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Interventions and Management

1. Arch Phys Med Rehabil. 2012 Feb 21. [Epub ahead of print]

Impact of Tactile Dysfunction on Upper-Limb Motor Performance in Children With Unilateral Cerebral Palsy.

Auld ML, Boyd RN, Moseley GL, Ware RS, Johnston LM.

Division of Physiotherapy, School of Health and Rehabilitation Sciences, The University of Queensland, Brisbane; Cerebral Palsy League, Brisbane, Australia.

OBJECTIVE: To determine the relationship between tactile function and upper-limb function in children with unilateral cerebral palsy (CP). **DESIGN:** Cross-sectional study. **SETTING:** Assessments were performed in community or hospital venues or in participants' homes. **PARTICIPANTS:** Recruitment information was sent to 253 possible participants with unilateral CP (aged 8-18y), and N=52 participated (median age [interquartile range], 12y [9-14y]; Gross Motor Functional Classification System level I=34; II=18; Manual Abilities Classification Scale level I=36; II=16). **INTERVENTIONS:** Not applicable. **MAIN OUTCOME MEASURES:** Tactile assessment included 1 test of registration, 5 tests for spatial perception, and 1 test for texture perception. Upper-limb motor function was assessed using 2 unimanual tests, the Melbourne Unilateral Upper Limb Assessment (MUUL) and Jebsen-Taylor Test of Hand Function (JTTHF), and 1 bimanual test, the Assisting Hand Assessment (AHA). **RESULTS:** Tactile registration and all tests of spatial perception were moderately related to the MUUL, JTTHF, and AHA ($P<.001$). Texture perception was not related to upper-limb motor function. Regression analysis showed that single point localization, a unilateral tactile spatial perception test, contributed most strongly to unimanual capacity (29% explained variance in MUUL and 26% explained variance in JTTHF), whereas double simultaneous, a bilateral tactile spatial perception test, contributed most strongly to bimanual performance (33% for the AHA). **CONCLUSIONS:** Spatial tactile deficits account for approximately 30% of the variance in upper-limb motor function in children with unilateral CP. This emphasizes the need for routine tactile assessment and targeted treatment of tactile spatial deficits in this population.

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[PMID: 22360974](https://pubmed.ncbi.nlm.nih.gov/22360974/) [PubMed - as supplied by publisher]

2. Dev Med Child Neurol. 2012 Feb 27. doi: 10.1111/j.1469-8749.2012.04229.x. [Epub ahead of print]**Could muscle deformity in children with spastic cerebral palsy be related to an impairment of muscle growth and altered adaptation?**

Gough M, Shortland AP.

One Small Step Gait Analysis Laboratory, Guy's Hospital, Guy's and St Thomas' NHS Foundation Trust, London, UK.

Skeletal muscle deformity is common in children with spastic cerebral palsy (CP), but the underlying mechanisms are unclear. This review explores some possible factors which may influence the development of muscle deformity in CP. Normal muscle function and growth appear to depend on the interaction of neuronal, endocrinal, nutritional, and mechanical factors, and also on the development of an appropriate balance between muscle protein synthesis and degradation, and between the development of contractile and non-contractile components. In this context, the changes seen in muscle in children with CP are reviewed and discussed. It is suggested that the development of muscle deformity in children with CP may be related to a multifactorial impairment of muscle growth, on which adaptation of the extracellular matrix due to altered loading may be imposed.

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[PMID: 22364585](#) [PubMed - as supplied by publisher]

3. Health Psychol. 2012 Feb 27. [Epub ahead of print]**Walking Drawings and Walking Ability in Children With Cerebral Palsy.**

Chong J, Mackey AH, Stott NS, Broadbent E.

Objectives: To investigate whether drawings of the self walking by children with cerebral palsy (CP) were associated with walking ability and illness perceptions. **Method:** This was an exploratory study in 52 children with CP (M:F = 28:24), mean age 11.1 years (range 5-18), who were attending tertiary level outpatient clinics. Children were asked to draw a picture of themselves walking. Drawing size and content was used to investigate associations with clinical walk tests and children's own perceptions of their CP assessed using a CP version of the Brief Illness Perception Questionnaire. **Results:** Larger drawings of the self were associated with less distance traveled, higher emotional responses to CP, and lower perceptions of pain or discomfort, independent of age. A larger self-to-overall drawing height ratio was related to walking less distance. Drawings of the self confined within buildings and the absence of other figures were also associated with reduced walking ability. **Conclusion:** Drawing size and content can reflect walking ability, as well as symptom perceptions and distress. Drawings may be useful for clinicians to use with children with cerebral palsy to aid discussion about their condition. (PsycINFO Database Record (c) 2012 APA, all rights reserved).

