

Mondays 7 & 14 January 2013

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. This free weekly bulletin is just one of our activities. Please find out more at www.cpresearch.org.au

Professor Nadia Badawi

Macquarie Group Foundation Chair of Cerebral Palsy
PO Box 560, Darlinghurst, New South Wales 2010 Australia

Interventions and Management

1. *Res Dev Disabil.* 2013 Jan 2;34(3):1044-1051. doi: 10.1016/j.ridd.2012.11.012. [Epub ahead of print]

Logistic regression analyses for predicting clinically important differences in motor capacity, motor performance, and functional independence after constraint-induced therapy in children with cerebral palsy.

Wang TN, Wu CY, Chen CL, Shieh JY, Lu L, Lin KC.

School of Occupational Therapy, College of Medicine, National Taiwan University, Taipei, Taiwan; Division of Occupational Therapy, Department of Physical Medicine and Rehabilitation, National Taiwan University Hospital, Taipei, Taiwan.

Given the growing evidence for the effects of constraint-induced therapy (CIT) in children with cerebral palsy (CP), there is a need for investigating the characteristics of potential participants who may benefit most from this intervention. This study aimed to establish predictive models for the effects of pediatric CIT on motor and functional outcomes. Therapists administered CIT to 49 children (aged 3-11 years) with CP. Sessions were 1-3.5h a day, twice a week, for 3-4 weeks. Parents were asked to document the number of restraint hours outside of the therapy sessions. Domains of treatment outcomes included motor capacity (measured by the Peabody Developmental Motor Scales II), motor performance (measured by the Pediatric Motor Activity Log), and functional independence (measured by the Pediatric Functional Independence Measure). Potential predictors included age, affected side, compliance (measured by time of restraint), and the initial level of motor impairment severity. Tests were administered before, immediately after, and 3 months after the intervention. Logistic regression analyses showed that total amount of restraint time was the only significant predictor for improved motor capacity immediately after CIT. Younger children who restrained the less affected arm for a longer time had a greater chance to achieve clinically significant improvements in motor performance. For outcomes of functional independence in daily life, younger age was associated with clinically meaningful improvement in the self-care domain. Baseline motor abilities were significantly predictive of better improvement in mobility and cognition. Significant predictors varied according to the aspects of motor outcomes after 3 months of follow-up. The potential predictors identified in this study allow clinicians to target those children who may benefit most from CIT.

Copyright © 2012 Elsevier Ltd. All rights reserved.

[PMID: 23291522](https://pubmed.ncbi.nlm.nih.gov/23291522/) [PubMed - as supplied by publisher]

2. *Pediatr Phys Ther.* 2013 Spring;25(1):71-8. doi: 10.1097/PEP.0b013e31827abaf4.

Constraint-induced movement therapy effects on gross motor function of a child with triplegic cerebral palsy.

Schrank J.

Physical Medicine and Rehabilitation Department, Mayo Clinic Health System-Mankato, Mankato, Minnesota.

BACKGROUND AND PURPOSE: The purpose of this case report is to describe physical therapy interventions used and gross motor functional outcomes achieved during a 3-week course of constraint-induced movement therapy for a child with cerebral palsy. **CASE DESCRIPTION:** A 10-year-old boy with spastic triplegic cerebral palsy underwent fine and gross motor interventions to force use of the left extremities and right lower extremity. **INTERVENTION:** For weeks 1 to 2, he received 2 occupational and physical therapy sessions each week. For weeks 3 to 5, he participated in constraint-induced movement therapy, while wearing a cast 90% of waking hours. **OUTCOMES:** The Gross Motor Function Measure-88 score increased from 44.55% to 62.35% after treatment. Although he improved in one area of the Functional Independence Measure for Children, he demonstrated remarkable progress in his ability to bear weight and shift weight to his involved side in various developmental positions.

[PMID: 23288013](#) [PubMed - in process]

3. *Res Dev Disabil.* 2013 Jan 2;34(3):923-931. doi: 10.1016/j.ridd.2012.11.011. [Epub ahead of print]

Motor learning curve and long-term effectiveness of modified constraint-induced movement therapy in children with unilateral cerebral palsy: A randomized controlled trial.

Geerdink Y, Aarts P, Geurts AC.

Department of Pediatric Rehabilitation, Sint Maartenskliniek, Postbus 9011, 6500 GM Nijmegen, The Netherlands. Electronic address: y.geerdink@maartenskliniek.nl.

The goal of this study was to determine the progression of manual dexterity during 6 weeks (54h) (modified) constraint-induced movement therapy ((m)CIMT) followed by 2 weeks (18h) bimanual training (BiT) in children with unilateral spastic cerebral palsy (CP), to establish whether and when a maximal training effect was reached and which factors might influence the motor learning curve. In addition, long-term retention of effects was determined. In a randomized controlled trial of 52 children with CP, aged 2.5-8 years, comparing mCIMT-BiT to conventional therapy, 28 children were allocated to the mCIMT-BiT group. This group was assessed weekly with the Box and Block test. Long-term effectiveness was determined by collecting follow-up data of the primary (Assisting Hand Assessment, ABILHAND-Kids) and secondary (Melbourne, COPM) outcomes at six months and one year after intervention. Fifteen children (53.6%) reached a maximum training effect within the mCIMT period. This group differed from others with respect to age, but not gender, affected side or manual ability. Children younger than five years had a greater chance to reach a maximum score within 6 weeks mCIMT (OR=6.67, 95%CI=1.24-35.71) that stabilized already after four weeks; older children showed a longer progression and tended to decline afterwards. In both age groups, beneficial effects were retained in the long term. The findings suggest that children of 5 years and older might profit from a longer period of mCIMT than 54h to reach their maximum unimanual capacity and to retain this capacity during subsequent bimanual training.

Copyright © 2012 Elsevier Ltd. All rights reserved.

