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Interventions and Management

1. Am J Occup Ther. 2012 Jul-Aug;66(4):422-9.

Predicting the effects of cerebral palsy severity on self-care, mobility, and social function.

Phipps S, Roberts P.

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In this retrospective, longitudinal cohort study, the Pediatric Evaluation of Disability Inventory was used to predict the effects of cerebral palsy (CP) on self-care, mobility, and social function for 2,768 children, adolescents, and young adults with CP. Multiple linear regression was used to predict functional performance and level of caregiver assistance and found that CP severity, as measured by the Gross Motor Function Classification System and the Manual Ability Classification System, had the strongest effect. More severe levels of gross motor and fine motor dysfunction resulted in lower levels of self-care, mobility, and social function and increased levels of caregiver assistance. This study provides critical evidence regarding the importance of CP severity as a predictor of self-care, mobility, and social function that can be tested in future research to improve therapy treatment planning, caregiver education, and clinical resource utilization.

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[PMID: 22742690](https://pubmed.ncbi.nlm.nih.gov/22742690/) [PubMed - in process]

2. Pediatr Phys Ther. 2012 Fall;24(3):268-77.

Medical and surgical procedures experienced by young children with cerebral palsy.

McLellan A, Cipparone C, Giancola D, Armstrong D, Bartlett D.

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

PURPOSE: To determine the variation in medical and surgical procedures experienced by children with cerebral palsy (CP) by Gross Motor Function Classification System (GMFCS) levels and geographical region. **METHODS:**

A secondary analysis of an existing database was completed on 386 children with CP (56% male) between the ages of 18 months and 5 years (mean of 38 months, SD = 11.5). The total number of procedures experienced by young children was analyzed using 1-way analyses of variance. RESULTS: Botulinumtoxin A (Botox) injections, gastrostomies, shunts, and interventions involving the gastrointestinal tract, respiration, and eyes varied significantly by GMFCS level. No meaningful variations were detected between East, Central, and West regions in North America. CONCLUSIONS: This study describes variations in medical and surgical procedures for children with CP across GMFCS levels. This information is useful for therapists and parents when planning comprehensive services for young children with CP.

[PMID: 22735479](#) [PubMed - in process]

3. *Pediatr Phys Ther.* 2012 Fall;24(3):277.

Commentary on "medical and surgical procedures experienced by young children with cerebral palsy".

Michaels MB, Bossola K.

Slippery Rock University, Slippery Rock, Pennsylvania Children's Hospital of Pittsburgh University of Pittsburgh Medical Center, Pittsburgh, Pennsylvania Pine Center Specialty Care Center, Wexford, Pennsylvania.

[PMID: 22735480](#) [PubMed - in process]

4. *Dev Neurorehabil.* 2012 Jun 22. [Epub ahead of print]

Therapy management of the upper limb in children with cerebral palsy: A cross-sectional survey.

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Purpose: To establish perceived severity of upper limb (UL) impairments and their therapeutic management in children with cerebral palsy (CP). Methods: A cross-sectional questionnaire survey was mailed to all 208 paediatric physiotherapists (PTs) and occupational therapists (OTs) working in a region of the UK. Data analysis included descriptive statistics, frequency counts and chi-square tests. Results: A 74% response rate was achieved, of which 94 questionnaires were valid for analysis. Many impairments were rated as affecting the UL to a moderate or great extent. Goniometry and manual muscle testing were frequently reported for measuring UL impairment and by significantly more PTs than OTs. UL activity measures were rarely reported as being available or used by therapists. Participants frequently reported using positioning, neurodevelopmental therapy and task practice to treat UL dysfunction. Conclusions: UL management in children with CP could be enhanced by application of standardized measurement tools and evidence-based interventions.

[PMID: 22725133](#) [PubMed - as supplied by publisher]

5. *Stud Health Technol Inform.* 2012;176:315-8.

Surgical treatment of neuromuscular scoliosis: current techniques.

Greggi T, Lolli F, Di Silvestre M, Martikos K, Vommaro F, Maredi E, Giacomini S, Baioni A, Cioni A.

Department of Spinal Deformity Surgery, Rizzoli Orthopaedic Institute, Bologna Italy.

