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Interventions and Management

1. Phys Occup Ther Pediatr. 2013 Dec 4. [Epub ahead of print]

Delivering Evidence-Based Upper Limb Rehabilitation for Children with Cerebral Palsy: Barriers and Enablers Identified by Three Pediatric Teams.

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This study aimed to identify barriers and enablers experienced by occupational therapists to delivering evidence-based upper limb intervention for children with unilateral cerebral palsy. Semistructured interviews informed by the Theoretical Domains Framework were conducted with nine occupational therapists from three teams to ascertain barriers and enablers to implementing five evidence criteria. A key barrier was lack of knowledge of current evidence for upper limb therapies for children with unilateral cerebral palsy. Therapists were confident in delivering goal-directed bimanual occupational therapy, but less knowledgeable and skilled, and hence confident in providing constraint therapy. Strategies to increase dose of therapy were identified as greater use of home programs and group-based interventions; however, therapists indicated the need for further education and skill development in these areas. In order to increase the uptake of research evidence into practice, findings from this study will be used to inform context-specific, individually targeted implementation strategies.

[PMID: 24303800](https://pubmed.ncbi.nlm.nih.gov/24303800/) [PubMed - as supplied by publisher]

2. Prog Brain Res. 2013;207:379-401. doi: 10.1016/B978-0-444-63327-9.00015-1.

Constraint-induced movement therapy: a method for harnessing neuroplasticity to treat motor disorders.

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Constraint-Induced Movement therapy or CI therapy is an approach to physical rehabilitation elaborated from basic neuroscience and behavioral research with primates. The application of the CI therapy protocol to humans began with the upper extremity after stroke and was then modified and extended to cerebral palsy in young

children, traumatic brain injury, and multiple sclerosis. A form of CI therapy was developed for the lower extremities and has been used effectively after stroke, spinal cord injury, fractured hip, multiple sclerosis, and cerebral palsy. Adaptations of the CI therapy paradigm have also been developed for aphasia, focal hand dystonia in musicians, and phantom limb pain. Human and animal studies using a variety of methods provide evidence that CI therapy produces marked neuroplastic changes in the structure and function of the CNS. Moreover, these changes appear to be important for the intervention's therapeutic effect.

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[PMID: 24309263](#) [PubMed - in process]

3. Res Dev Disabil. 2013 Nov 28;35(2):250-260. doi: 10.1016/j.ridd.2013.11.001. [Epub ahead of print]

Reduced integrity of sensorimotor projections traversing the posterior limb of the internal capsule in children with congenital hemiparesis.

Tsao H, Pannek K, Fiori S, Boyd RN, Rose S.

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There is reduced integrity of corticospinal projections that traverse the posterior limb of the internal capsule (PLIC) in children with unilateral cerebral palsy (CP). It remains unclear whether there are changes in integrity of other projections traversing the PLIC. Forty children with congenital hemiparesis and 15 typically developing children underwent structural and diffusion-weighted MRI. All children with congenital hemiparesis showed lesions to the periventricular white matter. Structural images were parcellated into 34 cortical regions per hemisphere and posterior limb of the internal capsule was identified. PLIC connections to each cortical region were extracted using probabilistic tractography. Differences between hemispheres for each cortical projection (asymmetry index (AI)) and tract microstructure (fractional anisotropy (FA), mean diffusivity (MD)) were assessed. The results showed that 17 children (42.5%) with congenital hemiparesis showed bilateral lesions on structural MRI. Projections to the primary motor cortex (precentral gyrus and paracentral lobule) showed greater asymmetry in unilateral CP group compared to typically developing children and indicate reduced projections on the hemisphere contralateral to the impaired limb (i.e., contralateral hemisphere). Reduced FA and increased MD were also observed for connections with the primary motor cortex, primary sensory cortex (postcentral gyrus) and precuneus on the contralateral hemisphere in children with congenital hemiparesis. Similar changes were observed between children with unilateral and bilateral lesions on structural MRI. Notably, microstructural changes were associated with deficits in both sensory and motor function. The findings further unravel the underlying neuroanatomical correlates of sensorimotor deficits in children with congenital hemiparesis.

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4. J Child Orthop. 2012 Dec;6(6):485-490. Epub 2012 Nov 20.

