activity performance in children with cerebral palsy: A multidimensional approach using the ICF-CY as a framework.

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This study aimed to identify the determinants of activity performance in children with cerebral palsy (CP) in school by considering factors from the entire scope of the International Classification of Functioning, Disability, and Health for Child and Youth (ICF-CY). A sample of 167 school-aged children with CP and their caregivers were recruited in the study. Activity performance in school settings was assessed with part 3 of the School Functional Assessment - Chinese version, which divides activity performance into performance of physical activities and cognitive/behavioral activities. Possible determinants were collected according to all dimensions of the ICF-CY. Multiple regression analyses showed that the determinants of performance of physical activities were receiving speech therapy in school, diplegia, having a domestic helper, and severity of gross and fine motor impairments, explaining 83% of the total variance; the determinants of performance of cognitive/behavioral activities were intellectual impairment, prosocial behavior, having an assistant in school, educational placement, severity of fine motor impairment, accounting for 73% of the total variance. Results of the study provide clinicians a holistic understanding of factors influencing school activity performance, and enable clinicians to make appropriate evaluations and interventions targeted at the determinants to enhance children's activity performance in school.

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16. Fam Process. 2013 Sep;52(3):411-24. doi: 10.1111/famp.12016. Epub 2013 Jan 7.

A randomized controlled trial of group Stepping Stones Triple P: a mixed-disability trial.

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Stepping Stones Triple P (SSTP) is a parenting program designed for families of a child with a disability. The current study involved a randomized controlled trial of Group Stepping Stones Triple P (GSSTP) for a mixed-disability group. Participants were 52 families of children diagnosed with an Autism Spectrum Disorder, Down syndrome, Cerebral Palsy, or an intellectual disability. The results demonstrated significant improvements in parent-

reported child behavior, parenting styles, parental satisfaction, and conflict about parenting. Results among participants were similar despite children's differing impairments. The intervention effect was maintained at 6-month follow-up. The results indicate that GSSTP is a promising intervention for a mixed-disability group. Limitations of the study, along with areas for future research, are also discussed.

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17. Phys Occup Ther Pediatr. 2013 Sep 13. [Epub ahead of print]

Evidence to Practice Commentary Advancing the Evidence and the Right to Participation.

Novak I.

Cerebral Palsy Alliance, School of Medicine, University of Notre Dame Australia, Darlinghurst NSW, Australia.

[PMID: 24032671](#) [PubMed - as supplied by publisher]

18. Phys Occup Ther Pediatr. 2013 Sep 13. [Epub ahead of print]

Cerebral Palsy: From Diagnosis to Adult Life

Cicirello N.

[PMID: 24032742](#) [PubMed - as supplied by publisher]

Prevention and Cure

19. AJNR Am J Neuroradiol. 2013 Sep 19. [Epub ahead of print]

Role of Diffusion Tensor Imaging as an Independent Predictor of Cognitive and Language Development in Extremely Low-Birth-Weight Infants.

Pogribna U, Burson K, Lasky RE, Narayana PA, Evans PW, Parikh NA.

Division of Neonatology, Department of Pediatrics, and Department of Radiology, University of Texas Health Science Center, Houston, Texas; Center for Perinatal Research, The Research Institute at Nationwide Children's Hospital, Columbus, Ohio; and Department of Pediatrics, Ohio State University College of Medicine, Columbus, Ohio.

BACKGROUND AND PURPOSE: Diffusion tensor imaging at term can predict later development of cerebral palsy. Less is known about its ability to independently predict cognitive and language development in extremely preterm infants. The goals of the study were to investigate the following: 1) whether regional DTI measures at term-equivalent age in extremely low-birth-weight infants (birth weight, ≤ 1000 g) are predictive of Bayley III developmental scores at 18- to 22-months' corrected age, and 2) to compare white matter microstructural development at term and neurodevelopmental outcomes of extremely low-birth-weight infants with healthy term controls. **MATERIALS AND METHODS:** Fractional anisotropy and mean diffusivity in 7 vulnerable cerebral regions were measured in 42 extremely low-birth-weight and 16 term infants with high-quality DTI scans. The Bayley mental scale score (average of cognitive and language scale scores) was the primary outcome of interest with individual scores serving as secondary outcomes. Multiple linear regression modeling was used to identify the incremental ability of DTI measures to predict Bayley scores over known predictors. **RESULTS:** Compared with healthy term infants, extremely low-birth-weight infants exhibited significantly higher mean diffusivity and lower fractional anisotropy in 6 of 7 regions. At 18- to 22-months' corrected age, 39 extremely low-birth-weight infants (93%) and 14