[PMID: 23291509](#) [PubMed - as supplied by publisher]

4. Gait Posture. 2012 Dec 27. pii: S0966-6362(12)00457-2. doi: 10.1016/j.gaitpost.2012.12.002. [Epub ahead of print]

A kinematic description of dynamic midfoot break in children using a multi-segment foot model.

Maurer JD, Ward V, Mayson TA, Davies KR, Alvarez CM, Beauchamp RD, Black AH.

Shriners Gait Lab, Sunny Hill Health Centre for Children, 3644 Slocan Street, Vancouver, BC, Canada V5M 3E8. Electronic address: jmaurer@cw.bc.ca.

Midfoot break (MFB) is a foot deformity that occurs most commonly in children with cerebral palsy (CP), but may also affect children with other developmental disorders. Dynamic MFB develops because the muscles that cross the ankle joint are hypertonic, resulting in a breakdown and dysfunction of the bones within the foot. In turn, this creates excessive motion at the midfoot. With the resulting inefficient lever arm, the foot is then unable to push off the ground effectively, resulting in an inadequate and painful gait pattern. Currently, there is no standard quantitative method for detecting early stages of MFB, which would allow early intervention before further breakdown occurs. The first step in developing an objective tool for early MFB diagnosis is to examine the difference in dynamic function between a foot with MFB and a typical foot. Therefore, the main purpose of this study was to compare the differences in foot motion between children with MFB and children with typical feet (Controls) using a multi-segment kinematic foot model. We found that children with MFB had a significant decrease in peak ankle dorsiflexion compared to Controls ($1.3 \pm 6.4^\circ$ versus $8.6 \pm 3.4^\circ$) and a significant increase in peak midfoot dorsiflexion compared to Controls ($15.2 \pm 4.9^\circ$ versus $6.4 \pm 1.9^\circ$). This study may help clinicians track the progression of MFB and help standardize treatment recommendations for children with this type of foot deformity.

Copyright © 2012 Elsevier B.V. All rights reserved.

[PMID: 23273965](#) [PubMed - as supplied by publisher]

5. Clin Orthop Relat Res. 2013 Jan 3. [Epub ahead of print]

Are Results After Single-event Multilevel Surgery in Cerebral Palsy Durable?

Rutz E, Baker R, Tirosch O, Brunner R.

Murdoch Childrens Research Institute, The Royal Children's Hospital, Victoria, Australia, erich_rutz@hotmail.com.

BACKGROUND: Gait and function may deteriorate with time in patients with spastic diplegia. Single-event multilevel surgery often is performed to either improve gait or prevent deterioration. However it is unclear whether the presumed gait improvements are durable. **QUESTIONS/PURPOSES:** We therefore determined whether (1) single-event multilevel surgery improves gait in patients with spastic diplegia and (2) whether the improved function is durable. **METHODS:** We retrospectively reviewed the data of 14 patients with spastic diplegia. At the time of surgery, one patient had gross motor Level I function, 10 patients had Level II function, and three patients had Level III function. There were four females and 10 males with a mean age of 13 years (range, 7-18 years). The mean number of orthopaedic procedures per single-event multilevel surgery session was 7.4 ± 2.8 (median, 6.5; range, 4-15). We used instrumented gait analysis to determine joint ROM, movement analysis profiles, and the gait profile score. The minimum followup was 1 year (mean, 2 years; range, 1-3 years). **RESULTS:** At last followup, movement analysis profiles for knee flexion, for ankle dorsiflexion, and for foot progression improved as did the gait profile score. Additional surgery after the index procedure was performed in nine of the 14 patients because of relapse of the original or new gait problems. Major surgical adverse events occurred in one of the 14 patients. **CONCLUSIONS:** Severe gait dysfunction in patients with spastic diplegia can be improved short-term in one operative session by single-event multilevel surgery, but to preserve the early improvements many patients require additional surgery. It is unknown whether the improvements will last for decades.

LEVEL OF EVIDENCE: Level IV, therapeutic study. See Guidelines for Authors for a complete description of levels of evidence.

[PMID: 23283676](#) [PubMed - as supplied by publisher]

6. ANZ J Surg. 2012 May;82(5):355-61. doi: 10.1111/j.1445-2197.2012.06030.x.

Biomechanics of medial hamstring lengthening.

Dagge B, Firth GB, Palamara JE, Eizenberg N, Donath S, Graham HK.

Orthopaedic Department, The Royal Children's Hospital The University of Melbourne, Parkville and Murdoch Childrens Research Institute, Monash University, Melbourne, Victoria, Australia.

Background: Medial hamstring lengthening is frequently used to correct contractures in neuromuscular conditions such as cerebral palsy. Surgical techniques vary considerably and little is known about the lengthening characteristics of muscle-tendon-units after surgical intervention. Methods: A randomized trial was performed on paired cadaver medial hamstring muscle-tendon-units comparing 'High' (proximal) versus 'Low' (distal) lengthening procedures. The paired muscle-tendon-units were subjected to tensile testing utilizing an Instron® (Instron Corporation, Canton, MA, USA) machine under controlled conditions. Prior to tensile testing, the paired semitendinosus and paired gracilis received either high or low intramuscular tenotomy. Load (N) versus displacement (mm) was recorded continuously for each test. The difference in lengthening and load at failure for intact and surgical simulation muscle-tendon-units was recorded and compared with paired t-tests. Results: Both low and high lengthenings increased the amount of lengthening achieved compared with intact controls and the lengthening was achieved at lower applied load. Low intramuscular tenotomy of the semitendinosus resulted in a 30% greater lengthening when compared with high intramuscular tenotomy. For the gracilis muscle, the low intramuscular tenotomy achieved 39% greater lengthening than the high intramuscular tenotomy and these differences were significant. Conclusion: Biomechanical testing of formalin-preserved human cadaveric medial hamstring muscle-tendon-units confirms that it is possible to achieve lengthening in continuity following an intramuscular tenotomy or fascial striping procedure. The site of the surgical procedure (high versus low) results in a different effect on the lengthening characteristics, dictated by the anatomy of the particular muscle-tendon-unit.

