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Interventions and Management

1. *J Biomech.* 2015 Oct 28. pii: S0021-9290(15)00575-8. doi: 10.1016/j.jbiomech.2015.10.027. [Epub ahead of print]

Examination of the torque required to passively palmar abduct the thumb CMC joint in a pediatric population with hemiplegia and stroke.

Stirling L, Ahmad MQ, Kelty-Stephen D, Correia A.

Many activities of daily living involve precision grasping and bimanual manipulation, such as putting toothpaste on a toothbrush or feeding oneself. However, children afflicted by stroke, cerebral palsy, or traumatic brain injury may have lost or never had the ability to actively and accurately control the thumb. To translate insights from adult rehabilitation robotics to innovative therapies for hand rehabilitation in paediatric care, specifically for thumb deformities, an understanding of the torque needed to abduct the thumb to assist grasping tasks is required. Participants ($n=16$, 10 female, 13.2 ± 3.1 years) had an upper extremity evaluation and measures were made of their passive range of motion, anthropometrics, and torques to abduct the thumb for both their affected and non-affected sides. Torque measures were made using a custom wrist orthosis that was adjusted for each participant. The torque to achieve maximum abduction was 1.47 ± 0.61 inlb for the non-affected side and 1.51 ± 0.68 inlb for the affected side, with a maximum recorded value of 4.87inlb. The overall maximum applied torque was observed during adduction and was 5.10inlb. We saw variation in the applied torque, which could have been due to the applied torques by the Occupational Therapist or the participant actively assisting or resisting the motion rather than remaining passive. We expect similar muscle and participant variation to exist with an assistive device. Thus, the data presented here can be used to inform the specifications for the development of an assistive thumb orthosis for children with "thumb-in-palm" deformity.

[PMID: 26542786](#)

2. *Dev Med Child Neurol.* 2015 Nov 3. doi: 10.1111/dmcn.12949. [Epub ahead of print]

Selective Control of the Upper Extremity Scale: validation of a clinical assessment tool for children with hemiplegic cerebral palsy.

Wagner LV, Davids JR, Hardin JW.

AIM: The ability to determine the relationship between selective motor control and upper extremity function in children with unilateral cerebral palsy (CP), and to measure the functional outcome and efficacy of interventions designed to improve selective motor control, has been limited by the lack of an objective, validated tool.

The primary objective of this study is to describe the development of a clinical tool entitled Selective Control of the Upper Extremity Scale (SCUES), and present evidence of its validity and reliability. **METHOD:** Content validity was established through an expert panel (eight clinicians, mean and median of 17y of clinical experience, range 2-30y). Intra- and interrater reliability was determined by six occupational therapists who scored 10 participant studies. Construct validity of the SCUES was established by comparison to the spontaneous functional analysis section of the Shriners Hospitals Upper Extremity Evaluation, the Manual Ability Classification System, and the Box and Block test for 25 children with unilateral CP. **RESULTS:** The content validity ratio values were greater than 0 (indicating >50% agreement) for 33 of the 34 items (97%), and equal or greater than 0.5 (indicating $\geq 75\%$ agreement) for 26 of the 34 items (76%). Intrarater reliability was excellent (intraclass correlation coefficient [ICC] > 0.75) for all segments and joints of the affected extremity. Interrater reliability was excellent for all segments and joints of the affected extremity except the shoulder (ICC=0.72). The SCUES was strongly correlated with the SHUEE (Spearman's $\rho=0.69$, $p=0.003$). The SCUES was not correlated with the Manual Ability Classification System ($\rho=-0.24$, $p=0.369$) or the Box and Block test ($\rho=0.47$, $p=0.066$). **INTERPRETATION:** Psychometric analysis of the SCUES revealed comparable validity to other accepted video-based clinical assessment tools for the upper extremity in children with CP.

[PMID: 26526592](#)

3. Acta Orthop. 2015 Nov 6:1-7. [Epub ahead of print]

Epidural analgesia is superior to local infiltration analgesia in children with cerebral palsy undergoing unilateral hip reconstruction.

Kjeldgaard Pedersen L, Nikolajsen L, Rahbek O, Uldall Duch B, Møller-Madsen B.

