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Interventions and Management

1. Dev Med Child Neurol. 2014 Feb 5. doi: 10.1111/dmcn.12391. [Epub ahead of print]

Rasch analysis of The Melbourne Assessment of Unilateral Upper Limb Function.

Randall M, Imms C, Carey LM, Pallant JF.

AIM: This study investigated the internal construct validity and dimensionality of the Melbourne Assessment of Unilateral Upper Limb Function (Melbourne Assessment), a widely-used measure of quality of upper limb movement, valid for children aged 2 years 6 months to 15 years with cerebral palsy. **METHOD:** Rasch analysis was used to assess of Melbourne Assessment raw scores for 163 children (94 males, 69 females; mean age 8y, SD 3y 5mo). Analysis was undertaken on the full scale comprising 37 scores and on groups of scores separated into four distinct movement subscales: range of movement, accuracy, dexterity, and fluency. Tests were conducted to evaluate overall model fit, item fit, suitability of the response options, unidimensionality, and differential item functioning (DIF) for sex, child age, and different raters. **RESULTS:** The results did not support the unidimensionality of the 37-score scale. The four subscales showed adequate model fit after removal of some score items, and rescaling of others. The resulting subscales showed good internal consistency and no DIF for sex or child age. **INTERPRETATION:** This study provides empirical support for a revised version of the Melbourne Assessment which comprises 14 tasks and 30 movement scores grouped across four separate subscales. Further testing is required to assess the responsiveness of subscales to clinically important change.

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2. PLoS One. 2014 Jan 30;9(1):e87253. doi: 10.1371/journal.pone.0087253. eCollection 2014.

Using reinforcement learning to provide stable brain-machine interface control despite neural input reorganization.

Pohlmeyer EA1, Mahmoudi B2, Geng S1, Prins NW1, Sanchez JC3.

Brain-machine interface (BMI) systems give users direct neural control of robotic, communication, or functional electrical stimulation systems. As BMI systems begin transitioning from laboratory settings into activities of daily living, an important goal is to develop neural decoding algorithms that can be calibrated with a minimal burden on

the user, provide stable control for long periods of time, and can be responsive to fluctuations in the decoder's neural input space (e.g. neurons appearing or being lost amongst electrode recordings). These are significant challenges for static neural decoding algorithms that assume stationary input/output relationships. Here we use an actor-critic reinforcement learning architecture to provide an adaptive BMI controller that can successfully adapt to dramatic neural reorganizations, can maintain its performance over long time periods, and which does not require the user to produce specific kinetic or kinematic activities to calibrate the BMI. Two marmoset monkeys used the Reinforcement Learning BMI (RLBMI) to successfully control a robotic arm during a two-target reaching task. The RLBMI was initialized using random initial conditions, and it quickly learned to control the robot from brain states using only a binary evaluative feedback regarding whether previously chosen robot actions were good or bad. The RLBMI was able to maintain control over the system throughout sessions spanning multiple weeks. Furthermore, the RLBMI was able to quickly adapt and maintain control of the robot despite dramatic perturbations to the neural inputs, including a series of tests in which the neuron input space was deliberately halved or doubled.

[PMID: 24498055](#) [PubMed - in process] [Free full text](#)

3. Clin Biomech (Bristol, Avon). 2014 Jan 15. pii: S0268-0033(14)00007-2. doi: 10.1016/j.clinbiomech.2014.01.003. [Epub ahead of print]

Geometrical adaptation in ulna and radius of cerebral palsy patients: Measures and consequences.

de Bruin M1, van de Giessen M2, Vroemen JC3, Veeger HE4, Maas M5, Strackee SD3, Kreulen M6.

BACKGROUND: The presence of significant forearm bone torsion might affect planning and evaluating treatment regimes in cerebral palsy patients. We aimed to evaluate the influence of longstanding wrist flexion, ulnar deviation, and forearm pronation due to spasticity on the bone geometries of radius and ulna. Furthermore, we aimed to model the hypothetical influence of these deformities on potential maximal moment balance for forearm rotation. **METHODS:** Geometrical measures were determined in hemiplegic cerebral palsy patients (n=5) and healthy controls (n=5). Bilateral differences between the spastic arm and the unaffected side were compared to bilateral differences between the dominant and non-dominant side in the healthy controls. Hypothetical effects of bone torsion on potential maximal forearm rotation moment were calculated using an existing anatomical muscle model. **FINDINGS:** Patients showed significantly smaller (radius: 41.6%; ulna: 32.9%) and shorter (radius: 9.1%; ulna: 8.4%) forearm bones in the non-dominant arm than in the dominant arm compared to controls (radius: 2.4%; ulna 2.5% and radius: 1.5%; ulna: 1.0% respectively). Furthermore, patients showed a significantly higher torsion angle difference (radius: 24.1°; ulna: 26.2°) in both forearm bones between arms than controls (radius: 2.0°; ulna 1.0°). The model predicted an approximate decrease of 30% of potential maximal supination moment as a consequence of bone torsion. **INTERPRETATION:** Torsion in the bones of the spastic forearm is likely to influence potential maximal moment balance and thus forearm rotation function. In clinical practice, bone torsion should be considered when evaluating movement limitations especially in children with longstanding spasticity of the upper extremity.