Orthopedic surgery and mobility goals for children with cerebral palsy GMFCS level IV: what are we setting out to achieve?

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BACKGROUND: Multilevel orthopedic surgery is considered to be the gold standard treatment for ambulatory children with cerebral palsy (CP), classified at levels I, II, or III according to the Gross Motor Function Classification System (GMFCS). Hip enlocation and stability are the main goals of orthopedic intervention in the GMFCS level IV subgroup and are well researched; however, there is no evidence to date to support or challenge the effectiveness

of orthopedic treatment to preserve functional mobility in this patient group. The aim of this study was to evaluate the results of orthopedic surgery to maintain or restore standing transfers and supported walking in children with CP at GMFCS level IV. **METHODS:** Twenty-two children with CP GMFCS level IV who underwent orthopedic surgery to improve mobility between the years 2004 and 2008 were included in this study. A retrospective chart review was performed and a satisfaction questionnaire sent to all patients. The primary outcome measure was the attainment and maintenance of mobility goals 2 years post-surgery. The secondary outcome measures were family/patient satisfaction, Functional Mobility Scale (FMS), and complications. **RESULTS:** The two goals identified by the patients and carers were standing transfers and supported walking. At the 2-year post-surgery assessment, 14 children (63.6 %) did not reach their pre-determined goals. In the questionnaire, 21.4 % of the families reported that surgery was not beneficial. The FMS score remained unchanged in 95.4 % of the patients. Fourteen patients (63.6 %) had at least one complication that prolonged their post-operative rehabilitation (e.g., neuropraxia). **CONCLUSION:** This study suggests that orthopedic surgery in children with CP at GMFCS level IV is unlikely to maintain or restore mobility. Furthermore, it carries a significant risk of complications.

LEVEL OF EVIDENCE: Case series, Level IV.

[PMID: 24294311](#) [PubMed - as supplied by publisher] [PMCID: PMC3511688](#) [Free PMC Article](#)

5. *Curr Opin Pediatr.* 2013 Dec 2. [Epub ahead of print]

Hip problems in cerebral palsy: screening, diagnosis and treatment.

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PURPOSE OF REVIEW: Spastic type is the most common form of cerebral palsy. The purpose of this review was to evaluate recent literature for current trends in the surveillance and treatment of spastic hip problems in cerebral palsy. **RECENT FINDINGS:** Cerebral palsy is still the most common physical disability in childhood in developed countries. Surveillance programs have had promising results in the detection of 'at risk' patients. However, neither regular radiographic screening nor surgical treatment indications and procedures have shown any progression in the last decade. In addition, recent studies have focused heavily on nonoperative treatment strategies to improve gait. **SUMMARY:** Cerebral palsy is a static encephalopathy causing myostatic contractures especially in the knee and hip. Unbalanced hip contractures can lead to silent hip dislocation. Surgical and rehabilitative approaches such as soft tissue lengthening and proximal femoral and pelvic osteotomies can help patients maintain function and comfort. Selective dorsal rhizotomy or Intrathecal Baclofen Pump insertion or, recently, noninvasive techniques such as neurodevelopmental therapy may help patients and caregivers cope with what is still a devastating and inexorably progressive disorder.

[PMID: 24299910](#) [PubMed - as supplied by publisher]

6. *J Electromyogr Kinesiol.* 2013 Nov 15. pii: S1050-6411(13)00274-5. doi: 10.1016/j.jelekin.2013.11.003. [Epub ahead of print]

Methodologies to assess muscle co-contraction during gait in people with neurological impairment - A systematic literature review.

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PURPOSE: To review the methodologies used to assess muscle co-contraction (MCo) with surface electromyography (sEMG) during gait in people with neurological impairment. **METHODS:** The Scopus (1995-2013), Web of Science (1970-2013), PubMed (1948-2013) and B-on (1999-2013) databases were searched. Articles were included when sEMG was used to assess MCo during gait in people with impairment due to central nervous system disorders (CNS). **RESULTS:** Nineteen articles met the inclusion criteria and most studied people

with cerebral palsy and stroke. No consensus was identified for gait assessment protocols (surfaces, speed, distance), sEMG acquisition (electrodes position), analysis of sEMG data (filters, normalisation techniques) and quantification of MCo (agonist-antagonist linear envelopes overlapping or agonist-antagonist overlapping periods of muscles activity, onset delimited). **CONCLUSION:** Given the wide range of methodologies employed, it is not possible to recommend the most appropriate for assessing MCo. Researchers should adopt recognized standards in future work. This is needed before consensus about the role that MCo plays in gait impairment in neurological diseases and its potential as a target for gait rehabilitation can be determined.

