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Interventions and Management

1. Clin Rehabil. 2014 May 21. pii: 0269215514533709. [Epub ahead of print]

Upper limb training using Wii Sports Resort™ for children with hemiplegic cerebral palsy: A randomized, single-blind trial.

Chiu HC1, Ada L2, Lee HM3.

OBJECTIVE: To investigate whether Wii Sports Resort™ training is effective and if any benefits are maintained. **DESIGN:** Randomized, single-blind trial. **PARTICIPANTS:** Sixty-two hemiplegic children with cerebral palsy (6-13 years). **INTERVENTION:** Experimental group undertook six weeks of home-based Wii Sports Resort™ training plus usual therapy, while the control group received usual therapy. **MAIN MEASURES:** Outcomes were coordination, strength, hand function, and carers' perception of hand function, measured at baseline, six, and 12 weeks by a blinded assessor. **RESULTS:** There was a trend of mean difference (MD) for the experimental group to have more grip strength by six (MD 4.0 N, 95% confidence interval (CI) -0.8 to 8.8, $p = 0.10$) and 12 (MD 4.1 N, 95% CI -2.1 to 10.3, $p = 0.19$) weeks, and to have a higher quantity of hand function according to carers' perception by six (MD 4.5 N, 95% CI -0.7 to 9.7, $p = 0.09$) and strengthened by 12 (MD 6.4, 95% CI 0.6 to 12.3, $p = 0.03$) weeks than the control group. There was no difference between groups in coordination and hand function by six or 12 weeks. **CONCLUSION:** Wii™ training did not improve coordination, strength, or hand function. Beyond the intervention, carers perceived that the children used their hands more.

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2. Ann Rehabil Med. 2014 Apr;38(2):209-17. doi: 10.5535/arm.2014.38.2.209. Epub 2014 Apr 29.

Two-year outcomes of deep brain stimulation in adults with cerebral palsy.

Kim AR1, Chang JW2, Chang WS2, Park ES1, Cho SR3.

OBJECTIVE: To investigate the effect of deep brain stimulation (DBS) on reducing dystonia and disability in adults with cerebral palsy (CP) and to compare the therapeutic outcomes between primary dystonia patients and CP patients over two years after bilateral pallidal DBS. **METHODS:** Five patients with primary dystonia and seven CP patients with dystonia were recruited. All subjects received DBS surgery in both globus pallidus. Burke-Fahn-

Marsden dystonia rating scale consisting of dystonia movement score and disability score and subjective satisfaction scale were assessed after 1 month and every 6 months over two years following DBS treatment. RESULTS: On the dystonia movement scale, both groups of primary dystonia patients and CP patients showed a significant decrease over time following DBS. On the disability scale, patients with primary dystonia showed a significant decrease over time, whereas the disability score of CP patients did not change over the two years. Comparing the dystonia movement and disability scores of CP patients at each assessment, patients with primary dystonia showed a significant reduction after 6 months. Comparing the satisfaction scores of CP patients after DBS, patients with primary dystonia showed significantly higher subjective satisfaction. CONCLUSION: Whereas dystonia can be significantly reduced in patients with primary dystonia, CP patients showed a modest improvement on the dystonia movement scale, but not on the disability scale. Therefore, DBS may be considered with caution as a treatment modality of CP patients with dystonia.

PMID: 24855615 [PubMed] Free PMC Article

3. Braz J Phys Ther. 2014 Apr;18(2):99-110.

Measurement properties and feasibility of clinical tests to assess sit-to-stand/stand-to-sit tasks in subjects with neurological disease: a systematic review. [Article in English, Portuguese]

Silva PF1, Quintino LF2, Franco J2, Faria CD1.