© 2012 The Authors. ANZ Journal of Surgery © 2012 Royal Australasian College of Surgeons.

[PMID: 23305051](#) [PubMed - in process]

7. Res Dev Disabil. 2013 Jan 4;34(3):1052-1058. doi: 10.1016/j.ridd.2012.11.016. [Epub ahead of print]

Botulinum toxin type A injections in the psoas muscle of children with cerebral palsy: Muscle atrophy after motor end plate-targeted injections.

Van Campenhout A, Verhaegen A, Pans S, Molenaers G.

University Hospital Leuven, Department of Orthopaedics, Leuven, Belgium. Electronic address: anja.vancampenhout@uzleuven.be.

MEP targeting during BoNT-A injections has been demonstrated to improve outcome. Two injection techniques of the psoas muscle - proximal MEP targeting versus a widely used more distal injection technique - are compared using muscle volume assessment by digital MRI segmentation as outcome measure. METHOD: 7 spastic diplegic children received injections in both psoas muscles: two different injection techniques randomly in 5 patients, in 2 patients bilateral MEP targeting. MRI images of the psoas were taken before, after 2months and in 3 patients after 6months. RESULTS: Average post injection volume (in relation to pre-injection volume) for the MEP targeted muscles (9) is 79.5% versus 107.8% in the 5 distal injected psoas muscles ($p=0.0033$). In all 5 asymmetric injected patients the MEP targeted psoas had a larger volume reduction than the more distal injected psoas muscle. This atrophy remains even 6months after the injection. This is the first study were a longitudinal follow-up by MRI demonstrates muscle atrophy after BoNT-A in children with CP. Injections in the MEP zone of the muscle, which is the more proximal part of the psoas muscle, cause atrophy in contrary to more distal injections were this atrophy is not observed.

Copyright © 2012 Elsevier Ltd. All rights reserved.

[PMID: 23295965](#) [PubMed - as supplied by publisher]

8. J Rehabil Med. 2013 Jan 10. doi: 10.2340/16501977-1090. [Epub ahead of print]**The long-term cost-effectiveness of the use of Functional Electrical Stimulation for the correction of dropped foot due to upper motor neuron lesion.**

Taylor P, Humphreys L, Swain I.

The National Clinical FES Centre, Salisbury District Hospital, SP2 8BJ Salisbury, United Kingdom.
p.taylor@salisburyfes.com.

Objective: Functional Electrical Stimulation (FES) for correction of dropped foot has been shown to increase mobility, reduce the incidence of falls and to improve quality of life. This study aimed to determine how long the intervention is of benefit, and the total cost of its provision. **Design:** Retrospective review of medical records. **Participants:** One hundred and twenty-six people with spastic dropped foot (62 stroke, 39 multiple sclerosis, 7 spinal cord injury, 3 cerebral palsy, 15 others) who began treatment in the year 1999. **Method:** All received common peroneal nerve stimulation, producing dorsiflexion and eversion time to the swing phase of gait using a heel switch. **Device usage,** 10 m walking speed and Functional Walking Category (FWC) were recorded. **Results:** The median time of FES use was 3.6 years (mean 4.9, standard deviation 4.1, 95% confidence interval 4.2-5.6) with 33 people still using FES after a mean of 11.1 years. People with stroke walked a mean of 45% faster overall, including a 24% training effect with 52% improving their FWC. People with multiple sclerosis did not receive a consistent training effect but walked 29% faster when FES was used with 40% increasing their FWC. The average treatment cost was £3,095 per patient resulting in a mean cost per Quality Adjusted Life Years of £15,406. **Conclusion:** FES is a practical, long-term and cost-effective treatment for correction of dropped foot.

[PMID: 23303521](#) [PubMed - as supplied by publisher]

9. Pediatr Phys Ther. 2013 Spring;25(1):46-51. doi: 10.1097/PEP.0b013e318277f157.**Sitting postural control in infants with typical development, motor delay, or cerebral palsy.**

Kyvelidou A, Harbourne RT, Willett SL, Stergiou N.

Department of Biology (Dr Kyvelidou), Northeastern University, Boston, Massachusetts; Munroe-Meyer Institute (Drs Harbourne and Ms Willett), University of Nebraska Medical Center, Omaha, Nebraska; and Nebraska Biomechanics Core Facility (Dr Stergiou), University of Nebraska at Omaha, Omaha, Nebraska.

PURPOSE: To determine whether infants born full-term, infants born preterm with motor delays, and infants born preterm who have a diagnosis of cerebral palsy (CP) differed in postural control at the emergence of early sitting. **METHODS:** Thirty infants born at term who were developing typically, 6 infants born preterm who were later diagnosed with CP, and 5 infants born preterm who were delayed in motor development participated in this study. Center-of-pressure data from unsupported sitting were recorded and analyzed using measures of both amount and temporal organization of center-of-pressure variability. **RESULTS:** Infants born full-term, infants born preterm with motor delays, and infants born preterm who have a diagnosis of CP exhibited dissimilar movement-control strategies at the onset of sitting. **CONCLUSIONS:** The present findings may be helpful in directing and testing intervention protocols for infants born preterm.

[PMID: 23288009](#) [PubMed - in process]

10. Pediatr Phys Ther. 2013 Spring;25(1):52. doi: 10.1097/PEP.0b013e318277f17d.**Commentary on "sitting postural control in infants with typical development, motor delay, or cerebral palsy".**

Gannotti M, Nahorniak M.

University of Hartford Hartford, CT Shriners Hospital for Children Hartford, CT.