Background and purpose - Treatment of postoperative pain in children with cerebral palsy (CP) is a major challenge. We investigated the effect of epidural analgesia, high-volume local infiltration analgesia (LIA), and an approximated placebo control on early postoperative pain in children with CP who were undergoing unilateral hip reconstruction. **Patients and methods** - Between 2009 and 2014, we included 18 children with CP. The first part of the study was a randomized double-blind trial with allocation to either LIA or placebo for postoperative pain management, in addition to intravenous or oral analgesia. In the second part of the study, the children were consecutively included for postoperative pain management with epidural analgesia in addition to intravenous or oral analgesia. The primary outcome was postoperative pain 4 h postoperatively using 2 pain assessment tools (r-FLACC and VAS-OBS) ranging from 0 to 10. The secondary outcome was opioid consumption over the 21-h study period. **Results** - The mean level of pain 4 h postoperatively was lower in the epidural group (r-FLACC: 0.7; VAS-OBS: 0.6) than in both the LIA group (r-FLACC: 4.8, $p=0.01$; VAS-OBS: 5.2, $p=0.02$) and the placebo group (r-FLACC: 5.2, $p=0.01$; VAS-OBS: 6.5, $p<0.001$). Corrected for body weight, the mean opioid consumption was lower in the epidural group than in the LIA group and the placebo group (both $p<0.001$). **Interpretation** - Epidural analgesia is superior to local infiltration analgesia for early postoperative pain management in children with cerebral palsy who undergo unilateral hip reconstruction.

[PMID: 26541479](#)

4. J Pediatr Orthop. 2015 Oct 30. [Epub ahead of print]

What's New in the Orthopaedic Treatment of Cerebral Palsy.

Aversano MW, Sheikh Taha AM, Mundluru S, Otsuka NY.

BACKGROUND: The orthopaedic treatment of the patient with cerebral palsy (CP) is complex and must take into account the heterogeneity and natural history of the condition. Although the goals of management are for the most part universal, the specific interventions and outcome measures used to reach these goals are wide ranging. This update serves to summarize some of the recent publications in the field of paediatric orthopaedics that have made important contributions to our understanding and care of the patient with CP. **METHODS:** We searched the PubMed database using the following terms: "cerebral palsy" AND "orthopedic." The results were then filtered to include only review papers or clinical trials published in English from 2010 to 2014. The obtained list of references was then reviewed for publications in the fields of lower extremity muscle imbalance, foot and ankle deformities, hip and acetabular dysplasia, and advances in orthopaedic-related technology.

RESULTS: Updates in the field of paediatric orthopaedics are constant and the current level of evidence for the effectiveness of specific treatment modalities in patients with CP was reviewed. The search method yielded 153 publications, of which 31 papers were identified as having contributed important new findings. **CONCLUSIONS:** Our understanding of orthopaedic treatments for children with CP continues to grow and expand. The studies reviewed illustrate just some of the strides we have taken in utilizing evidence-based surgical decision making in practice. Nevertheless, there remains a paucity of randomized controlled trials and higher evidence research, which may contribute to the variability in current practices among providers. By elucidating these gaps we can more purposefully delegate our time and resources into targeted areas of research. **LEVEL OF EVIDENCE:** Level 4-literature review.

[PMID: 26523699](#)

5. J Pediatr Orthop B. 2015 Nov 2. [Epub ahead of print]

Stepwise surgical approach to equinovarus in patients with cerebral palsy.

Won SH, Kwon SS, Chung CY, Lee KM, Lee IH, Jung KJ, Moon SY, Chung MK, Park MS.

This study investigated the radiologic results of a stepwise surgical approach to equinovarus in 24 patients with cerebral palsy and determined the extent to which each procedure affected radiographic parameters using a linear mixed model. The anteroposterior talus-first metatarsal and anteroposterior talonavicular coverage angles were improved. The calcaneal pitch angle, tibiocalcaneal angle, lateral talus-first metatarsal angle, and naviculocuboid overlap were also improved. The Dwyer sliding osteotomy affected the tibiocalcaneal angle, whereas first metatarsal dorsal wedge osteotomy improved the calcaneal pitch angle and lateral first metatarsal angle. The stepwise surgical approach is effective for correction of equinovarus in cerebral palsy patients.

[PMID: 26529433](#)

6. Res Dev Disabil. 2015 Oct 27;47:430-440. doi: 10.1016/j.ridd.2015.10.009. [Epub ahead of print]

Relationships between gross- and fine motor functions, cognitive abilities, and self-regulatory aspects of students with physical disabilities.

Varsamis P, Agalotis I.

This article reports research on self-regulatory aspects (i.e., goal-setting, self-efficacy and self-evaluation) of secondary and post-secondary students with congenital motor disabilities, who performed a ball-throwing-at-a-target task. Participants were divided into four subgroups presenting distinct combinations of motor and cognitive abilities (i.e., normal cognitive development and mild physical disabilities, normal cognitive development and severe physical disabilities, mild-to-moderate intellectual disability and mild physical disabilities, and mild-to-moderate intellectual disability and severe physical disabilities). Results showed that students presenting mild motor disabilities exhibited a positive self-concept and self-regulation profile, irrespective of their cognitive functioning. Students with considerable motor disabilities, but without cognitive challenges, presented a negative, though realistic self-concept and self-regulation profile. Finally, students with considerable motor disabilities and mild-to-moderate cognitive disabilities showed a positive, though unrealistic, self-regulation profile. The nature of the diverse relationship of motor and cognitive (dis)abilities to specific self-regulatory aspects are discussed, and important instructional implications are mentioned.