BACKGROUND: Subjects with neurological disease (ND) usually show impaired performance during sit-to-stand and stand-to-sit tasks, with a consequent reduction in their mobility levels. OBJECTIVE: To determine the measurement properties and feasibility previously investigated for clinical tests that evaluate sit-to-stand and stand-to-sit in subjects with ND. METHOD: A systematic literature review following the PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses) protocol was performed. Systematic literature searches of databases (MEDLINE/SCIELO/LILACS/PEDro) were performed to identify relevant studies. In all studies, the following inclusion criteria were assessed: investigation of any measurement property or the feasibility of clinical tests that evaluate sit-to-stand and stand-to-sit tasks in subjects with ND published in any language through December 2012. The COSMIN checklist was used to evaluate the methodological quality of the included studies. RESULTS: Eleven studies were included. The measurement properties/feasibility were most commonly investigated for the five-repetition sit-to-stand test, which showed good test-retest reliability (Intraclass Correlation Coefficient: ICC=0.94-0.99) for subjects with stroke, cerebral palsy and dementia. The ICC values were higher for this test than for the number of repetitions in the 30-s test. The five-repetition sit-to-stand test also showed good inter/intra-rater reliabilities (ICC=0.97-0.99) for stroke and inter-rater reliability (ICC=0.99) for subjects with Parkinson disease and incomplete spinal cord injury. For this test, the criterion-related validity for subjects with stroke, cerebral palsy and incomplete spinal cord injury was, in general, moderate (correlation=0.40-0.77), and the feasibility and safety were good for subjects with Alzheimer's disease. CONCLUSIONS: The five-repetition sit-to-stand test was used more often in subjects with ND, and most of the measurement properties were investigated and showed adequate results.

[PMID: 24839043](#) [PubMed - in process] Free full text

4. Ann Rehabil Med. 2014 Apr;38(2):200-8. doi: 10.5535/arm.2014.38.2.200. Epub 2014 Apr 29.

Comparison of treatment effects between children with spastic cerebral palsy under and over five years after botulinum toxin type a injection.

Lee WY, Park GY, Kwon DR.

OBJECTIVE: To evaluate whether age influences a change in the spasticity of the ankle plantar flexor after botulinum toxin type A (BTA) injection in children with spastic cerebral palsy (CP). METHODS: Sixteen children with spastic CP were enrolled in the study. Seven children (group 1) were under 5 years of age, and nine (group 2) were over 5 years of age. They all received BTA injection in the gastrocnemius muscle (GCM) under ultrasound guidance. Passive range of motion (PROM) of ankle dorsiflexion, Modified Ashworth Scale (MAS) of the ankle plantar flexor, Gross Motor Function Measure (GMFM) and median red pixel intensity (RPI) of the medial GCM on real-time sonoelastography were measured at baseline (pre-injection) and 1-, 3-, and 6-month post-injection. RESULTS: In both groups, the mean PROM, MAS, and RPI were significantly improved after injection until 6-month

post-injection. The change of PROM of ankle dorsiflexion in group 1 was significantly greater than that in group 2, until 6-month post-injection. The change in the MAS and GMFM between baseline and 6-month post-injection in group 1 was greater than that in group 2. The changes in the median RPI between baseline and 3- and 6-month post-injections were greater in group 1 than in group 2. CONCLUSION: Our pilot study demonstrated the different changes in spasticity of the ankle plantar flexor after BTA injection based on age. Therefore, age may be considered when establishing a treatment plan using BTA injection for children with spastic CP.

[PMID: 24855614](#) [PubMed] Free PMC Article

5. Dev Med Child Neurol. 2014 May;56(5):482-9.

One-Minute Walk and modified Timed Up and Go tests in children with cerebral palsy: performance and minimum clinically important differences.

Hassani S, Krzak JJ, Johnson B, Flanagan A, Gorton G 3rd, Bagley A, Ounpuu S, Romness M, Tylkowski C, Oeffinger D.

AIM: This prospective multicenter study assessed performance and changes over time, with and without surgical intervention, in the modified Timed Up and Go (mTUG) and One-Minute Walk tests (1MWT) in children with bilateral cerebral palsy (CP). Minimum clinically important differences (MCIDs) were established for these tools. METHOD: Two hundred and nineteen participants with bilateral spastic CP (Gross Motor Function Classification System [GMFCS] levels I–III) were evaluated at baseline and 12 months follow-up. The non-surgical group (n=168; 54 females, 114 males; mean age 12y 11mo, [SD 2y 7mo], range 8y 1mo–19y) had no surgical interventions during the study. The surgical group (n=51; 19 females, 32 males; mean age 12y 10mo [SD 2y 8mo] range 8y 2mo–17y 5mo) underwent soft-tissue and/or bony procedures within 12 months from baseline. The mTUG and 1MWT were collected and MCIDs were established from the change scores of the non-surgical group. RESULTS: Dependent walkers (GMFCS level III) required more time to complete the mTUG ($p \leq 0.01$) than independent walkers (GMFCS levels I and II). For the 1MWT, distance walked decreased with increasing impairment ($p \leq 0.01$). 1MWT and mTUG change scores were not significantly different at any GMFCS level for either the surgical or non-surgical groups ($p \leq 0.01$). INTERPRETATION: Children with varying levels of function (GMFCS level) perform differently on the 1MWT and mTUG. The data and MCID values can assist clinicians in interpreting changes over time and in assessing interventions.

