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Interventions and Management

1. *Arq Neuropsychiatr.* 2014 May;72(5):360-7.

Side-to-side growth discrepancies in children with hemiplegic cerebral palsy: association with function, activity and social participation.

Zonta MB1, Ramalho-Júnior A2, Puppi M1, Bruck I3, Magdalena N3, Muzzolon SR1, Carvalho-Neto Ad4, Santos LH3.

Objective: Evaluate side-to-side discrepancies in children with hemiplegic cerebral palsy (HCP), and investigate associations of these discrepancies with patients' age at initiation of physical therapy, motor and cognitive function, and degree of activities and social participation. **Method:** We obtained eight side-to-side measurements from 24 HCP children with mean age 49.3±5.2 months. **Results:** Early initiation of physical therapy was associated with lower discrepancy in hand length ($p=0.037$). Lower foot length discrepancy was associated with lower requirement for caregiver assistance in activities related to mobility. Increased side-to-side discrepancy was associated with reduced wrist extension and increased spasticity. Discrepancy played a larger role in children with hemineglect and in those with right involvement. **Conclusion:** Increased discrepancy in HCP children was associated with reduced degree of activity/social participation. These results suggest an association between functional use of the extremities and limb growth.

[PMID: 24863512](#) [PubMed - in process] Free full text

2. *Res Dev Disabil.* 2014 May 23;35(9):1963-1969. doi: 10.1016/j.ridd.2014.04.028. [Epub ahead of print]

Increase in physical activities in kindergarten children with cerebral palsy by employing MaKey-MaKey-based task systems.

Lin CY1, Chang YM2.

In this study, we employed Flash- and Scratch-based multimedia by using a MaKey-MaKey-based task system to increase the motivation level of children with cerebral palsy to perform physical activities. MaKey MaKey is a circuit board that converts physical touch to a digital signal, which is interpreted by a computer as a keyboard message. In this study, we used conductive materials to control this interaction. This study followed single-case design using ABAB models in which A indicated the baseline and B indicated the intervention. The experiment period comprised 1 month and a half. The experimental results demonstrated that in the case of two kindergarten children with

cerebral palsy, their scores were considerably increased during the intervention phrases. The developmental applications of the results are also discussed.

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3. Dev Neurorehabil. 2014 May 27:1-7. [Epub ahead of print]

Continuous vs. blocks of physiotherapy for motor development in children with cerebral palsy and similar syndromes: A prospective randomized study.

Brunner AL1, Rutz E, Juenemann S, Brunner R.

Objective: To determine whether physiotherapy is more effective when applied in blocks or continuously in children with cerebral palsy (CP). **Methods:** A prospective randomized cross-over design study compared the effect of regular physiotherapy (baseline) with blocks of physiotherapy alternating with no physiotherapy over one year. Thirty-nine institutionalized children with CP and clinically similar syndromes (6-16 years old, Gross Motor Function Classification Scale II-IV) were included. During the first scholastic year, group A received regular physiotherapy, group B blocks of physiotherapy and vice versa in the second year. The Gross Motor Function Measure 66 (GMFM-66) was the outcome measure. **Results:** Thirteen children in each group completed the study. GMFM-66 improved ($p < 0.05$) over the study period in both groups in total; changes ($p < 0.05$) were seen only in dimension D (group B) and E (both groups) during regular therapy. **Conclusion:** Physiotherapy may be more effective when provided regularly rather than in blocks.

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4. Res Dev Disabil. 2014 May 23;35(9):2044-2052. doi: 10.1016/j.ridd.2014.04.031. [Epub ahead of print]

Altered trunk movements during gait in children with spastic diplegia: Compensatory or underlying trunk control deficit

Heyrman L1, Feys H2, Molenaers G3, Jaspers E4, Monari D5, Nieuwenhuys A6, Desloovere K7.