41 consecutive patients surgically treated at Our Department by posterior only instrumented fusion from January 1995 to January 2009 were reviewed. There were 20 females and 21 males with a mean age of 15.8 years (range, 10 to 38). Diagnosis was: cerebral palsy (13 cases), Duchenne muscular dystrophy (7), spinal amyotrophy (7), myelomeningocele (5), poliomyelitis (3), Friedreich's ataxia (2), Escobar syndrome (2), Steinert's disease (1), Charcot Marie Tooth disease (1). Main scoliosis Cobb angle averaged 94.05° (range, 34° to 165°), the curve was

thoracic in 19 cases, thoracolumbar or lumbar in 22 cases. Kyphosis (T5-T12) averaged 42.86° (range, 7° to 90°), lordosis was 33.57°. The fusion was extended to the lumbar tract in 23 patients, to the sacrum in the other 18. Our results showed that, in patients with neuromuscular scoliosis, posterior instrumented fusion is a safe and effective procedure and is the treatment of choice for patients with limited respiratory function, as in Duchenne muscular dystrophy and spinal muscular atrophy. The surgery should be performed as early as possible, and the extension of the fusion to the sacrum should be avoided in patients with residual walking ability.

[PMID: 22744518](#) [PubMed - in process]

6. Foot Ankle Int. 2012 Jun;33(6):469-74.

Results of extra-articular subtalar arthrodesis in children with cerebral palsy.

Mazis GA, Sakellariou VI, Kanellopoulos AD, Papagelopoulos PJ, Lyras DN, Soucacos PN.

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BACKGROUND: Grice-Green extra-articular subtalar arthrodesis is considered to be a valid surgical method which improves foot alignment in patients with spastic pes planovalgus deformity. The purpose of the present study was to examine the long-term results of Grice-Green procedure and whether it can achieve significant correction of each of the components of pes planovalgus deformity. **METHODS:** Eleven children (16~feet) with cerebral palsy who underwent Grice extra-articular subtalar arthrodesis were reviewed retrospectively. The mean age of patients at the time of surgery was 9~years and 8~months (range, 6~years 5~months to 12~years 4~months). The mean followup was 3~years and 7~months (range, 2~years 1~month to 8~years 3~months). Seven radiographic parameters of each patient before surgery, after surgery and at the latest followup were used. In addition, position of the graft relative to the weightbearing axis of the tibia was evaluated. **RESULTS:** Most of the examined parameters showed statistically significant correction which was maintained in the long run. Moreover, the placement of the graft along the mechanical axis seemed to play an important role for stability and preservation of correction of the planovalgus deformity. On the other hand, there were three cases where the osseous graft was absorbed and two cases where triple arthrodesis was necessary due to recurrence of the deformity. **CONCLUSION:** Grice-Green extra-articular subtalar arthrodesis improves foot alignment in patients with spastic pes planovalgus deformity and can achieve significant correction, postoperatively as well as on a long-term basis, of each of the components of pes planovalgus deformity.

[PMID: 22735318](#) [PubMed - in process]

7. Gait Posture. 2012 Jun 26. [Epub ahead of print]

Differences in the dynamic gait stability of children with cerebral palsy and typically developing children.

Kurz MJ, Arpin DJ, Corr B.

Department of Physical Therapy, Munroe-Meyer Institute for Genetics and Rehabilitation, University of Nebraska Medical Center, Omaha, NE, United States.

The aim of this investigation was to evaluate the differences in the dynamic gait stability of children with cerebral palsy (CP) and typically developing (TD) children. The participants walked on a treadmill for 2min as a motion capture system assessed the walking kinematics. Floquet analysis was used to quantify the rate of dissipation of disturbances that were present in the walking kinematics, and the variability measures were used to assess the magnitude of the disturbances present in the step length and width. The Floquet multipliers, step width and length values were correlated with Sections D and E of the Gross Motor Function Measure (GMFM). The children with CP had a larger Floquet multiplier and used a wider step width than the TD children. The magnitude of the maximum Floquet multiplier was positively correlated with the step width. Furthermore, the magnitude of the maximum Floquet multiplier and the step width were negatively correlated with the score on Section E of the GMFM. Lastly, the children with CP used a more variable step length than the TD children. These results suggest that children with CP have poor dynamic gait stability because they require more strides to dissipate the disturbances that are present in their walking pattern. In effort to stabilize these disturbances, the children with CP appear to utilize a

wider step width and modulate their step length. Overall the inability to effectively dissipate the gait disturbances may be correlated with the child's ability to perform a wide range of gross motor skills (e.g., step over obstacles, jump, walk up stairs).

