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Interventions and Management

1. Am J Phys Med Rehabil. 2014 Apr 16. [Epub ahead of print]

Upper-Limb Position Sense Deficits in Adults with Cerebral Palsy.

Langan J1, Kern KL, Hurvitz EA, Brown SH.

OBJECTIVE: The aim of this study was to examine proprioceptive performance in adults with hemiplegic cerebral palsy and the possibility that a home-based sensorimotor training program could improve proprioceptive performance. **DESIGN:** This study is a preintervention/postintervention assessment of 12 adults participating in a home-based program consisting of targeted unilateral and bilateral reaching movements, hand manipulation tasks, tactile discrimination, and stereognosis. It did not specifically include proprioceptive tasks. Training sessions were 45 mins, 5 days per week, for 8 wks. Limb position sense was assessed using three conditions: ipsilateral remembered (same arm used for reference and matching targets), contralateral concurrent (reference arm moved and held at target position while opposite arm matched reference position), and contralateral remembered (reference arm moved to target position and then returned to start position before opposite arm matching position). **RESULTS:** The participants demonstrated greater absolute and constant error when the more affected arm served as the reference arm, and matching was performed by the less affected arm, particularly in the contralateral remembered condition. After training, the participants demonstrated less absolute error across matching tasks and no change in constant error. **CONCLUSIONS:** The results suggest an important role for the reference arm in bilateral position matching tasks and the potential for improved proprioceptive performance after training in movement and unrelated sensory tasks.

[PMID: 24743460](https://pubmed.ncbi.nlm.nih.gov/24743460/) [PubMed - as supplied by publisher]

2. Arch Phys Med Rehabil. 2014 Apr 14. pii: S0003-9993(14)00266-4. doi: 10.1016/j.apmr.2014.03.025. [Epub ahead of print]

Improvement of upper extremity motor control and function after home-based constraint-induced therapy in children with unilateral cerebral palsy: Immediate and long-term effects.

Chen HC1, Chen CL2, Kang LJ3, Wu CY4, Chen FC5, Hong WH6.

OBJECTIVE: To investigate the long-term effects of home-based constraint-induced therapy (hCIT) on motor control underlying functional change in children with unilateral cerebral palsy (CP). **DESIGN:** A randomized

controlled trial. SETTING: Home-based. PARTICIPANTS: Forty-five children with unilateral CP (aged 6-12 years) were randomly assigned to receive hCIT (n = 23) or traditional rehabilitation (TR) (n = 22). INTERVENTIONS: Both groups received a 4-week therapist-based intervention at home. The hCIT involved intensive functional training of the more affected upper extremity while the less affected one was restrained. The TR involved functional unimanual and bimanual training. MAIN OUTCOME MEASURES: All children underwent kinematic and clinical assessments at baseline, 4 weeks (post-treatment), and 3 and 6 months (follow-up). The reach-to-grasp kinematics were reaction time (RT), normalized movement time (nMT), normalized movement unit (nMU), peak velocity (PV), maximum grip aperture (MGA), and percentage of movement where MGA occurs (PMGA). The clinical measures were the Peabody Developmental Motor Scale 2 (PDMS-2), Bruininks-Oseretsky Test of Motor Proficiency (BOTMP), and Functional Independence Measure for children (WeeFIM) RESULTS: The hCIT group showed a shorter RT ($p < 0.050$) and nMT ($p < 0.010$), smaller MGA ($p = 0.006$), and fewer nMU ($p = 0.014$) in the reach-to-grasp movements at post-treatment and follow-up than the TR group. The hCIT group improved more on the PDMS-2 ($p < 0.001$) and the WeeFIM ($p < 0.010$) in all post-treatment tests and on the BOTMP ($p < 0.010$) at follow-up than the TR group. CONCLUSIONS: The hCIT induced better spatial and temporal efficiency (smoother movement, more efficient grasping, and better movement preplanning and execution) for functional improvement up to 6 months after treatment than the TR.

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[PMID: 24742939](#) [PubMed - as supplied by publisher]

3. Clin Neurophysiol. 2014 Mar 18. pii: S1388-2457(14)00158-8. doi: 10.1016/j.clinph.2014.02.025. [Epub ahead of print]

Changes in diffusion tensor tractographic findings associated with constraint-induced movement therapy in young children with cerebral palsy.

Kwon JY1, Chang WH2, Chang HJ3, Yi SH4, Kim MY1, Kim EH5, Kim YH6.

OBJECTIVE: The objective of the study was to determine whether constraint-induced movement therapy (CIMT) could lead to changes in diffusion tensor tractography (DTT) associated with clinical improvement in young children with unilateral cerebral palsy (CP). METHODS: A standardized pediatric CIMT protocol (4weeks, 120h of constraint) was used on 10 children with unilateral CP who were younger than 5years. DTT was performed in five participants before and after the intervention. Clinical outcome was measured by using the Pediatric Motor Activity Log (PMAL), Quality of Upper Extremity Skills Test (QUEST), and self-care domain of the Pediatric Evaluation of Disability Inventory. RESULTS: In two patients, the affected corticospinal tract (CST) visible on pretreatment DTT became more prominent on posttreatment DTT. In one patient, the affected CST was not visible on pretreatment DTT, but was visible on posttreatment DTT. All the clinical outcomes significantly improved in the CIMT group compared with the control group. Changes in the PMAL how often scale (PMAL-HO) score significantly differed between the CIMT and control groups. CONCLUSIONS: Changes in the properties of the affected CST on DTT were accompanied with improved arm function after CIMT in the children with CP. SIGNIFICANCE: CIMT might lead to CST reorganization in young children with CP.

