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Interventions and Management

1. Arch Dis Child Educ Pract Ed. 2011 Nov 4. [Epub ahead of print]

Cerebral palsy: the whys and hows.

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The descriptive term of cerebral palsy encompasses the largest group of childhood movement disorders. Severity and pattern of clinical involvement varies widely dependent on the area of the central nervous system compromised. A multidisciplinary team approach is vital for all the aspects of management to improve function and minimise disability. From a medical viewpoint, there are two pronged approaches. First a focus on developmental and clinical comorbidities such as communication, behaviour, epilepsy, feeding problems, gastro-oesophageal reflux and infections; and second on specifics of muscle tone, motor control and posture. With regards to the latter, there is an increasing number of available treatments including oral antispasticity and antidystonic medications, injectable botulinum toxin, multilevel orthopaedic and neurosurgical options and a variety of complementary and alternative therapies.

[PMID: 22058069](#) [PubMed - as supplied by publisher]

2. Disabil Rehabil. 2011 Nov 8. [Epub ahead of print]

Motion interactive video games in home training for children with cerebral palsy: parents' perceptions.

Sandlund M, Dock K, H Ger CK, Lindh Waterworth E.

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Purpose: To explore parents' perceptions of using low-cost motion interactive video games as home training for their children with mild/moderate cerebral palsy. Method: Semi-structured interviews were carried out with parents from 15 families after participation in an intervention where motion interactive games were used daily in home training for their child. A qualitative content analysis approach was applied. Results: The parents' perception of the training was very positive. They expressed the view that motion interactive video games may promote positive experiences of physical training in rehabilitation, where the social aspects of gaming were especially valued.

Further, the parents experienced less need to take on coaching while gaming stimulated independent training. However, there was a desire for more controlled and individualized games to better challenge the specific rehabilitative need of each child. Conclusions: Low-cost motion interactive games may provide increased motivation and social interaction to home training and promote independent training with reduced coaching efforts for the parents. In future designs of interactive games for rehabilitation purposes, it is important to preserve the motivational and social features of games while optimizing the individualized physical exercise.

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3. Gait Posture. 2011 Nov 2. [Epub ahead of print]

Gait asymmetries in children with cerebral palsy: Do they deteriorate with running?

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In children with cerebral palsy (CP) analysis of gait asymmetry can provide insight into the control of walking and may help in guiding the clinician's treatment decisions. Running is more difficult than walking for the musculoskeletal system, however, in the literature it has been shown that gait deviations associated with CP may be better tolerated during running. This leads us to the hypothesis that running might increase gait symmetry in patients with CP. Therefore the purpose of this study was to investigate the effect of running on asymmetries in spatio-temporal, kinematic and kinetic gait parameters for children with CP. Twenty-four children with diplegia and 25 with hemiplegia were examined using 3D gait analysis during running and walking. MANOVA on two factors: diagnosis (hemiplegic, diplegic) and movement (walking, running) was conducted on a total of 22 gait parameters. The MANOVA revealed a significant difference in symmetry between walking and running ($p < 0.001$) and between patients groups ($p = 0.004$). The detailed analysis of gait parameters demonstrated a significant decrease of symmetry in 13 of the 22 gait parameters investigated, only symmetry of step time was significantly increased. Therefore the hypothesis that gait symmetry improved with running in children with CP can be rejected. Based on the results of this study, asymmetries masked during walking might appear during running. Therefore, analysis of asymmetry of walking and running gives a more comprehensive assessment of the gait pathology for clinical decision making.

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4. J Electromyogr Kinesiol. 2011 Nov 7. [Epub ahead of print]

The role of co-activation in strength and force modulation in the elbow of children with unilateral cerebral palsy.

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To study the role of coactivation in strength and force modulation in the elbow joint of children and adolescents with cerebral palsy (CP), we investigated the affected and contralateral arm of 21 persons (age 8-18) with spastic unilateral CP in three tasks: maximal voluntary isokinetic concentric contraction and passive isokinetic movement during elbow flexion and extension, and sub-maximal isometric force tracing during elbow flexion. Elbow flexion-extension torque and surface electromyography (EMG) of the biceps brachii (BB) and triceps brachii (TB) muscles were recorded. During the maximal contractions, the affected arm was weaker, had decreased agonist and similar antagonist EMG amplitudes, and thus increased antagonist co-activation (% of maximal activity as agonist) during both elbow flexion and extension, with higher coactivation levels of the TB than the BB. During passive elbow extension, the BB of the affected arm showed increased resistance torque and indication of reflex, and thus spastic, activity. No difference between the two arms was found in the ability to modulate force, despite increased TB

coactivation in the affected arm. The results indicate that coactivation plays a minor role in muscle weakness in CP, and does not limit force modulation. Moreover, spasticity seems particularly to increase coactivation in the muscle antagonistic to the spastic one, possibly in order to increase stability.

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5. J Pediatr Neurosci. 2011 Oct;6(Suppl 1):S118-25.