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4. Phys Occup Ther Pediatr. 2014 Feb 3. [Epub ahead of print]

Clinimetric Properties of Sitting Balance Measures for Children with Cerebral Palsy: A Systematic Review.

Bañas BB, Gorgon EJ.

Assessment of sitting balance in children and youth with cerebral palsy (CP) is critical in order to design appropriate interventions to enhance activities and participation. This systematic review synthesized research evidence on the reliability, validity, responsiveness to change, and clinical utility of sitting balance measures for children and youth with CP. A two-tiered search in August 2012 using nine peer-reviewed electronic databases yielded nine articles with relevant information on seven clinical measures. Four of seven clinical measures: the Pediatric Reach Test (PRT), Sitting Assessment for Children with Neuromotor Dysfunction (SACND), Segmental Assessment of Trunk Control (SATCo), and Trunk Control Measurement Scale (TCMS), demonstrate acceptable overall applicability (at least one study supporting clinical utility, reliability, and validity) and are thus recommended for use in practice. Ongoing research on responsiveness to change, however, is warranted to support validity for outcomes

measurement.

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5. Spine J. 2014 Jan 31. pii: S1529-9430(14)00129-6. doi: 10.1016/j.spinee.2014.01.052. [Epub ahead of print]

Effect of increased axial rotation angle on bone mineral density measurements of the lumbar spine.

Jeon YK1, Shin MJ2, Shin YB3, Kim C4, Kim SJ5, Ko HY6, Kim IJ1.

BACKGROUND CONTEST: Osteoporosis frequently occurs in elderly people and is commonly associated with neuromuscular diseases or severe cerebral palsy. Osteoporosis can cause pain via compression fractures or secondary neurological deficits; thus, accurate evaluation of bone mineral density (BMD) is essential for the prevention and treatment of osteoporosis. However, spinal axial rotation caused by scoliosis may affect the outcome of BMD tests; such that BMD measurements may be significantly greater than actual BMD in patients with severe scoliosis of the spine. **PURPOSE:** We investigated the effect of axial rotation angle on BMD measurements of the phantom spine. **STUDY DESIGN/SETTING:** Investigation for the effect of axial rotation with aluminum phantom spine **METHODS:** A GE-Lunar Aluminum Spine Phantom was used to assess BMD. Bone mineral content (BMC), BMD, and cross-sectional area were measured 100 times at L1-L4 using a GE Lunar Prodigy Vision system. Dual-energy X-ray absorptiometry was performed at axial rotation angles of 0-25° (5° intervals). **RESULTS:** Cross-sectional area decreased and BMD values increased as the axial rotation angle increased, whereas BMC did not change significantly. A fitting function was obtained to evaluate the relationships among axial rotation angle, cross-sectional area, and BMD. We obtained an equation to estimate BMD at L1-L4: $1.000 - 0.001674x + 0.0001043x^2 - 0.000005333x^3$, where x denotes the axial rotation angle. We found that the observed BMD needed adjustment when the angle was >5°. **CONCLUSIONS:** BMD values may be overestimated in patients with even slight (>5°) axial rotation. When osteoporosis is suspected in a clinical setting, the degree of axial rotation should be measured on a lumbar spine X-ray.

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6. Disabil Rehabil. 2014 Feb 5. [Epub ahead of print]

Effect of multisite botulinum toxin injections on gait quality in adults with cerebral palsy.

Marchiori C, Roche N, Vuillerme N, Zory R, Pradon D.

Purpose: In the management of adults with cerebral palsy (CP), one of the goals is to monitor and prevent spasticity-related deteriorations in gait. Botulinum Toxin Injections (BTI) are commonly used to treat this spasticity in these patients. The purpose of this study was to evaluate (i) the effect of multi-site BTI on gait patterns in adults with CP and (ii) to determine if these modifications could be detected by the Gait Deviation Index (GDI). **Method:** Spontaneous-velocity gait was recorded using 3D gait analysis before and 1 month after multi-site BTI in lower limb muscles. Spatiotemporal parameters (STP), kinematic parameters (KP) and the GDI were computed. **Results:** Post BTI, stride length, peak hip flexion and peak knee flexion during Swing Phase (SW) were significantly increased while the GDI was not significantly modified. **Conclusion:** A single multi-site BTI improved STP and KP of adults with CP but the GDI was not sensitive enough to detect these changes. **Implications for Rehabilitation** Only few study on adults with cerebral palsy BTI approach on the gait patterns are largely unknown. BTI session induced only some smaller improvement of KP and STP. This improvement did not modify the GDI. We cannot determine if GDI is a relevant tool to evaluate changes following BTI or other types of treatment.