[PMID: 26519661](#)

7. Cochrane Database Syst Rev. 2015 Nov 2;11:CD009257. [Epub ahead of print]

Sleep positioning systems for children with cerebral palsy.

Blake SF, Logan S, Humphreys G, Matthews J, Rogers M, Thompson-Coon J, Wyatt K, Morris C.

BACKGROUND: Sleep positioning systems can be prescribed for children with cerebral palsy to help reduce or

prevent hip migration, provide comfort to ease pain and/or improve sleep. As sleep disturbance is common in children with developmental disabilities, with impact on their carers' sleep, and as sleep positioning systems can be expensive, guidance is needed to support decisions as to their use. OBJECTIVES: To determine whether commercially-available sleep positioning systems, compared with usual care, reduce or prevent hip migration in children with cerebral palsy. Any negative effect of sleep positioning systems on hip migration will be considered within this objective. Secondary objectives were to determine the effect of sleep positioning systems on: (1) number or frequency of hip problems; (2) sleep patterns and quality; (3) quality of life of the child and family; (4) pain; and (5) physical functioning. We also sought to identify any adverse effects from using sleep positioning systems. SEARCH METHODS: In December 2014, we searched CENTRAL, Ovid MEDLINE, Embase, and 13 other databases. We also searched two trials registers. We applied no restrictions on date of publication, language, publication status or study design. We checked references and contacted manufacturers and authors for potentially relevant literature, and searched the internet using Google. SELECTION CRITERIA: We included all randomised controlled trials (RCTs) evaluating whole body sleep positioning systems for children and adolescents (up to 18 years of age) with cerebral palsy. DATA COLLECTION AND ANALYSIS: Two review authors independently screened reports retrieved from the search against pre-determined inclusion criteria and assessed the quality of eligible studies. Members of the public (parent carers of children with neurodisability) contributed to this review by suggesting the topic, refining the research objectives, interpreting the findings, and reviewing the plain language summary. MAIN RESULTS: We did not identify any randomised controlled trials that evaluated the effectiveness of sleep positioning systems on hip migration. We did find two randomised cross-over trials that met the inclusion criteria in respect of secondary objectives relating to sleep quality and pain. Neither study reported any important difference between sleeping in sleep positioning systems and not for sleep patterns or sleep quality (two studies, 21 children, very low quality evidence) and pain (one study, 11 children, very low quality evidence). These were small studies with established users of sleep positioning systems and were judged to have high risk of bias. We found no eligible trials that explored the other secondary objectives (number or frequency of hip problems, quality of life of the child and family, physical functioning, and adverse effects). AUTHORS' CONCLUSIONS: We found no randomised trials that evaluated the effectiveness of sleep positioning systems to reduce or prevent hip migration in children with cerebral palsy. Nor did we find any randomised trials that evaluated the effect of sleep positioning systems on the number or frequency of hip problems, quality of life of the child and family or on physical functioning. Limited data from two randomised trials, which evaluated the effectiveness of sleep positioning systems on sleep quality and pain for children with cerebral palsy, showed no significant differences in these aspects of health when children were using and not using a sleep positioning system. In order to inform clinical decision-making and the prescription of sleep positioning systems, more rigorous research is needed to determine effectiveness, cost-effectiveness, and the likelihood of adverse effects.

[PMID: 26524348](#)

8. Atherosclerosis. 2015 Oct 9;243(2):462-465. doi: 10.1016/j.atherosclerosis.2015.09.035. [Epub ahead of print]

Associations of non-invasive measures of arterial structure and function, and traditional indicators of cardiovascular risk in adults with cerebral palsy.

McPhee PG, Gorter JW, Cotie LM, Timmons BW, Bentley T, MacDonald MJ.

BACKGROUND: Persons with cerebral palsy (CP) have mobility limitations and may be at increased risk for cardiovascular disease (CVD). AIMS: To determine the feasibility of assessing novel CVD risk indicators and to identify predictors of CVD risk in a clinic-based group of adults with CP. METHODS: In an observational study, we examined 42 adults with CP (mean age 33.5 ± 12.3 yr). Traditional (resting blood pressure, smoking status and lipids) and novel CVD risk indicators (endothelial function, arterial stiffness, and carotid wall thickness) were assessed. RESULTS: Measures of endothelial function and central arterial stiffness were conducted in 100% and 83% of participants, respectively. Age was the strongest independent predictor of vascular health (cIMT, Age, R square = 0.576, $p = 0.001$).

CONCLUSION: Non-invasive measures of arterial structure and function are feasible to assess and may assist in the prediction of CVD risk in adults with CP.