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8. J Pediatr Orthop B. 2012 Jun 28. [Epub ahead of print]

An anatomical measurement of medial femoral torsion.

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Medial femoral torsion (MFT) can be corrected with derotational osteotomy. Derotational osteotomies can be performed in the proximal or the distal part of the femur. Similar results have been reported for these two procedures. The aim of this study was to evaluate the pathologic location of the MFT by measuring the degree of infratrochanteric and supratrochanteric torsion (STT) of the femur using computed tomography (CT) scans. The current study was carried out in patients with the chief complaint of an in-toeing gait because of the MFT. Sixty-seven patients were enrolled in the study. Forty-one patients (72 lower extremities) were included in the intervention group; 20 patients were included in the cerebral palsy (CP) group (35 lower extremities) and 21 patients were included in the developmental MFT group [developmental femoral torsional (DF) group, 37 lower extremities]. The control group included 26 patients (33 lower extremities) with uninjured limbs with a femoral or a tibial fracture. In this study, torsional angles [MFT, STT and infratrochanteric torsion (ITT)] were measured on CT scan using picture archiving and communication system measurement tools. To measure the STT and ITT, the most prominent points of the lesser and the greater trochanter were marked on CT scans; these two points were connected and were defined as the intertrochanteric line (ITL). The angle between the ITL and the axis of the femoral neck was defined as the STT. The angle between the ITL and the axis of the condylar axis was defined as the ITT. Two authors measured the MFT, STT, and ITT angles of each femur independently. The twisting of the femur had occurred in a different location for each case. In all groups, however, STT was reduced with increasing age; this change was statistically significant. ITT of the each group showed a random distribution. The means of the ITT in the control group and the DF group did not change significantly, and that of the CP group tended to decrease with age. MFT of the control group and the DF group reduced significantly with age ($P < 0.05$). The value of MFT in the CP group was steady, without a significant change with age. The pathology of MFT could occur differently in the supratrochanteric, infratrochanteric region, or for both sites in each patient. To avoid another lever arm disease after surgery, the correction of MFT should be performed in the correct position. In the CP group, derotational osteotomy could be performed safely at a younger age compared with the DF group. In addition, the distal femur is the preferable osteotomy site for older CP patients.

[PMID: 22744234](#) [PubMed - as supplied by publisher]

9. Pediatr Phys Ther. 2012 Fall;24(3):218-22.

A comparison of 2 techniques for measuring rectus femoris muscle thickness in cerebral palsy.

Dew AP, Moreau NG.

Department of Health Professions, Medical University of South Carolina, Charleston.

PURPOSE: Precise measures of muscle size are useful when investigating weakness in children with cerebral palsy (CP). Therefore, the purpose of the study was to determine agreement between 2 muscle thickness measurements of the rectus femoris (RF) in CP. **METHODS:** Measures of RF thickness in 13 youth with CP who were ambulatory (mean age: 14.4 ± 3.6 years) were obtained bilaterally using ultrasound imaging. Three measures were obtained at 50% thigh length and averaged (MT50). Maximum muscle thickness (MaxMT) was also determined through repeated measurements toward the proximal insertion of the RF. **RESULTS:** The Bland-Altman plot showed that all values, except for one outlier, fell within 95% limits of agreement (-0.11 to 0.28 cm), showing

excellent agreement. However, a constant bias toward higher values with MaxMT method was observed.
CONCLUSION: Given the time-consuming nature of obtaining MaxMT, the MT50 measurement may be a more feasible alternative when estimating maximum muscle thickness of the RF.

[PMID: 22735467](#) [PubMed - in process]

10. *Pediatr Phys Ther.* 2012 Fall;24(3):223.

Commentary on "a comparison of 2 techniques for measuring rectus femoris muscle thickness in cerebral palsy".

Vander Linden DW, Carlson SJ.

Department of Physical Therapy Eastern Washington University Spokane, Washington Spokane Guild's School Spokane, Washington.

[PMID: 22735468](#) [PubMed - in process]

11. *Zhongguo Zhen Jiu.* 2012 Apr;32(4):301-4.

Impacts on IEMG of gastrocnemius muscle for children with cerebral palsy treated with different intervention order [Article in Chinese]

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College of Acupuncture and Moxibustion, Fujian University of TCM, Fuzhou 350108, China.