Comment in: Measuring the effectiveness of interventions for children with cerebral palsy. [Dev Med Child Neurol. 2014]

[PMID: 24843890](#) [PubMed - in process]

6. Clin Rehabil. 2014 May 16. pii: 0269215514533710. [Epub ahead of print]

The clinical impact of orthotic correction of lower limb rotational deformities in children with cerebral palsy: a randomized controlled trial.

Abd El-Kafy EM.

OBJECTIVE: This study aimed to evaluate the effectiveness of a static ground reaction ankle foot orthosis and strapping system on improving gait parameters in children with spastic diplegic cerebral palsy. SETTING: The current study was conducted at the physical therapy faculty of Cairo University, Egypt. SUBJECTS: This study included 57 children of both sexes, aged 6 to 8 years. STUDY DESIGN: Three-armed randomized control trial. INTERVENTION: Participants in all groups received a traditional neuro-developmental physical therapy program that included standing and gait training exercises. Children in group A performed the training program without any orthotic management, in group B with the TheraTogs™ strapping system, and in group C with the TheraTogs™ strapping system and static ground reaction ankle foot orthoses. Children underwent treatment for two hours daily, except on weekends, for twelve successive weeks. MAIN MEASURE: Gait speed, cadence, stride length, and hip and knee flexion angles in the mid-stance phase were evaluated pre-and post-treatment using a three-dimensional motion analysis system (pre-reflex system). RESULTS: Statistically significant differences were recorded among the three groups post-treatment in gait speed, cadences, and stride length. The P-values for these variable differences were 0.03, 0.011, and 0.001 respectively. Significant post-treatment differences were also recorded for

bilateral hip-and knee-flexion angles. For all measured parameters, better significant results were registered for group C than for the other groups. **CONCLUSION:** Orthotic intervention composed of a static ground reaction ankle foot orthosis combined with the TheraTogs™ strapping system improves gait more than conventional treatment with or without TheraTogs™ in children with spastic diplegic cerebral palsy.

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7. *Pediatr Emerg Care.* 2014 May 20. [Epub ahead of print]

Risk Factors Leading to Failed Procedural Sedation in Children Outside the Operating Room.

Grunwell JR1, McCracken C, Fortenberry J, Stockwell J, Kamat P.

OBJECTIVES: Deep sedation enables effective performance of imaging or procedures in children, but failed sedation still occurs. We desired to determine the factors that were associated with failed sedation in children receiving deep sedation by a dedicated nonanesthesia sedation service and hypothesized that the presence of an upper respiratory infection (URI) and/or other risk factors would increase the probability of failing sedation. **METHODS:** Patient sedation records from January 2007 to December 2011 were reviewed to identify 83 failed sedations. A convenience sample of 523 patients with successful sedation from January to February 2009 was identified for comparison. **RESULTS:** Seven of the 13 predictors were significantly associated with failed sedation; these are as follows: (1) URI ($P = 0.008$); (2) congenital heart disease ($P = 0.021$); (3) obstructive sleep apnea (OSA)/snoring ($P < 0.001$); (4) the American Society of Anesthesiologists (ASA) class of above II ($P < 0.001$); (5) obesity ($P < 0.001$); (6) increased weight ($P < 0.001$); and (7) older age ($P < 0.001$). Sex, prematurity, asthma, gastroesophageal reflux, and cerebral palsy/developmental delay were not associated with failure. Pulmonary hypertension was not able to be assessed because only 1 patient with pulmonary hypertension was sedated. A forward stepwise regression identified 5 variables that could be considered useful predictors of failed sedation, which are as follows: (1) URI (odds ratio [OR], 2.73 [range, 1.58-4.73]); (2) OSA/snoring (OR, 2.06 [range, 1.22-3.48]); (3) ASA class III (OR, 2.31 [range, 1.40-3.84]); (4) obesity (OR, 1.95 [range, 1.01-3.75]); and (5) older age (OR, 1.15 [range, 1.08-1.21]). **CONCLUSIONS:** Presence of a URI, a history of OSA/snoring, ASA class III, obesity, and older age are associated with increased probability of failed sedation. A prospective, multicenter observational study would allow for the robust modeling of comorbidities to guide pediatric sedation management.