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[PMID: 24746686](#) [PubMed - as supplied by publisher]

4. Front Neurol. 2014 Mar 31;5:38. doi: 10.3389/fneur.2014.00038. eCollection 2014.

Timing training in three children with diplegic cerebral palsy: short- and long-term effects on upper-limb movement organization and functioning.

Johansson AM1, Domellöf E2, Rönnqvist L1.

Despite the great need of interventions to maintain and improve motor functions in children with diplegic cerebral palsy (DCP), scientific evaluations of existing training methods are rare. This study aimed to explore individual effects of synchronized metronome training (SMT) on motor timing, spatio-temporal movement organization, and

subjective experiences of changes in upper-limb functions in three children with DCP. All children participated in an individualized 4-week/12 session SMT training regime. Measurements before training (Pre), after training (Post1), and at 6 months post completed training (Post2) were made by the applied SMT training equipment, optoelectronic registrations of goal-directed upper-limb movements, and a questionnaire assessing subjective experiences of changes in upper-limb functions and usability. In general, the training regime was shown to have little effect on motor timing. However, some positive changes in spatio-temporal movement organization were found. Two children also reported substantial long-lasting positive changes in subjective experiences of hand/arm functionality in terms of increased movement control and reduced muscle tone. For these children, parallel kinematic findings also indicated smoother and faster movement trajectories that remained at Post2. Although highly individualized, the shown improvements in upper-limb kinematics and subjective experiences of improved functionality of the hands/arms for two of the cases warrant further explorations of SMT outcomes in children with DCP.

[PMID: 24744747](#) [PubMed] [PMCID: PMC3978369](#) Free PMC Article

5. Korean J Spine. 2013 Sep;10(3):192-4. doi: 10.14245/kjs.2013.10.3.192. Epub 2013 Sep 30.

Combined Chronic Occipito-atlantal and Atlanto-axial Rotator Fixation with Cerebral Palsy.

Kim JH, Kim JH, Jang SY, Kong MH.

Occipito-atlantalrotatory subluxation that occurs in conjunction with atlanto-axial rotator fixation is extremely rare. The common clinical characteristics are painful torticollis and cock robin position presented with the head tilted to one side and rotated to the other side. The object of this report is to emphasize that AARF combined with OARF may be caused by a variety of conditions, to be must need algorithm for proper management, apparently. A torticollis patient who had cerebral palsy presented with severe nuchal pain and wryneck for a long period. The patient had a history of fallen down 16 years ago which caused severe nuchal pain. The conservative management had failed to correct the deformity and instability. we decided to operate using occiput-C1-C2 arthrodesis and C3-4-5 bilateral screw fixation for reinforcement. Now he doesn't have neurologic deficit and shows good outcome enough to sustain his head, not using his hands, in his daily life.

[PMID: 24757487](#) [PubMed] [PMCID: PMC3941761](#) Free PMC Article

6. Biol Sport. 2013 Jun;30(2):91-5. doi: 10.5604/20831862.1044223. Epub 2013 Apr 11.

Jump landing characteristics in elite soccer players with cerebral palsy.

Cámara J1, Grande I2, Mejuto G1, Los Arcos A3, Yanci J1.

The aim of the present study was to analyse the parameters that characterize the vertical ground reaction force during the landing phase of a jump, and to determine the relationship among these parameters in elite soccer players with cerebral palsy (CP). Thirteen male members of the Spanish national soccer team for people with CP (mean age: 27.1 ± 4.7 years) volunteered for the study. Each participant performed three counter movement jumps. The characteristics of the first peak of the vertical ground reaction force during the landing phase of a jump, which corresponds to the forefoot contact with the ground, were similar to the results obtained in previous studies. However, a higher magnitude of rearfoot contact with the ground (F2) was observed in participants with CP than in participants without CP. Furthermore, a significant correlation between F2 magnitude and the elapsed time until its production (T2) was not observed ($r = -0.474$ for $p = 0.102$). This result implies that a landing technique based on a delay in the production of F2 might not be effective to reduce its magnitude, contrary to what has been observed in participants without CP. The absence of a significant correlation between these two parameters in the present study, and the high magnitude of F2, suggest that elite soccer players with CP should use footwear with proper cushioning characteristics.

[PMID: 24744473](#) [PubMed] [PMCID: PMC3944576](#) Free PMC Article

7. Adapt Phys Activ Q. 2014 Apr;31(2):184-185.**Individualized Exercise: Effects on Youth With Cerebral Palsy.**

Esposito P.

No abstract available for this article.

[PMID: 24762391](#) [PubMed - as supplied by publisher]**8. Disabil Rehabil Assist Technol. 2014 Apr 21. [Epub ahead of print]****Optimising the effects of rigid ankle foot orthoses on the gait of children with cerebral palsy (CP) - an exploratory trial.**

Jagadamma KC1, Coutts FJ, Mercer TH, Herman J, Yirrell J, Forbes L, van der Linden ML.