[PMID: 23288010](#) [PubMed - in process]

11. Dev Med Child Neurol. 2013 Jan 7. doi: 10.1111/dmcn.12073. [Epub ahead of print]**Impaired muscle growth in spastic cerebral palsy.**

Barrett RS, Barber L.

School of Rehabilitation Sciences, Griffith University, Gold Coast campus, Queensland; Centre for Musculoskeletal Research, Griffith University, Gold Coast campus, Queensland.

[PMID: 23294400](#) [PubMed - as supplied by publisher]

12. Neurorehabil Neural Repair. 2013 Jan 4. [Epub ahead of print]**Differential Adaptations of Muscle Architecture to High-Velocity Versus Traditional Strength Training in Cerebral Palsy.**

Moreau NG, Holthaus K, Marlow N.

Louisiana State University Health Sciences Center, New Orleans, LA, USA.

BACKGROUND: Everyday activities for youth with cerebral palsy (CP) require muscle power, but the velocity component of muscle contraction is neglected with traditional strength training (ST). **OBJECTIVE:** To determine whether velocity training (VT), which includes resistance training at increasingly higher velocities, would induce specific muscle adaptations not observed with ST. **METHODS:** Sixteen ambulatory youth with CP were randomized to VT or ST. Participants trained the knee extensors 3 times per week for 24 sessions on a Biodex dynamometer. At each session, 6 sets of 5 concentric repetitions were performed either at 30 deg/s (ST group) or progressively higher velocities from 30 deg/s to 120 deg/s (VT group). Outcomes included muscle architecture, power, strength, walking speed, and functional walking performance. **RESULTS:** A significant increase in rectus femoris fascicle length was observed after VT with a decrease after ST. Rectus femoris cross-sectional area increased in both groups. Both showed significant increases in isokinetic strength at all tested speeds; however, peak velocity and power improved after VT only. Self-selected and fast walking speed and functional walking performance improved after VT only. **CONCLUSIONS:** Muscle architecture in CP is capable of adapting differentially to the training stimulus. VT was equally effective as traditional ST in improving isokinetic strength of the knee extensors but more effective in improving velocity of movement, muscle power, and walking performance. Differences may be partially attributed to specificity of training effects on muscle architecture, such as the increase in fascicle length after VT. Strengthening interventions involving higher velocity movements should be incorporated into clinical practice.

[PMID: 23292847](#) [PubMed - as supplied by publisher]

13. Pediatr Phys Ther. 2013 Spring;25(1):25-8. doi: 10.1097/PEP.0b013e3182791459.**Validity of the muscle power sprint test in ambulatory youth with cerebral palsy.**

Verschuren O, Bongers BC, Obeid J, Ruyten T, Takken T.

Rudolf Magnus Institute of Neuroscience and Center of Excellence for Rehabilitation Medicine (Dr Verschuren and Mr Ruyten), University Medical Center Utrecht and Rehabilitation Center De Hoogstraat, Utrecht, the Netherlands; Child Development & Exercise Center (Mr Bongers and Dr Takken), Wilhelmina Children's Hospital, UMC Utrecht, Utrecht, the Netherlands; Child Health & Exercise Medicine Program (Ms Obeid), Department of Pediatrics, McMaster University, Hamilton, Ontario, Canada.

PURPOSE: To validate the Muscle Power Sprint Test (MPST) against the Wingate Anaerobic cycling Test (WANt) in a group of youth with cerebral palsy (CP). **METHODS:** Twenty children and adolescents (11 boys and 9 girls; mean age = 14.8 years) with spastic CP, and classified as either level I or II of the Gross Motor Function Classification System, completed the study. **RESULTS:** Very strong significant correlations were seen for peak power (PP) and mean power (MP) from the MPST and WANt PP and MP values (PP: $r = 0.731$, $P < .001$; MP: $r = 0.903$, $P < .001$). **CONCLUSIONS:** The results of this study show that the MPST is a valid test for measuring anaerobic capacity in children with CP, and that this test can be used as an evaluation tool for anaerobic

performance in exercise interventions focusing on children and adolescents with CP who are able to walk or run independently.

[PMID: 23288003](#) [PubMed - in process]

14. *Pediatr Phys Ther.* 2013 Spring;25(1):29. doi: 10.1097/PEP.0b013e3182792a7e.

Commentary on "validity of the muscle power sprint test in ambulatory youth with cerebral palsy".

Hendershot S, Heathcock JC.

Nationwide Children's Hospital and The Ohio State University The Ohio State University, Division of Physical Therapy.

[PMID: 23288004](#) [PubMed - in process]

15. *Phys Occup Ther Pediatr.* 2013 Jan 8. [Epub ahead of print]

The Relationship Between Manual Ability and Ambulation in Adolescents with Cerebral Palsy.

Majnemer A, Shikako-Thomas K, Shevell M, Poulin C, Lach L, Law M, Schmitz N, Group TQ.

School of Physical and Occupational Therapy , McGill University, Montreal, Quebec , Canada.

This study examined the relationship between gross motor function and manual ability in 120 adolescents with cerebral palsy (CP) (15.2, SD 2.1 years, 59.8% male). Adolescents were evaluated using the Gross Motor Function Classification System (GMFCS) and the Manual Ability Classification System (MACS). A neurologist classified CP subtype. Most adolescents were ambulatory with or without utilization of aids (GMFCS level I: 35.0%, II: 30.0%, III: 5.8%, IV: 10.8%, and V: 18.3%). MACS levels were I: 34.2%, II: 25.8%, III: 16.7%, IV: 7.5%, and V: 15.8%. Correlations between GMFCS and MACS were strong in youth with quadriplegia ($r = .89$, $p < .001$), moderate in individuals with diplegia ($r = .58$, $p = .01$), but weakly associated for adolescents with hemiplegia ($r = .24$, $p = .23$). The findings provide evidence for maintaining a clinical distinction between spastic quadriplegia and spastic diplegia. Manual ability may not be congruent with mobility in adolescents with CP and should be specifically evaluated given its importance to daily life functioning.