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[PMID: 24295541](#) [PubMed - as supplied by publisher]

7. J Child Orthop. 2012 Dec;6(6):515-516. Epub 2012 Oct 11.

Response to letter re: Comparison of hamstring lengthening with hamstring lengthening plus transfer for treatment of flexed knee gait in ambulatory patients with cerebral palsy.

Sussman MD, Aiona M, Do KP, Pierce R, Feng J, Feng L.

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[PMID: 24294316](#) [PubMed - as supplied by publisher] PMCID: PMC3511690 [Free PMC Article](#)

8. J Child Orthop. 2012 Dec;6(6):513-514. Epub 2012 Oct 2.

Re: Feng L, Do P, Aiona M, Feng J, Pierce R, Sussman M (2012) Comparison of hamstring lengthening with hamstring lengthening plus transfer for the treatment of flexed knee gait in ambulatory patients with cerebral palsy. J Child Orthop 6:229-235.

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[PMID: 24294315](#) [PubMed - as supplied by publisher] PMCID: PMC3511685 [Free PMC Article](#)

9. Res Dev Disabil. 2013 Nov 26;35(2):239-249. doi: 10.1016/j.ridd.2013.10.021. [Epub ahead of print]

Meta-analysis of the effect of strengthening interventions in individuals with cerebral palsy.

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This study aimed to investigate the evidence that strengthening interventions can improve muscle strength and activity in individuals with cerebral palsy. The search focused on studies that employed strength training for children with cerebral palsy for which six electronic databases were used to extract literature published from 2001 to 2012. The key terms used in these searches were combined strength training, strengthening, weight training, weight lifting, resistance, and cerebral palsy. The quality of each study was assessed using the PEDro (Physiotherapy Evidence Database) scale. Thirteen randomized controlled trial studies were selected and divided into categories according to program type, mode, and outcome measures. The overall effect sizes of each study and types of strengthening were large. Strengthening exercise improved muscle strength to a greater degree, when practiced 3 times per week in 40-50min sessions than in other categories of session length, and greater improvement was observed in younger children than in older. The effect size of the activities and variables related to gait, except for gait endurance, were medium to large. The effect size of individual muscles was large, but the effect sizes for ankle plantar flexor, hip abductor/adductor, and extensor were insignificant. Strengthening interventions are useful for increasing muscle strength in individuals with cerebral palsy, specifically in youth and children, and optimal exercise

consisted of 40- to 50-min sessions performed 3 times per week. Although strengthening interventions may improve activities, including gait, more studies that are rigorous are needed to determine the contributions to gross motor function.

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10. Zhen Ci Yan Jiu. 2013 Oct;38(5):403-6, 410.

Clinical trials of acupuncture intervention combined with sitting training for cerebral palsy children with parafunctional sitting position [Article in Chinese]

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OBJECTIVE: To observe the clinical effect of electroacupuncture (EA) combined with sitting training for cerebral palsy (CP) children with parafunctional sitting position. **METHODS:** A total of 120 parafunctional sitting CP child patients were randomly and equally divided into sitting training (control) group and EA plus sitting training (EA) group. The sitting training included assistant-sitting, legs-crossing-sitting, sitting with one-leg extending, long-term sitting, balancing-sitting, chair-climbing, and pron and hand-supporting, twice daily. EA (4 Hz, a tolerable strength) was applied to Mingmen (GV 4), Jizhong (GV 6), Shenshu (BL 23), and Pishu (BL 20) for 30 min, once daily. Both sitting training and EA treatment were conducted 5 times a week and continuously for a month. Twenty-items of sitting functions (0 - 3 point scaling) of Gross Motor Function Measure (GMFM) were used to evaluate the infantile patients' motor function and Nimodipine-method was employed to assess the curative effect. **RESULTS:** The sitting function scores were significantly increased in both control and EA groups compared with pre-treatment in the same one group ($P < 0.01$), and were apparently higher in the EA group than in the control group ($P < 0.05$), suggesting a better therapeutic effect of EA plus sitting training. EA plus sitting training intervention was better for the spastic and hypotonic patterns of CP patients than the other patterns in the therapeutic effect ($P < 0.01$). Of the two 60 cases of CP children in the control and EA groups, 20 (33.33%) and 22 (36.67%) experienced marked improvement, 24 (40.00%) and 30 (50.00%) were effective, and 16 (26.67%) and 8 (13.33%) failed, with the effective rates being 73.33% and 86.67% respectively. **CONCLUSION:** Acupuncture intervention combined with sitting training is better than sitting training intervention alone in improving cerebral palsy children with parafunctional sitting position, especially for the spastic and hypotonic CP patients.