[PMID: 24849275](#) [PubMed - as supplied by publisher]

8. *Undersea Hyperb Med.* 2014 Mar-Apr;41(2):77-85.

Intensive rehabilitation combined with HBO2 therapy in children with cerebral palsy: a controlled longitudinal study.

Mukherjee A, Raison M, Sahni T, Arya A, Lambert J, Marois P, James PB, Parent A, Ballaz L.

OBJECTIVE: The present study aimed to assess the effect of intensive rehabilitation combined with hyperbaric oxygen (HBO2) therapy on gross motor function in children with cerebral palsy (CP). **METHODS:** We carried out an open, observational, platform-independent study in 150 children with cerebral palsy with follow-up over eight months to compare the effects of standard intensive rehabilitation only (control group $n = 20$) to standard intensive rehabilitation combined with one of three different hyperbaric treatments. The three hyperbaric treatments used were: air ($FiO_2 = 21\%$) pressurized to 1.3 atmospheres absolute/atm abs ($n = 40$); 100% oxygen pressurized at 1.5 atm abs ($n = 32$); and 100% oxygen, pressurized at 1.75 atm abs ($n = 58$). Each subject assigned to a hyperbaric arm was treated one hour per day, six days per week during seven weeks (40 sessions). Gross motor function measure (GMFM) was evaluated before the treatments and at two, four, six and eight months after beginning the treatments. **RESULTS:** All four groups showed improvements over the course of the treatments in the follow-up evaluations ($p < 0.001$). However, GMFM improvement in the three hyperbaric groups was significantly superior to the GMFM improvement in the control group ($p < 0.001$). There was no significant difference between the three hyperbaric groups. **CONCLUSION:** The eight-month-long benefits we have observed with combined treatments vs. rehabilitation can only have been due to a beneficial effect of hyperbaric treatment.

[PMID: 24851544](#) [PubMed - in process]

9. Undersea Hyperb Med. 2014 Mar-Apr;41(2):71-6.

How and why hyperbaric oxygen therapy can bring new hope for children suffering from cerebral palsy--an editorial perspective.

Efrati S, Ben-Jacob E.

[PMID: 24851543](#) [PubMed - in process]

10. Occup Ther Int. 2014 May 16. doi: 10.1002/oti.1370. [Epub ahead of print]

Effectiveness of Standing Frame on Constipation in Children with Cerebral Palsy: A Single-Subject Study.

Rivi E1, Filippi M, Fornasari E, Mascia MT, Ferrari A, Costi S.

Children with cerebral palsy (CP) and quadriplegia or severe diplegia suffer from highly reduced mobility and consequent constipation. Clinicians recommend standing frames to exercise the support reaction in this population, sharing the opinion that the upright position may facilitate intestinal transit, although no evidence supports this assumption. We conducted this study to determine the effects of the standing frame on spontaneous evacuation in children with CP. Moreover, we studied its effects on the frequency of induction of evacuation, the characteristics of the stool and the pain suffered by the child due to constipation and/or evacuation. We implemented a single-subject research design in one chronically constipated child with CP and quadriplegia, Gross Motor Function Classification System Level V. To monitor the effects of the standing frame, we measured the outcome of interest throughout the study using a daily diary and the Bristol Stool Scale. This study was approved by the local Ethics Committee. This study has several limitations; primarily, the use of a single-subject research design only makes possible the visual analysis of data obtained from a unique patient. So, by themselves, data obtained do not allow us any generalization for the target population. Future research should verify our results collecting more data and also investigating the effect of the standing-frame on respiratory functions. Although the standing frame did not affect the frequency of evacuations or the characteristics of the stool, its employment reduced the inductions of evacuation and the related pain suffered by the child. However, this study has several limitations, such as the lack of generalization due to the fact that we studied a unique patient and the overall brevity of the study due to external circumstances. Therefore, we suggest future research to verify our results, also investigating the effect of the standing frame on respiratory functions. Relevance to clinical practice. The standing frame may positively influence the management of constipation of these children, possibly improving their quality of life. Copyright © 2014 John Wiley & Sons, Ltd.