[PMID: 23298373](#) [PubMed - as supplied by publisher]

16. *Int J Rehabil Res.* 2012 Dec 31. [Epub ahead of print]

The relationship between spasticity and gross motor capability in nonambulatory children with spastic cerebral palsy.

Katusic A, Alimovic S.

Day-Care Centre for Rehabilitation, 'Mali dom-Zagreb', Zagreb, Croatia.

Spasticity has been considered as a major impairment in cerebral palsy (CP), but the relationship between this impairment and motor functions is still unclear, especially in the same group of patients with CP. The aim of this investigation is to determine the relationship between spasticity and gross motor capability in nonambulatory children with spastic CP. Seventy-one children (30 boys, 41 girls) with bilateral spastic cerebral palsy and with Gross Motor Function Classification System (GMFCS) levels IV ($n=34$) and V ($n=37$) were included in the study. The spasticity level in lower limbs was evaluated using the Modified Modified Ashworth Scale and the gross motor function with the Gross Motor Function Measure (GMFM-88). Spearman's correlation analysis was used to determine the nature and the strength of the relationship. The results showed a moderate correlation between spasticity and gross motor skills ($p=0.52$ for the GMFCS level; $p=0.57$ for the GMFM-88), accounting for less than 30% of the explained variance. It seems that spasticity is just one factor among many others that could interfere with gross motor skills, even in children with severe forms of spastic CP. Knowledge of the impact of spasticity on

motor skills may be useful in the setting of adequate rehabilitation strategies for nonambulatory children with spastic CP.

[PMID: 23282668](#) [PubMed - as supplied by publisher]

17. Ann Neurol. 2012 Nov;72(5):633-4. doi: 10.1002/ana.23760.

Last breath: Effectiveness of hyperbaric oxygen treatment for cerebral palsy.

Novak I, Badawi N.

Cerebral Palsy Alliance, School of Medicine, University of Notre Dame Australia, Darlinghurst, Australia.

[PMID: 23280788](#) [PubMed - in process]

18. Arq Neuropsiquiatr. 2013 Jan 8. pii: S0004-282X2013005000003. [Epub ahead of print]

Environmental settings and families' socioeconomic status influence mobility and the use of mobility devices by children with cerebral palsy.

Cury VC, Figueiredo PR, Mancini MC.

Universidade Federal de Minas Gerais, Belo Horizonte, MG, Brazil.

Functional mobility of children with cerebral palsy (CP) is influenced by personal and environmental factors, serving as barriers and/or facilitators and impacting on children's strategies and functional outcome. **OBJECTIVES:** To describe typical mobility methods used by children with CP at home, school and community and to compare them across family's socioeconomic levels (SES). **METHODS:** The Functional Mobility Scale was used to assess mobility of 113 children with CP of high and low SES at home, school, and community. **RESULTS:** Differences in mobility methods of participants classified as Gross Motor Function Classification System levels II, III and IV were found between home and community. For levels III and IV, differences were also found between home and school. At home, participants from higher SES used wheelchairs more frequently while those from lower SES used floor mobility (crawling). **CONCLUSIONS:** Environmental settings and families' socioeconomic status influence mobility and use of mobility devices by children with CP.

[PMID: 23295366](#) [PubMed - as supplied by publisher]

19. Res Dev Disabil. 2013 Jan 2;34(3):1001-1010. doi: 10.1016/j.ridd.2012.11.026. [Epub ahead of print]

Picture me playing-A portrait of participation and enjoyment of leisure activities in adolescents with cerebral palsy.

Shikako-Thomas K, Shevell M, Lach L, Law M, Schmitz N, Poulin C, Majnemer A; the QUALA group.

School of Physical and Occupational Therapy, McGill University, 3654, Promenade Sir William Osler, Montreal, Quebec, Canada H3G 1Y5. Electronic address: keiko.thomas@mail.mcgill.ca.

In recent years attention has been paid to the participation levels of children and youth with Cerebral Palsy (CP), particularly the extent to which they have the opportunity to be involved in and enjoy leisure activities. The objective of this study is to describe the level of participation and enjoyment in leisure activities among adolescents with CP and to identify potential differences in participation patterns related to sociodemographic attributes. A cross-sectional design was used. Participants were 175 adolescents 12-20 years old (M=15.3; \pm 2.2), GMFCS I=55/II=43/III=13/IV=18/V=39 who completed the Children's Assessment of Participation and Enjoyment (CAPE). The types of activities participants engaged in most frequently were social and recreational activities, whereas self-improvement and skill-based activities were least frequent. Social activities were the activities they enjoyed most. In general, participation decreases, as youth grow older. Girls engaged in more self-improvement activities than boys. Adolescents who study in special segregated schools experienced a lower diversity and intensity of engagement in

all leisure activity domains. Adolescents who were not ambulatory and those presenting with more severe manual ability limitations participated less in all activity types except skill-based activities. Adolescents with CP place a high value on the ability to engage in activities of their own choosing and on interacting with friends. Engagement in a variety of leisure activities is important for a healthy development. Understanding the leisure patterns and preferences of this population, in addition to the contextual factors, may help in the elaboration of interventions and programs to promote a healthy development for this population.

Copyright © 2012 Elsevier Ltd. All rights reserved.

[PMID: 23291518](#) [PubMed - as supplied by publisher]

20. Res Dev Disabil. 2013 Jan 2;34(3):994-1000. doi: 10.1016/j.ridd.2012.11.025. [Epub ahead of print]

The Cerebral Palsy Quality of Life for Children (CP QOL-Child): Evidence of construct validity.