[PMID: 24308189](#) [PubMed - in process]

11. Pain Res Manag. 2013 Nov-Dec;18(6):323-7.

Motor function predicts parent-reported musculoskeletal pain in children with cerebral palsy.

Barney CC, Krach LE, Rivard PF, Belew JL, Symons FJ.

BACKGROUND: The relationship between pain and motor function is not well understood, especially for children and adolescents with communication and motor impairments associated with cerebral palsy (CP). **OBJECTIVES:** To determine whether a predictive relationship between motor function and musculoskeletal pain exists in children with CP. **METHODS:** Following informed consent, caregivers of 34 pediatric patients with CP (mean [\pm SD] age 9.37 \pm 4.49 years; 80.0% male) completed pain- and function-related measures. Parents completed the Dalhousie Pain Interview and the Brief Pain Inventory based on a one-week recall to determine whether pain had been experienced in the past week, its general description, possible cause, duration, frequency, intensity and interference with daily function. The Gross Motor Function Classification System (GMFCS) was used to classify the motor involvement of the child based on their functional ability and their need for assistive devices for mobility. **RESULTS:** GMFCS level significantly predicted parent-reported musculoskeletal pain frequency ($P < 0.02$), duration ($P = 0.05$) and intensity ($P < 0.01$). Duration of pain was significantly related to interference with activities of daily living ($P < 0.05$). **CONCLUSIONS:** Children with CP with greater motor involvement, as indexed by GMFCS level, may be at risk for increased pain (intensity, frequency and duration) that interferes with activities of daily living. The

clinical index of suspicion should be raised accordingly when evaluating children with developmental disability who cannot self-report reliably.

[PMID: 24308022](#) [PubMed - in process]

12. Disabil Rehabil. 2013 Dec 6. [Epub ahead of print]

Obesity prevention for children with physical disabilities: a scoping review of physical activity and nutrition interventions.

McPherson AC, Keith R, Swift JA.

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Purpose: Children with disabilities are at higher risk of obesity, engage in less physical activity and report poorer quality dietary habits than their non-disabled peers. This study reviewed current evidence on interventions designed to facilitate weight management and/or weight-related behaviors (i.e. physical activity and/or healthy eating habits) in children with physical disabilities. **Methods:** A scoping review was performed using established methodology. Data from studies meeting specific inclusion criteria were extracted and analyzed using summary statistics, and common characteristics thematically identified. **Results:** Thirty-four articles were included in the synthesis. No long-term obesity prevention interventions were identified. The majority of research focused upon children with cerebral palsy, and had case study, quasi- or non-experimental designs. All interventions reporting positive outcomes (n = 18) addressed physical activity, with common themes including using motivational strategies for the child and child self-direction. Incremental increases in workload and engaging in strength training for longer than 15 minutes were also effective. Interventions targeting body weight/composition did not report success in the long term. **Conclusions:** A robust evidence base is lacking for long-lasting obesity interventions for children with physical disabilities. Current research provides some insights into the specific components that should be considered when planning such interventions in the future. Implications for Rehabilitation Clinicians should be aware of the high risk of obesity, physical inactivity and poor diet in children with physical disabilities. The use of motivational strategies, child direction in activities and incremental increases in workload all appear promising approaches, yet require further evaluation. Evidence-based interventions are needed to improve both short- and long-term health and quality of life for children with physical disabilities.

[PMID: 24308905](#) [PubMed - as supplied by publisher]

13. Rev Esc Enferm USP. 2013 Aug;47(4):836-842.

Constipation in patients with quadriplegic cerebral palsy: intestinal reeducation using massage and a laxative diet [Article in English, Portuguese]

Faleiros-Castro FS, Paula ED.

