

Monday 13 July 2015

**Cerebral Palsy Alliance** is delighted to bring you this free weekly bulletin of the latest published research into cerebral palsy. Our organisation is committed to supporting cerebral palsy research worldwide - through information, education, collaboration and funding. Find out more at [research.cerebralpalsy.org.au](http://research.cerebralpalsy.org.au)

**Professor Nadia Badawi AM**

Macquarie Group Foundation Chair of Cerebral Palsy

[Subscribe to CP Research News](#)

## Interventions and Management

1. *J Phys Ther Sci*. 2015 May;27(5):1617-20. doi: 10.1589/jpts.27.1617. Epub 2015 May 26.

**Upper limb function evaluation scales for individuals with cerebral palsy: a systematic review.**

Santos CA, Franco de Moura RC, Lazzari RD, Dumont AJ, Braun LA, Oliveira CS

[Purpose] The aim of the present study was to perform a systematic review of the literature on the scales and methods most often used for the evaluation of upper limb function in individuals with cerebral palsy. [Materials and Methods] Searches were conducted in the Medline, PEDro, Lilacs, Scielo, and PubMed databases. The following inclusion criteria were used for the selection of articles: randomized controlled study, evaluation of upper limb function in individuals with cerebral palsy, and publication between 2006 and 2014. The methodological quality of the articles was evaluated using the PEDro evidence scale. [Results] Five articles met the inclusion criteria and achieved 6 points or higher on the PEDro scale of methodological quality. [Conclusion] The studies analyzed used different evaluation scales, but no consensus has been reached thus far on which scale is the most appropriate. Thus, further studies are needed to establish an adequate method for the evaluation of upper limb function in individuals with cerebral palsy.

[PMID: 26157275](#) [PubMed]

2. *Neurophotonic*. 2014 Oct;1(2):025009. doi: 10.1117/1.NPh.1.2.025009. Epub 2014 Nov 11.

**Motion tracking and electromyography-assisted identification of mirror hand contributions to functional near-infrared spectroscopy images acquired during a finger-tapping task performed by children with cerebral palsy.**

Hervey N, Khan B, Shagman L, Tian F, Delgado MR, Tulchin-Francis K, Shierk A, Roberts H, Smith L, Reid D, Clegg NJ, Liu H, MacFarlane D, Alexandrakis G.

Recent studies have demonstrated functional near-infrared spectroscopy (fNIRS) to be a viable and sensitive method for imaging sensorimotor cortex activity in children with cerebral palsy (CP). However, during unilateral finger tapping, children with CP often exhibit unintended motions in the nontapping hand, known as mirror motions, which confuse the interpretation of resulting fNIRS images. This work presents a method for separating some of the mirror motion contributions to fNIRS images and demonstrates its application to fNIRS data from four children with CP performing a finger-tapping task with mirror motions. Finger motion and arm muscle activity were measured simultaneously with fNIRS signals using motion tracking and electromyography (EMG), respectively.

Subsequently, subject-specific regressors were created from the motion capture or EMG data and independent component analysis was combined with a general linear model to create an fNIRS image representing activation due to the tapping hand and one image representing activation due to the mirror hand. The proposed method can provide information on how mirror motions contribute to fNIRS images, and in some cases, it helps remove mirror motion contamination from the tapping hand activation images.

[PMID: 26157980](#) [PubMed]

### 3. J Orthop Surg Res. 2015 Jul 8;10:106. doi: 10.1186/s13018-015-0251-3.

#### **The results of surgical treatment for pronation deformities of the forearm in cerebral palsy after a mean follow-up of 17.5 years.**

Čobeljić G, Rajković S, Bajin Z, Lešić A, Bumbaširević M, Aleksić M, Atkinson HD.