[PMID: 26520900](#)

9. Res Social Adm Pharm. 2015 Oct 27. pii: S1551-7411(15)00177-1. doi: 10.1016/j.sapharm.2015.09.008. [Epub ahead of print]

Predictors of medication adherence and persistence in Medicaid enrollees with developmental disabilities and type 2 diabetes.

Patel I, Erickson SR, Caldwell CH, Woolford SJ, Bagozzi RP, Chang J, Balkrishnan R.

BACKGROUND: The prevalence of diabetes mellitus is high among patients with developmental disabilities (cerebral palsy, autism, Down's syndrome and cognitive disabilities). **OBJECTIVES:** The purpose of this study was to examine the racial health disparities in medication adherence and medication persistence in developmentally disabled adults with type 2 diabetes enrolled in Medicaid. **METHODS:** This was a retrospective cohort study using the MarketScan® Multi-State Medicaid Database. Adults aged 18-64 years with a prior diagnosis of a developmental disability (cerebral palsy/autism/down's/cognitive disabilities) and a new diagnosis of type 2 diabetes enrolled in Medicaid from January 1, 2004 and December 31, 2006, were included. Adults were included if they had a continuous enrollment for at least 12 months and were excluded if they were dual eligible. Anti-diabetes medication adherence and diabetes medication persistence were measured using multivariate logistic regression and the Cox-proportional hazard regression, respectively. **RESULTS:** The study population comprised of 1529 patients. Although overall diabetes medication adherence in this population was optimal, African Americans had significantly lower odds (25%) of adhering to anti-diabetes medications compared to Caucasians (OR = 0.75, 95% CI = 0.58-0.97, P < 0.05). Also, after controlling for other covariates, the rate of discontinuation was higher in African Americans compared to Caucasians (hazard ratio = 1.03, 95% CI = 0.91-1.18, P < 0.629). **CONCLUSION:** In this study, racial disparities were found in anti-diabetes medication adherence among Medicaid enrollees with developmental disabilities (DD). Studies conducted in the future should examine predictors that impact access to care, availability of primary and specialized care, social support as well as beliefs of racial minority populations with developmental disabilities and chronic conditions like diabetes to optimize medication use outcomes in this especially vulnerable population.

[PMID: 26522400](#)

10. Value Health. 2015 Nov;18(7):A752. doi: 10.1016/j.jval.2015.09.2913. Epub 2015 Oct 20.

Budget Impact Analysis of Botulinum Toxin Type A Treatment for Cerebral Palsy In The Russian Federation.

Yagudina R, Kulikov A, Ugrekhelidze D.

[PMID: 26534212](#)

11. Value Health. 2015 Nov;18(7):A734. doi: 10.1016/j.jval.2015.09.2811. Epub 2015 Oct 20.

Cost-Effectiveness Analysis of Botulinum Toxin Type a Treatment for Cerebral Palsy.

Yagudina R, Kulikov A, Ugrekhelidze D.

[PMID: 26534110](#)

12. Zh Vopr Neurokhir Im N N Burdenko. 2015;79(3):27-33.

Preliminary results of chronic intrathecal therapy in treatment of spastic syndromes of various etiologies. [Article in Russian]

Dekopov AV, Shabalov VA, Tomskiy AA, Gaevyi IO, Salova EM.

AIM: To estimate the effectiveness of the chronic intrathecal baclofen infusion (ITB) for the treatment of botuloresistant spastic disorders.

MATERIAL AND METHODS: ITB have been performed in 15 cases of spastic disorders. In 8 cases spasticity was the result of cerebral palsy, 5 - spinal cord injury, 1 - cerebral injury, 1 - pyogenic spinal epiduritis. The results of surgical treatment were estimated with the Ashworth, GMFM-88 and Arens scales. These data have been exposed statistically analysis. **RESULTS:** Significantly decrease of spasticity have been revealed in most cases: from 4.26 ± 0.7 points before the operation to 1.8 ± 0.67 points after the operation ($p < 0.004$). In 8 cases we have observed improvement in motor functions. **CONCLUSION:** ITB is an effective procedure which leads to decreasing of spasticity, increase of movement volume and improvement in motor functions in patients with spastic disorders.

[PMID: 26529531](#)

13. J Pediatr. 2015 Oct 28. pii: S0022-3476(15)01138-5. doi: 10.1016/j.jpeds.2015.09.064. [Epub ahead of print]

Factors Associated with Respiratory Illness in Children and Young Adults with Cerebral Palsy.

Blackmore AM, Bear N, Blair E, Gibson N, Jalla C, Langdon K, Moshovis L, Steer K, Wilson AC.