OBJECTIVE: To observe the impacts on integrated electromyogram (IEMG) of gastrocnemius muscle of the children with spastic cerebral palsy treated with different intervention order of acupuncture and kinesitherapy. **METHODS:** Twenty-nine children with spastic cerebral palsy were randomly divided into group A (15 cases) in which the patients were treated with acupuncture before kinesitherapy, and group B (14 cases) in which the patients were treated with acupuncture after kinesitherapy. In group A, acupuncture was applied at Weizhong (BL 40) and Chengshan (BL 57). Afterward, Bobath kinesitherapy was adopted. In group B, Bobath kinesitherapy was adopted at first, and acupuncture was applied at Weizhong (BL 40) and Chengshan (BL 57) afterward. The instant changes of IEMG after treatment were recorded in each group. **RESULTS:** (1) Group A: after single acupuncture and the combined intervention in which acupuncture was applied together with kinesitherapy, IEMG increased apparently (both $P < 0.05$). There was no significant difference statistically in IEMG after acupuncture as compared with that after the combined intervention of acupuncture and kinesitherapy ($P > 0.05$). (2) Group B: after single kinesitherapy and the combined intervention in which acupuncture was applied together with kinesitherapy, IEMG increased in tendency, but no statistically significant difference indicated (both $P > 0.05$). (3) In comparison of IEMG after treatment between two groups, there was no significant difference statistically ($P > 0.05$). **CONCLUSION:** The different intervention order of acupuncture and kinesitherapy impacts significantly IEMG of gastrocnemius muscle of the children with spastic cerebral palsy. In order to avoid hypermyotonia of gastrocnemius muscle after treatment, kinesitherapy should be applied before acupuncture in priority.

[PMID: 22734374](#) [PubMed - in process]

12. *Pediatr Phys Ther.* 2012 Fall;24(3):232-240.

Development of the Early Activity Scale for Endurance for Children With Cerebral Palsy.

Westcott McCoy S, Yocum A, Bartlett DJ, Mendoza J, Jeffries L, Chiarello L, Palisano RJ.

Department of Rehabilitation Medicine, University of Washington (Dr McCoy), Seattle, Washington; Waypoint Pediatric Therapies (Dr Yocum), Sammamish, Washington; School of Physical Therapy, Faculty of Health Sciences, University of Western Ontario (Dr Bartlett), London, Ontario, Canada; Valley Medical Center, Children's Therapy (Dr Mendoza), Renton, Washington; Department of Rehabilitation Science, University of Oklahoma Health

Sciences Center (Dr Jeffries), Langston, Oklahoma; Programs in Physical Therapy and Rehabilitation Sciences, Drexel University (Drs Chiarello and Palisano), Philadelphia, Pennsylvania.

PURPOSE: The Early Activity Scale for Endurance (EASE) was developed as a clinically feasible measure of endurance for physical activity in young children with cerebral palsy (CP). Validity and reliability were evaluated. **METHODS:** Participants included 414 children with CP and 106 without CP. Parents completed the EASE, an 11-item self-report measure. For construct validity, EASE scores were compared by Gross Motor Function Classification System levels (0 assigned for children without CP), age, and gender. In subgroups, convergent validity with the 6-minute walk test and test-retest reliability with a second EASE were evaluated. **RESULTS:** EASE scores differed significantly by Gross Motor Function Classification System, but not by age or gender. The EASE correlated moderately ($r_s = 0.57$) with the 6-minute walk test. Test-retest reliability was high, intraclass correlation (2,1) = 0.95. **CONCLUSION:** The EASE has acceptable psychometrics for use in practice and research to estimate endurance for physical activity in young children with CP.

[PMID: 22735471](#) [PubMed - as supplied by publisher]

13. *Pediatr Phys Ther.* 2012 Fall;24(3):241.

Commentary on "development of the early activity scale for endurance for children with cerebral palsy".

O'neil ME, Fragala-Pinkham M.

Drexel University, Philadelphia, Pennsylvania Franciscan Hospital for Children, Brighton, Massachusetts.

[PMID: 22735472](#) [PubMed - in process]

14. *J Neurol Phys Ther.* 2012 Jun 28. [Epub ahead of print]

Neuromagnetic Activity of the Somatosensory Cortices Associated With Body Weight-Supported Treadmill Training in Children With Cerebral Palsy.

Kurz MJ, Wilson TW, Corr B, Volkman KG.