Altered trunk movements during gait in children with CP are considered compensatory due to lower limb impairments, although scientific evidence for this assumption has not yet been provided. This study aimed to study the functional relation between trunk and lower limb movement deficits during gait in children with spastic diplegia. Therefore, the relationship between trunk control in sitting, and trunk and lower limb movements during gait was explored in 20 children with spastic diplegia (age 9.2 ± 3 yrs; GMFCS level I $n=10$, level II $n=10$). Trunk control in sitting was assessed with the Trunk Control Measurement Scale (TCMS), a clinical measure that reflects the presence of an underlying trunk control deficit. Trunk movements during gait were measured with a recently developed trunk model including the pelvis, thorax, head, shoulder line and spine. Lower limb movements were assessed with the Plug-in-Gait model (Vicon®). Range of motion (ROM) of the different trunk segments was calculated, as well as the Trunk Profile Score (TPS) and Trunk Variable Scores (TVSs). Similarly, the Gait Profile Score (GPS) and Gait Variable Scores (GVSs) were calculated to describe altered lower limb movements during gait. Correlation analyses were performed between the presence of impaired trunk control in sitting (TCMS) and altered trunk movements during gait (ROM, TPS/TVSs) and between these altered trunk movements and lower limb movements (GPS/GVSs) during gait. A poorer performance on the TCMS correlated with increased ROM and TPS/TVSs, particularly for the thorax, indicating the presence of an underlying trunk control deficit. No significant correlation was found between the TPS and GPS, suggesting that overall trunk and lower limb movement deficits were not strongly associated. Only few correlations between specific lower limb deficits (GVSs for hip ab/adduction, knee flexion/extension and ankle flexion/extension) and TVSs for thorax lateral bending and rotation were found. This study provided first evidence that the altered trunk movements observed during gait should not be solely considered compensatory due to lower limb impairments, but that these may also partially reflect an underlying trunk control deficit. A better understanding of underlying trunk control deficits in children with CP may facilitate targeted therapy planning and ultimately can optimize a child's functionality.

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5. Dev Neurorehabil. 2014 May 27:1-5. [Epub ahead of print]

The effect of training in an interactive dynamic stander on ankle dorsiflexion and gross motor function in children with cerebral palsy.

Curtis DJ1, Bencke J, Mygind B.

Objective: To study the effect of active stretching of ankle plantarflexors using an interactive dynamic stander in children with cerebral palsy (CP). **Methods:** Six children in Gross Motor Function Classification System classes I-III, aged 4-10 years, trained intensive active dorsiflexion in an interactive dynamic stander using ankle movement to play custom computer games following a 10-week control period. Gross Motor Function Measure Item Set, gait performance and passive and active dorsiflexion with extended and flexed knee were chosen as outcome parameters. **Results:** Median active and passive ankle dorsiflexion increased significantly (5 and 10 degrees, respectively) with extended knee. There was a small but clinically significant increase in gross motor function. The intervention had no effect on temporospatial gait parameters. **Conclusion:** In spite of the low number of participants, these results may indicate that intensive active stretching in an interactive dynamic stander could be an effective new conservative clinical treatment of ankle plantarflexor contracture in children with CP.

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6. Disabil Rehabil Assist Technol. 2014 May 29:1-6. [Epub ahead of print]

Measuring static seated pressure distributions and risk for skin pressure ulceration in ice sledge hockey players.

Darrah SD1, Dicianno BE, Berthold J, McCoy A, Haas M, Cooper RA.

Purpose: To determine whether sledge hockey players with physical disability have higher average seated pressures compared to non-disabled controls. **Method:** Fifteen age-matched controls without physical disability and 15 experimental participants with physical disability were studied using a pressure mapping device to determine risk for skin pressure ulceration and the impact of cushioning and knee angle positioning on seated pressure distributions. **Results:** Regardless of participant group, cushioning, or knee angle, average seated pressures exceeded clinically acceptable seated pressures. Controls had significantly higher average seated pressures than the disability group when knees were flexed, both with the cushion ($p=0.013$) and without ($p=0.015$). Knee extension showed significantly lower average pressures in controls, both with the cushion ($p<0.001$) and without ($p<0.001$). Placement of the cushion resulted in significantly lower average pressure in controls when knees were extended ($p=0.024$) but not when flexed ($p=0.248$). Placement of the cushion resulted in no difference in pressure ($p=0.443$) in the disability group. **Conclusions:** Pressures recorded indicate high risk for skin ulceration. Cushioning was effective only in the control group with knees extended. That knee extension significantly lowered average seated pressures is important, as many sledge hockey players utilize positioning with larger knee flexion angles. **Implications for Rehabilitation** Ice sledge hockey is a fast growing adaptive sport. Adaptive sports have been associated with several positive improvements in overall health and quality of life, though may be putting players at risk for skin ulceration. Measured static seated pressure in sledges greatly exceeds current clinically accepted clinical guidelines. With modern improvements in wheelchair pressure relief/cushioning there are potential methods for improvement of elevated seated pressure in ice hockey sledges.