[PMID: 22369490](#) [PubMed - as supplied by publisher]

4. J Pediatr Orthop B. 2012 Feb 24. [Epub ahead of print]**Intraoperative assessment of acetabular orientation: technical note.**

Gallacher PD, Roberts AP.

A. University Hospital of North Staffordshire, Stoke on Trent, Staffordshire b. Robert Jones and Agnes Hunt Orthopaedic Hospital, Gobowen, Shropshire, UK.

Acetabular surgery is frequently utilized to manage developmental dysplasia of the hip and hip problems associated with cerebral palsy. During the operation, accurate correction of the orientation of the acetabular fragment is necessary. We describe a technique that enables accurate assessment of the coronal plane alteration in orientation. Intraoperative image intensifier records were compared with postoperative films and the accuracy of the coronal plane correction was evaluated. We found the intraoperative sourcil angle closely correlated to the

postoperative angle to within 1°. The Spearman correlation coefficient was $R=0.97$, suggesting a close relationship between the two measurements.

[PMID: 22362040](#) [PubMed - as supplied by publisher]

5. J Rehabil Med. 2012 Feb 27. doi: 10.2340/16501977-0937. [Epub ahead of print]

Managing spastic hypertonia in children with cerebral palsy via repetitive passive knee movements.

Cheng HY, Ju YY, Chen CL, Wong MK.

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Objective: Most children with cerebral palsy have increased muscle tension in the lower extremities, which inevitably leads to abnormal gait characteristics. Proper management of excessive muscle tension is therefore of great importance. The aim of this study was to explore the effects of continuous passive motion on children with cerebral palsy, regarding their lower extremity spastic hypertonia and ambulatory function. **Design:** A repeated measures design. **Subjects:** Sixteen children with cerebral palsy. **Methods:** Intervention was applied to the subject's knees with a continuous passive motion device (at velocities of 15 and 0°/s) for 20 min. Effects were evaluated via variables measuring range-of-motion, muscle tone, and ambulatory function before, immediately after, and 30 min after intervention. **Results:** For the 15°/s intervention, significant differences were found in time, intervention, and interaction among variables, including active range-of-motion of the knee (increased), relaxation index (increased), Modified Ashworth Scale (decreased), Timed Up-and-Go (decreased), and 6-Minute Walk test (increased). No difference was found in passive range of motion measurements. For the 0°/s control condition, none of the dependent variables demonstrated statistically significant differences. **Conclusion:** Repetitive passive movement can reduce lower extremity spastic hypertonia in children with cerebral palsy, and improve ambulatory function in terms of walking speed.

[PMID: 22366894](#) [PubMed - as supplied by publisher]

6. Arch Phys Med Rehabil. 2012 Mar;93(3):485-9.

Validity of submaximal exercise testing in adults with athetospastic cerebral palsy.

Satonaka A, Suzuki N, Kawamura M.

Graduate School of Medicine, Nagoya University, Nagoya, Japan.

Satonaka A, Suzuki N, Kawamura M. Validity of submaximal exercise testing in adults with athetospastic cerebral palsy.

OBJECTIVE: To examine the validity of the multistage submaximal cycle ergometer test for adults with athetospastic cerebral palsy. **DESIGN:** Cross-sectional and correlative study. Oxygen uptake and heart rates were recorded while the participants underwent the maximal cycle ergometer test and the multistage submaximal cycle ergometer test. Peak oxygen consumption ($\dot{V}O_{2peak}$) was achieved by the maximal cycle test. Maximum oxygen consumption ($\dot{V}O_{2max}$) was predicted by the multistage submaximal cycle ergometer test. **SETTING:** Research laboratory setting. **PARTICIPANTS:** Adults with athetospastic cerebral palsy ($N=16$; 10 women and 6 men; mean age \pm SD, 43.7 \pm 14.5y). **INTERVENTIONS:** Not applicable. **MAIN OUTCOME MEASURE:** Peak $\dot{V}O_{2peak}$ was compared with the predicted $\dot{V}O_{2max}$. **RESULTS:** Mean $\dot{V}O_{2peak}$ and the predicted $\dot{V}O_{2max} \pm$ SD were 866.9 \pm 202.9mL/min(-1) and 857.4 \pm 248.4mL/min(-1), respectively. There was not a significant difference between $\dot{V}O_{2peak}$ values and the predicted $\dot{V}O_{2max}$ values ($r=.28$). And there was a significant correlation between $\dot{V}O_{2peak}$ values and the predicted $\dot{V}O_{2max}$ values ($r=.94$, $P<.001$). SE of the estimate (or SE for X to Y) was 71.2mL/min(-1), equivalent to 7.4%. The multistage submaximal cycle ergometer test may provide a valid $\dot{V}O_{2max}$ estimate of adults with athetospastic cerebral palsy.