term infants (88%) had undergone neurodevelopmental assessments. Although not statistically significant, extremely low-birth-weight infants averaged 7-9 points lower on Bayley subtests than term controls. In multivariable analyses, centrum semiovale mean diffusivity was a significant predictor of mental and language scale scores, and subventricular zone fractional anisotropy was a significant predictor of cognitive scale scores. A 10% increase in centrum semiovale mean diffusivity was associated with a 4.6 (95% CI, 1.6-7.6) point lower mental scale score (adjusted R² = 0.341, P = .001). **CONCLUSIONS:** In our extremely low-birth-weight cohort, DTI was an independent predictor of later cognitive and language development.

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20. Anal Biochem. 2013 Sep 10. pii: S0003-2697(13)00423-5. doi: 10.1016/j.ab.2013.09.001. [Epub ahead of print]

Concurrent Quantification of Tryptophan and Its Major Metabolites.

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Imbalance in tryptophan (TRP) metabolites is associated with several neurological and inflammatory disorders. Therefore, analytical methods allowing for simultaneous quantification of TRP and its major metabolites would be highly desirable. We have developed a HPLC method for concurrent quantitative determination of tryptophan, serotonin, 5-hydroxyindoleacetic acid, kynurenine and kynurenic acid in tissue and fluids. The method utilizes the intrinsic spectroscopic properties of TRP and its metabolites that enable UV absorbance and fluorescence detection by HPLC, without additional labeling. The origin of the peaks related to analytes of interest, was confirmed by UV/Vis spectral patterns using a PDA detector, and mass spectrometry. The developed methods were validated in rabbit fetal brain and amniotic fluid at gestational day 29. Results are in excellent agreement with those reported in literature for the same regions. This method allows for rapid quantification of tryptophan and four of its major metabolites concurrently. A change in the relative ratios of these metabolites can provide important insights in predicting the presence and progression of neuroinflammation in disorders such as cerebral palsy, autism, multiple sclerosis, Alzheimer's and schizophrenia.

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21. Dev Med Child Neurol. 2013 Aug;55(8):681-2. doi: 10.1111/dmcn.12172. Epub 2013 May 16.

Predicting developmental plasticity after perinatal stroke.

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Comment on: Neonatal neuroimaging predicts recruitment of contralesional corticospinal tracts following perinatal brain injury. [Dev Med Child Neurol. 2013]

[PMID: 23678869](#) [PubMed - indexed for MEDLINE]

22. J Perinatol. 2013 Sep 19. doi: 10.1038/jp.2013.116. [Epub ahead of print]**Adverse neurodevelopmental outcomes after exposure to phenobarbital and levetiracetam for the treatment of neonatal seizures.**

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Objective: Compare neurodevelopment after levetiracetam (LEV) and phenobarbital (PB) for neonatal seizures. **Study design:** Retrospective study of infants who received antiepileptic drugs (AEDs) for neonatal seizures. Effect of cumulative exposure to LEV and PB on outcomes of death, cerebral palsy (CP) and Bayley Scales of Infant Development (BSID) scores were evaluated at 24 months corrected age. Analyses were adjusted for number of electrographic seizures and gestational age. **Result:** In 280 infants with comparable seizure etiology and cranial imaging results, increased exposure to PB was associated with worse BSID cognitive and motor scores (8.1- and 9-point decrease per 100 mg kg⁻¹; P=0.01). The effect was less with LEV (2.2- and 2.6-point decrease per 300 mg kg⁻¹ LEV (P=0.01)). CP probability increased by 2.3-fold per 100 mg kg⁻¹ PB and was not associated with increasing LEV. **Conclusion:** Increased exposure to PB is associated with worse neurodevelopmental outcomes than LEV. Prospective studies of outcomes of neonatal exposure to AEDs are essential.