Purpose: This exploratory trial investigated the effects of rigid ankle foot orthoses (AFO) with an optimally cast Angle of the Ankle in the AFO (AAAFO) on the gait of children with Cerebral Palsy (CP), and whether tuning of the AFO - Footwear Combination (AFO-FC) further affected gait. Methods: Eight children with CP underwent gait analysis and tuning of their AFO-FCs using a 3-D motion analysis system. Comparisons were carried out for selected gait parameters between three conditions - barefoot, non-tuned AFO-FC and tuned AFO-FC. Results: In comparison to barefoot gait, walking with a non-tuned AFO-FC produced significant ($p < 0.05$) improvements in several key gait parameters. Compared to the non-tuned AFO-FC, on average a tuned AFO-FC produced a significant reduction in peak knee extension and knee ROM during gait. However, when examined as case studies, it was observed that the type of gait pattern demonstrated while wearing a non-tuned AFO-FC affected the outcomes of tuning. Conclusions: The findings of the current study indicate the potential benefits of using rigid AFO-FC with optimal AAAFO and tuning of AFO-FCs. This study emphasises the need for categorising children with CP based on their gait patterns when investigating the effects of interventions such as AFOs. Implications for Rehabilitation Rigid ankle foot orthoses (AFO) cast at an optimal angle to accommodate the length of gastrocnemius muscle may positively influence walking in children with Cerebral Palsy (CP). Tuning of the AFO-Footwear Combination (AFO-FC) has potential benefits to the walking of children with CP, depending on their gait abnormalities. When investigating the effects of interventions such as AFOs, it is important to categorise children with CP based on their gait abnormalities.

[PMID: 24749536](#) [PubMed - as supplied by publisher]**9. Gait Posture. 2014 Mar 28. pii: S0966-6362(14)00112-X. doi: 10.1016/j.gaitpost.2014.03.017. [Epub ahead of print]****The functional effect of a distal rectus femoris tenotomy in adults with cerebral palsy.**

Drefus LC1, Buckland MA2, Backus SI2, Root L2.

The purpose of this study was to determine the effect of a distal rectus femoris tenotomy on function and gait in adults with cerebral palsy who had diminished knee flexion during swing. A stiff knee gait pattern is commonly seen in individuals with cerebral palsy and frequently leads to tripping and falling. Five subjects, 25-51 years, (34.6 ± 10.3 years) participated in the study; each individual had the surgery after the age of 18. Four of the five subjects underwent bilateral distal rectus femoris tenotomies for a total of nine limbs being studied. Four of the five subjects had a single procedure of a distal rectus femoris tenotomy and one subject also had bilateral adductor tenotomies. All individuals underwent a pre-operative and post-operative, (3.28 ± 1.6 years) three-dimensional gait analysis. Pre-operative gait revealed diminished peak knee flexion and out of phase rectus femoris activity with a quiet vastus lateralis during swing in all subjects. Significant findings after a distal rectus femoris tenotomy included: improved peak swing knee flexion, improved peak stance hip extension, and increased total knee excursion without loss in knee extension strength. During swing, knee flexion angle improved on average 11° which correlated with subjective report of less shoe wear, tripping, and falling due to improved clearance. In conclusion, a distal rectus femoris tenotomy should be considered a surgical option for adults with cerebral palsy and a stiff knee gait pattern to improve mobility, function, and quality of life.

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[PMID: 24742707](#) [PubMed - as supplied by publisher]

10. Games Health J. 2013 Aug;2(4):222-228.

Feasibility of Computer-Based Videogame Therapy for Children with Cerebral Palsy.

Radtko S1, Hone R2, Brown C2, Mastick J3, Melnick ME1, Dowling GA3.

OBJECTIVES: Standing and gait balance problems are common in children with cerebral palsy (CP), resulting in falls and injuries. Task-oriented exercises to strengthen and stretch muscles that shift the center of mass and change the base of support are effective in improving balance. Gaming environments can be challenging and fun, encouraging children to engage in exercises at home. The aims of this project were to demonstrate the technical feasibility, ease of use, appeal, and safety of a computer-based videogame program designed to improve balance in children with CP. **MATERIALS AND METHODS:** This study represents a close collaboration between computer design and clinical team members. The first two phases were performed in the laboratory, and the final phase was done in subjects' homes. The prototype balance game was developed using computer-based real-time three-dimensional programming that enabled the team to capture engineering data necessary to tune the system. Videogame modifications, including identifying compensatory movements, were made in an iterative fashion based on feedback from subjects and observations of clinical and software team members. **RESULTS:** Subjects (n=14) scored the game 21.5 out of 30 for ease of use and appeal, 4.0 out of 5 for enjoyment, and 3.5 on comprehension. There were no safety issues, and the games performed without technical flaws in final testing. **CONCLUSIONS:** A computer-based videogame incorporating therapeutic movements to improve gait and balance in children with CP was appealing and feasible for home use. A follow-up study examining its effectiveness in improving balance in children with CP is recommended.

[PMID: 24761324](#) [PubMed]

11. J Phys Ther Sci. 2014 Apr;26(4):539-42. doi: 10.1589/jpts.26.539. Epub 2014 Apr 23.

Can walking ability enhance the effectiveness of breathing exercise in children with spastic cerebral palsy?

Lee HY1, Kim K2.