OBJECTIVE: To describe associations between respiratory illness and its potential predictors in children and young adults with cerebral palsy (CP). **STUDY DESIGN:** Cross-sectional survey of self- and caregiver-reported respiratory symptoms for individuals aged up to 26 years with CP. Respiratory illness was indicated by 2 outcomes: (1) ≥ 1 respiratory hospitalizations in the past year; and (2) ≥ 2 courses of antibiotics for respiratory symptoms in the past year. ORs were calculated using univariate and multivariate logistic regression. **RESULTS:** There were 551 participants, aged 1-26 years, distributed across all gross motor function classification scale (GMFCS) levels. In univariate analyses, factors significantly associated with respiratory hospitalizations were weekly respiratory symptoms (OR 2.31, 95% CI 1.78-3.00), respiratory symptoms during meals (OR 3.23, 95% CI 1.50-5.80), gastroesophageal reflux (OR 3.01, 95% CI 1.71-5.31), coughing or choking on saliva (OR 4.36, 95% CI 2.38-8.01), current asthma (OR 3.56, 95% CI 1.97-6.42), age (0-3 years) (OR 3.24, 95% CI 1.19-8.80, compared with 13-17 years), seizures (OR 3.45, 95% CI 1.96-6.08), and scoliosis (OR 2.14, 95% CI 1.16-3.97). Nonambulatory individuals (GMFCS IV-V) were at significantly increased risk of hospitalizations only if they had food modifications and/or nasogastric or gastrostomy tube feeds (OR 5.36, 95% CI 2.89-9.96, compared with GMFCS I-III with no food modifications and no tube). All factors, except seizures and scoliosis, were significantly associated with multiple courses of antibiotics in univariate analyses. **CONCLUSIONS:** Oromotor dysfunction is strongly associated with respiratory illness in patients with CP.

[PMID: 26520916](#)

14. J Int Soc Prev Community Dent. 2015 Sep-Oct;5(5):389-93. doi: 10.4103/2231-0762.165925.

Use of different oral hygiene strategies in children with cerebral palsy: A comparative study.

Maiya A, Shetty YR, Rai K, Padmanabhan V, Hegde AM.

BACKGROUND: Cerebral palsy (CP) is described as a group of conditions usually occurring in childhood, where children have motor dysfunction and are unable to adequately master the necessary techniques of plaque control, which ultimately leads to dental caries and periodontal problems. **AIMS:** The objective of this study was to educate the parents/caretakers/institution staff and children with CP about the different preventive home care measures and to evaluate the oral hygiene and gingival health status of these children before and after the institution of different preventive home care measures. **MATERIALS AND METHODS:** A total of 64 individuals with CP, aged between 6 and 18 years, were examined for their oral hygiene and gingival health status, after which the parents/caretakers received a health education program. The children were then randomly divided into four groups. Each group was administered a specific preventive home care measure (mechanical and chemotherapeutic) to be followed for a period of 6 weeks, and the oral hygiene and the gingival health status were recorded at the end of 1 week, 2 weeks, and 6 weeks. The data were then subjected to statistical analysis. **RESULTS:** In the sample of 64 children diagnosed with CP, the mean OHI(S) score among the groups of children who were given different preventive home care measures was compared at baseline, 1 week, 2 weeks, and 6 weeks. Group 4 showed a marked reduction in the OHI(S) score measured from baseline to 6 weeks, when compared to the other three groups which was statistically very highly significant ($P < 0.001$)

The mean MGI score was compared at baseline, 1 week, 2 weeks, and 6 weeks home, Group 4 showed a marked reduction in the MGI score measured from baseline to 6 weeks, when compared to the other three groups. When the mean MGI score was compared from baseline to 6 weeks, there was a gradual decrease in the MGI score, which was statistically highly significant between baseline and 1 week ($P < 0.05$) and statistically very highly significant between 1 and 2 weeks ($P < 0.001$). However, this improvement was not statistically significant between 2 and 6 weeks ($P > 0.05$). **CONCLUSION:** A combined mechanical and chemotherapeutic measure is highly recommended to maintain the oral hygiene and gingival health of these special children because of their difficulties and their limited abilities to control dental plaque.

[PMID: 26539391](#)

15. Dev Med Child Neurol. 2015 Nov 2. doi: 10.1111/dmcn.12944. [Epub ahead of print]

Alignment of classification paradigms for communication abilities in children with cerebral palsy.

Hustad KC, Oakes A, McFadd E, Allison KM.