[PMID: 24875641](#) [PubMed - as supplied by publisher]

7. *J Physiother.* 2014 Mar;60(1):40-9. doi: 10.1016/j.jphys.2013.12.007. Epub 2014 Apr 24.

Physical activity stimulation program for children with cerebral palsy did not improve physical activity: a randomised trial.

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

Question: In children with cerebral palsy, does a 6-month physical activity stimulation program improve physical activity, mobility capacity, fitness, fatigue and attitude towards sports more than usual paediatric physiotherapy
Design: Multicentre randomised controlled trial with concealed allocation, blinded assessments and intention-to-treat analysis. Participants: Forty-nine walking children (28 males) aged 7-13 years with spastic cerebral palsy and severity of the disability classified as Gross Motor Function Classification System level I-III. Intervention: The intervention group followed a 6-month physical activity stimulation program involving counselling through motivational interviewing, home-based physiotherapy, and 4 months of fitness training. The control group continued their usual paediatric physiotherapy. Outcome measures: Primary outcomes were walking activity (assessed objectively with an activity monitor) and parent-reported physical activity (Activity Questionnaire for Adults and Adolescents). Secondary outcomes were: mobility capacity, consisting of Gross Motor Function Measure-66 (GMFM-66), walking capacity and functional strength, fitness (aerobic and anaerobic capacity, muscle strength), self-reported fatigue, and attitude towards sport (child and parent). Assessments were performed at baseline, 4 months, 6 months and 12 months. Results: There were no significant intervention effects for physical activity or secondary outcomes at any assessment time. Positive trends were found for parent-reported time at moderate-to-vigorous intensity (between-group change ratio=2.2, 95% CI 1.1 to 4.4) and GMFM-66 (mean between-group difference=2.8 points, 95% CI 0.2 to 5.4) at 6 months, but not at 12 months. There was a trend for a small, but clinically irrelevant, improvement in the children's attitudes towards the disadvantages of sports at 6 months, and towards the advantages of sports at 12 months. Conclusions: This physical activity stimulation program, that combined fitness training, counselling and home-based therapy, was not effective in children with cerebral palsy. Further research should examine the potential of each component of the intervention for improving physical activity in this population. Trial registration: NTR2099. [Van Wely L, Balemans ACJ, Becher JG, Dallmeijer AJ (2014) Physical activity stimulation program for children with cerebral palsy did not improve physical activity: a randomised trial. *Journal of Physiotherapy*60: 40-49].

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8. *Res Dev Disabil.* 2014 May 23;35(9):1995-2002. doi: 10.1016/j.ridd.2014.03.051. [Epub ahead of print]

Habitual physical activity and cardiometabolic risk factors in adults with cerebral palsy.

Ryan JM1, Crowley VE2, Hensey O3, Broderick JM4, McGahey A3, Gormley J4.