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Constipation affects 74% of individuals with cerebral palsy. This study aimed to evaluate the results of nursing interventions for treating intestinal constipation associated with cerebral palsy. This quantitative, prospective, comparative study included 50 patients with quadriplegic cerebral palsy and constipation. The main conservative measures included daily consumption of laxative foods and vegetable oils, increase in fluid intake, and daily intestinal massage. Total or partial constipation relief was observed in 90% of the patients, with improvement in quality-of-life aspects such as sleep, appetite, and irritability, and a significant decrease in rectal bleeding, anal fissure, voluntary retention of stools, crying, and pain on defecation. Only 10% of the patients required laxative medications. It is recommended that conservative measures be used for treating cerebral palsy-related constipation and medications be used solely as adjuvants, if needed.

[PMID: 24310680](#) [PubMed - as supplied by publisher] [Free full text](#)

14. J Child Neurol. 2013 Nov 28. [Epub ahead of print]**Epileptic Encephalopathy With Continuous Spike and Wave During Sleep Associated to Periventricular Leukomalacia.**

Grandis ED, Mancardi MM, Carelli V, Carpaneto M, Morana G, Prato G, Mirabelli-Badenier M, Pinto F, Veneselli E, Baglietto MG.

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Periventricular leukomalacia is the most common type of brain injury in premature infants. Our aim is to describe the frequency and the features of epilepsy in a single-center population of 137 children with periventricular leukomalacia. Forty-two of the 137 (31%) patients presented epilepsy. Twelve percent of these patients presented West syndrome, whereas 19% showed a pattern of continuous spike-waves during slow sleep syndrome. In the latter group, outcome was frequently unfavorable, with a greater number of seizures and more drug resistance. A significant association was found between epilepsy and neonatal seizures, spastic tetraplegia, and mental retardation. Although less common than in other forms of brain injury, epilepsy is nevertheless a significant complication in children with periventricular leukomalacia. The fairly frequent association with continuous spike-waves during slow sleep syndrome deserves particular attention: electroencephalographic sleep monitoring is important in order to provide early treatment and prevent further neurologic deterioration.

[PMID: 24293309](#) [PubMed - as supplied by publisher]

15. JAMA Ophthalmol. 2013 Dec 5. doi: 10.1001/jamaophthalmol.2013.5812. [Epub ahead of print]**Ophthalmologic Outcome at 30 Months' Corrected Age of a Prospective Swedish Cohort of Children Born Before 27 Weeks of Gestation: The Extremely Preterm Infants in Sweden Study.**

Holmström GE, Källén K, Hellström A, Jakobsson PG, Serenius F, Stjernqvist K, Tornqvist K.

Department of Neuroscience, Ophthalmology, University Hospital, Uppsala, Sweden.

IMPORTANCE Follow-up at 30 months' corrected age reveals eye and visual problems in one-third of children born extremely prematurely (<27 weeks' gestation). **OBJECTIVE** To investigate the ophthalmologic outcome of extremely preterm children at 30 months' corrected age. **DESIGN, SETTING, AND PARTICIPANTS** A prospective, population-based follow-up study (Extremely Preterm Infants in Sweden Study [EXPRESS]) was conducted in Sweden. The population included extremely preterm infants (<27 weeks' gestation) born in Sweden between 2004 and 2007, of whom 491 survived until age 2.5 years. Screening for retinopathy of prematurity (ROP) was performed in the neonatal period. At 30 months' corrected age, an ophthalmologic assessment was performed in 411 of 491 children (83.7%). **MAIN OUTCOMES AND MEASURES** Visual acuity, manifest strabismus, and refractive errors were evaluated. **RESULTS** Visual impairment was identified in 3.1% of the children, and 1.0% were blind. Refractive errors, defined as myopia less than -3 diopters (D), hypermetropia greater than +3 D, astigmatism 2 D or more, and/or anisometropia 2 D or more, were found in 25.6% of the children, and 14.1% had manifest strabismus. There were significant associations between visual impairment and treated ROP ($P = .02$), cognitive disability ($P < .001$), and birth weight ($P = .02$). Multiple regression analyses revealed significant associations between strabismus and treated ROP ($P < .001$), cognitive disability ($P < .01$), and cerebral palsy ($P = .02$). Refractive errors were significantly correlated with severity of ROP (right eye, $P < .001$; left eye, $P < .01$). Children who had been treated for ROP had the highest frequency (69.0%) of eye and visual abnormalities. **CONCLUSIONS AND RELEVANCE** One-third of the extremely prematurely born children in this study had some kind of eye or visual problems, such as visual impairment, strabismus, or major refractive error. Despite being born extremely preterm, the present cohort has a similar prevalence of blindness and visual impairment as in previous Swedish cohorts of children born less prematurely.