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[PMID: 22373935](#) [PubMed - in process]

7. J Child Neurol. 2012 Feb 28. [Epub ahead of print]

Novel Assessment of Cortical Response to Somatosensory Stimuli in Children With Hemiparetic Cerebral Palsy.

Maitre NL, Barnett ZP, Key AP.

The brain's response to somatosensory stimuli is essential to experience-driven learning in children. It was hypothesized that advances in event-related potential technology could quantify the response to touch in somatosensory cortices and characterize the responses of hemiparetic children. In this prospective study of 8 children (5-8 years old) with hemiparetic cerebral palsy, both event-related potential responses to sham or air puff trials and standard functional assessments were used. Event-related potential technology consistently measured signals reflecting activity in the primary and secondary somatosensory cortices as well as complex cognitive processing of touch. Participants showed typical early responses but less efficient perceptual processes. Significant differences between affected and unaffected extremities correlated with sensorimotor testing, stereognosis, and 2-point discrimination ($r > 0.800$ and $P = .001$ for all). For the first time, a novel event-related potential paradigm shows that hemiparetic children have slower and less efficient tactile cortical perception in their affected extremities.

[PMID: 22378658](#) [PubMed - as supplied by publisher]

8. Child Care Health Dev. 2012 Feb 28. doi: 10.1111/j.1365-2214.2012.01367.x. [Epub ahead of print]

Family needs and profiles for children with cerebral palsy: understanding supports in times of scarcity.

Msall ME.

Section of Developmental and Behavioral Pediatrics, JP Kennedy Research Center on Intellectual and Developmental Disabilities, University of Chicago Comer Children's Hospital, Chicago, IL, USA.

[PMID: 22372837](#) [PubMed - as supplied by publisher]

9. Dev Med Child Neurol. 2012 Feb;54(2):103-4. doi: 10.1111/j.1469-8749.2011.04158.x. Epub 2011 Dec 5.

Speaking to like-minded individuals.

Samson-Fang L.

Comment on

Dev Med Child Neurol. 2012 Feb;54(2):170-5.

[PMID: 22142397](#) [PubMed - indexed for MEDLINE]

10. J Child Adolesc Psychopharmacol. 2012 Feb 29. [Epub ahead of print]

Presentation and Treatment of Acute Psychosis in an Adolescent Girl with Cerebral Palsy.

Grody MB, Coffey BJ.

New York Presbyterian Hospital of Columbia and Cornell Universities, New York, NY.

[PMID: 22375855](#) [PubMed - as supplied by publisher]

11. Ocul Immunol Inflamm. 2012 Feb 23. [Epub ahead of print]**Streptococcal Pharyngitis Leading to Corneal Ulceration.**

Millender TW, Reller LB, Meekins LC, Afshari NA.

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Purpose: To report a patient with a history of exposure keratopathy who presented with bilateral bacterial keratitis associated with streptococcal pharyngitis and use of bilevel positive airway pressure (BiPAP). Design: Case report. Methods: Pulsed-field gel electrophoresis of patient isolates from ocular and pharyngeal cultures. Results: Ocular and oropharyngeal cultures from a 24-month-old child with a history of cerebral palsy on BiPAP at night revealed the same strain of *Streptococcus pyogenes*. Conclusions: Use of mechanical ventilation, such as BiPAP, may precipitate inoculation of eye with respiratory or oropharyngeal pathogens. To the authors' knowledge this is the first report demonstrating the association between concurrent streptococcal pharyngitis, keratitis, and use of BiPAP.

[PMID: 22360434](#) [PubMed - as supplied by publisher]

Prevention and Cure

12. Am J Obstet Gynecol. 2012 Mar;206(3):204.e1-5. Epub 2012 Jan 18.**Intrauterine transfusion for parvovirus B19 infection: long-term neurodevelopmental outcome.**

De Jong EP, Lindenburg IT, van Klink JM, Oepkes D, van Kamp IL, Walther FJ, Lopriore E.

Department of Pediatrics, Juliana Children's Hospital, HAGA Hospital, The Hague, The Netherlands.