Adults with cerebral palsy (CP) are known to participate in reduced levels of total physical activity. There is no information available however, regarding levels of moderate-to-vigorous physical activity (MVPA) in this population. Reduced participation in MVPA is associated with several cardiometabolic risk factors. The purpose of this study was firstly to compare levels of sedentary, light, MVPA and total activity in adults with CP to adults without CP. Secondly, the objective was to investigate the association between physical activity components, sedentary behavior and cardiometabolic risk factors in adults with CP. Adults with CP (n=41) age 18-62yr (mean±SD=36.5±12.5yr), classified in Gross Motor Function Classification System level I (n=13), II (n=18) and III (n=10) participated in this study. Physical activity was measured by accelerometry in adults with CP and in age- and sex-matched adults without CP over 7 days. Anthropometric indicators of obesity, blood pressure and several biomarkers of cardiometabolic disease were also measured in adults with CP. Adults with CP spent less time in light, moderate, vigorous and total activity, and more time in sedentary activity than adults without CP (p<0.01 for all). Moderate physical activity was associated with waist-height ratio when adjusted for age and sex ($\beta=-0.314$, p<0.05). When further adjustment was made for total activity, moderate activity was associated with waist-height ratio ($\beta=-0.538$, p<0.05), waist circumference ($\beta=-0.518$, p<0.05), systolic blood pressure ($\beta=-0.592$, p<0.05) and diastolic blood pressure ($\beta=-0.636$, p<0.05). Sedentary activity was not associated with any risk factor. The findings provide evidence that relatively young adults with CP participate in reduced levels of MVPA and spend increased time in sedentary behavior, potentially increasing their risk of developing cardiometabolic disease.

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9. Res Dev Disabil. 2014 May 22;35(9):1970-1977. doi: 10.1016/j.ridd.2014.04.019. [Epub ahead of print]

Impaired visually guided weight-shifting ability in children with cerebral palsy.

Ballaz L1, Robert M2, Parent A3, Prince F4, Lemay M5.

The ability to control voluntary weight shifting is crucial in many functional tasks. To our knowledge, weight shifting ability in response to a visual stimulus has never been evaluated in children with cerebral palsy (CP). The aim of the study was (1) to propose a new method to assess visually guided medio-lateral (M/L) weight shifting ability and (2) to compare weight-shifting ability in children with CP and typically developing (TD) children. Ten children with spastic diplegic CP (Gross Motor Function Classification System level I and II; age 7-12 years) and 10 TD age-matched children were tested. Participants played with the skiing game on the Wii Fit game console. Center of pressure (COP) displacements, trunk and lower-limb movements were recorded during the last virtual slalom. Maximal isometric lower limb strength and postural control during quiet standing were also assessed. Lower-limb muscle strength was reduced in children with CP compared to TD children and postural control during quiet standing was impaired in children with CP. As expected, the skiing game mainly resulted in M/L COP displacements. Children with CP showed lower M/L COP range and velocity as compared to TD children but larger trunk movements. Trunk and lower extremity movements were less in phase in children with CP compared to TD children. Commercially available active video games can be used to assess visually guided weight shifting ability. Children with spastic diplegic CP showed impaired visually guided weight shifting which can be explained by non-optimal coordination of postural movement and reduced muscular strength.

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10. J Physiother. 2014 Mar;60(1):58. doi: 10.1016/j.jphys.2013.12.010. Epub 2014 May 9.

Progressive resistance exercise increases strength but does not improve objective measures of mobility in young people with cerebral palsy.

Damiano DL.

[PMID: 24856945](#) [PubMed - in process]

11. Am J Infect Control. 2014 May 22. pii: S0196-6553(14)00247-8. doi: 10.1016/j.ajic.2014.03.024. [Epub ahead of print]

Health care-associated respiratory infection surveillance among Chinese children with cerebral palsy.

Chen J1, Ma B2, Yan H3.

BACKGROUND: To explore the characteristics and distribution of hospital length of stay (LOS) and direct hospitalization costs of children with cerebral palsy (CP) affected by health care-associated infection (HAI). **METHODS:** A prospective observational study was performed from March 2010 to February 2012 on HAI cases among hospitalized children with CP. Demographic, clinical, and HAI data were recorded. Mann-Whitney test, chi-square test, and multiple linear regressions were used for data analysis. **RESULTS:** Of 528 patients with CP, 151 (28.6%) suffered HAI in the form of respiratory tract infection. Male to female ratio was 2.87. About 50 patients had recurrent HAI. Upper respiratory infection and pneumonia were common infections. HAI occurring more than once contributed mainly to total LOS, and the length of HAI was >10 days in >50% of patients. Frequency of HAI was an independent predictor of LOS, and frequency of HAI and LOS were independent predictors of hospitalization costs. **CONCLUSION:** Health care-associated respiratory infection significantly impacted LOS and total cost of children with CP admitted for rehabilitation. These data should assist in establishing preventive and control measures for

HAI to help improve the quality of rehabilitation and survival in the long run.