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7. Gait Posture. 2014 Jan 8. pii: S0966-6362(14)00003-4. doi: 10.1016/j.gaitpost.2014.01.001. [Epub ahead of print]

Stiff-knee gait in cerebral palsy: How do patients adapt to uneven ground?

Böhm H1, Hösl M2, Schwameder H3, Döderlein L2.

Patients with cerebral palsy frequently experience foot dragging and tripping during walking due to reduced toe clearance mostly caused by a lack of adequate knee flexion in swing (stiff-knee gait). The aim of this study was to investigate adaptive mechanism to an uneven surface in stiff-knee walkers with cerebral palsy. Sixteen patients with bilateral cerebral palsy, GMFCS I-II and stiff-knee gait, mean age 14.1 (SD=6.2) years, were compared to 13 healthy controls with mean age 13.5 (SD=4.8) years. Gait analysis including EMG was performed under even and uneven surface conditions. Similar strategies to improve leg clearance were found in patients as well as in controls. Both adapted with significantly reduced speed and cadence, increased outward foot rotation, knee and hip flexion as well as anterior pelvic tilt. Therefore cerebral palsy and stiff-knee gait did not affect the adaptation capacity on the uneven surface. On the uneven surface an average increase in knee flexion of 7° (SD=3°) and 12° (SD=5°) was observed in controls and patients with cerebral palsy, respectively. Although rectus femoris activity was increased in patients with cerebral palsy, they were able to increase their knee flexion during swing. The results of this study suggest that walking on uneven surface has the potential to improve knee flexion in stiff-knee walkers. Therefore training on uneven surface could be used as a conservative treatment regime alone, in combination with Botulinum neurotoxin or in the rehabilitation of surgery.

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8. Clin Biomech (Bristol, Avon). 2014 Jan 13. pii: S0268-0033(14)00006-0. doi: 10.1016/j.clinbiomech.2014.01.002. [Epub ahead of print]

Muscle and fascicle excursion in children with cerebral palsy.

Matthiasdottir S1, Hahn M2, Yaraskavitch M2, Herzog W2.

BACKGROUND: Fascicle length and fascicle excursion measurements in children with cerebral palsy have yielded inconsistent results. The purpose of this study was to measure in vivo passive fascicle lengths and fascicle excursions in the Medial Gastrocnemius muscle of children with cerebral palsy and typically developing controls. **METHODS:** We measured 11 children with spastic cerebral palsy and 14 controls between the ages of 9 and 16 years. Ultrasound imaging was used to measure fascicle lengths while a dynamometer moved the ankle joint through the range of motion. A common range of motion for all subjects was used for analysis of fascicle excursion. **FINDINGS:** Fascicle lengths in children with cerebral palsy were 43% smaller than those for control subjects throughout the range of motion. The relative fascicle excursion was 92% greater on average for the cerebral palsy compared to the control group children. The muscle excursion for the control group children was greater than for the cerebral palsy group children. **INTERPRETATION:** Since the fascicles in children with spastic cerebral palsy are shorter, but they go through the same excursion as fascicles in typically developing children, sarcomeres within the medial gastrocnemius muscle must be working over a larger range of sarcomere lengths. Combined with findings of overstretched sarcomeres in spastic muscles reported in the literature, our results suggest that the increased passive forces and the weakness found in spastic muscles may be caused by a decrease in contractile filament overlap as sarcomeres are pulled to extreme lengths in children with cerebral palsy.

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9. BMC Pediatr. 2014 Feb 7;14(1):35. [Epub ahead of print]

GRIN: "GRoup versus INdividual physiotherapy following lower limb intra-muscular Botulinum Toxin-A injections for ambulant children with cerebral palsy: an assessor-masked randomised comparison trial": study protocol.

Thomas RE, Johnston LM, Boyd RN, Sakzewski L, Kentish MJ.