Outcome of selective motor fasciculotomy in the treatment of upper limb spasticity.

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OBJECTIVE: The objective was to assess the outcome of selective motor fasciculotomy in relieving upper limb harmful resistant spasticity and thereby to improve motor functions in persons with cerebral palsy. **MATERIALS AND METHODS:** Twenty people having cerebral palsy (12 females and 8 males) with age ranging from 5 to 35 (mean 12.85) years with upper limb resistant spasticity due to spastic hemiplegia (n=7), triplegia (n=6), and quadriplegia (n=7) were assessed using Modified Ashworth Scale, Selective Voluntary Control Grade, Wee FIM Scale and hand function evaluation. Selective motor fasciculotomy was performed on the musculocutaneous nerve (n=13) for elbow flexors spasticity, median nerve (n=24) for pronators and radial wrist flexors spasticity and ulnar nerve (n=3) for ulnar wrist flexors spasticity. Pre- and post-op therapeutic exercises were performed. **RESULTS:** Statistical analysis using the Wilcoxon Signed Ranks test showed significant reduction in spasticity and improvement in selective voluntary control, hand functions (grasp to hold a 2 inch rod), and Wee FIM (self-care domain in particular). There was no recurrence in spasticity and complications following surgery. **CONCLUSIONS:** The selective motor fasciculotomy of musculocutaneous, median, and ulnar nerves significantly reduces spasticity in the affected muscle groups and thereby improves the self-care (motor) functions in selected people with cerebral palsy who have harmful resistant spasticity without any organic shortening of the muscles. The procedure is safe and the spasticity does not recur.

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6. Spec Care Dentist. 2011 Nov;31(6):210-5. doi: 10.1111/j.1754-4505.2011.00213.x.

The incidence of dental caries in children and adolescents who have cerebral palsy and are participating in a dental program in Brazil.

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The aim of this study was to describe the incidence of caries among children and adolescents who have cerebral palsy. The authors conducted baseline and follow-up dental examinations of 118 children and adolescents with cerebral palsy in a specialized healthcare unit in São Paulo, Brazil. Family care-givers completed a questionnaire that provided socioeconomic and behavioral information. The analysis used multivariate Poisson regression models adjusted for age. More than half (52.5%) of the subjects had at least one permanent or deciduous tooth affected by new caries during the longitudinal assessment (2004-2008). The incidence of caries was associated with the baseline prevalence of caries (incidence ratio = 1.92), a higher frequency of sugar intake (IR = 1.56), and having at least one sibling (IR = 1.64). Participants whose family care-givers had more education had a significantly lower incidence (IR = 0.68). The factors associated with a higher incidence of caries are similar to those in the general population. This evidence can potentially be used to develop an effective oral health promotion program for these patients.

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7. Coll Antropol. 2011 Sep;35(3):761-4.

Dental health and dental care in children with cerebral palsy.

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The aim of this study was to determine a difference between children with cerebral palsy (CP) and healthy children, regarding health condition of teeth and oral tissues. Dysfunction of masticatory system, in children with CP, causes many problems with mastication. Nonfunctional mastication is related with the consumption of mushy food and decreased selfcleaning of occlusal and approximal surfaces. All that leads to higher incidence of dental caries. Comparing the DMFT/dft (decayed, missing, filled tooth) index, it is evident that there is no statistically significant difference in a tooth morbidity between the group of healthy children and group of children with CP. The healthy children have statistically significant more teeth with fillings with respect to children with CP. Extractions are more common in children with CP. There is no statistically significant difference between those two groups regarding decayed teeth, one of components of DMFT index. Decayed components are more common than the extractions and fillings in both groups, which shows the insufficient curative care for all children in both groups. It can be concluded that there is a certain need of early beginning and a better organization of the preventive pediatric and dental care, in order to decrease the appearance of dental decay and increase the level of dental health, in this challenged population.

[PMID: 22053553](#) [PubMed - in process]

Prevention and Cure

8. Acta Paediatr. 2011 Nov 6. doi: 10.1111/j.1651-2227.2011.02516.x. [Epub ahead of print]

Low 5-minute Apgar score in moderately preterm infants; association with subsequent death and cerebral palsy. A register based Danish national study.

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9. Brain Pathol. 2011 Nov 8. doi: 10.1111/j.1750-3639.2011.00548.x. [Epub ahead of print]

NF-κB activity in perinatal brain during infectious and hypoxic-ischemic insults revealed by a reporter mouse.