Chen KL, Wang HY, Tseng MH, Shieh JY, Lu L, Yao KP, Huang CY.

School of Occupational Therapy, College of Medicine, National Cheng Kung University, Tainan, Taiwan;
Department of Physical Medicine and Rehabilitation, National Cheng Kung University Hospital, Tainan, Taiwan.

The Cerebral Palsy Quality of Life for Children (CP QOL-Child) is the first health condition-specific questionnaire designed for measuring QOL in children with cerebral palsy (CP). However, its construct validity has not yet been confirmed by confirmatory factor analysis (CFA). Hence, this study assessed the construct validity of the caregiver proxy-report version of the Chinese version of the CP QOL-Child in children with CP using CFA. A total of 312 children with CP (mean age: 8.59 years, SD: 2.52 years) and their caregivers participated in this study. The Chinese version of the CP QOL-Child was completed by the caregivers of children with CP. Then, CFA was applied to evaluate the seven-factor measurement structure of the CP QOL-Child. The seven-factor CFA model had an adequate fit to our data as judged by χ^2 statistic and various goodness-of-fit (GOF) indices, including the root mean square error of approximation (RMSEA). This study provided empirical evidence of the construct validity of the CP QOL-Child to support its use with children with CP in the Chinese speaking society.

Copyright © 2012 Elsevier Ltd. All rights reserved.

[PMID: 23291517](#) [PubMed - as supplied by publisher]

21. Int J Pediatr Otorhinolaryngol. 2012 Dec 29. pii: S0165-5876(12)00667-2. doi: 10.1016/j.ijporl.2012.11.041. [Epub ahead of print]

Factors contributing to limited or non-use in the cochlear implant systems in children: 11 years experience.

Ozdemir S, Tuncer U, Tarkan O, Kiroglu M, Cetik F, Akar F.

Çukurova University School of Medicine, Department of Otolaryngology-Head and Neck Surgery, Adana, Turkey.
Electronic address: drsozdemir@gmail.com.

OBJECTIVES: The aim of this study was to analyze the incidence and etiologic factors of non-use and limited use of cochlear implants. The patients' age, gender, duration of implantation and additional disabilities were investigated. **PATIENTS AND METHODS:** Of the 413 (200 males, 213 females) pediatric patients (age under 16) implanted in our clinic between January 2000 and December 2011, 12 limited user/non-user cochlear implanted patients were selected who had a follow-up of at least 24 months. Preoperative and postoperative listening progress profile (LiP) and meaningful auditory integration scale (MAIS) tests were performed to analyze the auditory performances of the patients. **RESULTS:** In total of 12 recipients (2.90%) (7 male and 5 female patients; age range, 5-13 years), 4 (0.96%) patients were non-users and 8 (1.93%) patients were limited users. The patients had some additional disabilities as autism, cerebral palsy, moderate mental retardation, attention deficit/hyperactivity disorder, ossified cochlea due to meningitis and learning disability-lack of family interest. None had experienced device failure. In the postoperative 24th month, listening progress profile and meaningful auditory integration scale test scores were better in the limited users as expected. **CONCLUSIONS:** It should always be considered in patients with additional factors like autism, mental-motor retardation, learning disabilities that they will

show limited development from cochlear implantation. These patients are potential limited/non-users. These patients require unique rehabilitation and provide high family and educational interest.

Copyright © 2012 Elsevier Ireland Ltd. All rights reserved.

[PMID: 23280278](#) [PubMed - as supplied by publisher]

22. Spec Care Dentist. 2013 Jan;33(1):20-7. doi: 10.1111/j.1754-4505.2012.00311.x. Epub 2012 Nov 20.

The effect of toothbrush design on the ability of nurses to brush the teeth of institutionalized cerebral palsy patients.

Yitzhak M, Sarnat H, Rakocz M, Yaish Y, Ashkenazi M.

The Maurice and Gabriela Goldschleger School of Dental Medicine, Tel-Aviv University, Tel-Aviv, Israel.

Aim: To compare the effectiveness of two toothbrush designs in tooth brushing by nurses of individuals with cerebral palsy. **Methods:** Following instruction, nurses brushed the teeth of 21 individuals with a single-headed-toothbrush, and 22 with a triple-headed-toothbrush. After one month, the nurses brushed their patients with the other toothbrush, following instruction. Tooth brushing performance skill was evaluated and scored using the TB-PS -I/Ashkenazi index following the first brushing as well as on a recall visit one month later. **Results:** After 1 month, 7.6% of the nurses required further instruction following brushing with the triple-headed toothbrush compared to 15% after brushing with the single-headed. Reductions in plaque and gingival indices were greater after using the triple-headed than single-headed toothbrush. More nurses preferred the triple-headed toothbrush (75.5% compared to 22.6%). **Conclusion:** Brushing by nurses of cerebral palsy patients was more effective and instruction better retained with a triple-headed compared to single-headed toothbrush.

©2012 Special Care Dentistry Association and Wiley Periodicals, Inc.

[PMID: 23278145](#) [PubMed - in process]

23. Int Arch Med. 2013 Jan 10;6(1):1. [Epub ahead of print]

Functional capacity and assistance from the caregiver during daily activities in Brazilian children with cerebral palsy.

Malheiros SR, Monteiro CB, da Silva TD, Torriani-Pasin C, de Andrade MS, Valenti VE, Raimundo RD, Roosch A, Rodrigues LM, Manhabusque KV, Camargo RC, Drezzet J, Quadrado VH, de Abreu LC.