AIM: We examined three communication ability classification paradigms for children with cerebral palsy (CP): the Communication Function Classification System (CFCS), the Viking Speech Scale (VSS), and the Speech Language Profile Groups (SLPG). Questions addressed interjudge reliability, whether the VSS and the CFCS captured impairments in speech and language, and whether there were differences in speech intelligibility among levels within each classification paradigm. **METHOD:** Eighty children (42 males, 38 females) with a range of types and severity levels of CP participated (mean age 60mo, range 50-72mo [SD 5mo]). Two speech-language pathologists classified each child via parent-child interaction samples and previous experience with the children for the CFCS and VSS, and using quantitative speech and language assessment data for the SLPG. Intelligibility scores were obtained using standard clinical intelligibility measurement. **RESULTS:** Kappa values were 0.67 (95% confidence interval [CI] 0.55-0.79) for the CFCS, 0.82 (95% CI 0.72-0.92) for the VSS, and 0.95 (95% CI 0.72-0.92) for the SLPG. Descriptively, reliability within levels of each paradigm varied, with the lowest agreement occurring within the CFCS at levels II (42%), III (40%), and IV (61%). Neither the CFCS nor the VSS were sensitive to language impairments captured by the SLPG. Significant differences in speech intelligibility were found among levels for all classification paradigms. **INTERPRETATION:** Multiple tools are necessary to understand speech, language, and communication profiles in children with CP. Characterization of abilities at all levels of the International Classification of Functioning, Disability and Health will advance our understanding of the ways that speech, language, and communication abilities present in children with CP.

[PMID: 26521844](#)

16. An Acad Bras Cienc. 2015 Oct 30. pii: S0001-37652015005030413. [Epub ahead of print]

A comparative study: use of a Brain-computer Interface (BCI) device by people with cerebral palsy in interaction with computers.

Heidrich RO, Jensen E, Rebelo F, Oliveira T.

This article presents a comparative study among people with cerebral palsy and healthy controls, of various ages, using a Brain-computer Interface (BCI) device. The research is qualitative in its approach. Researchers worked with Observational Case Studies. People with cerebral palsy and healthy controls were evaluated in Portugal and in Brazil. The study aimed to develop a study for product evaluation in order to perceive whether people with cerebral palsy could interact with the computer and compare whether their performance is similar to that of healthy controls when using the Brain-computer Interface. Ultimately, it was found that there are no significant differences between people with cerebral palsy in the two countries, as well as between populations without cerebral palsy (healthy controls).

[PMID: 26536851](#)

17. J Telemed Telecare. 2015 Oct 29. pii: 1357633X15610720. [Epub ahead of print]**Availability, spatial accessibility, utilisation and the role of telehealth for multi-disciplinary paediatric cerebral palsy services in Queensland.**

Edirippulige S, Reyno J, Armfield NR, Bambling M, Lloyd O, McNevin E.

AIMS: The purpose of this study was to understand the methods of current delivery of health care services to cerebral palsy (CP) patients in Queensland, Australia. The study also examines the current use of telehealth by clinicians and their perceptions about telehealth use. **METHODS:** Patient records during July 2013-July 2014 were accessed from the Queensland Paediatric Rehabilitation Service (QPRS) to collect information relating to the service delivery for CP patients. Analysis was carried out to examine the patient locations and travel distances using ArcMap geoprocessing software. In addition, 13 face-to-face semi structured interviews were conducted with clinicians from the QPRS and the Cerebral Palsy Health Service (CPHS) to understand the perceptions of clinicians relating to the current level of health care delivery. We also examined the clinicians' current use of telehealth and their opinions about this method. **RESULTS:** Records of 329 paediatric CP patients were accessed and reviewed. The majority of patients (96%, n = 307) who attended the clinics at the Royal Children's Hospital (RCH), Brisbane, were from remote, rural or regional areas of Queensland. Only 4% of patients (n = 13) were from major cities. During 12 months, patients had attended nine outreach programmes that were conducted by the QPRS and CPHS. The study found that non-local patients were required to travel an average distance of 836 km to access QPRS and CPHS services in Brisbane. The average distance for receiving a consultation at an outreach clinic was 173 km. Clinicians perceived that access to health care services to CP patients in Queensland is inadequate. Nearly all clinicians interviewed had some experience in using telehealth. They had high satisfaction levels with the method. **CONCLUSIONS:** Traditional methods of delivering services to CP patients do not meet their needs. Clinicians have found telehealth is a feasible and satisfactory delivery method. However, the use of telehealth is still limited.

[PMID: 26519377](#)

18. Bull Hosp Jt Dis (2013). 2015 Jul;73(3):204-9.**The Relationship between the School Function Assessment (SFA) and the Gross Motor Function Classification System (GMFCS) in Ambulatory Patients with Cerebral Palsy.**

Rabinovich RV, Patel NV, Gates PE, Otsuka NY.