Department of Physical Therapy, Munroe-Meyer Institute for Genetics and Rehabilitation (M.J.K., B.C.), Department of Pharmacology and Experimental Neuroscience and Department of Neurology, College of Medicine (T.W.W.), and Division of Physical Therapy Education, School of Allied Health Programs (K.G.V.), University of Nebraska Medical Center, Omaha, Nebraska.

BACKGROUND AND PURPOSE: It has been previously shown that body weight-supported treadmill training (BWSTT) can improve the walking performance of children with cerebral palsy (CP). Potentially, the sensorimotor experience from BWSTT may facilitate reorganization of the brain areas that are involved in the control of the stepping pattern. We explored whether BWSTT has the potential to promote parallel changes in the motor behavior of children with CP and the activity of the somatosensory cortices. **METHODS:** Four children with spastic diplegic CP (age = 13.7 ± 2 years; 3 males and 1 female) who had Gross Motor Function Classification Scores that ranged from III to IV participated in this investigation. The body weight-supported treadmill training was performed twice a week for 6 weeks. Magnetoencephalography brain imaging was used to determine whether the amplitudes of the early latency somatosensory cortical responses changed after BWSTT. Motor behavioral outcomes included changes in walking speed, walking endurance, and lower extremity strength. **RESULTS:** The neuromagnetic source amplitudes were attenuated after BWSTT and were accompanied by faster walking speeds and improved lower extremity strengths. **DISCUSSION AND CONCLUSIONS:** These preliminary findings suggest that the BWSTT sensorimotor experience may result in neuroeconomical changes that reduce cortical processing demands in children with CP. Furthermore, these neuroplastic changes may be related to the parallel changes in the walking performance and lower extremity strength of children with CP.

[PMID: 22743850](#) [PubMed - as supplied by publisher]

15. Disabil Rehabil. 2012 Jun 23. [Epub ahead of print]**Nutritional status of children with cerebral palsy in Turkey.**

Tüzün EH, Güven DK, Eker L, Elbasan B, Bülbül SF.

Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, Kirikkale University, Kirikkale, Turkey.

Purpose: The aim of this study was to assess the nutritional status, and provide information regarding anthropometric measurements of cerebral-palsied children living in the city of Ankara, Turkey. **Method:** A total of 447 children with cerebral palsy (CP) were participated in this cross-sectional study. Participants were assessed for functional motor impairment by the gross motor function classification system (GMFCS). Assessment of nutritional status was based on the triceps skinfold thickness (TSF), arm fat area (AFA) estimates derived from TSF and mid-upper arm circumference measurements. TSF and AFA Z-scores were computed using reference data. **Results:** Cerebral-palsied children had lower TSF and AFA Z-scores compared to reference data from healthy children. The prevalence of underweight and overweight among boys was 8.3 and 9.5%, respectively, whereas it was 19.0 and 0.5% for girls. Underweight was more prevalent in the low functioning children than in moderate functioning children. **Conclusions:** The findings of this study indicate that cerebral-palsied children face nutritional challenges. Underweight is more prevalent than overweight among cerebral-palsied children. To optimize the outcomes of rehabilitation and prevention efforts, an understanding of the heterogeneity of nutritional status among children with CP is required. [Box: see text].

[PMID: 22725837](#) [PubMed - as supplied by publisher]

16. J Pediatr Orthop B. 2012 Jun 24. [Epub ahead of print]**Parenting stress in parents of children with cerebral palsy and its association with physical function.**

Park MS, Chung CY, Lee KM, Sung KH, Choi IH, Kim TW.

Department of Orthopaedic Surgery, Seoul National University Bundang Hospital, Kyungki bDepartment of Orthopaedic Surgery, Seoul National University Children's Hospital, Seoul, Korea.

This study was carried out to determine parenting stress levels in the parents of children with cerebral palsy (CP) and to examine the factors that contribute to the parenting stress score. Parenting stress levels were assessed in 101 parents of children with CP (mean age 8.8 years, SD 2.1) using the parenting stress index (PSI). The extent of involvement, gross motor function classification system, and pediatric outcomes data collection instrument were collected for patients' information. The responding parent, parents' age, percentage of involvement in the parenting role, employment, socioeconomic status, educational level, other children, and age were obtained for parents' information. Normative percentile scores were calculated for each subscale, each domain, and the total PSI score. Multiple regression analysis was carried out to determine the significant factors contributing to the PSI score. The mean total PSI score was 97.7 (SD 4.6). The global function score of pediatric outcomes data collection instrument ($P=0.004$) and ambulatory states (gross motor function classification system, $P=0.002$) were found to be the significant factors contributing to the total PSI score, where parents of children with a more favorable function showed a higher PSI score. Parents of children with CP showed a high level of parenting stress. Clinicians should keep in mind that psychological support and intervention might be needed for parents of children with CP.