BACKGROUND: Cerebral Palsy (CP) presents changes in posture and movement as a core characteristic, which requires multiprofessional clinical treatments during children's habilitation or rehabilitation. Besides clinical treatment, it is fundamental that professionals use evaluation systems to quantify the difficulties presented to the individual and their families in their daily lives. We aimed to investigate the functional capacity of individuals with CP and the amount of assistance required by the caregiver in day-to-day activities. **METHODS:** Twenty patients with CP, six-year-old on average, were evaluated. The Pediatric Evaluation Inventory of Incapacities was used (PEDI - Pediatric Evaluation Disability Inventory), a system adapted for Brazil that evaluates child's dysfunction in three dimensions: self-care, mobility and social function. To compare the three areas, repeated measures analysis of variance (ANOVA) were used. **RESULTS:** We found the following results regarding the functional capacity of children: self-care, 27.4%, +/-17.5; mobility, 25.8%, +/-33.3 and social function, 36.3%, +/-27.7. The results of the demand of aid from the caregiver according to each dimension were: self-care, 9.7%, +/-19.9; mobility, 14.1%, +/-20.9 and social function, 19.8%, +/-26.1. **CONCLUSION:** We indicated that there was no difference between the performance of the subjects in areas of self-care, mobility and social function considering the functional skills and assistance required by the caregiver.

[PMID: 23302576](#) [PubMed - as supplied by publisher]

24. Lancet. 2012 Dec 8;380(9858):2050-1. doi: 10.1016/S0140-6736(12)62003-0.

"Thank you for seeing my beautiful daughter Kate..."

Nielsen J.

Concord Hospital, NSW, Australia. jamesnielsen@gmail.com

Comment in

The Wakley Prize 2012: Good night, and good luck. [Lancet. 2012]

[PMID: 23217868](#) [PubMed - indexed for MEDLINE]

25. Lancet. 2012 Dec 8;380(9858):1977. doi: 10.1016/S0140-6736(12)62132-1.

The Wakley Prize 2012: Good night, and good luck.

Boyce N.

niall.boyce@lancet.com

Comment on

"Thank you for seeing my beautiful daughter Kate...". [Lancet. 2012]

[PMID: 23217854](#) [PubMed - indexed for MEDLINE]

Prevention and Cure

26. BMC Pediatr. 2012 Dec 28;12(1):198. [Epub ahead of print]

Outcome at two years of age in a Swiss national cohort of extremely preterm infants born between 2000 and 2008.

Schlapbach LJ, Adams M, Proietti E, Aebischer M, Grunt S, Borradori-Tolsa C, Bickle-Graz M, Bucher HU, Latal B, Natalucci G.

BACKGROUND: While survival rates of extremely preterm infants have improved over the last decades, the incidence of neurodevelopmental disability (ND) in survivors remains high. Representative current data on the severity of disability and of risk factors associated with poor outcome in this growing population are necessary for clinical guidance and parent counselling. **METHODS:** Prospective longitudinal multicentre cohort study of preterm infants born in Switzerland between 240/7 and 276/7 weeks gestational age during 2000–2008. Mortality, adverse outcome (death or severe ND) at two years, and predictors for poor outcome were analysed using multilevel multivariate logistic regression. Neurodevelopment was assessed using Bayley Scales of Infant Development II. Cerebral palsy was graded after the Gross Motor Function Classification System. **RESULTS:** Of 1266 live born infants, 422 (33%) died. Follow-up information was available for 684 (81%) survivors: 440 (64%) showed favourable outcome, 166 (24%) moderate ND, and 78 (11%) severe ND. At birth, lower gestational age, intrauterine growth restriction and absence of antenatal corticosteroids were associated with mortality and adverse outcome ($p < 0.001$). At 360/7 weeks postmenstrual age, bronchopulmonary dysplasia, major brain injury and retinopathy of prematurity were the main predictors for adverse outcome ($p < 0.05$). Survival without moderate or severe ND increased from 27% to 39% during the observation period ($p = 0.02$). **CONCLUSIONS:** In this recent Swiss national cohort study of extremely preterm infants, neonatal mortality was determined by gestational age, birth weight, and antenatal corticosteroids while neurodevelopmental outcome was determined by the major neonatal morbidities. We observed an increase of survival without moderate or severe disability.

[PMID: 23272671](#) [PubMed - as supplied by publisher]

27. J Paediatr Child Health. 2012 Dec 21:5-8. doi: 10.1111/jpc.12068. [Epub ahead of print]

Causal pathways in cerebral palsy.

Badawi N, Keogh JM.

Macquarie Group Foundation, Cerebral Palsy Institute, University of Notre Dame; Grace Centre for Newborn Care, The Children's Hospital at Westmead; University of Sydney.

[PMID: 23279220](#) [PubMed - as supplied by publisher]

28. Acta Obstet Gynecol Scand. 2012 Nov;91(11):1247-51. doi: 10.1111/aogs.12021.

Conclusive meta-analyses on antenatal magnesium may be inconclusive! Are we underestimating the risk of random error?

Brok J, Huusom LD, Thorlund K.

Department of Pediatrics, Rigshospitalet, Copenhagen University Hospitals, Copenhagen, Denmark.
jesperb5@hotmail.com

Results from meta-analyses significantly influence clinical practice. Both simulation and empirical studies have demonstrated that the risk of random error (i.e. spurious chance findings) in meta-analyses is much higher than previously anticipated. Hence, authors and users of systematic reviews and meta-analyses have a responsibility to carefully consider the risk of random errors to avoid misleading conclusions. Trial sequential analysis is a useful meta-analytic method for gauging the risk of random error in meta-analysis and the amount of additional evidence required to reach firm conclusions about the investigated intervention effect(s). We outline the rationale for conducting trial sequential analysis including some examples of the meta-analysis on antenatal magnesium for women at risk of preterm birth.

© 2012 The Authors Acta Obstetrica et Gynecologica Scandinavica© 2012 Nordic Federation of Societies of Obstetrics and Gynecology.