Purpose: The purpose of this study was to compare differences in respiratory pressure and pulmonary function and the effectiveness of respiratory feedback training according to walking ability in children with cerebral palsy (CP). **Subjects and Methods:** Twenty-three children with spastic CP were enrolled in the final analysis and were divided into an independent walking group (n=12) and non-independent walking group. All children received respiratory feedback training for four weeks. Before and after the training, respiratory muscle strength was measured and a pulmonary function test was performed. **Results:** Comparison of respiratory pressure and pulmonary function test results between the two revealed that the independent walking group had significantly higher respiratory function than the other group in all variables except peak expiratory flow. In comparison of changes in respiratory function between the two groups, the independent walking group showed significantly higher improvement of respiratory function in terms of maximal inspiratory pressure, maximal expiratory pressure, and forced vital capacity. **Conclusion:** These findings showed that children with independent walking ability had better respiratory muscle strength and pulmonary function compared with children without independent walking ability. Understanding respiratory function and the effectiveness of respiratory training according to walking ability will be valuable clinical information for respiratory assessment and therapy in children with CP.

[PMID: 24764629](#) [PubMed]

12. Zhonghua Yi Xue Za Zhi. 2014 Feb 11;94(5):376-8.**Individualized neurosurgical treatments of spastic cerebral palsy [Article in Chinese]**

Chen J1, Wang Y2, Liu Y2, Yang Y2, Ma Y2, Wang S2.

OBJECTIVE: To explore the outcomes of individualized neurosurgical treatments of spastic cerebral palsy. **METHODS:** A total of 452 spastic cerebral palsy patients undergoing microneurosurgery during March 2006 and December 2011 were retrospectively analyzed. Performed on the basis of clinical manifestations, comprehensive procedures included selective cutting of neck or lumbosacral dorsal root ganglia (SPR, n = 182) for multiple muscle spasm, selective peripheral neurotomy (SPN, n = 270) for focal muscle spasm, line tendon lengthening or cutting and orthopedic surgery (n = 116) for tendon contracture plus limb deformities and carotid artery adventitia endarterectomy (n = 46) for salivation plus athetoid. **RESULTS:** The average follow-up period was 18 (10-24) months. The limb spasm relief rate of SPR was 95.6% and that of SPN 98.3%. And the postoperative symptom improvement rate of common carotid arterial adventitia stripping was 91.3%. There were 8 cases (4.4%) of recurrent spasticity after SPR and 28 (10.4%) after SPN. **CONCLUSION:** Offering individualized microsurgical treatments on the basis of clinical manifestations is essential for patients with spastic cerebral palsy.

[PMID: 24746087](#) [PubMed - in process]**13. Clin Rehabil. 2014 Apr 24. [Epub ahead of print]****Systematic review of power mobility outcomes for infants, children and adolescents with mobility limitations.**

Livingstone R1, Field D.

Objective: To summarize and critically appraise the evidence related to power mobility use in children (18 years or younger) with mobility limitations. **Data sources:** Searches were performed in 12 electronic databases along with hand searching for articles published in English to September 2012 and updated February 2014. **Review methods:** The search was restricted to quantitative studies including at least one child with a mobility limitation and measuring an outcome related to power mobility device use. Articles were appraised using American Academy of Cerebral Palsy and Developmental Medicine (AACPD) criteria for group and single-subject designs. The PRISMA statement was followed with inclusion criteria set a priori. Two reviewers independently screened titles, abstracts and full-text articles. AACPD quality ratings were completed for levels I-III studies. **Results:** Of 259 titles, 29 articles met inclusion criteria, describing 28 primary research studies. One study, rated as strong level II evidence, supported positive impact of power mobility on overall development as well as independent mobility. Another study, rated as moderate level III evidence, supported positive impact on self-initiated movement. Remaining studies, rated evidence levels IV and V, provided support for a positive impact on a broad range of outcomes from to International Classification of Functioning (ICF) components of body structure and function, activity and participation. Some studies suggest that environmental factors may be influential in successful power mobility use and skill development. **Conclusion:** The body of evidence supporting outcomes for children using power mobility is primarily descriptive rather than experimental in nature, suggesting research in this area is in its infancy.

[PMID: 24764156](#) [PubMed - as supplied by publisher]**14. Dev Med Child Neurol. 2014 Apr 20. doi: 10.1111/dmcn.12462. [Epub ahead of print]****Long-term impact of the ketogenic diet on growth and resting energy expenditure in children with intractable epilepsy.**

Groleau V1, Schall JI, Stallings VA, Bergqvist CA.

AIM: The long-term effects of the ketogenic diet, a high fat diet for treating intractable epilepsy, on resting energy expenditure (REE) are unknown. The aim of this study was to evaluate the impact of 15 months of ketogenic diet treatment on growth and REE in children with intractable epilepsy. **METHOD:** Growth, body composition, and REE were assessed at baseline, 3 months and 15 months in 24 children (14 males, 10 females; mean age 5y 6mo [SD 26mo], range 7mo-6y 5mo), 10 with cerebral palsy [CP]). Fifteen were identified as ketogenic diet responders at 3

months and continued on the ketogenic diet until 15 months. These were compared to 75 healthy children (43 males, 32 females; mean age 6y 3mo [SD 21mo] age range 2-9y). REE was expressed as percentage predicted, growth as height (HAz) and weight (WAZ) z-scores, and body composition as fat and fat free mass (FFM). RESULTS: HAZ declined -0.2 and -0.6 from baseline to 3 months and 15 months respectively ($p=0.001$), while WAZ was unchanged. In ketogenic diet responders, FFM, age and CP diagnosis predicted REE (overall $R^2=0.76$, $p<0.001$) and REE did not change. REE adjusted for FFM was lower ($p<0.01$) in children with CP at baseline (mean [standard error], -143[51] kcals/d) and 15 months (-198[53] kcals/d) compared to the healthy children. INTERPRETATION: After 15 months of the ketogenic diet, linear growth status declined while weight status and REE were unchanged. REE remained reduced in children with CP.