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11. Dev Neurorehabil. 2014 May 19:1-6. [Epub ahead of print]

Executive functions in preschool children with cerebral palsy - Assessment and early intervention - A pilot study.

Sørensen K1, Liverød JR, Lerdal B, Vestrheim IE, Skranes J.

Objective: To assess the level of executive functioning among preschool children with cerebral palsy (CP) and evaluate effects of the Program Intensified habilitation (PIH). Methods: In this non-randomized, prospective study, 15 preschool children with CP, and their parents attended the PIH for a 1-year period. Executive functions were evaluated using the Behavior Rating Inventory of Executive functions - Preschool version (BRIEF-P), filled out by parents and preschool teachers. Results: Before PIH, scores of executive function difficulties were close to the general population mean. After PIH, fathers and preschool teachers reported reduced levels of executive difficulties on, respectively, the Emergent Metacognition Index and the Flexibility Index on the BRIEF-P. Mothers reported no changes. Conclusion: The children in our sample showed age-appropriate levels of executive functions before

attending PIH. Some aspects of executive skills difficulties were reduced after PIH. Using BRIEF-P contributed to the differentiation of cognitive strengths and weaknesses among the children.

[PMID: 24840746](#) [PubMed - as supplied by publisher]

12. Child Care Health Dev. 2014 May;40(3):354-62.

Family resources for families of children with cerebral palsy in Jordan: psychometric properties of the Arabic-family resources scale.

Almasri NA, Saleh M, Dunst CJ.

BACKGROUND: Resource-based, family-centred practices are associated with better health, emotional, and social well-being of children with disabilities. The adequacy of resources available for families of children with disabilities in Middle Eastern countries has not been described adequately in part because of lack of measures that are culturally adapted to be used in Arabic countries. Therefore, this study aims to (1) to evaluate the psychometric properties of the Arabic-Family Resource Scale (A-FRS) on a sample of families of children cerebral palsy (CP); (2) examine the adequacy of family resources as perceived by parents of children with CP in Jordan; and (3) examine the influence of child and family demographic variables on how parents report resources available to their families. **METHOD:** A cross-section design was applied. One-hundred fifteen parents of children with CP with mean age 4.6 years (SD = 4.4) and their parents participated in the study. Research assistants interviewed the participants to complete the A-FRS, and family and child demographic questionnaire, and determined the Gross Motor Function Classification System level of children. **RESULTS:** The principal axis factoring of the A-FRS yielded a six-factor solution that accounted for 67.39% of the variance and that is different than the factor structure reported by the developers of the FRS. Cronbach's coefficient alpha of the total score of family resources was 0.86 indicating a good internal consistency and the test-retest reliability for the total scale score was $r = 0.92$ ($P = 0.000$) indicating excellent test-retest reliability. Child health and family income were significantly associated with the total score of the A-FRS. **CONCLUSIONS:** The A-FRS is a valid and reliable measure of family resources for Jordanian families of children with CP. Service providers are encouraged to use A-FRS with families to plan resource-based interventions in which family resources are mobilized to meet family needs.

[PMID: 24843867](#) [PubMed - in process]

Prevention and Cure

13. Paediatr Child Health. 2014 Apr;19(4):185-9.

Trends in the prevalence of cerebral palsy among very preterm infants (<31 weeks' gestational age).

Vincer MJ¹, Allen AC², Allen VM³, Baskett TF³, O'Connell CM².