**AIM:** This study evaluates the effects of three surgical procedures in the treatment of pronation deformities of the forearm in cerebral palsy patients; namely the transposition of pronator teres to extensor carpi radialis brevis muscle; and rerouting of the pronator teres muscle with or without pronator quadratus muscle myotomy. **METHODS:** Sixty-one patients, 48 male/13 female, with a mean age of 17 years (5-41 years) were treated between 1971 and 2011. Pronator teres transposition was performed in 10, pronator rerouting in 35, and pronator rerouting with pronator quadratus myotomy in 16 patients. Ranges of motion, and assessments using the Quick Dash, Mayo Scoring, and Functional Classification system of upper extremity, were made before and after surgery. Mean follow-up was 17.5 years (3-41 years). **RESULTS:** All three procedures led to significantly improved ranges of motion and upper limb function, with good/excellent results in 80 % of patients. Mean active supination improved from 10 ° (0-60 °) to 85 ° (30-90 °) ( $p < 0.001$ ). There were significant improvements in Functional Classification system for the upper extremity scores ( $p < 0.003$ ), Mean Quick Dash Scores improved from 58.41 (38.63-79.54) to 44.59 (27.27-68.18), and mean MEPS improved from 68 (30-85) to 84 (60-100) following surgery. All three techniques had statistically improved MEPS following surgery ( $p < 0.001$ ); only the pronator teres muscle rerouting with pronator quadratus myotomy showed an improved Functional Classification system for the upper extremity score ( $p < 0.05$ ); and only the pronator teres rerouting procedure showed an improved Quick Dash score ( $p < 0.05$ ). There were no statistically significant differences in outcomes between different ages groups, and no significant differences between isolated pronator teres muscle rerouting were compared with those undergoing simultaneous treatment of carpal flexion and thumb adduction deformities ( $p > 0.05$ ). **CONCLUSION:** Surgery is very effective in the management of pronation deformities of the forearm in patients with cerebral palsy. Isolated pronator teres rerouting is probably the most effective and simple technique. Adjunctive pronator quadratus myotomy does not lead to an improvement in the results and requires an additional surgical approach. There should be no age restriction to surgery, as all age groups appear to benefit from similar improvements in range of motion and upper limb function.

[PMID: 26152666](#) [PubMed - in process]

### 4. Eur Spine J. 2015 Jul 9. [Epub ahead of print]

#### **Surgical correction of scoliosis in patients with severe cerebral palsy.**

Beckmann K, Lange T, Gosheger G, Bövingloh AS, Borowski M, Bullmann V, Liljenqvist U, Schulte TL.

**INTRODUCTION:** There is a lack of data in the literature on surgical correction of severe neuromuscular scoliosis in patients with serious extent of cerebral palsy. The purpose of this retrospective cohort study was to analyze the radiological and clinical results after posterior-only instrumentation (group P) and combined anterior-posterior instrumentation (group AP) in severe scoliosis in patients with Gross Motor Function Classification System grades IV and V. **MATERIALS AND METHODS:** All eligible patients who underwent surgery in one institution between 1997 and 2012 were analyzed, and charts, surgical reports, and radiographs were evaluated with a minimum follow-up period of 2 years. **RESULTS:** Fifty-seven patients were included (35 in group P, 22 in group AP), with a median follow-up period of 4.1 years. The preoperative mean Cobb angles were 84° (34 % flexibility) in group P and 109° (27 % flexibility) in group AP. In group P, the Cobb angle was 39° (54 % correction) at discharge and 43° at the final follow-up, while in group AP the figures were 54° (50 % correction) at discharge and 56° at the final follow-up. Major

complications occurred in 23 vs. 46 % of the patients, respectively. Preoperative curve flexibility was an important predictor for relative curve correction, independently of the type of surgery. **CONCLUSION:** Posterior-only surgery appears to lead to comparable radiological results, with shorter operating times and shorter intensive-care unit and hospital stays than combined surgery. The duration of surgery was a relevant predictor for complications.

[PMID: 26155897](#) [PubMed - as supplied by publisher]

##### **5. Eur Spine J. 2015 Jul 7. [Epub ahead of print]**

###### **Major perioperative complications after spine surgery in patients with cerebral palsy: assessment of risk factors.**

Samdani AF, Belin EJ, Bennett JT, Miyajni F, Pahys JM, Shah SA, Newton PO, Betz RR, Cahill PJ, Sponseller PD.