PURPOSE: Determine the relationship between the SFA and GMFCS in children with cerebral palsy (CP). **METHODS:** Through correlation, regression, and ANOVA analysis, data from 103 children were examined. A regression model was used to compare SFA-predicted versus actual GMFCS levels. One-way ANOVA was utilized to determine differences between SFA subscale scores in the context of GMFCS. **RESULTS:** A significant correlation between composite SFA scores and GMFCS levels ($r = -0.847$, $p < 0.020$) was observed. Subscale-SFA and GMFCS correlations included Regular Class ($r = -0.338$, $p < 0.001$), Physical Tasks Adaptation (Phys1; $r = -0.340$, $p < 0.001$) and Assistance(Phys2; $r = -0.340$, $p < 0.001$), Position ($r = -0.338$, $p < 0.001$), Recreational Movement (RecMvmt; $r = -0.387$, $p < 0.0001$), Manipulation Movement (ManMvmt; $r = -0.494$, $p < 0.0001$), and Up/Down Stairs (UDStairs; $r = -0.453$, $p < 0.0001$). Between predicted and actual GMFCS levels, no statistical difference was observed. One-way ANOVA demonstrated SFA differences at GMFCS levels: Phys1 ($F = 5.32$, $p < 0.002$), Phys2 ($F = 4.54$, $p < 0.005$), Position ($F = 4.63$, $p < 0.004$), RecMvmt ($F = 7.92$, $p < 0.0001$), ManMvmt ($F = 13.50$, $p < 0.0001$), and UDStairs ($F = 6.18$, $p < 0.001$). **CONCLUSION:** Utilizing both SFA-predicted and actual GMFCS levels may help determine if a child is performing at an expected level of daily function.

[PMID: 26535600](#)

19. Dev Med Child Neurol. 2015 Nov 4. doi: 10.1111/dmcn.12946. [Epub ahead of print]**Whose goal is it anyway? Self-directed goal setting for children with cerebral palsy.**

Foley S.

[PMID: 26534842](#)

20. *Int J Dev Neurosci.* 2015 Dec;47(Pt A):120-1. doi: 10.1016/j.ijdevneu.2015.04.321.

An environmental scan of current practices related to initial referral of children with cerebral palsy to medical and rehabilitation specialists.

Boychuck Z, Hubermann L, Shevell M, Majnemer A.

[PMID: 26531642](#)

21. *Dan Med J.* 2015 Nov;62(11). pii: A5152.

Management of cerebral palsy varies by healthcare region.

Rackauskaite G, Uldall PW, Bech BH, Østergaard JR.

INTRODUCTION: Cerebral palsy (CP) is the most common type of motor disability in childhood. The aim of the present paper was to describe regional differences in the management of CP in school-aged children in Denmark. **METHODS:** This was a cross-sectional study based on the Danish Cerebral Palsy Registry. The parents of 462 children answered a questionnaire about their child's treatment and the family's characteristics. Descriptive and logistic regression analyses were performed for every treatment modality, stratified by the Gross Motor Function Classification System (GMFCS) level and adjusted for family and child characteristics. **RESULTS:** Significant regional differences were found regarding the provision of occupational therapy at all GMFCS levels, speech therapy at GMFCS levels II-V and orthopaedic surgery at GMFCS levels I and III-V. No regional differences were observed in the frequency of physiotherapy. We found no regional differences in the severity of disability. **CONCLUSIONS:** Regional differences in the management of CP cannot be explained by social differences or differences in the severity of the disability. **FUNDING:** This study was funded by the Research Foundation from the Central Denmark Region and the Department of Clinical Medicine at Aarhus University Hospital, the Augustinus Foundation, the Bevica Foundation, the Dagmar Marshalls Foundation, the Ludvig and Sara Elsass Foundation, and the Civil Engineer Frode V. Nyegaard's and his Wife's Foundation.

[PMID: 26522483](#)

Prevention and Cure

22. *Eur Rev Med Pharmacol Sci.* 2015 Oct;19(20):3955-60.

Influence of one-year neurologic outcome of treatment on newborns with moderate and severe hypoxic-ischemic encephalopathy by rhuEPO combined with ganglioside (GM1).

Zhu XY, Ye MY, Zhang AM, Wang WD, Zeng F, Li JL, Fang F.

OBJECTIVE: To observe the one-year neurologic prognostic outcome of newborns with moderate and severe hypoxic-ischemic encephalopathy (HIE) who received recombinant human erythropoietin (rhuEPO) combined with exogenous monosialotetrahexosylganglioside (GM1) treatment to provide new guidelines for clinical treatment. **PATIENTS AND METHODS:** Seventy-six newborns with moderate and severe HIE were selected from February 2011 to February 2014 in our hospital. This study received the informed consent of our hospital's Ethics Committee and the newborns' guardians. The newborns were divided to an observation group (n = 34 cases) and a control group (n = 42 cases). All newborns underwent hypothermia and conventional treatment for their conditions. The control group received GMI treatment and observation group received rhuEPO combined with GMI treatment. The curative differences and neural behaviour from these two groups were compared. **RESULTS:** The excellent, efficient proportion and total effective rate of the newborns from the observation group were higher than the control group. The death rate, cerebral palsy and the invalid ratio of the newborns from the observation group were lower than that of the control group. Awareness, muscle tension, primitive reflex and increased intracranial pressure recovery time of the newborns in the observation group were less than those of the control group. The Neonatal Behavior Neurological Assessment (NBNA) score of both groups after the treatment of 7, 14 and 28 days were significantly higher and increased with time (p < 0.05).