BACKGROUND: The birth prevalence of cerebral palsy varies over time among very preterm infants, and the reasons are poorly understood. **OBJECTIVE:** To describe the variation in the prevalence of cerebral palsy among very preterm infants over time, and to relate these differences to other maternal or neonatal factors. **METHODS:** A population-based cohort of very preterm infants was evaluated over a 20-year period (1988 to 2007) divided into four equal epochs. **RESULTS:** The prevalence of cerebral palsy peaked in the third epoch (1998 to 2002) while mortality rate peaked in the second epoch (1993 to 1997). Maternal anemia, tocolytic use and neonatal need for home oxygen were highest in the third epoch. **CONCLUSIONS:** Lower mortality rates did not correlate well with the prevalence of cerebral palsy. Maternal risk factors, anemia and tocolytic use, and the newborn need for home oxygen were highest during the same epoch as the peak prevalence of cerebral palsy.

[PMID: 24855414](#) [PubMed]

14. Dev Neurosci. 2014 May 21. [Epub ahead of print]**Magnesium Is Not Consistently Neuroprotective for Perinatal Hypoxia-Ischemia in Term-Equivalent Models in Preclinical Studies: A Systematic Review.**

Galinsky R1, Bennet L, Groenendaal F, Lear CA, Tan S, van Bel F, Juul SE, Robertson NJ, Mallard C, Gunn AJ.

There is an important unmet need to further improve the outcome of neonatal encephalopathy in term infants. Meta-analyses of large controlled trials now suggest that maternal magnesium sulfate (MgSO₄) therapy is associated with a reduced risk of cerebral palsy and gross motor dysfunction after premature birth, but that it has no effect on death or disability. Because of this inconsistency, it remains controversial whether MgSO₄ is clinically neuroprotective and, thus, it is unclear whether it would be appropriate to test MgSO₄ for treatment of encephalopathy in term infants. We therefore systematically reviewed the preclinical evidence for neuroprotection with MgSO₄ before or after hypoxic-ischemic encephalopathy (HIE) in term-equivalent perinatal and adult animals. The outcomes were highly inconsistent between studies. Although there were differences in dose and timing of administration, there was evidence that beneficial effects of MgSO₄ were associated with confounding mild hypothermia and, strikingly, the studies that included rigorous maintenance of environmental temperature or body temperature consistently suggested a lack of effect. On balance, these preclinical studies suggest that peripherally administered MgSO₄ is unlikely to be neuroprotective. Rigorous testing in translational animal models of perinatal HIE is needed before MgSO₄ should be considered in clinical trials for encephalopathy in term infants. © 2014 S. Karger AG, Basel.

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15. AJNR Am J Neuroradiol. 2014 May 22. [Epub ahead of print]**MRI-Based Radiologic Scoring System for Extent of Brain Injury in Children with Hemiplegia.**

Shiran SI1, Weinstein M2, Sirota-Cohen C2, Myers V2, Ben Bashat D2, Fattal-Valevski A2, Green D2, Schertz M2.

BACKGROUND AND PURPOSE: Brain MR imaging is recommended in children with cerebral palsy. Descriptions of MR imaging findings lack uniformity, due to the absence of a validated quantitative approach. We developed a quantitative scoring method for brain injury based on anatomic MR imaging and examined the reliability and validity in correlation to motor function in children with hemiplegia. **MATERIALS AND METHODS:**

Twenty-seven children with hemiplegia underwent MR imaging (T1, T2-weighted sequences, DTI) and motor assessment (Manual Ability Classification System, Gross Motor Functional Classification System, Assisting Hand Assessment, Jebsen Taylor Test of Hand Function, and Children's Hand Experience Questionnaire). A scoring system devised in our center was applied to all scans. Radiologic score covered 4 domains: number of affected lobes, volume and type of white matter injury, extent of gray matter damage, and major white matter tract injury. Inter- and intrarater reliability was evaluated and the relationship between radiologic score and motor assessments determined. **RESULTS:** Mean total radiologic score was 11.3 ± 4.5 (range 4-18). Good inter- ($\rho = 0.909$, $P < .001$) and intrarater ($\rho = 0.926$, $P < .001$) reliability was demonstrated. Radiologic score correlated significantly with manual ability classification systems ($\rho = 0.708$, $P < .001$), and with motor assessments (assisting hand assessment [$\rho = -0.753$, $P < .001$]; Jebsen Taylor test of hand function [$\rho = 0.766$, $P < .001$]; children's hand experience questionnaire [$\rho = -0.716$, $P < .001$]), as well as with DTI parameters. **CONCLUSIONS:** We present a novel MR imaging-based scoring system that demonstrated high inter- and intrarater reliability and significant associations with manual ability classification systems and motor valuations. This score provides a standardized radiologic assessment of brain injury extent in hemiplegic patients with predominantly unilateral injury, allowing comparison between groups, and providing an additional tool for counseling families.