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12. Childs Nerv Syst. 2014 May 27. [Epub ahead of print]

COL4A1 mutations should not be a contraindication for epilepsy surgery.

Papandreou A1, Tisdall MM, Chong W, Cross JH, Harkness WF, Varadkar SM.

PURPOSE: We describe the first case in the literature of complication-free epilepsy surgery in a paediatric patient with collagen type IV alpha 1 (COL4A1) mutation. **METHODS:** This is a case report. **RESULTS:** COL4A1 mutations disrupt the integrity of vascular basement membranes, so predisposing to a broad spectrum of disorders including periventricular leucomalacia, haemorrhagic stroke, aneurysm formation, epilepsy and developmental delay. Intracranial haemorrhage is reported and may be recurrent or associated with trauma and anticoagulant therapy. Children have an increased risk of stroke with general anaesthesia. A 6-year-old girl, COL4A1 mutation positive, had drug-resistant epilepsy, cerebral palsy and developmental delay. Following presurgical evaluation, she was a candidate for corpus callosotomy. Previous general anaesthesia had been uncomplicated. Preoperative full blood count and coagulation studies were normal. Perioperatively, normotension was maintained, and anticoagulation was avoided. A complete corpus callosotomy was performed with no intracranial haemorrhage or other perioperative complications. **CONCLUSION:** Although there is an increased risk of intracranial haemorrhages in COL4A1 patients, this is not clearly quantifiable. There are minimal data in the literature on the subject. COL4A1 mutations should not be a contraindication for presurgical evaluation. Each patient should be individually evaluated and assessed, risks and benefits were carefully weighed, and informed decisions were reached after thorough discussions with patients and families.

[PMID: 24864020](#) [PubMed - as supplied by publisher]

13. Dev Med Child Neurol. 2014 May;56(5):416. doi: 10.1111/dmcn.12437.

Nutritional assessment: new tools and knowledge translation.

Samson-Fang L.

Comment on: Accuracy of skinfold and bioelectrical impedance assessments of body fat percentage in ambulatory individuals with cerebral palsy. [Dev Med Child Neurol. 2014]

[PMID: 24724994](#) [PubMed - indexed for MEDLINE]

14. J Tradit Complement Med. 2014 Jan;4(1):49-55. doi: 10.4103/2225-4110.124345.

Exploratory study on the Ayurveda therapeutic management of cerebral palsy in children at a tertiary care hospital of karnataka, India.

Shailaja U1, Rao PN2, Debnath P3, Adhikari A4.

Cerebral palsy (CP) is the leading cause of childhood disability affecting cognitive function and developments in approximately 1.5 to 3 cases per 1000 live births. Based on Ayurvedic therapeutic principles, CP patients were subjected to Abhyanga (massage) with Moorchita Tila Taila (processed sesame oil) and Svedana (fomentation) with Shastikashali Pinda Sveda (fomentation with bolus of drugs prepared with boiled rice). Study group received Mustadi Rajayapana Basti (enema with herbal decoction) and Baladi Yoga (a poly-herbo-mineral formulation), while the placebo group received Godhuma Vati (tablet prepared with wheat powder) and saline water as enema. Treatment with Mustadi Rajayapana Basti and Baladi Yoga improved the activities of daily life by 8.79%, gross motor functions by 19.76%, and fine motor functions 15.05%, and mental functions like memory retention got

improved by 15.43%. The placebo group showed an improvement of 0.21% in daily life activities, 2.8% in gross motor, and 2.4% in fine motor functions. Mustadi Rajayapana Basti and Baladi Yoga proved to be more supportive in improving the motor activities and gross behavioral pattern. Further clinical trials are required to evaluate and validate the maximum effect of the combination therapy in a large sample with repetition of the courses for longer duration.

[PMID: 24872933](#) [PubMed]

15. Disabil Rehabil. 2014 May 26:1-6. [Epub ahead of print]

Validation of the Caregiver Priorities and Child Health Index of Life with Disabilities (CPCHILD) in a sample of Dutch non-ambulatory children with cerebral palsy.

Zalmstra TA1, Elema A, Boonstra AM, Maathuis KG, Narayanan UG, V D Putten AA, Reinders-Messelink HA, Vlaskamp C, Lindeboom R.