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15. Arch Phys Med Rehabil. 2014 Apr 14. pii: S0003-9993(14)00280-9. doi: 10.1016/j.apmr.2014.03.029. [Epub ahead of print]

Waist circumference provides an indication of numerous cardiometabolic risk factors in adults with cerebral palsy.

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

OBJECTIVE: To report the prevalence of cardiometabolic risk factors in a cohort of adults with cerebral palsy (CP) and to investigate the ability of anthropometric measures to predict these factors. DESIGN: Cross-sectional study SETTING: Testing took place in a laboratory setting PARTICIPANTS: Fifty-five adults with CP (mean±SD age 37.5±13.3 yr; Gross Motor Function Classification System levels I-V) participated in this study. INTERVENTIONS: Not applicable MAIN OUTCOME MEASURES: Total cholesterol, HDL-cholesterol, LDL-cholesterol, triglycerides, glucose, insulin and C-reactive protein were measured from a fasting venous blood sample. Insulin resistance was calculated using the Homeostasis Model Assessment Index (HOMA-IR). The metabolic syndrome was defined according to the 2009 Joint Interim Statement. Blood pressure, body mass index (BMI), waist circumference (WC), waist-hip ratio and waist-height ratio were also measured. RESULTS: The prevalence of the metabolic syndrome was 20.5% in ambulatory adults and 28.6% in non-ambulatory adults. BMI was associated with HOMA-IR only ($\beta=0.451$, $p<0.01$). WC was associated with HOMA-IR ($\beta=0.480$, $p<0.01$), triglycerides ($\beta=0.450$, $p<0.01$) and systolic blood pressure ($\beta=0.352$, $p<0.05$). Receiver operating characteristic curve analysis revealed that WC provided the best indication of hypertensive blood pressure, dyslipidaemia, HOMA-IR, and the presence of multiple risk factors (area under the curve values of 0.713-0.763). CONCLUSION: A high prevalence of the metabolic syndrome was observed in this relatively young sample of adults. WC was a better indicator of a number of risk factors compared to BMI and presents as a clinically useful method of screening for cardiometabolic risk among adults with CP.

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16. Childs Nerv Syst. 2014 Apr 23. [Epub ahead of print]

Quality of life in adults treated in infancy for hydrocephalus.

Lindquist B1, Fernell E, Persson EK, Uvebrant P.

PURPOSE: The objective was to analyze quality of life in a very long-term follow-up study of now adult individuals, treated for hydrocephalus (without spina bifida) during infancy. METHODS: The entire series was population-based, and the subgroup under study consisted of the 29 individuals without intellectual disability, who consented to participate. About one third had concomitant mild cerebral palsy or epilepsy or both. A Finnish validated questionnaire, the 15D, was used to measure quality of life. RESULTS: There was no significant difference between the study group and the controls with regard to the total quality of life score. Individuals with associated cerebral palsy and/or epilepsy had a lower total score compared with both those without associated impairments and controls. Most participants differed from controls in the dimension of mental/memory function which pertains to

executive functions, an ability of considerable importance for daily life skills. **CONCLUSION:** It is important to follow children with hydrocephalus over time-due to the different etiological panorama, interventions, and associated impairments this group displays. This is the only way to learn more about critical factors that require attention and that predict quality of life in adulthood.

[PMID: 24756304](#) [PubMed - as supplied by publisher]

17. Dev Med Child Neurol. 2014 Mar;56(3):203-4. doi: 10.1111/dmcn.12383. Epub 2014 Jan 17.

Relations between maternal interactive behavior and mastery motivation in children with developmental disabilities.

Liao HF1, Morgan G.

Comment on: Mastery motivation in children with congenital hemiplegia: individual and environmental associations. [Dev Med Child Neurol. 2014]

[PMID: 24433327](#) [PubMed - indexed for MEDLINE]

18. Work. 2014 Apr 24. [Epub ahead of print]

"Home is at work and work is at home": Telework and individuals who use augmentative and alternative communication.

McNaughton D1, Rackensperger T2, Dorn D1, Wilson N1.

BACKGROUND: Telework, the use of distance communication technologies to participate in the workforce, has been suggested as a promising employment strategy for individuals with disabilities. **OBJECTIVE:** The goal of this study was to obtain a better understanding of the benefits and negative impacts of telework, as well as the supports and challenges to telework activities, for persons who use augmentative and alternative communication (AAC). **METHODS:** This study used a series of focus group discussions, conducted on the internet, to examine the employment experiences of nine individuals with disabilities who used AAC and who held jobs that involved the use of telework. **RESULTS:** Four major themes emerged from the discussion: (a) benefits of telework, (b) negative impacts of telework, (c) strategies for addressing negative impacts of telework, and (d) recommendations for improving employment outcomes for individuals who use AAC. **CONCLUSIONS:** In summary, while participants identified the elimination of travel time and flexible work schedules as key strengths of telework, concerns were expressed regarding feelings of isolation and the difficulty in separating home and work environments. The participants also emphasized the important role of educational programs in supporting the acquisition of literacy and self-advocacy skills, and the need for post-secondary programs to support the school-to-workplace transition.