BACKGROUND: Cerebral palsy is the most common cause of physical disability in childhood. Spasticity is a significant contributor to the secondary impairments impacting functional performance and participation. The most common lower limb spasticity management is focal intramuscular injections of Botulinum Toxin-Type A accompanied by individually-delivered (one on one) physiotherapy rehabilitation. With increasing emphasis on improving goal-directed functional activity and participation within a family-centred framework, it is timely to explore whether physiotherapy provided in a group could achieve comparable outcomes, encouraging providers to offer flexible models of physiotherapy delivery. This study aims to compare individual to group-based physiotherapy following intramuscular Botulinum Toxin-A injections to the lower limbs for ambulant children with cerebral palsy aged four to fourteen years. **Methods/design:** An assessor-masked, block randomised comparison trial will be conducted with random allocation to either group-based or individual physiotherapy. A sample size of 30 (15 in each study arm) will be recruited. Both groups will receive six hours of direct therapy following Botulinum Toxin-A injections in either an individual or group format with additional home programme activities (three exercises to be performed three times a week). Study groups will be compared at baseline (T1), then at 10 weeks (T2, efficacy) and 26 weeks (T3, retention) post Botulinum Toxin-A injections. Primary outcomes will be caregiver/s perception of and satisfaction with their child's occupational performance goals (Canadian Occupational Performance Measure) and quality of gait (Edinburgh Visual Gait Score) with a range of secondary outcomes across domains of the International Classification of Disability, Functioning and Health. **DISCUSSION:** This paper outlines the study protocol including theoretical basis, study hypotheses and outcome measures for this assessor-masked, randomised comparison trial comparing group versus individual models of physiotherapy following intramuscular injections of Botulinum Toxin-A to the lower limbs for ambulant children with cerebral palsy. Trial registration: ACTRN12611000454976.

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10. Anesthesiol Clin. 2014 Mar;32(1):63-81. doi: 10.1016/j.anclin.2013.10.014. Epub 2013 Dec 9.

Major Surgical Procedures in Children with Cerebral Palsy.

Theroux MC1, Dicindio S2.

There are 3 surgical procedures that patients with cerebral palsy (CP) undergo that may be considered major procedures: femoral osteotomies combined with pelvic osteotomies, spine fusion, and intrathecal baclofen pump implant for the treatment of spasticity. Many complications are known to occur at a higher rate in this population, and some may be avoided with prior awareness of the preoperative pathophysiology of the patient with CP.

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11. Zhongguo Xiu Fu Chong Jian Wai Ke Za Zhi. 2013 Nov;27(11):1345-9.

Analysis of medium- and long-term effectiveness of selective posterior rhizotomy for spastic cerebral palsy [Article in Chinese]

Jia Y1, Xiao Y2, Yang W1.

OBJECTIVE: To assess the medium- and long-term effectiveness of selective posterior rhizotomy (SPR) for spastic cerebral palsy. **METHODS:** A retrospective analysis was made on 27 patients with spastic cerebral palsy undergoing SPR between January 1997 and January 2008, whose data were complete with more than 5 years follow-up. There were 14 males and 13 females with an average age of 10.1 years (range, 4-19 years). All patients

had simple spastic cerebral palsy, including 17 cases of bilateral spastic palsy and 10 cases of unilateral spastic palsy. The muscle strength, muscle tone, ambulatory function, the sharp foot and crossing-feet, knee jerk, ankle clonus, and Babinski's sign were evaluated before and after operation. RESULTS: All the patients were followed up 5-16 years (mean, 9.6 years). No obvious limitation of lumbar flexion, extension and lateral flexion, spondylolisthesis, kyphosis, and other deformities occurred. At last follow-up, the muscle strength of hip extensors, hip flexors, and knee extensors were significantly increased when compared with preoperative ones ($P < 0.05$); but no significant difference was found in the muscle strength of hip abductors, hip adductors, knee flexors, plantar extensors, and plantar flexors ($P > 0.05$). Abnormal increased muscle tone of hip flexors, hip adductors, knee flexors, and plantar flexors was declined in different degrees in all patients, showing significant differences when compared with preoperative ones ($P < 0.05$); but no significant difference was found in hip extensors, hip abductors, knee extensors, and plantar extensors ($P > 0.05$). At last follow-up, the status of toe steps and crossing-feet disappeared without recurrence for a long time. Sthenic knee jerk was eliminated, but there were several patients also keeping the active knee jerk, showing significant difference when compared with preoperative ones ($Z = -7.404$, $P = 0.000$). The results of Babinski's sign were negative in 31 sides and positive in 13 sides, showing significant difference when compared with preoperative ones ($Z = -6.897$, $P = 0.000$). No sharp foot or crossing-feet was observed. And ambulation ability was significantly improved after operation ($Z = -4.111$, $P = 0.000$). CONCLUSION: SPR is very effective in decreasing the muscle tone and improving the motor function without recurrence in long-term.

[PMID: 24501894](#) [PubMed - in process]

12. BMC Pediatr. 2014 Feb 3;14(1):31. [Epub ahead of print]

A pedometer based physical activity self-management program for children and adolescents with physical disability - design and methods of the StepUp study.