[PMID: 24310059](#) [PubMed - as supplied by publisher]

16. BMC Pediatr. 2013 Dec 5;13(1):201. [Epub ahead of print]**Risk determinants in early intervention use during the first postnatal year in children born very preterm.**

Pritchard MA, Colditz PB, Cartwright D, Gray PH, Tudehope D, Beller E.

BACKGROUND: Early interventions (EI) are recognised for their potential risk-reduction capacity. Although developmental delay is common in children born very preterm reports continue to suggest poor uptake of EI services. This study examined the risk determinants of EI in Australian children born less than 32 weeks gestation during the first year of life. **METHODS:** As part of a multi-centre-randomised-trial, 195 children were prospectively studied during their first year of life and EI use, type of follow-up, perinatal, social and parental psychosocial risk factors were collected using questionnaires. Child eurodevelopmental disability-status was assessed at 12-months (cerebral palsy, blind, deaf, developmental quotient 1standard deviation (SD) below mean). The associations between EI and variables were examined using Pearson's chi-squared test (chi²) and regression techniques. **RESULTS:** A total of 55% of children received EI, 51% attended post discharge neonatal intensive care unit (NICU) and the remainder attended exclusive primary health care. Risk factors included, 50% perinatal, 19% social and 34% psychosocial and at 12-months 23% were categorised as disabled. Low social risk and NICU follow-up attendance were significantly associated with EI use but only perinatal risk (OR 3.1, 95%CI 1.7, 5.6, p = <0.01) and disability (OR 2.2, 95%CI 1.1, 4.7, p = 0.04) independently predicted EI use. **CONCLUSIONS:** It is reassuring that children with perinatal risk receive EI, opportunity remains to improve EI uptake in families with social and parental psychosocial risk during the first year of life.

[PMID: 24304976](#) [PubMed - as supplied by publisher] [Free full text](#) (provisional PDF)

Prevention and Cure

17. Semin Fetal Neonatal Med. 2013 Nov 28. pii: S1744-165X(13)00114-5. doi: 10.1016/j.siny.2013.11.005. [Epub ahead of print]**Cerebral palsy and developmental coordination disorder in children born preterm.**

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Children born early (<37 weeks of gestation) are at high risk of a range of motor impairments due to a variety of biological and environmental risk factors. Cerebral palsy occurs more frequently in those children born preterm, with the risk increasing with decreasing gestational age. Mild and moderate motor impairments, consistent with developmental coordination disorder, occur in almost half of those children born preterm and include difficulties with balance, manual dexterity and ball skills. All forms of motor impairment are associated with comorbidities, which may have a greater effect on quality of life, academic achievement and participation in extracurricular activities than the motor impairment itself. Infants at risk of motor impairment can be identified in early infancy with a combination of clinical assessment tools and perinatal risk factors. However, the reliable diagnosis of motor impairment requires follow-up into early childhood and it is important to ensure that the appropriate intervention is implemented.

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18. Cochrane Database Syst Rev. 2013 Dec 5;12:CD000246. [Epub ahead of print]**Prophylactic antibiotics for inhibiting preterm labour with intact membranes.**