Purpose: To assess the reliability and validity of the Caregiver Priorities and Child Health Index of Life with Disabilities (CPCHILD)-Dutch Version, a proxy measure of health status and well-being of non-ambulatory children with cerebral palsy (CP). **Methods:** Parents (n=66) of 47 boys/19 girls between 5 and 18 years with CP (GMFCS IV-V) participated. To assess the reliability each domain and the total measure was tested for internal consistency, test-retest and inter-rater reliability. Known-groups validity of the CPCHILD-DV was assessed by comparing mean scores of clinically distinct subgroups and convergent validity by correlating the CPCHILD-DV with the TNO-AZL Preschool Children Quality of Life (TAPQOL). **Results:** The mean CPCHILD-DV total score was 52.0 (SD11.5). Test-retest reliability of the total score as assessed by intraclass correlations (ICC) was 0.73 (domains: 0.55-0.80). For the inter-rater reliability the ICC was 0.64 (domains: 0.58-0.90); the Cronbach's alpha's ranged from 0.60 to 0.95. The CPCHILD score could differentiate between GMFCS levels and between subgroups of cognitive level in the domain "communication and social interaction". There were moderate significant correlations (range rs: 0.31-0.50) between sections of CPCHILD-DV and TAPQOL. **Conclusions:** The CPCHILD-DV has sufficient reliability and validity as a proxy measure of health status and well-being of non-ambulatory children with CP. Implications for Rehabilitation The Caregiver Priorities and Child Health Index of Life with Disabilities (CPCHILD) can be used to estimate health related quality of life of non-ambulatory children with cerebral palsy. The Dutch version of the CPCHILD has sufficient reliability and validity to be used as a proxy measure in research and clinical practice.

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16. J Child Neurol. 2014 May 27. pii: 0883073814535502. [Epub ahead of print]

Quality of Life in Children With Cerebral Palsy: Implications for Practice.

Gilson KM1, Davis E2, Reddihough D3, Graham K4, Waters E2.

The ability to assess the quality of life of children with cerebral palsy to inform and evaluate individual care plans, service planning, interventions, and policies is crucial. In this article, the recent evidence on quality of life in children with cerebral palsy is reviewed, with attention to the determinants of quality of life and role of this construct as a practical outcome indicator in clinical trials. Quality of life measurement advances for children with cerebral palsy are discussed with a focus on condition-specific quality of life measures, particularly, the Cerebral Palsy Quality of Life-Child, which is the first condition-specific quality of life measure for children with cerebral palsy. The article presents an overview for clinicians and researchers intending to use quality of life measures on children with cerebral palsy and provides recommendations for future research that will better inform practice in the field.

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17. Dev Med Child Neurol. 2014 May;56(5):504. doi: 10.1111/dmcn.12443. Epub 2014 Mar 19.

Brogren Carlberg and Löwing reply.

Brogren Carlberg E1, Löwing K.

Comment on: Does goal setting in activity-focused interventions for children with cerebral palsy influence treatment outcome

[Dev Med Child Neurol. 2013]

Can goal setting be isolated from activity-focused intervention in cerebral palsy [Dev Med Child Neurol. 2014]

[PMID: 24640946](#) [PubMed - indexed for MEDLINE]

18. J Child Neurol. 2014 May 27. pii: 0883073814535505. [Epub ahead of print]

Innovation in the Rehabilitation of Children With Cerebral Palsy: A 21st-Century View.

Majnemer A.

[PMID: 24870367](#) [PubMed - as supplied by publisher]

19. Res Dev Disabil. 2014 May 22;35(9):1952-1962. doi: 10.1016/j.ridd.2014.04.017. [Epub ahead of print]

Cognitive procedural learning among children and adolescents with or without spastic cerebral palsy: The differential effect of age.

Gofer-Levi M1, Silberg T2, Brezner A3, Vakil E4.