[PMID: 22735919](#) [PubMed - as supplied by publisher]

17. Sensors (Basel). 2012;12(3):3049-67. Epub 2012 Mar 6.**A robust kalman algorithm to facilitate human-computer interaction for people with cerebral palsy, using a new interface based on inertial sensors.**

Raya R, Rocon E, Gallego JA, Ceres R, Pons JL.

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Mails: e.rocon@csic.es (E.R.); gallego@iai.csic.es (J.A.G.); ceres@iai.csic.es (R.C.); jlpons@iai.csic.es (J.L.P.).

This work aims to create an advanced human-computer interface called ENLAZA for people with cerebral palsy (CP). Although there are computer-access solutions for disabled people in general, there are few evidences from motor disabled community (e.g., CP) using these alternative interfaces. The proposed interface is based on inertial sensors in order to characterize involuntary motion in terms of time, frequency and range of motion. This characterization is used to design a filtering technique that reduces the effect of involuntary motion on person-computer interaction. This paper presents a robust Kalman filter (RKF) design to facilitate fine motor control based on the previous characterization. The filter increases mouse pointer directivity and the target acquisition time is reduced by a factor of ten. The interface is validated with CP users who were unable to control the computer using other interfaces. The interface ENLAZA and the RKF enabled them to use the computer.

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18. Res Dev Disabil. 2012 Jun 22;33(6):1975-1983. [Epub ahead of print]

Effectiveness of adaptive pretend play on affective expression and imagination of children with cerebral palsy.

Hsieh HC.

National Hsinchu University of Education, Department of Special Education, No. 521, Nanda Rd., Hsinchu City 300, Taiwan.

PURPOSE: Children with cerebral palsy (CP) have difficulty participating in role-pretending activities. The concept of adaptive play makes play accessible by modifying play materials for different needs or treatment goals for children with CP. This study examines the affective expressions and imagination in children with CP as a function of ordinary versus adaptive pretend play. **METHOD:** The Affect in Play Scale-Brief Rating measured the affective expression and imagination for 29 children with CP and 29 typically developing children (mean age=7.34 years). Two groups of children were observed while playing with a standard set of ordinary toys for ten times and with a standard procedure of adaptive pretend play for ten times. **RESULT:** The results show significantly different affective expressions and imagination between the two groups. Typically developing children displayed much more affective expression and imagination. However, a more positive influence of affective expression and imagination occurred in children with CP than in typically developing children. In repeated measures analysis, the frequency of positive affective expression and imagination of children with CP was higher when pretending with adaptive toys. **CONCLUSION:** Adaptive pretend play can promote more role-pretending behaviors and a sense of environmental control during the manipulating process for children with CP.

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19. Tohoku J Exp Med. 2012;227(3):185-9.

Monitoring the autonomic nervous activity as the objective evaluation of music therapy for severely and multiply disabled children.

Orita M, Hayashida N, Shinkawa T, Kudo T, Koga M, Togo M, Katayama S, Hiramatsu K, Mori S, Takamura N.

Departments of Global Health, Medicine and Welfare, Nagasaki University Graduate School of Biomedical Sciences.

Severely and multiply disabled children (SMDC) are frequently affected in more than one area of development, resulting in multiple disabilities. The aim of the study was to evaluate the efficacy of music therapy in SMDC using monitoring changes in the autonomic nervous system, by the frequency domain analysis of heart rate variability. We studied six patients with SMDC (3 patients with cerebral palsy, 1 patient with posttraumatic syndrome after head injury, 1 patient with herpes encephalitis sequelae, and 1 patient with Lennox-Gastaut syndrome characterized by frequent seizures, developmental delay and psychological and behavioral problems), aged 18-26

(mean 22.5 ± 3.5). By frequency domain method using electrocardiography, we measured the high frequency (HF; with a frequency ranging from 0.15 to 0.4 Hz), which represents parasympathetic activity, the low frequency/high frequency ratio, which represents sympathetic activity between the sympathetic and parasympathetic activities, and heart rate. A music therapist performed therapy to all patients through the piano playing for 50 min. We monitored each study participant for 150 min before therapy, 50 min during therapy, and 10 min after therapy. Interestingly, four of 6 patients showed significantly lower HF components during music therapy than before therapy, suggesting that these four patients might react to music therapy through the suppression of parasympathetic nervous activities. Thus, music therapy can suppress parasympathetic nervous activities in some patients with SMDC. The monitoring changes in the autonomic nervous activities could be a powerful tool for the objective evaluation of music therapy in patients with SMDC.