**PURPOSE:** A prospective, longitudinal cohort was studied to determine the incidence, consequences, and risk factors of major perioperative complications in patients with cerebral palsy (CP) treated with spinal fusion. There is a wide variety of data available on the complications of spine surgery; however, little exists on the perioperative complications in patients with CP. **METHODS:** A prospective multicenter dataset of consecutive patients with CP treated with spinal fusion was evaluated. All major perioperative complications were identified and stratified into categories: pulmonary, gastrointestinal, other medical, wound infection, neurological, instrumentation related, and unplanned staged surgery. Univariate and multivariate analyses were performed to identify various risk factors for major perioperative complications. **RESULTS:** 127 patients were identified with a mean age of  $14.3 \pm 2.6$  years. Overall, 39.4 % of the patients had a major perioperative complication. Occurrence of a complication [no complication (NC), yes complication (YC)] resulted in significantly increased intensive care unit (ICU) (NC = 3.2 days, YC = 7.8 days,  $p < 0.05$ ) and hospital stays (NC = 7.7 days, YC = 15.6 days,  $p < 0.05$ ). Variables associated with greater risk of a complication included: increased estimated blood loss (EBL) ( $p < 0.001$ ), larger preoperative kyphosis ( $p = 0.05$ ), staged procedures ( $p < 0.05$ ), a lack of antifibrinolytic use ( $p < 0.05$ ), and a trend toward lower body mass index (BMI) ( $p = 0.08$ ). Multivariate regression analysis revealed an increased EBL as independently associated with a major perioperative complication ( $p < 0.05$ ). **CONCLUSIONS:** In this cohort of patients with CP who underwent spinal fusion, 39.4 % experienced a major perioperative complication, with pulmonary being the most common. The occurrence of a major perioperative complication lengthened both ICU and hospital stay. Risk factors for major perioperative complications included greater preoperative kyphosis, staged procedures, a lack of antifibrinolytic use, and increased EBL, with the latter being an independent predictor of a major perioperative complication. **LEVEL OF EVIDENCE:** 2.

[PMID: 26148567](#) [PubMed - as supplied by publisher]

##### **6. Physiother Theory Pract. 2015 Jul 8:1-8. [Epub ahead of print]**

###### **Feasibility of using a large amplitude movement therapy to improve ambulatory function in children with cerebral palsy.**

Hickman R, Dufek JS, Lee SP, Blahovec A, Kuiken A, Riggins H, McClellan JR.

Cerebral palsy (CP) is the most common cause of motor disability among children. Limited evidence exists regarding the efficacy of traditional rehabilitation strategies on improving ambulatory function in this population. The purpose of the study was to investigate the feasibility and short-term effects of a novel large amplitude movement therapy on ambulatory functions in children with CP. Temporal-spatial gait characteristics were examined before and after a single intervention session, replicated over five children. Five children with CP ( $7.0 \pm 1.0$  years); Gross Motor Function Classification System Levels I-II, participated. Baseline gait parameters were obtained as the participant walked across an instrumented walkway at self-selected and fast speeds. Children then participated in a 20-30 min intervention focused on making body and limb movements as large as possible with gait assessment repeated immediately. All children tolerated testing and therapy with no adverse effects. Outcomes after one intervention included: significantly greater stride velocity; reduced double support time; and greater stride length after training for three of the five participants. Results for this pilot study suggested that the large amplitude movement therapy was feasible for children with CP.

There is a need for a larger scale study to determine if the protocol can be effective at an appropriate clinical dose.

[PMID: 26154826](#) [PubMed - as supplied by publisher]

**7. Res Dev Disabil. 2015 Jul 4;43-44:1-10. doi: 10.1016/j.ridd.2015.05.004. [Epub ahead of print]**

**The influence of seat heights and foot placement positions on postural control in children with cerebral palsy during a sit-to-stand task.**

Medeiros DL, Conceição JS, Graciosa MD, Koch DB, Santos MJ, Ries LG.

This paper aimed to analyze, from both a kinetic and kinematic perspective, the postural control of children with cerebral palsy (CP) able to independently perform the sit-to-stand (STS) task (ICP) and children who needed support (SCP) typically developing children during the STS; and also investigate the influence of seats heights and foot placement positions on postural control of these children. Fourteen children with CP and fourteen typically developing controls were recruited. Based on the Gross Motor Function Classification System (GMFCS) the children with CP were divided into ICP (level I) and SCP (levels II and III). Balance was assessed using the Pediatric Balance Scale. Motor function was rated using the GMFCS. Kinematic and kinetic data were recorded and analyzed during the STS task at two different seat heights and foot placement positions. The SCP exhibited significantly less balance according to the PBS and smaller displacement of their center of pressure (COP) in anteroposterior (COPAP) and mediolateral (COPML) direction relative to the other two groups. ICP demonstrated significant greater in the COPML displacement than the other groups. Children with CP required more time to complete the STS than controls. Those in the SCP group had lower linear displacement of the shoulder and knee than others during the STS task. During the high bench condition, the linear displacements of the shoulder and knee were reduced also. We conclude that the SCP has less COPAP and COPML oscillation, what means the better postural control during STS than the other two groups, which may be related to the support provided. The ICP exhibited greater COPML oscillations than controls, suggesting that they utilized different strategies in the frontal plane during the STS task. The seat height and foot placement did not influence postural control in children with CP, at least in terms of kinetic parameters. Seat height influenced the kinematic variables, with a high bench reducing linear displacement of the shoulder (vertical and horizontal) and knee (vertical) both in children with CP and control children.