Maher C, Crettenden A, Evans K, Thiessen M, Toohey M, Dollman J.

BACKGROUND: Physical activity affords a wide range of physiological and psychological benefits for children and adolescents, yet many children with physical disabilities are insufficiently active to achieve these benefits. The StepUp program is a newly developed 6-week pedometer-based self-management program for children and adolescents with physical disability. Participants use a pedometer to undertake a 6-week physical activity challenge, with personalised daily step count goals set in consultation with a physiotherapist. The study aims to evaluate the effectiveness of the StepUp program, using a randomised control trial design. **Methods/design:** A target sample of 70 young people with physical disabilities (aged 8-17 years, ambulant with or without aid, residing in Adelaide) will be recruited. Participants will be randomly allocated to either intervention or control following completion of baseline assessments. Assessments are repeated at 8 weeks (immediately post intervention) and 20 weeks (12 weeks post intervention). The primary outcome is objective physical activity determined from 7 day accelerometry, and the secondary outcomes are exercise intention, physical self-worth, quality of life and fatigue. Analyses will be undertaken on an intention-to-treat basis using random effects mixed modelling. **DISCUSSION:** This study will provide information about the potential of a low-touch and low-cost physical activity intervention for children and adolescents with cerebral palsy. Trial registration: Australian New Zealand Clinical Trials Registry (ANZCTR): ACTRN12613000023752.

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13. Med Sci (Paris). 2013 Nov;29(11):957-60. doi: 10.1051/medsci/20132911009. Epub 2013 Nov 20.

Video games as a therapeutic approach for patients: coming soon? [Article in French]

Bonnechère B, Jansen B, Omelina L, Wermembol V, Rooze M, Van Sint Jan S.

[PMID: 24280496](#) [PubMed - indexed for MEDLINE]

14. Folia Phoniatr Logop. 2014 Feb 1;65(4):200-207. [Epub ahead of print]**Changes in Voice Quality after Speech-Language Therapy Intervention in Older Children with Cerebral Palsy.**

Miller N, Pennington L, Robson S, Roelant E, Steen N, Lombardo E.

Objective: We examined whether perceived voice quality is altered in a group of children with cerebral palsy (CP) following an intervention focusing on respiration and phonation, and whether possible improvements might be associated with increased intelligibility levels. Methods: Sixteen individuals with CP and dysarthria (9 girls, mean age 14 years, SD = 2; 9 with spastic type CP, 2 dyskinetic, 4 mixed, 1 Worster-Drought syndrome) completed intelligibility assessments on separate days twice before intervention, at termination of treatment and at 6-week follow-up using 50 words from the Children's Speech Intelligibility Measure lists, and describing cartoon strips. Experienced speech-language pathologists rated voice quality employing GRBAS scales. Results: There was no clear evidence that change in voice quality pre-post intervention was large compared with change in the pre-intervention or post-intervention periods. Asthenia demonstrated largest improvement (effect size of 0.4). Intelligibility correlated weakly with Grade, Breathiness and Asthenia, but not with Roughness or Strain. A deterioration of 1 unit on the Grade and Asthenia scales was associated with an approximately 11% decrease in intelligibility. Conclusion: Perceived changes in voice quality were small compared to changes in intelligibility. Further investigations must examine other variables potentially associated with intelligibility gain to better understand the links between the respiratory-phonatory intervention and improved intelligibility. © 2014 S. Karger AG, Basel.

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15. Int J Pediatr Otorhinolaryngol. 2014 Jan 9. pii: S0165-5876(14) 00024-X. doi: 10.1016/j.ijporl.2013.12.037. [Epub ahead of print]**Periodic botulinum toxin injections for paradoxical vocal fold motion in a child with cerebral palsy: A case study.**

Cheng YS1, Bhutta MF2, Ramsden JD3, Lennox P3.

We describe an unusual case of paradoxical vocal fold motion in a child with cerebral palsy. Clinically, the child presented with mild stridor, which worsened over months, eventually requiring emergency intubation. After an unsuccessful trial of medical management, microlaryngoscopy revealed abnormal adduction of the vocal folds during inspiration. This was successfully treated with periodic type A botulinum toxin injections to the vocal folds, sparing the child from tracheostomy.

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16. Cochrane Database Syst Rev. 2013 Aug 28;8:CD006151. doi: 10.1002/14651858.CD006151.pub3.**Fundoplication versus postoperative medication for gastro-oesophageal reflux in children with neurological impairment undergoing gastrostomy.**

Vernon-Roberts A, Sullivan PB.