OBJECTIVE: To evaluate long-term neurodevelopmental outcome of children treated with intrauterine transfusions for fetal anemia because of parvovirus B19 infection. STUDY DESIGN: Children treated with intrauterine transfusions for fetal anemia because of parvovirus B19 infection underwent standardized age-appropriate neurodevelopmental testing. Main outcome was the incidence of neurodevelopmental impairment. RESULTS: Twenty-eight children were evaluated at a median age of 5 years (range, 1.5-13 years). Neurodevelopmental impairment was diagnosed in 3 of 28 (11%) children, including 1 child with combined cerebral palsy and severe developmental delay and 2 children with isolated severe developmental delay. CONCLUSION: Neurodevelopmental impairment in children treated with intrauterine transfusion for parvovirus B19 infection is increased compared with the general population. Large long-term follow-up studies are required to determine potential risk factors.

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13. Am J Reprod Immunol. 2012 Mar 1. doi: 10.1111/j.1600-0897.2012.01110.x. [Epub ahead of print]**Models of Fetal Brain Injury, Intrauterine Inflammation, and Preterm Birth.**

Burd I, Balakrishnan B, Kannan S.

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Intrauterine infection and inflammation are known risk factors for brain damage in the neonate irrespective of the gestational age. Infection-induced maternal immune activation leads to a fetal inflammatory response mediated by cytokines that has been implicated in the development of not only periventricular leukomalacia and cerebral palsy but also a spectrum of neurodevelopmental disorders such as autism and schizophrenia (Behav Brain Res 2009;

204:313, *Ann Neurol* 2005; 57:67, *Am J Obstet Gynecol* 2000; 182:675). A common link among the neurobehavioral disorders associated with intrauterine inflammation appears to be the evidence for immune dysregulation in the developing brain (*Behav Brain Res* 2009; 204:313). The timing of the immune challenge with respect to the gestational age and neurologic development of the fetus may be crucial in the elicited response (*J Neurosci* 2006; 26:4752). Studies involving animal models of maternal inflammation serve a key role in elucidation of mechanisms involved in fetal brain injury associated with exposure to the maternal milieu. These animal models have been shown to result in fetal microglial activation, neurotoxicity as well motor deficits and behavioral abnormalities in the offspring (*J Neurosci* 2006; 26:4752, *J Neurosci Res* 2010; 88:172, *Am J Obstet Gynecol* 2009; 201:279, *Am J Obstet Gynecol* 2008; 199:651). A better understanding of the mechanisms of perinatal brain injury will allow discoveries of novel neuroprotective agents, better outcomes following preterm birth and stratification of fetuses and neonates for therapies in cases of preterm birth, preterm premature rupture of membranes, and chorioamnionitis.

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14. *J Matern Fetal Neonatal Med.* 2012 Feb 28. [Epub ahead of print]

Neurologic parameters in the perinatal period in children with neurodevelopmental disorders.

Tomasović S, Predojević M, Stanojević M, Nad KB.

Department of Neurology, University hospital "Sveti Duh" Medical School, University of Zagreb, Zagreb, Croatia.

Cerebral palsy (CP) is a term encompassing a group of non-progressive, non-contagious conditions causing mild, moderate, or severe disorders of neurodevelopment. Objective of this study was to analyze the possible prenatal etiological factors for the emergence of neurodevelopmental disorders (ND) and CP from the medical records of 100 children with neuromotor disabilities who were treated in Special Hospital for Children with Neurodevelopmental and Movement Disorders, Goljak, Croatia. Results: ND and CP were more often diagnosed in children with birth weight below 2500g which was statistically proved at the level of significance reaching 0.05, although significant correlation was low for both parameters reaching 0.21. There is a both statistically significant differences and the statistically significant correlation between the three gestational age categories within ND and CP. There were more children with the birth weight below 2500g in the CP than in the ND group and the difference was statistically significant. In the CP group there were more children with the lower gestational age than in the ND group, which was statistically highly significant. This difference, together with correlation is significant at the level of 0.01. Conclusion: Further studies on the etiology of neurodevelopmental disorders are needed, with particular focus on the intrauterine risk factors.

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15. *J Matern Fetal Neonatal Med.* 2012 Feb 28. [Epub ahead of print]

Cytomegalovirus and Epstein-Barr virus may be associated with some cases of cerebral palsy.

McMichael G, Maclennan A, Gibson C, Alvino E, Goldwater P, Haan E, Dekker G.