Copyright © 2015 Elsevier Ltd. All rights reserved.

[PMID: 26151438](#) [PubMed - as supplied by publisher]

**8. J Phys Ther Sci. 2015 May;27(5):1337-40. doi: 10.1589/jpts.27.1337. Epub 2015 May 26.**

**Effects of trunk-hip strengthening on standing in children with spastic diplegia: a comparative pilot study.**

Kim JH, Seo HJ.

[Purpose] This study evaluated the effects of trunk-hip strengthening exercise on trunk-hip activation and pelvic tilt motion during standing in children with spastic diplegia and compared the improvement of pelvic tilt between the modified trunk-hip strengthening exercise and conventional exercise. [Subjects and Methods] Ten ambulant children with spastic diplegia were randomized to the modified trunk-hip strengthening exercise (n = 5) or conventional exercise (n = 5) group. The intervention consisted of a 6-week modified trunk-hip strengthening exercise 3 times per week. The children were tested for trunk-hip muscles activation and pelvic tilt motion during standing by surface electromyography and an inclinometer before and after the intervention. [Results] The anterior pelvic tilt angle and activation of the extensor spinae, rectus femoris, and semitendinosus during standing decreased significantly in the modified exercise group. The activation of extensor spinae differed significantly between groups. [Conclusion] Compared to the conventional exercise, the modified exercise was more effective for trunk-hip activation improvement and anterior pelvic tilt motion decrease during standing in children with spastic diplegia. We suggest clinicians use an individually tailored modified trunk-hip strengthening exercise for strengthening the weakest muscle groups in children with standing ability problems.

[PMID: 26157214](#) [PubMed] PMCID: PMC4483392

**9. J Phys Ther Sci. 2015 May;27(5):1283-6. doi: 10.1589/jpts.27.1283. Epub 2015 May 26.**

**Plantarflexor training affects propulsive force generation during gait in children with spastic hemiplegic cerebral palsy: a pilot study.**

Ishihara M, Higuchi Y, Yonetsu R, Kitajima H.

[Purpose] The purpose of this preliminary study was to assess the trade-off relationship between the hip and ankle joints after plantarflexor training in children with spastic hemiplegic cerebral palsy (CP). [Subjects and Methods] Three boys aged 9, 10, and 13 years with spastic hemiplegic CP participated in the study. Gait analysis was performed using a three-dimensional motion analysis device and a floor reaction force detection device before and after plantarflexor training. Data on gait speed and stride length for both sides were collected. Peak hip and ankle powers in the sagittal plane and ankle-to-hip power ratio (A2/H3 ratio) were calculated. Plantarflexor training comprised heel raises and exercise band resistance at the participant's home (3 times/week for 12 weeks). [Results] The A2/H3 ratio increased significantly on both sides in two of three subjects after training. Peak A2 power increased significantly on both sides in subject 3 and on the affected side of subject 2. Peak H3 power decreased significantly on the non-affected side of subjects 1 and 2. [Conclusion] This study confirmed that two of three subjects demonstrated a trade-off relationship between the hip and ankle joints during gait after plantarflexor training.

[PMID: 26157201](#) [PubMed]

**10. J Phys Ther Sci. 2015 May;27(5):1581-4. doi: 10.1589/jpts.27.1581. Epub 2015 May 26.**

**The effects of progressive functional training on lower limb muscle architecture and motor function in children with spastic cerebral palsy.**

Lee M, Ko Y, Shin MM, Lee W.