Comment on

Does antenatal magnesium sulfate prevent cerebral palsy in preterm infants? The final trial? [Acta Obstet Gynecol Scand. 2012]

[PMID: 23016676](#) [PubMed - indexed for MEDLINE]

29. Am J Perinatol. 2013 Jan 4. [Epub ahead of print]

Cost-Effectiveness of Trial of Labor after Previous Cesarean in a Minimally Biased Cohort.

Gilbert SA, Grobman WA, Landon MB, Spong CY, Rouse DJ, Leveno KJ, Varner MW, Wapner RJ, Sorokin Y, O'Sullivan MJ, Sibai BM, Thorp JM, Ramin SM, Mercer BM; for the Eunice Kennedy Shriver National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network.

The George Washington University Biostatistics Center, Washington, District of Columbia.

Objective: To estimate the cost-effectiveness of a trial of labor after one previous cesarean delivery (TOLAC). Study Design: A model comparing TOLAC with elective repeat cesarean delivery (ERCD) was developed for a hypothetical cohort with no contraindication to a TOLAC. Probabilistic estimates were obtained from women matched on their baseline characteristics using propensity scores. Cost data, quality-adjusted life-years (QALYs),

and data on cerebral palsy were incorporated from the literature. Results: The TOLAC strategy dominated the ERCD strategy at baseline, with \$138.6 million saved and 1703 QALYs gained per 100,000 women. The model was sensitive to five variables: the probability of uterine rupture, the probability of successful TOLAC, the QALY of failed TOLAC, the cost of ERCD, and the cost of successful TOLAC without complications. When the probability of TOLAC success was at the base value, 68.5%, TOLAC was preferred if the probability of uterine rupture was 4.2% or less. When the probability of uterine rupture was at the base value, 0.8%, the TOLAC strategy was preferred as long as the probability of success was 42.6% or more. Conclusion: A TOLAC is less expensive and more effective than an ERCD in a group of women with balanced baseline characteristics.

Thieme Medical Publishers 333 Seventh Avenue, New York, NY 10001, USA.

[PMID: 23292916](#) [PubMed - as supplied by publisher]

30. Res Dev Disabil. 2013 Jan 2;34(3):1011-1017. doi: 10.1016/j.ridd.2012.11.028. [Epub ahead of print]

Neonatal stroke causes poor midline motor behaviors and poor fine and gross motor skills during early infancy.

Chen CY, Lo WD, Heathcock JC.

Division of Physical Therapy, The Ohio State University, 516 Atwell Hall, 453 West Tenth Avenue, Columbus, OH 43210, USA. Electronic address: chen.1740@buckeyemail.osu.edu.

Abstract

Upper extremity movements, midline behaviors, fine, and gross motor skills are frequently impaired in hemiparesis and cerebral palsy. We investigated midline toy exploration and fine and gross motor skills in infants at risk for hemiplegic cerebral palsy. Eight infants with neonatal stroke (NS) and thirteen infants with typical development (TD) were assessed from 2 to 7 months of age. The following variables were analyzed: percentage of time in midline and fine and gross motor scores on the Bayley Scales of Infant Development (BSID-III). Infants with neonatal stroke demonstrated poor performance in midline behaviors and fine and gross motor scores on the BSID-III. These results suggest that infants with NS have poor midline behaviors and motor skill development early in infancy.

Copyright © 2012. Published by Elsevier Ltd.

[PMID: 23291519](#) [PubMed - as supplied by publisher]

31. Stem Cells. 2012 Dec 24. doi: 10.1002/stem.1304. [Epub ahead of print]

Umbilical cord blood therapy potentiated with erythropoietin for children with cerebral palsy: A double-blind, randomized, placebo-controlled trial.

Min K, Song J, Kang JY, Pt JK, Ryu JS, Kang MS, Jang S, Kim SH, Oh D, Kim MK, Soo KS, Kim M.

Department of Rehabilitation Medicine, CHA Bundang Medical Center, CHA University.

Allogeneic umbilical cord blood (UCB) has therapeutic potential for cerebral palsy (CP). Concomitant administration of recombinant human erythropoietin (rhEPO) may boost the efficacy of UCB, as it has neurotrophic effects. The objectives of this study were to assess the safety and efficacy of allogeneic UCB potentiated with rhEPO in children with CP. Children with CP, were randomly assigned to one of three parallel groups: the pUCB group, which received allogeneic UCB potentiated with rhEPO; the EPO group, which received rhEPO and placebo UCB; and the Control group, which received placebo UCB and placebo rhEPO. All participants received rehabilitation therapy. The main outcomes were changes in scores on the following measures during the six months treatment period: the Gross Motor Performance Measure (GMPM), Gross Motor Function Measure, and Bayley Scales of Infant Development-II (BSID-II) Mental and Motor scales. (18) F-fluorodeoxyglucose positron emission tomography ((18) F-FDG-PET/CT) and diffusion tensor images (DTI) were acquired at baseline and followed up to detect changes in the brain. In total, 96 subjects completed the study. Compared with the EPO (n = 33) and Control (n = 32) groups, the pUCB (n = 31) group had significantly higher scores on the GMPM and BSID-II Mental and Motor scales at six months. DTI revealed significant correlations between the GMPM increment and changes in fractional anisotropy in

the pUCB group. (18) F-FDG-PET/CT showed differential activation and deactivation patterns between the three groups. The incidence of serious adverse events did not differ between groups. In conclusion, UCB treatment ameliorated motor and cognitive dysfunction in children with CP undergoing active rehabilitation, accompanied by structural and metabolic changes in the brain.

Copyright © 2012 AlphaMed Press.

[PMID: 23281216](#) [PubMed - as supplied by publisher]

Subscribe to CP Research News

To subscribe to this research bulletin, please complete the online form at www.cpresearch.org/subscribe/researchnews You can bookmark this form on the home screen of your smart phone and also email the link to a friend.

To unsubscribe, please email researchnews@cerebralpalsy.org.au with 'Unsubscribe' in the subject line, and your name and email address in the body of the email.