INTRODUCTION: Children learn to engage their surroundings skillfully, adopting implicit knowledge of complex regularities and associations. Probabilistic classification learning (PCL) is a type of cognitive procedural learning in which different cues are probabilistically associated with specific outcomes. Little is known about the effects of developmental disorders on cognitive skill acquisition. **METHODS:** Twenty-four children and adolescents with cerebral palsy (CP) were compared to 24 typically developing (TD) youth in their ability to learn probabilistic associations. Performance was examined in relation to general cognitive abilities, level of motor impairment and age. **RESULTS:** Improvement in PCL was observed for all participants, with no relation to IQ. An age effect was found only among TD children. **CONCLUSIONS:** Learning curves of children with CP on a cognitive procedural learning task differ from those of TD peers and do not appear to be age sensitive.

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20. J Rehabil Med. 2014 May 26. doi: 10.2340/16501977-1832. [Epub ahead of print]

Development of work participation in young adults with cerebral palsy: A longitudinal study.

Verhoef JA1, Bramsen I, Miedema HS, Stam HJ, Roebroek ME.

Objective: To document the development of work participation in young adults with cerebral palsy who are transitioning into adulthood, examine associated characteristics, and investigate work limitations and barriers among employed persons. **Design:** Observational longitudinal cohort study. **Subjects:** Seventy-four young adults with cerebral palsy of average intelligence, aged 16-20 years at baseline. **Methods:** Work participation in 3 categories (employed, unemployed, studying) was assessed at baseline, 2-year and 4-year follow-ups using structured interviews. At 4-year follow-up, associations of work participation with demographic and clinical characteristics were examined using multinomial logistic regression. **Work limitations and barriers among employed**

persons were evaluated using questionnaires. Results: From age range 16-20 years to age range 20-24 years the proportions of subjects who were employed and unemployed increased from 12% to 49% and 3% to 17%, respectively; the proportion who were students decreased from 85% to 34%. In the age range 20-24 years, the employment rate of young adults with cerebral palsy was lower and the unemployment rate higher, than that of the general population. A lower level of gross motor function and younger age were associated with unemployment. Employed persons experienced few work limitations; 28% experienced situational or health barriers. Conclusion: Young adults with cerebral palsy and average intelligence are at risk of experiencing unfavourable developments in work participation. Rehabilitation services should offer support to prevent unemployment and occupational disability.

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Prevention and Cure

21. Am J Obstet Gynecol. 2014 May 22. pii: S0002-9378(14)00498-0. doi: 10.1016/j.ajog.2014.05.030. [Epub ahead of print]

Neonatal and early childhood outcomes following early vs. later preterm premature rupture of membranes.

Manuck TA1, Varner MW2.

OBJECTIVE: Data regarding long term outcomes of neonates reaching viability following early preterm premature rupture of membranes (PPROM, <25.0 weeks at rupture) are limited. We hypothesized that babies delivered after early PPRM would have increased rates of major childhood morbidity compared to those with later PPRM (=25.0 weeks at rupture). **METHODS:** Secondary analysis of a multicenter RCT of magnesium sulfate vs. placebo for cerebral palsy prevention. Women with singletons and PPRM 15-32 weeks were included. All women delivered =24.0 wks. Those with PPRM <25.0 wks (cases) were compared to women with PPRM at 25.0-31.9 weeks (controls). Composite severe neonatal morbidity (sepsis, severe intraventricular hemorrhage, periventricular leukomalacia, severe necrotizing enterocolitis, bronchopulmonary dysplasia, and/or death) and composite severe childhood morbidity at age 2 (moderate or severe cerebral palsy and/or Bayley II Infant and Toddler Development scores >2 SD below the mean) were compared. **RESULTS:** 1,531 women (275 early PPRM cases) were included. Demographics were similar between groups. Cases delivered earlier (26.6 vs. 30.1 weeks, $p<0.001$), and had a longer rupture-to-delivery interval (20.0 vs. 10.4 days, $p<0.001$). Case neonates had high rates of severe composite neonatal morbidity (75.6% vs. 21.8%, $p<0.001$). Early PPRM children had higher composite severe childhood morbidity (51.6% vs. 22.5%, $p<0.001$). Early PPRM remained associated with composite severe childhood morbidity in multivariable models, even when controlling for delivery gestational age and other confounders. **CONCLUSIONS:** Early PPRM is associated with high rates of neonatal morbidity. Early childhood outcomes at age 2 remain poor compared to those delivered after later PPRM.