[Purpose] To investigate the effects of progressive functional training on lower limb muscle architecture and motor function of children with spastic cerebral palsy (CP). [Subjects] The subjects of this study were 26 children with spastic CP. [Methods] Thirteen subjects in the experimental group performed general neurodevelopmental treatment (NDT) and additional progressive functional trainings and 13 subjects in the control group performed only general NDT 3 times a week for 6 weeks. Ultrasonography, gross motor function measurement (GMFM) and the mobility questionnaire (MobQue) were evaluated. [Results] After the intervention, the muscle thickness of the quadriceps femoris (QF), cross-sectional area of the rectus femoris (RF), pennation angle of the gastrocnemius (GCM) and the MobQue score of the experimental group were significantly greater than those of the control group. The muscle thickness of QF correlated with the cross-sectional area (CSA) of RF and the pennation angle of GCM, and GMFM score correlated with the pennation angle of GCM. [Conclusion] Progressive functional training can increase muscle thickness, CSA, and the pennation angle of the lower limb muscles, and improve the mobility of spastic CP children making it useful as a practical adjunct to rehabilitation therapy.

[PMID: 26157267](#) [PubMed]

**11. J Phys Ther Sci. 2015 May;27(5):1571-5. doi: 10.1589/jpts.27.1571. Epub 2015 May 26.**

**Cardiorespiratory endurance in children with and without cerebral palsy as measured by an ergometer: a case series study.**

Jung JW, Woo JH, Ko J, Kim H.

[Purpose] This preliminary study aimed to determine the cardiorespiratory endurance of children with cerebral palsy (CP) using a case series study in order to provide the reference data required for interventions appropriate for South Korean CP sufferers, since aerobic ability evaluation and interventions for children with CP are not well recognized in South Korea. [Subjects and Methods] Four children and adolescents with CP GMFCS (Gross Motor Function Classification System) level I and II and two normally developing children (ND) (age: 7-15 years) were

studied. Cycle ergometer testing was performed to determine their VO<sub>2</sub> peak and RER peak concentrations as well as VE peak and 6MWT distance. [Results] The VO<sub>2</sub> peak was lower in subject E (CP) at 44.5 than in subject B (ND), and it was lower in subject A (ND) at 22.9 than in subject C (CP). The 6MWT distance was longer in subjects A and B (ND) than in age-matched CP subjects. [Conclusion] This case report demonstrates that the cardiorespiratory parameters values of CP children were similar to those reported previously. Further research is required to evaluate the normative values of CP and the optimal cardiorespiratory parameters.

[PMID: 26157265](#) [PubMed]

**12. Einstein (Sao Paulo). 2015 Apr-Jun;13(2):232-7. doi: 10.1590/S1679-45082015AO3266.**

**Esophageal eosinophilia in pediatric patients with cerebral palsy.**

Nápolis AC, Alves FA, Rezende ER, Segundo GR.

**OBJECTIVE:** To describe the clinical picture, test results, and clinical evolution of patients with cerebral palsy associated with diagnosis of eosinophilic esophagitis, monitored at tertiary centre. **METHODS:** Cross-sectional, retrospective and descriptive study that evaluated the medical records data of pediatric patients with diagnosis of cerebral palsy and eosinophilic esophagitis in a tertiary center of pediatric gastroenterology between August 2005 and August 2013. **RESULTS:** Seven out of 131 patients with cerebral palsy had the diagnosis of eosinophilic esophagitis. The mean age at diagnosis of eosinophilic esophagitis was 52.3 months and the mean number of eosinophils in esophagus was 35 per high-power field. Symptoms more frequent were recurrent vomiting and dysphagia. Endoscopic alterations found were mucosal thickening, vertical lines, mucosal opacification and white plaques. **CONCLUSION:** The frequency of eosinophilic esophagitis found was higher than in general pediatric population. The investigation of eosinophilic esophagitis should be done regularly in those patients, once this entity could overlap other gastrointestinal diseases.

[PMID: 26154544](#) [PubMed - in process]

**13. Tokai J Exp Clin Med. 2015 Jun 20;40(2):40-3.**

**Duodenal Emphysema Complicated with Superior Mesenteric Artery Syndrome in a Patient with Cerebral Paralysis: A Case Report.**

Ichikawa T, Yamamuro H, Koizumi J, Joishi D, Ohnuki Y, Yutani S, Imai Y.

Superior mesenteric artery syndrome (SMAS) is characterized by an arteriomesenteric duodenal compression commonly resulting from significant weight loss. Vomiting is the most frequent symptom. SMAS can be complicated by massive gastric dilatation. Patients with cerebral palsy have various factors that can predispose them to SMAS. In this paper, we report a rare case of SMAS complicated by duodenal, peritoneal and retroperitoneal emphysema in a patient with cerebral paralysis, referring to the relevant literature. In this case, severe vomiting associated with epilepsy and weight loss may have contributed to the development of duodenal emphysema.