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BACKGROUND: The aetiology of preterm birth is complex and there is evidence that subclinical genital tract infection influences preterm labour in some women but the role of prophylactic antibiotic treatment in the management of preterm labour is controversial. Since rupture of the membranes is an important factor in the progression of preterm labour, it is important to see if the routine administration of antibiotics confers any benefit or causes harm, prior to membrane rupture. **OBJECTIVES:** To assess the effects of prophylactic antibiotics administered to women in preterm labour with intact membranes, on maternal and neonatal outcomes. **SEARCH METHODS:** We searched the Cochrane Pregnancy and Childbirth Group's Trials Register (31 August 2013). **SELECTION CRITERIA:** Randomised trials that compared antibiotic treatment with placebo or no treatment for women in preterm labour (between 20 and 36 weeks' gestation) with intact membranes. **DATA COLLECTION AND ANALYSIS:** Two review authors independently assessed trial eligibility, and undertook quality assessment and data extraction. We contacted study authors for additional information. Results are presented using risk ratio (RR) for categorical data and mean difference (MD) for data measured on a continuous scale with their respective 95% confidence intervals (CI). The number needed to treat to benefit (NNTB) and the number needed to treat to harm (NNTH) was calculated where appropriate. **MAIN RESULTS:** In this update (2013), with the addition of three trials (305 women), the large ORACLE II 2001 trial continues to dominate the results of this review. This review now includes a total of 14 studies randomising 7837 women. No significant difference was shown in perinatal or infant mortality for infants of women allocated to any prophylactic antibiotics compared with no antibiotics. However, an increase in neonatal deaths was shown for infants of women receiving any prophylactic antibiotics when compared with placebo (RR 1.57, 95% CI 1.03 to 2.40; NNTH 149, 95% CI 2500 to 61). No reduction in preterm birth or other clinically important short-term outcomes for the infant were shown. Long-term child outcomes to seven years of age were available for infants in the UK enrolled in the ORACLE II trial. Comparing any antibiotics with placebo, a marginally non-statistically significant increase was shown in any functional impairment (RR 1.10, 95% CI 0.99 to 1.23) and cerebral palsy (CP) (RR 1.82, 95% CI 0.99 to 3.34). In subgroup analysis, CP was statistically significantly increased for infants of women allocated to macrolide and beta-lactam antibiotics combined compared with placebo (RR 2.83, 95% CI 1.02 to 7.88; NNTH 35, 95% CI 333 to 9). Further, exposure to any macrolide antibiotics (including erythromycin alone or erythromycin plus co-amoxiclav) versus no macrolide antibiotics (including placebo and co-amoxiclav alone) was shown to increase neonatal death (RR 1.52, 95% CI 1.05 to 2.19; NNTH 139, 95% CI 1429 to 61), any functional impairment (RR 1.11, 95% CI 1.01 to 1.20; NNTH 24, 95% CI 263 to 13) and CP (RR 1.90, 95% CI 1.20 to 3.01; NNTH 64, 95% CI 286 to 29). Exposure to any beta-lactam (beta-lactam alone or in combination with macrolide antibiotics) versus no beta-lactam antibiotics resulted in more neonatal deaths (RR 1.51, 95% CI 1.06 to 2.15; NNTH 143, 95% CI 1250 to 63) and CP (RR 1.67, 95% CI 1.06 to 2.61; NNTH 79, 95% CI 909 to 33), however no difference was shown in functional impairment. Maternal infection was reduced with the use of any prophylactic antibiotics compared with placebo (RR 0.74, 95% CI 0.63 to 0.86; NNTB 34, 95% CI 24 to 63) and any beta-lactam compared with no beta-lactam antibiotics (RR 0.80, 95% CI 0.69 to 0.92; NNTB 47, 95% CI 31 to 119). However, caution should be exercised with this finding due to the possibility of bias shown by funnel plot asymmetry. Any beta-lactam compared with no beta-lactam antibiotics was associated with an increase in maternal adverse drug reaction (RR 1.61, 95% CI 1.02 to 2.54; NNTH 17, 95% CI 526 to 7). **AUTHORS' CONCLUSIONS:** This review did not demonstrate any benefit in important neonatal outcomes with the use of prophylactic antibiotics for women in preterm labour with intact membranes, although maternal infection may be reduced. Of concern, is the finding of short- and longer-term harm for children of mothers exposed to antibiotics. The evidence supports not giving antibiotics routinely to women in preterm labour with intact membranes in the absence of overt signs of infection. Further research is required to develop sensitive markers of subclinical infection for women in preterm labour with intact membranes, as this is a group that might benefit from future novel interventions, including new modalities of antibiotic therapy. The results of this review demonstrate the need for future trials in the area of preterm birth to include assessment of long-term neurodevelopmental outcome.