[PMID: 22729251](#) [PubMed - in process]

Prevention and Cure

20. Dev Neurobiol. 2012 Jun 25. doi: 10.1002/dneu.22043. [Epub ahead of print]

Prenatal and postnatal animal models of immune activation: Relevance to a range of neurodevelopmental disorders: Developmental Neurobiology Special Issue: Neuroimmunology in Development and Disease.

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Epidemiological evidence has established links between immune activation during the prenatal or early postnatal period and increased risk of developing a range of neurodevelopment disorders in later life. Animal models have been used to great effect to explore the ramifications of immune activation during gestation and neonatal life. A range of behavioural, neurochemical, molecular and structural outcome measures associated with schizophrenia, autism, cerebral palsy and epilepsy have been assessed in models of prenatal and postnatal immune activation. However, the epidemiology-driven disease-first approach taken by some studies can be limiting and, despite the wealth of data, there is a lack of consensus in the literature as to the specific dose, timing and nature of the immunogen that results in replicable and reproducible changes related to a single disease phenotype. In this review we highlight a number of similarities and differences in models of prenatal and postnatal immune activation currently being used to investigate the origins of schizophrenia, autism, cerebral palsy, epilepsy and Parkinson's disease. However, we describe a lack of synthesis not only between but also within disease-specific models. Our inability to compare the equivalency dose of immunogen used is identified as a significant yet easily remedied problem. We ask whether early life exposure to infection should be described as a disease-specific or general vulnerability factor for neurodevelopmental disorders and discuss the implications that either classification has on the design, strengths and limitations of future experiments. © 2012 Wiley Periodicals, Inc. *Develop Neurobiol*, 2012.

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21. J Trop Pediatr. 2012 Jun 25. [Epub ahead of print]

Cerebral Palsy in Maiduguri, Nigeria: A Case for Meningitis Prevention.

Peters GO, Ojo JD.

Department of Medical Rehabilitation (Physiotherapy), University of Maiduguri, Borno State, Nigeria.

[PMID: 22735792](#) [PubMed - as supplied by publisher]

22. Stroke. 2012 Jun 26. [Epub ahead of print]**Antenatal Factors Associated With Perinatal Arterial Ischemic Stroke.**

Darmency-Stamboul V, Chantegret C, Ferdynus C, Mejean N, Durand C, Sagot P, Giroud M, Bejot Y, Gouyon JB.

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BACKGROUND AND PURPOSE: Perinatal arterial ischemic stroke (PAIS) is a common cause of hemiplegic cerebral palsy in children. The diagnosis of PAIS is based on cerebral imaging. The objective of our study was to determine prenatal risk factors associated with PAIS. **METHODS:** A retrospective case-control study was nested in the whole population of Burgundy, France, from January 2000 to December 2007. Case patients were confirmed by review of brain imaging and medical records. Three control subjects per case were randomly selected from the study population by sex, term, place, and year of birth. **RESULTS:** PAIS was confirmed in 32 patients and its incidence was one per 4400 live births. In comparison to control subjects, clinical conditions significantly associated to cases were gestational diabetes (16.1% versus 4.2%; $P=0.04$), fetal heart rate abnormalities (35.5% versus 10.9%; $P=0.001$), and meconium-stained liquor (40% versus 12%; $P<0.001$). At the limit of statistical significance were found maternal smoking before (39.3% versus 22.9%; $P=0.08$) and during pregnancy (32.1% versus 16.7%; $P=0.07$), cord abnormalities (29% versus 14.1%; $P=0.06$), and cesarean delivery (28.1% versus 14.6%; $P=0.08$). In the multivariate analysis, maternal smoking during pregnancy (OR, 3.1; 95% CI, 1.1-8.8; $P=0.04$) was the only risk factor significantly associated with PAIS. **CONCLUSIONS:** This study is the first to identify maternal smoking during pregnancy as an independent prenatal risk factor of PAIS. Additional prospective studies are needed to confirm this result and to investigate the role of maternal smoking in fetal and neonatal thrombogenesis.

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