[PMID: 26150182](#) [PubMed - in process] Free full text

**14. Muscle Nerve. 2015 Jul 7. doi: 10.1002/mus.24763. [Epub ahead of print]**

**Muscle Histopathology in Children with Spastic Cerebral Palsy Receiving Botulinum toxin Type A.**

Valentine J, Stannage K, Fabian V, Ellis K, Reid S, Pitcher C, Elliott C.

**INTRODUCTION:** Botulinum toxin A (BoNTA) is routine treatment for hypertonicity in children with cerebral palsy (CP). **METHOD:** Single blind prospective cross sectional study of 10 participants (mean age 11 years, 7 months)

was done to determine the relationship between muscle histopathology and BoNTA in treated medial gastrocnemius muscle of children with CP. Open muscle biopsies were taken from medial gastrocnemius muscle and vastus lateralis (control) during orthopedic surgery. RESULTS: Neurogenic atrophy in the medial gastrocnemius was seen in 6 participants between 4 months to 3 years post BoNTA. Type 1 fiber loss with type 2 fiber predominance was significantly related to the number of BoNTA injections ( $r = 0.89$ ,  $P < 0.001$ ). DISCUSSION: The impact of these changes in muscle morphology on muscle function in CP is not clear. It is important to consider rotating muscle selection or injection sites within the muscle or allowing longer time between injections. This article is protected by copyright. All rights reserved.

© 2015 Wiley Periodicals, Inc.

[PMID: 26154631](#) [PubMed - as supplied by publisher]

**15. Front Neurosci. 2015 Jun 19;9:208. doi: 10.3389/fnins.2015.00208. eCollection 2015.**

**Case study: auditory brain responses in a minimally verbal child with autism and cerebral palsy.**

Yau SH, McArthur G, Badcock NA, Brock J.

An estimated 30% of individuals with autism spectrum disorders (ASD) remain minimally verbal into late childhood, but research on cognition and brain function in ASD focuses almost exclusively on those with good or only moderately impaired language. Here we present a case study investigating auditory processing of GM, a nonverbal child with ASD and cerebral palsy. At the age of 8 years, GM was tested using magnetoencephalography (MEG) whilst passively listening to speech sounds and complex tones. Where typically developing children and verbal autistic children all demonstrated similar brain responses to speech and nonspeech sounds, GM produced much stronger responses to nonspeech than speech, particularly in the 65-165 ms (M50/M100) time window post-stimulus onset. GM was retested aged 10 years using electroencephalography (EEG) whilst passively listening to pure tone stimuli. Consistent with her MEG response to complex tones, GM showed an unusually early and strong response to pure tones in her EEG responses. The consistency of the MEG and EEG data in this single case study demonstrate both the potential and the feasibility of these methods in the study of minimally verbal children with ASD. Further research is required to determine whether GM's atypical auditory responses are characteristic of other minimally verbal children with ASD or of other individuals with cerebral palsy.

[PMID: 26150768](#) [PubMed] Free PMC Article

**16. Dev Med Child Neurol. 2015 Aug;57(8):704-5. doi: 10.1111/dmcn.12721. Epub 2015 Feb 27.**

**A child with cerebral palsy: what difference does it make for parents?**

Horridge K.

[PMID: 26154758](#) [PubMed - in process]

**17. Dev Med Child Neurol. 2015 Aug;57(8):768-75. doi: 10.1111/dmcn.12719. Epub 2015 Mar 2.**

**Parental social consequences of having a child with cerebral palsy in Denmark.**

Michelsen SI, Flachs EM, Madsen M, Uldall P.

AIM: To analyse the social situation of parents who have a child with cerebral palsy (CP). METHOD: This was a population-based longitudinal study with linkage to public registries. Parents of children with CP ( $n=3671$ ) identified in the Danish CP Registry were compared with 17 983 parents of children without CP. Employment, income, cohabitation status, and presence of additional children were factors analysed during a follow-up period of 28 years. We followed parents from before their child was born and up to the age of 43 years of the child. RESULTS: Mothers

of children with CP under the age of 10 were less often employed: odds ratio [OR] of employment at age 5y 0.45 (95% confidence interval [CI] 0.36-0.57), but only 11% left the labour market. Mothers of children without CP had higher incomes: ratio full-time working 1.11 (95% CI 1.07-1.15). The risk of not living together was not increased among parents of children with CP: at age 5 years OR 1.04 (95% CI 0.84-1.28). Parents of children with CP as the first born postponed or more seldom had subsequent children: hazard ratio [HR] 0.75 (95% CI 0.68-0.83). INTERPRETATION: The Danish welfare system seems to have succeeded in keeping parents in the labour market and living together with their child. Special attention needs to be paid to the financial situation of families with children with CP under 10 years of age.