The MDI, PDI and DQ score of newborns from the two groups all increased after treatment of 3, 6 and 12 months than those of before, which increased with time ($p < 0.05$). CONCLUSIONS: The rhuEPO + GMI treatment in newborns with HIE improves short-term clinical effects and long-term neurological symptoms.

[PMID: 26531285](#)

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Relationship between white matter integrity and severity of motor impairment in children with cerebral palsy caused by periventricular leukomalacia.

Kim M, Shim JS, Song JY.

[PMID: 26531639](#)

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Outcomes in children with cerebral palsy: Does the level of neonatal care make a difference? Evidence from population based Cerebral Palsy registry.

Bolbocean C, Shevell M, Oskoui M.

[PMID: 26531496](#)

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Intrauterine growth restriction-induced cerebral palsy: Evaluating histological and behavioural differences in a translational rodent model.

Ruff CA, Faulkner SD, Armstrong E, Basilious A, Fan S, Thiyagalingam S, Yager JY, Fehlings MG.

[PMID: 26531490](#)

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A Prospective Longitudinal Assessment of Medical Records for Diagnostic Substitution among Subjects Diagnosed with a Pervasive Developmental Disorder in the United States.

Geier DA, Kern JK, Hooker BS, Sykes LK, Geier MR.

BACKGROUND: Previously, investigators suggested that diagnostic substitution from other diagnoses, e.g., mental retardation (MR) and/or cerebral palsy (CP) to pervasive developmental disorder (PDD) is a driving factor behind increases in autism. This study evaluated potential diagnostic substitution among subjects diagnosed with PDD vs. MR or CP by examining birth characteristic overlap. **METHODS:** SAS(®) and StatsDirect software examined medical records for subjects within the Vaccine Safety Datalink database who were Health Maintenance Organization-enrolled from birth until diagnosed with an International Classification of Disease, 9th revision (ICD-9) outcome of PDD (299.xx, n = 84), CP (343.xx, n = 300), or MR (317.xx, 318.xx, or 319.xx, n = 51). **RESULTS:** Subjects with PDD had significantly ($p < 0.01$) increased: male/female ratio (PDD = 5.5 vs. CP = 1.5 or MR = 1.3), mean age of initial diagnosis in years (PDD = 3.13 vs. CP = 1.09 or MR = 1.62), mean gestational age in weeks at birth (PDD = 38.73 vs. CP = 36.20 or MR = 34.84), mean birth weight in grams (PDD = 3,368 vs. CP = 2,767 or MR = 2,406), and mean Appearance-Pulse-Grimace-Activity-Respiration scores at 1 min (PDD = 7.82 vs. CP = 6.37 or MR = 6.76) and 5 min (PDD = 8.77 vs. CP = 7.92 or MR = 8.04), as compared to subjects diagnosed with CP or MR. **CONCLUSION:** This study suggests diagnostic substitution cannot fully explain increased PDD prevalence during the 1990s within the United States.

[PMID: 26528457](#)

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Pre-treatment with Resveratrol Prevents Neuronal Injury and Cognitive Deficits Induced by Perinatal Hypoxia-Ischemia in Rats.

Arteaga O, Revuelta M, Urigüen L, Álvarez A, Montalvo H, Hilario E.

Despite advances in neonatal care, hypoxic-ischemic brain injury is still a serious clinical problem, which is responsible for many cases of perinatal mortality, cerebral palsy, motor impairment and cognitive deficits. Resveratrol, a natural polyphenol with important anti-oxidant and anti-inflammatory properties, is present in grapevines, peanuts and pomegranates. The aim of the present work was to evaluate the possible neuroprotective effect of resveratrol when administered before or immediately after a hypoxic-ischemic brain event in neonatal rats by analysing brain damage, the mitochondrial status and long-term cognitive impairment. Our results indicate that pre-treatment with resveratrol protects against brain damage, reducing infarct volume, preserving myelination and minimizing the astroglial reactive response. Moreover its neuroprotective effect was found to be long lasting, as behavioural outcomes were significantly improved at adulthood. We speculate that one of the mechanisms for this neuroprotection may be related to the maintenance of the mitochondrial inner membrane integrity and potential, and to the reduction of reactive oxygen species. Curiously, none of these protective features was observed when resveratrol was administered immediately after hypoxia-ischemia.

[PMID: 26544861](#)