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Infants suffering from infection or hypoxia-ischemia around the time of birth can develop brain damage resulting in life-long impairment such as cerebral palsy, epilepsy and cognitive disability. Inflammation appears to be an

important contributor irrespective of whether the primary event is infection or hypoxia-ischemia. Activation of the transcription factor NF- κ B is a hallmark of inflammation. To study perinatal brain inflammation, we developed a transgenic reporter mouse for imaging NF- κ B activity in live animals and tissue samples. The reporter genes firefly luciferase and a destabilized version of enhanced GFP (dEGFP) were regulated by common NF- κ B sites using a bidirectional promoter. Luciferase activity was imaged *in vivo*, while dEGFP was detected at cellular level in tissue sections. In newborn mice subjected to experimental models of infections or hypoxia-ischemia; luciferase signal increased in brains of live animals. In brain sections dEGFP expression, revealing NF- κ B activation was observed in the endothelial cells of the blood brain barrier in all disease models. In meningitis and hypoxia-ischemia expression of dEGFP was also induced in perivascular astrocytes. In conclusion, by using this transgenic reporter mouse in experimental models of perinatal complications, we could assess NF- κ B activity *in vivo* and subsequently determine the cellular origin in the tissues.

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10. J Gynecol Obstet Biol Reprod (Paris). 2011 Nov 4. [Epub ahead of print]

Fetal and neonatal complications related to prolonged pregnancy [Article in French]

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OBJECTIVE: To evaluate fetal and neonatal outcomes related to prolonged pregnancy. **METHODS:** This study is based on Pubmed search, Cochrane library and HAS recommendations. **RESULTS:** The risk of fetal complications including macrosomia (6 %), oligohydramnios (10 %-15 %), abnormal fetal heart rate pattern and meconium-stained fluid is increased in prolonged pregnancy ($\geq 41(+0)$ weeks). The rate of stillbirth was estimated between 1.6‰ and 3.0‰ live births according to countries in post-term pregnancies ($\geq 42(+0)$ weeks). The risk of umbilical cord pH less than 7.10, Apgar score at five minutes inferior to 7, ICU admissions and perinatal asphyxia is increased in post-term infants ($\geq 42(+0)$ weeks) compared with term infants. The risk of neurologic complications including neonatal convulsion, hypoxic ischemic encephalopathy, cerebral palsy, developmental deviations and epilepsy in childhood is increased in post-term infants. The risk of meconium aspiration syndrome, neonatal sepsis, and birth trauma including shoulder dystocia and bone fracture is increased in post-term infants. The rate of perinatal mortality increases in post-term infants. The perinatal mortality in post-term infants could be explained by perinatal asphyxia and meconium aspiration syndrome. **CONCLUSIONS:** The risk of perinatal complications and mortality are increased in prolonged pregnancy.

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11. J Midwifery Womens Health. 2011 Nov;56(6):566-74. doi: 10.1111/j.1542-2011.2011.00121.x. Epub 2011 Oct 17.

Magnesium sulfate: past, present, and future.

Hunter LA, Gibbins KJ.

First used anecdotally for the control of eclamptic seizures in the early 1900s, magnesium sulfate remains 1 of the most commonly used medications in obstetric practice today. Over the past 95 years, there have been countless research studies investigating the efficacy of magnesium sulfate for the management of eclampsia, preeclampsia, preterm labor, and most recently for prevention of cerebral palsy. The majority of this evidence undeniably supports the use of magnesium sulfate as the drug of choice for the prevention and treatment of eclampsia when evidence of severe disease is present. On the other hand, studies have not shown magnesium sulfate to be comparably more effective than other tocolytics for treating preterm labor, nor is there agreement on whether the evidence supports its use as a neuroprotective agent for prevention of cerebral palsy. The exact mechanism of action of magnesium

sulfate remains largely hypothetical, and parenteral use has the potential to cause significant morbidity in high doses. This article reviews magnesium sulfate's remarkable history in obstetric practice and includes a summary of the evidence related to each of the controversies. An initial review of the physiology of magnesium sulfate is essential to understanding pharmacodynamic actions, dosing guidelines, and safety requirements.

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12. J Pediatr. 2011 Nov 3. [Epub ahead of print]

Neonatal Magnetic Resonance Imaging and Outcome at Age 30 Months in Extremely Preterm Infants.

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OBJECTIVE: To examine associations between brain white matter abnormalities, including diffuse excessive high signal intensities, detected on neonatal magnetic resonance imaging (MRI) with neurodevelopmental outcome at age 30 months. **STUDY DESIGN:** This was a prospective, population-based study of infants born at <27 weeks gestation (n=117) undergoing conventional MRI at term equivalent age (n=107). At age 30 months corrected, 91 of the preterm infants (78%) and 85 term-born controls were assessed with the Bayley Scales of Infant and Toddler Development, Third Edition (BSID-III). **RESULTS:** Cerebral palsy (CP) was present in 7% of the preterm group. On the BSID-III, mean composite scores were 96±9.5 for the cognitive scale, 97±14 for language scales, and 103±15 for motor scales, all within the normal range for age. Compared with the term-born controls, however, the preterm infants did not perform as well on all 3 scales, also when MRI was normal. Significant associations were seen between moderate to severe white matter abnormalities and CP (P<.001). The presence of diffuse excessive high signal intensities was not associated with performance on the BSID-III or with CP. **CONCLUSION:** This 3-year cohort of extremely preterm infants had low rates of major brain injury and impaired outcome. Neonatal MRI provides useful information, but this information needs to be treated with caution when predicting outcome.

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