© 2015 Mac Keith Press.

[PMID: 26154654](#) [PubMed - in process]

## Prevention and Cure

**18. Acta Paediatr. 2015 Jul 4. doi: 10.1111/apa.13109. [Epub ahead of print]**

### **Using a novel laminar flow unit provided effective total body hypothermia for neonatal hypoxic encephalopathy.**

Rodriguez Perez JM, Golombek SG, Alpan G, Sola A.

AIM: This was a clinical observational trial on a laminar flow device that provides total body hypothermia for infants with hypoxic ischaemic encephalopathy (HIE). METHODS: We enrolled infants born at up to 35 weeks of gestation, who presented with HIE within six hours of birth. Total body cooling was achieved by using the neonatal laminar flow unit for 72 hours, with continuous rectal temperature servo control, isolation and humidification. Outcome measures were cerebral palsy, a Bayley II Mental Development Index score <70, hearing loss or blindness. We compared findings with previously published studies. RESULTS: We included 26 newborn infants (69% male) with a birth weight of  $3.341 \pm 1.658$ g and gestational age of  $38.2 \pm 3.2$  weeks. The majority (62.6%) had a Sarnat HIE score of three and 38.4% had a score of two. Total body cooling (33-34°C) was achieved in 70 minutes and maintained with servo control, showing very little variability until rewarming. At 18-24 months of age, two of the 18 survivors were diagnosed with cerebral palsy and one was diagnosed with impaired hearing. CONCLUSION: The laminar flow unit proved effective in maintaining moderate total body hypothermia under well-controlled conditions and our results were very similar to other studies.

© This article is protected by copyright. All rights reserved.

[PMID: 26148138](#) [PubMed - as supplied by publisher]

**19. BJOG. 2015 Jul 6. doi: 10.1111/1471-0528.13490. [Epub ahead of print]**

### **Long-term neurodevelopmental outcome after selective feticide in monochorionic pregnancies.**

van Klink J, Koopman HM, Middeldorp JM, Klumper FJ, Rijken M, Oepkes D, Lopriore E.

OBJECTIVE: To assess the incidence of and risk factors for adverse long-term neurodevelopmental outcome in complicated monochorionic pregnancies treated with selective feticide at our centre between 2000 and 2011. DESIGN: Observational cohort study. SETTING: National referral centre for fetal therapy (Leiden University Medical Centre, the Netherlands). POPULATION: Neurodevelopmental outcome was assessed in 74 long-term survivors. METHODS: Children, at least 2 years of age, underwent an assessment of neurologic, motor and cognitive development using standardised psychometric tests and the parents completed a behavioural questionnaire. MAIN OUTCOME MEASURES: A composite outcome termed neurodevelopmental impairment including cerebral palsy (GMFCS II-V), cognitive and/or motor test score of <70, bilateral blindness or bilateral deafness requiring amplification. RESULTS: A total of 131 monochorionic pregnancies were treated with selective feticide at the Leiden University Medical Centre. Overall survival rate was 88/131 (67%). Long-term outcome was assessed in

74/88 (84%). Neurodevelopmental impairment was detected in 5/74 [6.8%, 95% confidence interval (CI), 1.1-12.5] of survivors. Overall adverse outcome, including perinatal mortality or neurodevelopmental impairment was 48/131 (36.6%). In multivariate analysis, parental educational level was associated with cognitive test scores (regression coefficient B 3.9, 95% CI 1.8-6.0). Behavioural problems were reported in 10/69 (14.5%). CONCLUSIONS: Adverse long-term outcome in survivor twins of complicated monochorionic pregnancies treated with selective feticide appears to be more prevalent than in the general population. Cognitive test scores were associated with parental educational level.

© 2015 Royal College of Obstetricians and Gynaecologists.

[PMID: 26147116](#) [PubMed - as supplied by publisher]