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Reprint of "Quantitative evaluation of brain development using anatomical MRI and diffusion tensor imaging"

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The development of the brain is structure-specific, and the growth rate of each structure differs depending on the age of the subject. Magnetic resonance imaging (MRI) is often used to evaluate brain development because of the high spatial resolution and contrast that enable the observation of structure-specific developmental status. Currently, most clinical MRIs are evaluated qualitatively to assist in the clinical decision-making and diagnosis. The clinical MRI report usually does not provide quantitative values that can be used to monitor developmental status. Recently, the importance of image quantification to detect and evaluate mild-to-moderate anatomical abnormalities has been emphasized because these alterations are possibly related to several psychiatric disorders and learning disabilities. In the research arena, structural MRI and diffusion tensor imaging (DTI) have been widely applied to quantify brain development of the pediatric population. To interpret the values from these MR modalities, a "growth percentile chart," which describes the mean and standard deviation of the normal developmental curve for each anatomical structure, is required. Although efforts have been made to create such a growth percentile chart based on MRI and DTI, one of the greatest challenges is to standardize the anatomical boundaries of the measured anatomical structures. To avoid inter- and intra-reader variability about the anatomical boundary definition, and hence, to increase the precision of quantitative measurements, an automated structure parcellation method, customized for the neonatal and pediatric population, has been developed. This method enables quantification of multiple MR modalities using a common analytic framework. In this paper, the attempt to create an MRI- and a DTI-based growth percentile chart, followed by an application to investigate developmental abnormalities related to cerebral palsy, Williams syndrome, and Rett syndrome, have been introduced. Future directions include multimodal image analysis and personalization for clinical application.

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Postnatal corticosteroids to treat or prevent chronic lung disease in preterm infants [Article in English, French]

Jefferies AL.

Postnatal corticosteroids have been used for prevention and treatment of neonatal chronic lung disease (CLD) (also known as bronchopulmonary dysplasia), a significant cause of mortality and morbidity in preterm infants. As both dexamethasone and hydrocortisone administration within the first seven days of life is associated with an increased risk of cerebral palsy, early postnatal corticosteroid therapy is not recommended to prevent CLD. After seven days of life, dexamethasone has been shown to decrease the rate of CLD at 36 weeks' postmenstrual age with less impact on neurodevelopmental outcome. No trials have examined whether the benefits of corticosteroids outweigh the adverse effects for infants at high risk of, or with, severe CLD. While routine dexamethasone therapy of all ventilated infants is not recommended, clinicians may consider a short course of low-dose dexamethasone for individual infants at high risk of or with severe CLD. There is no evidence that hydrocortisone is an effective or safe alternative to dexamethasone and little evidence to support routine use of inhaled corticosteroids for prevention or treatment. Inhaled corticosteroids may be considered as an alternative to dexamethasone for treating individual infants with severe CLD. This revision replaces a statement published jointly with the American Academy of Pediatrics in 2002.

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Follow-up of newborns with hypoxic-ischaemic encephalopathy [Article in Spanish]

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Hypothermia treatment for newborn infants with hypoxic-ischemic encephalopathy reduces the number of neonates who die or have permanent neurological deficits. Although this therapy is now standard of care, neonatal hypoxic-ischaemic encephalopathy still has a significant impact on the child's neurodevelopment and quality of life. Infants with hypoxic-ischaemic encephalopathy should be enrolled in multidisciplinary follow-up programs in order to detect impairments, to initiate early intervention, and to provide counselling and support for families. This article describes the main neurodevelopmental outcomes after term neonatal hypoxic-ischaemic encephalopathy. We offer recommendations for follow-up based on the infant's clinical condition and other prognostic indicators, mainly neonatal neuroimaging. Other aspects, such as palliative care and medico-legal issues, are also briefly discussed.

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Magnesium sulfate for cerebral palsy prevention.

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Magnesium sulfate (MgSO₄) has been shown to prevent cerebral palsy among children born to women at high risk of early preterm delivery. Three large, randomized placebo-controlled trials and a subsequent Cochrane Review suggest this intervention can decrease rates of cerebral palsy by 32% with a number needed to treat of 63 to prevent one case. Not only is MgSO₄ familiar to obstetricians, it also has an excellent safety profile. Simple protocols exist to help guide clinicians in using MgSO₄ for this indication. Evaluation of actual clinical practice shows that this use is both feasible and can be accomplished parsimoniously.

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