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Prevention and Cure

19. Dev Med Child Neurol. 2014 Apr 19. doi: 10.1111/dmcn.12456. [Epub ahead of print]

Contribution of socio-economic status on the prevalence of cerebral palsy: a systematic search and review.

Solaski M1, Majnemer A, Oskoui M.

AIM: The association between socio-economic status (SES) and cerebral palsy (CP) remains controversial. Preterm birth, low birthweight, and postnatal injuries are accepted mediating risk factors for CP, but the question remains whether SES confers additional risk. The aim of this study was to analyse existing knowledge on the relationship between SES and the risk of CP. **METHOD:** We conducted a systematic search and review of

potentially relevant research relating to SES and CP published from 1980 to 2012. Heterogeneity between studies did not allow for data aggregation or meta-analysis; therefore, a narrative review was used to summarize the findings. RESULTS: Twelve studies were included in the systematic review. Of these, eight found low SES to be a risk factor for increased CP prevalence. Three studies detected statistically significant associations even after controlling for birthweight and gestational age as variables. Two of these studies also accounted for additional confounding variables (multiple births and timing of CP acquisition) and continued to detect contributory effects of SES. Linear negative correlations between CP prevalence and SES were shown by three studies.

INTERPRETATION: Evidence suggests that the effect of SES on CP prevalence goes beyond that of the mediating factors preterm birth, low birthweight, and postnatal trauma. These associations were seen in area-based and, to a lesser extent, individual measures of SES. A better understanding of mediating factors is imperative in developing targeted public health intervention programmes to reduce the prevalence of CP.

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20. Dev Med Child Neurol. 2014 Apr 19. doi: 10.1111/dmcn.12457. [Epub ahead of print]

Reliability of a novel, semi-quantitative scale for classification of structural brain magnetic resonance imaging in children with cerebral palsy.

Fiori S1, Cioni G, Klingels K, Ortibus E, Van Gestel L, Rose S, Boyd RN, Feys H, Guzzetta A.

AIM: To describe the development of a novel rating scale for classification of brain structural magnetic resonance imaging (MRI) in children with cerebral palsy (CP) and to assess its interrater and intrarater reliability. METHOD: The scale consists of three sections. Section 1 contains descriptive information about the patient and MRI. Section 2 contains the graphical template of brain hemispheres onto which the lesion is transposed. Section 3 contains the scoring system for the quantitative analysis of the lesion characteristics, grouped into different global scores and subscores that assess separately side, regions, and depth. A larger interrater and intrarater reliability study was performed in 34 children with CP (22 males, 12 females; mean age at scan of 9y 5mo [SD 3y 3mo], range 4y-16y 11mo; Gross Motor Function Classification System level I, [n=22], II [n=10], and level III [n=2]). RESULTS: Very high interrater and intrarater reliability of the total score was found with indices above 0.87. Reliability coefficients of the lobar and hemispheric subscores ranged between 0.53 and 0.95. Global scores for hemispheres, basal ganglia, brain stem, and corpus callosum showed reliability coefficients above 0.65. INTERPRETATION: This study presents the first visual, semi-quantitative scale for classification of brain structural MRI in children with CP. The high degree of reliability of the scale supports its potential application for investigating the relationship between brain structure and function and examining treatment response according to brain lesion severity in children with CP.

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21. Dev Med Child Neurol. 2014 Apr 25. doi: 10.1111/dmcn.12438. [Epub ahead of print]

Will a novel semi-quantitative scale for classification of structural brain MRI improve patient care and research in children with cerebral palsy?

Izbudak I1, Poretti A, Lequin M.

[PMID: 24762126](#) [PubMed - as supplied by publisher]

22. J Obstet Gynaecol Can. 2013 Dec;35(12):1101-4.

Fetal pharmacotherapy 3: magnesium sulfate.

Namouz-Haddad S, Koren G.

[PMID: 24405877](#) [PubMed - indexed for MEDLINE]

23. Dev Med Child Neurol. 2014 Apr 19. doi: 10.1111/dmcn.12467. [Epub ahead of print]

Congenital cytomegalovirus is associated with severe forms of cerebral palsy and female sex in a retrospective population-based study.

Smithers-Sheedy H1, Raynes-Greenow C, Badawi N, McIntyre S, Jones CA; the Australian Cerebral Palsy Register Group.