BACKGROUND: Children with neurological impairments frequently experience feeding difficulties, which can lead to malnutrition and growth failure. Gastrostomy feeding is now the preferred method of providing nutritional support to children with neurological impairments who are unable to feed adequately by mouth. Complications may arise as a result of gastrostomy placement, and the development or worsening of gastro-oesophageal reflux (GOR) has been widely reported. This has led to the frequent use of surgical antireflux treatment in the form of a fundoplication, or other antireflux procedures. Fundoplication is associated with a high recurrence rate, surgical failure, and significant morbidity and mortality. Since proton pump inhibitors (PPIs) were introduced in the 1990s, they have come to play a larger part in the medical management of GOR in children with neurological impairments.

Uncontrolled studies suggest that PPIs may be a safe, appropriate treatment for GOR. Other agents currently used include milk thickeners, acid suppression drugs, acid buffering agents, gut motility stimulants and sodium alginate preparations. There are risks and benefits associated with both surgical and medical interventions and further comparison is necessary to determine the optimal treatment choice. OBJECTIVES: To compare the effectiveness of antireflux surgery and antireflux medications for children with neurological impairments and GOR who are undergoing placement of a gastrostomy feeding tube. SEARCH METHODS: We searched the following databases on 23 March 2012: the Cochrane Central Register of Controlled Trials (CENTRAL), Ovid MEDLINE, EMBASE, CINAHL, LILACS and ISI Web of Science. Previously, we searched the Child Health Library in June 2009. We also performed online searches of trial registries, medical journals, conference proceedings, dissertations and theses. We contacted specialists in the medical and industry setting for knowledge of completed or ongoing trials. SELECTION CRITERIA: We sought to include randomised controlled trials that recruited children up to the age of 18 years with neurological impairments and GOR who were undergoing gastrostomy tube insertion. DATA COLLECTION AND ANALYSIS: The review authors worked independently to select trials; none were identified. MAIN RESULTS: We identified no trials that satisfied the criteria for this review. AUTHORS' CONCLUSIONS: There remains considerable uncertainty regarding the optimal treatment when faced with the decision of fundoplication surgery versus antireflux medications for children with GOR and neurological impairment who are undergoing gastrostomy insertion. There is a need for robust scientific evidence in order to provide data on the comparable risks or benefits of the two interventions.

Update of
Cochrane Database Syst Rev. 2007;(1):CD006151.

[PMID: 23986351](#) [PubMed - indexed for MEDLINE]

17. BMC Pediatr. 2014 Feb 1;14(1):30. doi: 10.1186/1471-2431-14-30.

Brazilian Portuguese translation and cross-cultural adaptation of the "Caregiver Priorities and Child Health Index of Life with Disabilities" (CPCHILD©) questionnaire.

Pellegrino LA, Ortolan EV, Magalhães CS, Viana AA, Narayanan UG.

BACKGROUND: Consideration of the quality of life in relation to individual health status is crucial for planning and maintaining a system of patient-centered care. Until recently, there have been no suitable instruments to assess health-related quality of life (HRQoL) of children and adolescents with severe, non-ambulant cerebral palsy (GMFCS functional levels IV and V). The "Caregiver Priorities and Child Health Index of Life with Disabilities Questionnaire" (CPCHILD©) was developed in English specifically for this population, and has been validated in Canada. The aim of this study was to translate and adapt the CPCHILD© Questionnaire into Brazilian Portuguese, thus permitting researchers in Brazil to access this important tool for measuring HRQoL in this population, as well as the possibility of making comparisons with other studies that use the same questionnaire in other languages. METHOD: The cross-cultural adaptation included two forward translations by independent translators, their synthesis, two back-translations by independent translators, an assessment of the versions by an expert committee and the development of a pre-final version, which was tested on 30 caregivers of children (5 -18) with severe cerebral palsy (GMFCS IV & V). RESULTS: Despite the relative equivalence between the two translations, some items required adaptations for the synthesized version. Certain modifications were necessary in the pre-final version to achieve idiomatic equivalence. The modifications were required to account for the socioeconomic and cultural levels of the target population. CONCLUSION: The translation and cross-cultural adaptation of the CPCHILD© questionnaire provides a Brazilian Portuguese equivalent to measure the HRQoL of children with severe developmental disabilities, with the potential to measure the benefits of various procedures that are indicated for these patients. This adaptation exhibited a satisfactory level of semantic equivalence between the Portuguese target and the original English source versions. The validity of the Brazilian version of the instrument must be established in the future by assessing its psychometric properties on Brazilian epidemiological samples.

[PMID: 24485229](#) [PubMed - in process] [PMCID: PMC3915619](#) [Free PMC Article](#)

18. Eur J Paediatr Neurol. 2014 Jan 25. pii: S1090-3798(14)00012-9. doi: 10.1016/j.ejpn.2014.01.006. [Epub ahead of print]

Quality of life and functional outcome in early school-aged children after neonatal stroke: A prospective cohort study.