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22. J Child Neurol. 2014 May 26. pii: 0883073814532543. [Epub ahead of print]

Spectrum of Neurodevelopmental Disabilities: A Cohort Study in Hungary.

Gergev G1, Máté A2, Zimmermann A3, Rárosi F4, Sztrihá L5.

The spectrum of neurodevelopmental disabilities was studied in a cohort of patients in Hungary. A search for etiologies and assessment of the degree of intellectual disability were carried out. The study included 241 (131 boys) patients. Disability occurred without any prenatal, perinatal, and/or neonatal adverse events in 167 patients. They were classified into the following subgroups: genetic syndromes with recognized etiology, global developmental delay/intellectual disability in association with dysmorphic features but unknown etiology, global developmental delay/intellectual disability without dysmorphic features and recognized etiology, brain

malformations, inborn errors of metabolism, leukoencephalopathies, epileptic syndromes, developmental language impairment, and neuromuscular disorders. Adverse events occurred in 74 children classified into subgroups such as cerebral palsy after delivery preterm or at term, and disabilities without cerebral palsy. The etiology was identified in 66.4%, and genetic diagnosis was found in 19.5%. Classification of neurodevelopmental disorders contribute to etiological diagnosis, proper rehabilitation, and genetic counseling.

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23. J Matern Fetal Neonatal Med. 2014 May 28:1-14. [Epub ahead of print]

The effect of placental abruption on the outcome of extremely premature infants.

Furukawa S1, Doi K, Furuta K, Sameshima H.

Objective: To determine the effect of placental abruption on the outcome of infants born between 22 and 26 weeks of gestation. **Methods:** A retrospective study involving 32 cases of placental abruption. Controls were matched to cases according to gestational age and birth weight. Medical records were reviewed to confirm maternal background and neonatal outcome. We compared characteristics of maternal background and neonatal outcome between the two groups. **Results:** There were no significant differences in the incidence of pregnancy-induced hypertension, low maternal fibrinogen (<200 mg/dl), premature rupture of membrane, intrauterine infection, ischemic changes of the placenta, or funisitis between the groups. Non-reassuring fetal heart rate patterns (NRFHRs) during intrapartum were frequently seen in the placental abruption group compared to controls (75% vs. 51%, $p=0.02$). However, no differences were found for the incidence of low umbilical artery pH (<7.1), cerebral palsy, or neonatal death. The incidence of chronic lung disease (CLD, 66% vs. 43%, $p=0.04$) and hemosiderin deposition on the placenta (16% vs. 0%, $p<0.01$) was higher in abruptions compared to controls. **Conclusion:** Placental abruption has a risk for the development of NRFHRs and CLD in infants born between 22 and 26 weeks of gestation, but shows no effect on neonatal mortality.

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24. J Neurosci Res. 2014 May 26. doi: 10.1002/jnr.23415. [Epub ahead of print]

XAV939, a small molecular inhibitor, provides neuroprotective effects on oligodendrocytes.

Chen J1, Li J, Miao Z, Xu X, Liu CF.

White matter tracts are composed of axons and myelinating oligodendrocytes. Oligodendrocytes are the myelinating cells in the central nervous system that allow formation of myelin and saltatory nerve conduction. Cerebral white matter is highly vulnerable to ischemic injury in adults and neonates. White matter injury in newborn brains results in cerebral palsy and cognitive disability. In this study, we found that XAV939, a small-molecular inhibitor that stimulated β -catenin degradation by stabilizing axin, protected against serum and glucose deprivation (SGD)-induced cell death in oligodendrocyte cell line OLN-93 cells in a concentration-dependent manner. We further showed that XAV939 reduced caspase-3 and caspase-8 levels and increased the expression of phosphorylated Akt in SGD-induced OLN-93 cells. Our data demonstrate that XAV939 protects against neonatal hypoxic/ischemic injury. In summary, our results demonstrate that XAV939 confers neuroprotection against SGD-induced injury in OLN-93 cells via its antiapoptotic activity and the loss of oligodendrocytes and neurons in neonatal hypoxic/ischemic injury. © 2014 Wiley Periodicals, Inc.

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