AIM: Congenital cytomegalovirus (cCMV) infection can result in poor outcomes including cerebral palsy (CP). The aim of this study was to describe the incidence and comorbidities of CP reported to the Australian Cerebral Palsy Register (ACPR) as attributed to cCMV infection. **METHOD:** This was a retrospective population-based study. Cases were drawn from Australian state CP registers with population level ascertainment, 1993 to 2003 (n=2265; 56.4% males, Gross Motor Function Classification System [GMFCS] ratings available for Victorian cases only: 70% GMFCS levels I to III and 30% GMFCS levels IV to V). Clinical data were extracted and cases with cCMV reported as a known cause were compared with cases where cCMV was not reported. **RESULTS:** Children with cCMV (n=34; 12 males, 22 females; mean [SD] gestational age, 36.4 wk [4.4], range 24-41 wk) accounted for 1.5% of CP cases; 2.9 per 100 000 live births, (95% confidence intervals 1.9-3.9). When compared with CP cases where cCMV was not reported, proportionally, more CP cases with cCMV were born to younger mothers (p<0.001), were female (64% vs 43%, p=0.014), had spastic quadriplegia (73% vs 21%, p<0.001), required wheeled mobility i.e. GMFCS IV or V (78% vs 28%, p<0.001), had epilepsy (70% vs 30%, p<0.001), deafness (40% vs 2%, p<0.001), functional blindness (20% vs 5%, p<0.001), and severe communication impairment (71% vs 25%, p<0.001). **INTERPRETATION:** cCMV is an important potentially preventable cause of CP and is associated with severe disability and female sex in cases reported to the ACPR. Future studies utilising prospective sample collection for cCMV testing are needed to confirm these findings.

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24. Dev Med Child Neurol. 2014 Apr 19. doi: 10.1111/dmcn.12461. [Epub ahead of print]

Quantitative comparison of cortical and deep grey matter in pathological subtypes of unilateral cerebral palsy.

Scheck SM1, Pannek K, Fiori S, Boyd RN, Rose SE.

AIM: The aim of this study was to quantify grey matter changes in children with unilateral cerebral palsy (UCP), differentiating between cortical or deep grey matter (CDGM) lesions, periventricular white matter (PWM) lesions, and unilateral and bilateral lesions. **METHOD:** In a cross-sectional study we obtained high resolution structural magnetic resonance images from 72 children (41 males, 31 females, mean age 10y 9mo [SD 3y 1mo], range 5y 1mo-17y 1mo) with UCP (33 left, 39 right hemiplegia; Manual Ability Classification System level I n=29, II n=43; Gross Motor Function Classification System level I n=46, II n=26), and 19 children with typical development (CTD; eight males, 11 females, mean age 11y 2mo [SD 2y 7mo], range 7y 8mo-16y 4mo). Images were classified by lesion type and analyzed using voxel-based morphometry (VBM) and subcortical volumetric analysis. **RESULTS:** Deep grey matter volumes were not significantly different between children with CDGM and PWM lesions, with the thalamus, putamen, and globus pallidus being reduced unilaterally in both groups compared with CTD (p≤0.001). Children with CDGM lesions additionally showed widespread cortical changes involving all lobes using VBM (p<0.01). Children with bilateral lesions had reduced thalamus and putamen volumes bilaterally (p<0.001). The thalamic volume was reduced bilaterally in children with unilateral lesions (p=0.004). **INTERPRETATION:** Lesions to the PWM cause secondary changes to the deep grey matter structures similar to primary changes seen in CDGM lesions. Despite having a unilateral phenotype, grey matter changes are observed bilaterally, even in children with unilateral lesions.

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25. Facts Views Vis Obgyn. 2011;3(3):215-20.**Judicious use of antenatal glucocorticoids: putting the risks into the balance.**

Verhaeghe J.

The administration of a course of antenatal glucocorticoids (AG) to improve neonatal outcome after preterm birth is a prime example of evidence-based medicine, but the current clinical application of AG is too broad. AG override the glucocorticoid enzymatic placental barrier in order to elicit fetal lung maturation at a pre-physiological gestational age. Yet the maturation benefit is accompanied by a number of undesirable phenomena, most of which are transient (lasting for at least 24-48 h after the last injection). These include metabolic effects in both mother and fetus and signs of reduced fetal wellbeing. In addition, the fetal growth rate slows down depending on the number of AG courses. Multiple courses may increase the risk of cerebral palsy, as neonatal dexamethasone treatment does. There are no randomised trials on the benefit-risk balance of AG in pregnancies complicated by diabetes or intra-uterine growth restriction (IUGR). Animal studies indicate that AG are associated with an inadequate response to acute hypoxaemia and different brain development. Judicious use of AG includes avoidance of multiple courses, and a case-based -approach in pregnancies with (pre)gestational diabetes, IUGR or equivocal fetal condition, until more data become available. In addition, better prediction models of preterm birth are needed.

[PMID: 24753867](#) [PubMed]**26. J Pediatr. 2014 Mar;164(3):647-51. doi: 10.1016/j.jpeds.2013.11.010. Epub 2013 Dec 19.****Postterm births: are prolonged pregnancies too long?**

Ayyavoo A1, Derraik JG2, Hofman PL1, Cutfield WS3.

[PMID: 24360995](#) [PubMed - indexed for MEDLINE]**27. J Pediatr. 2014 Mar;164(3):468-74.e1. doi: 10.1016/j.jpeds.2013.10.067. Epub 2013 Dec 12.****Biomarkers for severity of neonatal hypoxic-ischemic encephalopathy and outcomes in newborns receiving hypothermia therapy.**

Chalak LF1, Sánchez PJ2, Adams-Huet B3, Laptook AR4, Heyne RJ2, Rosenfeld CR2.