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16. Ann Rehabil Med. 2014 Apr;38(2):189-99. doi: 10.5535/arm.2014.38.2.189. Epub 2014 Apr 29.

Neuroradiological and neurophysiological characteristics of patients with dyskinetic cerebral palsy.

Park BH1, Park SH1, Seo JH1, Ko MH1, Chung GH2.

OBJECTIVE: To investigate neuroradiological and neurophysiological characteristics of patients with dyskinetic cerebral palsy (CP), by using magnetic resonance imaging (MRI), voxel-based morphometry (VBM), diffusion tensor tractography (DTT), and motor evoked potential (MEP). **METHODS:** Twenty-three patients with dyskinetic CP (13 males, 10 females; mean age 34 years, range 16-50 years) were participated in this study. Functional evaluation was assessed by the Gross Motor Functional Classification System (GMFCS) and Barry-Albright Dystonia Scale (BADS). Brain imaging was performed on 3.0 Tesla MRI, and volume change of the grey matter was assessed using VBM. The corticospinal tract (CST) and superior longitudinal fasciculus (SLF) were analyzed by DTT. MEPs were recorded in the first dorsal interossei, the biceps brachii and the deltoid muscles. **RESULTS:** Mean BADS was 16.4±5.0 in ambulatory group (GMFCS levels I, II, and III; n=11) and 21.3±3.9 in non-ambulatory group (GMFCS levels IV and V; n=12). Twelve patients showed normal MRI findings, and eleven patients showed abnormal MRI findings (grade I, n=5; grade II, n=2; grade III, n=4). About half of patients with dyskinetic CP showed putamen and thalamus lesions on MRI. Mean BADS was 20.3±5.7 in normal MRI group and 17.5±4.0 in abnormal MRI group. VBM showed reduced volume of the hippocampus and parahippocampal gyrus. In DTT, no abnormality was observed in CST, but not in SLF. In MEPs, most patients showed normal central motor conduction time. **CONCLUSION:** These results support that extrapyramidal tract, related with basal ganglia circuitry, may be responsible for the pathophysiology of dyskinetic CP rather than CST abnormality.

[PMID: 24855613](#) [PubMed] Free PMC Article

17. Clin Schizophr Relat Psychoses. 2014 May 20:1-10. [Epub ahead of print]

Folie à deux in monozygotic twins with cerebral palsy.

Francois D, Bander E, D'Agostino M, Swinburne A, Broderick L, Grody MB, Salajegheh A.

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18. Dev Med Child Neurol. 2014 May 21. doi: 10.1111/dmcn.12477. [Epub ahead of print]

Computer-based analysis of general movements reveals stereotypies predicting cerebral palsy.

Philippi H1, Karch D, Kang KS, Wochner K, Pietz J, Dickhaus H, Hadders-Algra M.

AIM: To evaluate a kinematic paradigm of automatic general movements analysis in comparison to clinical assessment in 3-month-old infants and its prediction for neurodevelopmental outcome. **METHOD:** Preterm infants at high risk (n=49; 26 males, 23 females) and term infants at low risk (n=18; eight males, 10 females) of developmental impairment were recruited from hospitals around Heidelberg, Germany. Kinematic analysis of general movements by magnet tracking and clinical video-based assessment of general movements were performed at 3 months of age. Neurodevelopmental outcome was evaluated at 2 years. By comparing the general movements of small samples of children with and without cerebral palsy (CP), we developed a kinematic paradigm typical for infants at risk of developing CP. We tested the validity of this paradigm as a tool to predict CP and neurodevelopmental impairment. **RESULTS:** Clinical assessment correctly identified almost all infants with neurodevelopmental impairment including CP, but did not predict if the infant would be affected by CP or not. The kinematic analysis, in particular the stereotypy score of arm movements, was an excellent predictor of CP, whereas stereotyped repetitive movements of the legs predicted any neurodevelopmental impairment. **INTERPRETATION:** The automatic assessment of the stereotypy score by magnet tracking in 3-month-old spontaneously moving infants at high risk of developmental abnormalities allowed a valid detection of infants affected and unaffected by CP.