Darteyre S1, Renaud C2, Vuillerot C3, Presles E4, Kossorotoff M5, Dinomais M6, Lazaro L7, Gautheron V8, Chabrier S9; AVCnn Group.

BACKGROUND: Quality of life (QoL) is recognized internationally as an efficient tool for evaluating health interventions. To our knowledge, QoL has not been specifically assessed in children after neonatal arterial ischemic stroke (AIS). **AIM:** To study the QoL of early school-aged children who suffered from neonatal AIS, and QoL correlation to functional outcome. **METHOD:** We conducted a multicenter prospective cohort study as part of a larger study in full-term newborns with symptomatic AIS. Participating families were sent anonymous QoL questionnaires (QUALIN). Functional outcome was measured using the Wee-FIM scale. Healthy controls in the same age range were recruited in public schools. Their primary caregivers filled in the QUALIN questionnaires anonymously. We used Student's t-test and a rank test to compare patients and controls' QoL and functional outcomes. **RESULTS:** 84 children with neonatal AIS were included. The control group was composed of 74 children, of which ten were later excluded due to chronic conditions. Mean ages and QUALIN median scores did not differ between patients and controls. Median Wee-FIM scores were lower in hemiplegic children than in non-hemiplegic ones ($p < 0.001$). QoL scores did not seem correlated to functional outcome. **INTERPRETATION:** Those results could support the presence of a "disability paradox" in young children following neonatal AIS.

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Prevention and Cure

19. Behav Brain Res. 2014 Jan 29. pii: S0166-4328(14)00010-2. doi: 10.1016/j.bbr.2014.01.007. [Epub ahead of print]

Beneficial effects of early environmental enrichment on motor development and spinal cord plasticity in a rat model of cerebral palsy.

Marques MR1, Stigger F1, Segabinazi E2, Augustin OA2, Barbosa S2, Piazza FV1, Achaval M1, Marcuzzo S3.

Cerebral palsy (CP) results from nonprogressive lesions in the immature brain generating changes on the neuromuscular system. Environmental enrichment (EE) is a combination of stimuli that provides greater motivation and interest in novel movement exploration through the provision of various devices associated to enhanced social stimulation that would mimic the physiotherapy approach. The aim of this study was to verify whether EE is able to prevent the establishment of motor impairment in a CP rat model. The animals were divided in two groups: control animals (healthy) and animals submitted to a CP model. After this, the pups were exposed to two environments: enriched or standard, totaling four groups: Control group (without CP in a standard environment), CP group (CP model in a standard environment), EE group (without CP in an enriched environment) and CP-EE (CP model in an enriched environment). The experimental model was induced in pregnant Wistar rats by the association of maternal exposure to bacterial endotoxin, perinatal anoxia and sensorimotor restriction of the pups. The assessment of motor skills was held using the following tests: open field, rotarod, horizontal ladder, narrow suspended bar and stride length. The histological analysis evaluated the mean cross-sectional area (CSA) of the soleus muscle fibers, the mean CSA of motoneuronal somata and expression of synaptophysin in the ventral horn of the spinal cord. EE was able to prevent the motor deficits, however, it did not reverse the muscle atrophy observed in CP animals. Furthermore, there was an average increase in the mean area of motoneurons and an increase in the expression of synaptophysin in the ventral horn of the spinal cord of the CP-EE group in relation to CP animals reared in a standard environment. Hereupon, the stimulus increment provided by EE can prevent the onset of motor deficits and histological changes in a CP rat model.

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Betamimetics for inhibiting preterm labour.