OBJECTIVE: To evaluate serum neuronal and inflammatory biomarkers to determine whether measurements of umbilical cords at birth can stratify severity of hypoxic-ischemic encephalopathy (HIE), whether serial measurements differ with hypothermia-rewarming, and whether biomarkers correlate with neurological outcomes. **STUDY DESIGN:** This is a prospective cohort of inborn term newborns with varying degrees of HIE by neurological assessment. Neuronal glial fibrillary acidic protein (GFAP), ubiquitin carboxyl-terminal hydrolase L1, and inflammatory cytokines were measured in serum from umbilical artery at 6-24, 48, 72, and 78 hours of age. Neurodevelopmental outcomes (Bayley Scales of Infant and Toddler Development-III scales) were performed at 15-18 months. **RESULTS:** Twenty neonates had moderate (n = 17) or severe (n = 3) HIE and received hypothermia; 7 had mild HIE and were not cooled. At birth, serum GFAP and ubiquitin carboxyl-terminal hydrolase L1 increased with the severity of HIE (P < .001), and serial GFAP remained elevated in neonates with moderate to severe HIE. Interleukin (IL)-6, IL-8, and vascular endothelial growth factor were greater at 6-24 hours in moderate to severe vs mild HIE (P < .05). The serial values were unaffected by hypothermia-rewarming. Elevated GFAP, IL-1, IL-6, IL-8, tumor necrosis factor, interferon, and vascular endothelial growth factor at 6-24 hours were associated with abnormal neurological outcomes. **CONCLUSIONS:** The severity of the hypoxic-ischemic injury can be stratified at birth because elevated neuronal biomarkers in cord serum correlated with severity of HIE and outcomes.

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Comment in: The search continues for the elusive biomarkers of neonatal brain injury. [J Pediatr. 2014]

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28. J Pediatr. 2014 Mar;164(3):481-6.e1-2. doi: 10.1016/j.jpeds.2013.10.084. Epub 2013 Dec 8.

Feasibility and safety of erythropoietin for neuroprotection after perinatal arterial ischemic stroke.

Benders MJ1, van der Aa NE2, Roks M2, van Straaten HL3, Isgum I4, Viergever MA4, Groenendaal F5, de Vries LS2, van Bel F2.

OBJECTIVE: To perform a feasibility and safety study with recombinant human erythropoietin (rhEPO) in neonates with perinatal arterial ischemic stroke. **STUDY DESIGN:** Neonates with a magnetic resonance imaging-confirmed perinatal arterial ischemic stroke (n = 21) were treated with 1000 IU/kg rhEPO immediately after diagnosis and at 24 and 48 hours after the first dose. Repeat magnetic resonance imaging was performed when the patients were 3 months of age. Coagulation and hematologic variables (red blood cells, white blood cells, platelet counts) were performed in the first week after initiation of treatment. We also compared 10 patients who were treated with rhEPO with 10 historic infants with perinatal arterial ischemic stroke matched for the involved arterial branch to investigate whether rhEPO reduces the residual size of the infarction and subsequent brain growth between first and second scan. **RESULTS:** Seizures were a first symptom in 20 of 21 neonates. Heart rate, blood pressure, and coagulation function were in the normal range, as were red blood cells, white blood cells, and platelet counts. In a subgroup of 10 rhEPO-treated neonates, no differences were detected in residual infarction volumes or neurodevelopmental outcome compared with their historical nontreated counterparts. **CONCLUSIONS:** rhEPO in neonates with perinatal arterial ischemic stroke had no adverse effects on red blood cells, white blood cells, platelets counts, or coagulation. rhEPO, 3000 IU/kg in total, given during a 3-day period, appears to be a safe therapy. The beneficial effects remains to be demonstrated in a larger, randomized, double-blind, placebo-controlled trial.

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29. Ultrasound Obstet Gynecol. 2014 Apr 21. doi: 10.1002/uog.13387. [Epub ahead of print]

Neurodevelopmental outcome in twin anemia polycythemia sequence after laser surgery for twin-twin transfusion syndrome.

Slaghekke F1, Van Klink JM, Koopman HM, Middeldorp JM, Oepkes D, Lopriore E.

OBJECTIVE: To evaluate the long-term neurodevelopmental outcome in children who developed twin anemia-polycythemia (TAPS) after laser surgery for twin-twin transfusion syndrome (TTTS). **METHODS:** Neurological, motor and cognitive development was assessed in a consecutive cohort of TTTS survivors treated with laser between 2004 and 2011 and complicated by post-laser TAPS. Primary outcome was neurodevelopmental impairment (NDI), a composite outcome including any of the following: cerebral palsy, bilateral deafness, blindness, severe motor and/or cognitive developmental delay (< -2 SD). A risk analysis on cognitive outcome was performed. **RESULTS:** During the study period, 33/306 (11%) monochorionic twin pairs developed TAPS after laser surgery for TTTS. Survival was 53/66 (80%). Long-term outcome was assessed in 47/53 (89%) children. The incidence of NDI was 4/47 (9%), occurring in one donor (1/20, 5%) and three recipients (3/27, 11%) (P = .63). Risk factors for low cognitive scores are low gestational age at birth (P = 0.02) and low birth weight (P < = 0.01). Lowest cognitive scores were detected in the subgroup of TAPS survivors treated with intrauterine transfusion (median score: 82.5). **CONCLUSIONS:** Neurodevelopmental impairment and cognitive delay was found in almost 1 in 5 children surviving post-laser TAPS. Better treatment and ideally prevention of this complication after laser for TTTS is urgently warranted.

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