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23. Neuropsychiatr Dis Treat. 2013;9:1295-300. doi: 10.2147/NDT.S42392. Epub 2013 Sep 9.**Prevalence of neurological disorders in Al Quseir, Egypt: methodological aspects.**

El-Tallawy H, Farghaly W, Metwally N, Rageh T, Shehata GA, Badry R, Moselhy EE, Hassan M, Sayed MM, Abdelwarith AA, Hamed Y, Shaaban I, Mohamed T, Hamed MA, Kandil M.

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Methodology and strategy play a very important role in epidemiological studies. Determination of the study area, geographical features, facilities, difficulties, and key personnel from the same area are important factors for successful methodology. Over 31 months (July 1, 2009 to January 31, 2012), a screening and an examination survey were carried out to ascertain the prevalence of epilepsy, stroke, dementia, cerebellar ataxia, migraine, cerebral palsy, Parkinsonism, chorea, athetosis, dystonia, trigeminal neuralgia, Bell's palsy, multiple sclerosis, spinal cord disorders, and attention deficit hyperactivity disorders in Al Quseir, Red Sea Governorate, Egypt. A total of 33,285 people were screened by three neurologists in a door-to-door manner, including every door, using a standardized Arabic questionnaire to detect any subject with a neurological disorder. The methodological aspects of this project were carried out through eight phases: (1) data collection; (2) preparation; (3) screening; (4) case ascertainment; (5) investigations; (6) classifications; (7) data entry; and (8) statistics and tabulations. The results of this study reveal that the total prevalence of neurological disorders in Al Quseir was 4.6% and higher among females (5.2%) than males (3.9%). The highest prevalence was recorded in the elderly population (60+ years [8.0%]) and among the age group 18-39 years (5.4%).

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24. Transfus Apher Sci. 2013 Aug 24. pii: S1473-0502(13)00279-6. doi: 10.1016/j.transci.2013.08.003. [Epub ahead of print]**Safety and efficacy of G-CSF mobilization and collection of autologous peripheral blood stem cells in children with cerebral palsy.**

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We hypothesized that mobilized peripheral blood stem cells (PBSCs) could be useful for treating neurological

impairments and therefore assessed the safety of administering G-CSF followed by collecting PBSC in children with cerebral palsy (CP). G-CSF (10µg/kg/day) was administered subcutaneously for 5 days, and apheresis was performed to collect PBSC via central venous catheter. G-CSF-related events occurred in 3 patients (fever in 2, irritability in 1). No catheter-related complications were reported. None of the patients needed platelet transfusion or calcium replacement during apheresis. Mobilization with G-CSF followed by PBSC collection appears to be safe and feasible in CP children.

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25. Value Health. 2013 Sep-Oct;16(6):953-64. doi: 10.1016/j.jval.2013.06.014.

Lifetime cost-effectiveness of trial of labor after cesarean in the United States.

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OBJECTIVE: To estimate the cost-effectiveness of a trial of labor after one previous cesarean (TOLAC) when incorporating long-term events and outcomes. **METHODS:** A Markov model comparing TOLAC with elective repeat cesarean delivery (ERCD) was developed for a hypothetical cohort with no contraindication to a TOLAC. Women were selected from a prospective study to derive probability estimates for potential events through three subsequent pregnancies. Probabilities for cerebral palsy and stress urinary incontinence, cost data, and quality-adjusted life-years (QALYs) were obtained from the literature. The primary outcome was cost-effectiveness measured as the marginal cost per QALY gained, with a \$50,000 threshold per QALY used to define cost-effectiveness. **RESULTS:** The TOLAC strategy dominated the ERCD strategy at baseline, with \$164.2 million saved and 500 QALYs gained per 100,000 women. The model was sensitive to six variables: the probability of uterine rupture and successful TOLAC among women with no prior vaginal delivery, the frequency of stress urinary incontinence, and the costs of failed TOLAC, successful TOLAC, and ERCD. When the probability of TOLAC success was at the base value, 67.2%, TOLAC was preferred if the probability of uterine rupture was 3.1% or less. When the probability of uterine rupture was at the base value, 0.8%, the TOLAC strategy was preferred as long as the probability of success was 47.2% or more. Probabilistic sensitivity analysis confirmed the base-case analysis. **CONCLUSIONS:** Under baseline circumstances, TOLAC is less expensive and more effective than an ERCD when considering long-term consequences when the likelihood of success is 47.2% or more.

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