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Objective. Intrauterine infection is a risk factor for cerebral palsy. Previous work reported a high frequency of viral DNA in newborn screening cards from cerebral palsy cases and controls possibly due to contamination. Methods. Retrospective case control study using improved methodologies to minimise contamination during PCR-based detection of viral DNA sequences. Newborn screening cards of 339 Caucasian children with cerebral palsy and 594 controls were examined. Viruses tested were herpes simplex viruses 1 and 2 (HSV1 & 2), varicella zoster virus (VZV), Epstein-Barr virus (EBV), cytomegalovirus (CMV), human herpes viruses 6, 7 and 8 (HHV6, HHV7 & HHV8), and parvovirus B19. Genotyping was performed on DNA extracted from dried blood spots. Results. CMV and EBV were detected in 5 (1.5%) and 3 (0.9%) of 339 cases, respectively, but not in controls ($p = 0.047$ and 0.006).

Frequencies of detection of the other viruses examined were similar for cases and controls. DNA from at least one of the nine viruses tested was found in 4.4% of cases and 3.1% of controls [OR 1.4 95% CI (0.71-2.76)]. Conclusion. Evidence of congenital viral infection was uncommon in cases of cerebral palsy and controls. However, CMV and EBV were significantly associated with cerebral palsy.

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16. J Matern Fetal Neonatal Med. 2012 Feb 28. [Epub ahead of print]

Results of laser therapy in twin-to-twin transfusion syndrome: our experience.

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Department of Obstetrics, Medical University of Gdansk, Gdansk, Poland.

Objective: The authors of this paper present the results of laser treatment in twin-to-twin transfusion syndrome. **Methods:** Laser photocoagulation of communicating vessels was performed on 91 patients from April 2005 to June 2010, at the Medical University of Gdansk (Poland). Results of treatment were analyzed. **Results:** The following results were achieved: at least one survival at delivery in 71 patients (83.5%), two survivors in 49 women (57.6%), and an overall survival rate of 70.6%. After the inclusion of neonatal deaths, at least one survival was reported in 65 women (76.5%)- 30 with two survivors (44.7%) and 27 with one survivor (31.8%). The incidence of preterm rupture of membranes (4 cases- 4.3%), dual intrauterine fetal demise (7 cases- 7.4%) and miscarriage or delivery (8 cases- 8.5%) during the first week after surgery were the main reasons of pregnancy loss in the analyzed group. The frequency of cerebral palsy diagnosed after 6 months was 7%. **Conclusions:** Despite a lower incidence of dual neonatal survivals than in other series, the results of the first years of experience with laser treatment of twin-twin transfusion syndrome are encouraging, and prompt us to improve our surgical skills to achieve better outcomes.

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17. J Neurosurg Pediatr. 2012 Mar;9(3):242-58.

Neonatal posthemorrhagic hydrocephalus from prematurity: pathophysiology and current treatment concepts.

Robinson S.

Rainbow Babies and Children's Hospital, Neurological Institute, University Hospitals of Cleveland, Case Western Reserve University, Cleveland, Ohio.

Object Preterm infants are at risk for perinatal complications, including germinal matrix-intraventricular hemorrhage (IVH) and subsequent posthemorrhagic hydrocephalus (PHH). This review summarizes the current understanding of the epidemiology, pathophysiology, management, and outcomes of IVH and PHH in preterm infants. **Methods** The MEDLINE database was systematically searched using terms related to IVH, PHH, and relevant neurosurgical procedures to identify publications in the English medical literature. To complement information from the systematic search, pertinent articles were selected from the references of articles identified in the initial search. **Results** This review summarizes the current knowledge regarding the epidemiology and pathophysiology of IVH and PHH, primarily using evidence-based studies. Advances in obstetrics and neonatology over the past few decades have contributed to a marked improvement in the survival of preterm infants, and neurological morbidity is also starting to decrease. The incidence of IVH is declining, and the incidence of PHH will likely follow. Currently, approximately 15% of preterm infants who suffer severe IVH will require permanent CSF diversion. The clinical presentation and surgical management of symptomatic PHH with temporary ventricular reservoirs (ventricular access devices) and ventriculosubgaleal shunts and permanent ventriculoperitoneal shunts are discussed. Preterm infants who develop PHH that requires surgical treatment remain at high risk for other related neurological problems, including cerebral palsy, epilepsy, and cognitive and behavioral delay. This review highlights numerous opportunities for further study to improve the care of these children. **Conclusions** A better grasp of the pathophysiology of IVH is beginning to impact the incidence of IVH and PHH. Neonatologists conduct rigorous Class I and II studies to advance the outcomes of preterm infants. The need for well-designed multicenter trials is essential because of the declining incidence of IVH and PHH, variations in referral patterns, and neonatal ICU and neurosurgical management. Well-

designed multicenter trials will eventually produce evidence to enable neurosurgeons to provide their smallest, most vulnerable patients with the best practices to minimize perioperative complications and permanent shunt dependence, and most importantly, optimize long-term neurodevelopmental outcomes.

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