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19. Am J Med Genet A. 2014 May 16. doi: 10.1002/ajmg.a.36559. [Epub ahead of print]

Cerebral palsy, epilepsy, and severe intellectual disability in a patient with 3q29 microduplication syndrome.

Fernández-Jaén A1, Castellanos MD, Fernández-Perrone AL, Fernández-Mayoralas DM, de la Vega AG, Calleja-Pérez B, Fernández EC, Albert J, Hombre MC.

Interstitial microduplication of 3q29 has been recently described. Individuals with this syndrome have widely variable phenotypes. We describe the first clinical case with a 1.607 Mb duplication at 3q29 (chr3: 195,731,956-197,339,329), accompanied by severe intellectual disability, epilepsy, and cerebral palsy. This duplication involves 22 genes; PAK2, DLG1, BDH1, and FBXO45 are implicated in neuronal development and synaptic function and could play an important role in this syndrome. We propose considering genetic studies, particularly array comparative genomic hybridization, in patients with epilepsy and/or cerebral palsy of unknown etiology when dysmorphic features are present. © 2014 Wiley Periodicals, Inc.

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20. Neuroscience. 2014 May 15. pii: S0306-4522(14)00341-8. doi: 10.1016/j.neuroscience.2014.04.038. [Epub ahead of print]

The challenge of understanding cerebral white matter injury in the premature infant.

Elitt CM1, Rosenberg PA2.

White matter injury in the premature infant leads to motor and more commonly behavioral and cognitive problems that are a tremendous burden to society. While there has been much progress in understanding unique vulnerabilities of developing oligodendrocytes over the past 30 years, there remain no proven therapies for the premature infant beyond supportive care. The lack of translational progress may be partially explained by the challenge of developing relevant animal models when the etiology remains unclear, as is the case in this disorder. There has been an emphasis on hypoxia-ischemia and infection/inflammation as upstream etiologies, but less consideration of other contributory factors. This review highlights the evolution of white matter pathology in the premature infant, discusses the prevailing proposed etiologies, critically analyzes a sampling of common animal models and provides detailed support for our hypothesis that nutritional and hormonal deprivation may be additional factors playing critical and overlooked roles in white matter pathology in the premature infant.

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Maternal adverse effects with different loading infusion rates of antenatal magnesium sulphate for preterm fetal neuroprotection: the IRIS randomised trial.

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OBJECTIVE: To evaluate a slower (compared with a standard) infusion rate of the loading dose of magnesium sulphate for preterm fetal neuroprotection as a strategy to reduce maternal adverse effects. **DESIGN:** Randomised controlled trial. **SETTING:** South Australian maternity hospital. **POPULATION:** Fifty-one women at <30 weeks of gestation, where birth was planned or expected within 24 hours. **METHODS:** Women received a loading infusion of 4 g of magnesium sulphate over either 60 or 20 minutes (followed by maintenance of 1 g/hour until birth, or for up to 24 hours). **MAIN OUTCOME MEASURES:** Any maternal adverse effects associated with the infusion. **RESULTS:** Overall, 71% of women experienced adverse effects during the first hour of their infusion; the difference between groups was not significant [15/25 (60%) 60-minute loading; 21/26 (81%) 20-minute loading; risk ratio (RR) 0.74; 95% confidence interval (95% CI) 0.51-1.08]. Although no serious maternal complications occurred, adverse effects

led to three women ceasing the loading treatment (1/25 in the 60-minute loading group; 2/26 in the 20-minute loading group; RR 0.52; 95% CI 0.05-5.38). Women in the 60-minute loading group experienced significantly less warmth and flushing at 20 minutes into the infusion (7/25 in the 60-minute loading group; 15/26 in the 20-minute loading group; RR 0.49; 95% CI 0.24-0.99). No other differences between groups for maternally reported and clinical adverse effects were shown. CONCLUSIONS: A slower rate of administering the loading dose of magnesium sulphate did not reduce the occurrence of maternal adverse effects overall. Flushing and warmth at 20 minutes into the infusion was reduced with a slower infusion.

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