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BACKGROUND: Preterm birth is a major contributor to perinatal mortality and morbidity worldwide. Tocolytic agents are drugs used to inhibit uterine contractions. Betamimetics are tocolytic agents that have been widely used, especially in resource-poor countries. **OBJECTIVES:** To assess the effects of betamimetics given to women with preterm labour. **SEARCH METHODS:** We searched the Cochrane Pregnancy and Childbirth Group's Trials Register (31 December 2013) and reference lists of retrieved studies. **SELECTION CRITERIA:** Randomised controlled trials of betamimetics, administered by any route or any dose, in the treatment of women in preterm labour where betamimetics were compared with other betamimetics, placebo or no treatment. **DATA COLLECTION AND ANALYSIS:** Two review authors assessed risk of bias and extracted the data independently. **MAIN RESULTS:** Twenty-eight trials were assessed as eligible for inclusion in the review, but eight did not report any outcome data relevant to the review. Results are based on the 20 trials that contributed data. Twelve trials, involving 1367 women, compared betamimetics with placebo. Betamimetics decreased the number of women in preterm labour giving birth within 48 hours (average risk ratio (RR) 0.68, 95% confidence interval (CI) 0.53 to 0.88, 10 trials, 1209 women). There was a decrease in the number of births within seven days (average RR 0.80; 95% CI 0.65 to 0.98, five trials, 911 women) but there was no evidence of a reduction in preterm birth (before 37 weeks' gestation) (RR 0.95; 95% CI 0.88 to 1.03, 10 trials, 1212 women). No benefit was demonstrated for betamimetics for perinatal death (RR 0.84; 95% CI 0.46 to 1.55, 11 trials, 1332 infants), or neonatal death (RR 0.90; 95% CI 0.27 to 3.00, six trials, 1174 infants). No significant effect was demonstrated for respiratory distress syndrome (RR 0.87; 95% CI 0.71 to 1.08, eight trials, 1239 infants). A few trials reported on cerebral palsy, infant death and necrotising enterocolitis; no significant differences between groups were identified for any of these outcomes. Betamimetics were significantly associated with the following outcomes: withdrawal from treatment due to adverse effects; maternal chest pain; dyspnoea; palpitation; tremor; headaches; hypokalaemia; hyperglycaemia; nausea or vomiting; nasal stuffiness; and fetal tachycardia. Nine trials compared different types of betamimetics. Other betamimetics were compared with ritodrine in five trials (n = 948). Other comparisons were examined in single trials: hexoprenaline compared with salbutamol (n = 140), slow versus moderate release salbutamol (n = 52) and salbutamol compared with terbutaline (n = 200). Trials were small, varied, and of insufficient quality to delineate any consistent patterns of effect. **AUTHORS' CONCLUSIONS:** Betamimetics help to delay birth, which may give time to allow women to be transferred to tertiary care or to complete a course of antenatal corticosteroids. However, multiple adverse effects must be considered. The data are too few to support the use of any particular betamimetic.

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Umbilical arterial pH in patients with cerebral palsy.

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BACKGROUND: Umbilical arterial pH (UApH) in severe cerebral palsy (CP) is not fully understood. **AIMS:** This work aims to determine the relationship between fetal acidemia and clinical features of severe CP. **STUDY DESIGN:** A retrospective study design is used. **SUBJECTS:** A review was conducted until 1 April 2013 among 218 infants with CP diagnosed to be caused by antenatal and/or intrapartum conditions determined by the Japan Council for Quality Health Care. After excluding patients in whom the causes of CP were thought to be due to events after delivery, 168 infants born at over 34 weeks of gestation that both Apgar score and UApH were measured were selected. **OUTCOME MEASURES:** Severe fetal acidemia was defined as a pH of less than 7.0. **RESULTS:** Six major factors were found to be associated with CP: placental abruption (A, n=42), traumatic delivery with an abnormal FHR pattern (B, n=29), an abnormal FHR pattern during labor (C, n=27), chorioamnionitis with an

abnormal FHR pattern (D, n=17), an abnormal FHR pattern before labor (E, n=14), and cord prolapse (F, n=10). The UApH was less than 7.0 in 114 cases (67.9%) and more than 7.20 in 20 cases (11.9%). The UApH values were lowest in group A (median 6.7, 6.43-6.99) and highest in group E (7.18, 6.92-7.45). The distribution of the UApH values was significantly different in these groups. CONCLUSION: Placental abruption was a factor most associated with low pH. Even among the infants with severe CP, over 10% of patients exhibited a non-acidemic status at birth.

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AP4M1 is abnormally expressed in oxygen-glucose deprived hippocampal neurons.

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AP4M1 mutations have been suggested to be associated with autosomal recessive cerebral palsy syndrome. But the pathogenic mechanism remains uncertain. The purpose of this study is to investigate whether and how AP4M1 expression is changed in injured neurons. Primary cultured hippocampal neurons were prepared for this experiment. They were subjected to oxygen-glucose deprivation (OGD) leading to apoptosis, mimicking brain ischemia. Neuron-specific enolase (NSE) was labeled immunofluorescently to confirm that the purity of neuron was higher than 90%. Real-time PCR and western blotting were performed to measure the gene expression. AP4M1 was labeled with MAP2 or Tau-1 to observe the distribution. We found that the AP4M1 protein levels immediately after the procedure were similar between the OGD group and the sham group. However, down-regulation was observed 12h after the reperfusion, and became more notable at 24h. The real-time PCR showed similar results, except that the down-regulation of mRNA was able to be detected immediately after the OGD. Immunofluorescent labeling revealed AP4M1 distributed in the dendrites of normal neurons, but it redistributed to the axons after the OGD procedure. In conclusion, AP4M1 is not only down-regulated at both the mRNA and protein levels, but also redistributed from dendrites to axons in oxygen-glucose deprived hippocampal neurons.

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