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# CP Research News

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**1: Am J Phys Med Rehabil. 2008 Jul;87(7):556-66.**

## **Safety profile of multilevel chemical denervation procedures using phenol or botulinum toxin or both in a pediatric population.**

Kolaski K, Ajizian SJ, Passmore L, Pasutharnchat N, Koman LA, Smith BP.

Department of Orthopaedic Surgery, Wake Forest University Health Sciences, Winston-Salem, NC 27103, USA.

**OBJECTIVE:** To investigate the safety of single and repeated multilevel injections of botulinum toxin (BoNT) alone or a combination of phenol and BoNT performed under general anesthesia in children with chronic muscle spasticity. **DESIGN:** Retrospective cohort study. Data from 336 children who received a total of 764 treatments were analyzed. Mean age was 7.4 yrs, and 90% had diagnoses of cerebral palsy. **RESULTS:** The overall complication rate was 6.8%, similar to rates reported in comparable studies of BoNT alone and combined BoNT and phenol. Of the total number of injection sessions with complications, 1.2% were anesthesia related and 6.3% were injection related; none resulted in any deaths or long-term morbidity. Injection-related complications were most frequently local symptoms of short duration. These were comparable with those reported previously, except that in this series there was a rare occurrence of dysesthesias (0.4%) with phenol injections. Complications occurred more frequently in patients injected with a combination of phenol and BoNT vs. BoNT alone, but no single causal factor can be implicated. No increase in complications with repeat injections was observed, and there was no correlation of complication rates with dosage of either agent. **CONCLUSIONS:** Although these procedures are not without adverse effects, this series suggests that the potential benefits outweigh the risks.

PMID: 18574347 [PubMed - in process]



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**2: J Pediatr. 2008 Jul;153(1):32-9. Epub 2008 Feb 20.**

**The quality of the early motor repertoire in preterm infants predicts minor neurologic dysfunction at school age.**

Bruggink JL, Einspieler C, Butcher PR, Van Braeckel KN, Prechtl HF, Bos AF.

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**OBJECTIVE:** The quality of a child's motor repertoire at age 3 to 4 months postterm is predictive of later cerebral palsy (CP). Its predictive power for minor neurologic dysfunction (MND) is unclear. This study aimed to investigate the predictive value of the quality of the early motor repertoire for the development of MND at school age. **STUDY DESIGN:** We assessed the motor repertoire from video recordings made at 6 to 24 weeks postterm in 82 preterm infants (mean gestational age, 29.7 +/- 1.9 weeks; mean birth weight, 1183 +/- 302 g). At age 7 to 11 years, Touwen's neurologic examination was performed, and the children were classified as normal (n = 49; 60%), MND (n = 18; 22%), or CP (n = 15; 18%). **RESULTS:** Multiple logistic regression analysis showed that the quality of fidgety movements (FMs) and the quality of the concurrent motor repertoire had independent prognostic value for MND at school age. Abnormal FMs evolved into MND in 64% of the children. Nine of the 28 children with normal FMs and an abnormal concurrent motor repertoire developed abnormally (32%). Only 1 child of the 21 children with normal FMs and a normal concurrent motor repertoire developed MND (5%). **CONCLUSIONS:** Assessment of the quality of the early motor repertoire can accurately identify individual infants at high and low risk for MND at school age.

PMID: 18571531 [PubMed - in process]

**3: J Pediatr Orthop. 2008 July/August;28(5):576-583.**

**Multidimensional Outcome Assessment in Cerebral Palsy: Is It Feasible and Relevant?**

Viehweger E, Haumont T, de Lattre C, Presedo A, Filipetti P, Ilharreborde B, Lebarbier P, Loundou A, Simeoni MC; VARAX Study Group.

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**BACKGROUND::** To examine feasibility and relevance of a multidimensional outcome assessment approach using instrumented 3-dimensional gait analysis, via the Gillette Gait Index (GGI), and a set of validated functional and health-related quality of life tools in diplegic cerebral palsy children, before introduction as a nationwide evaluation set. **METHODS::** A 3-year prospective government-funded multicenter study was conducted, recruiting patients during a 9-month period classified using the Gross Motor Function Classification System and the Rodda et al sagittal walking patterns. The Gross Motor Classification System Dimensions D and E, the 10-level Gillette Functional Assessment Questionnaire, the Energy Expenditure Index (EEI), the GGI out of 3D gait analysis, and health-related quality of life, assessed by self or proxy with the questionnaire "Vécu et Santé Perçu de l'Adolescent," were selected for the study. **RESULTS::** Cross-sectional data subset at inclusion of 160 spastic diplegic cerebral palsy patients, the largest series in our country, 6 to 18 years old (mean age, 11.0 years), are reported. The GGI correlated significantly ( $P < 0.001$ ) with the Gross Motor Classification System, the Functional Assessment Questionnaire, and the EEI for all the patients, and all but one (EEI) correlated if grouped according to Gross Motor Function Classification System or Rodda. No systematic correlation was found between the quality of life scores and the other outcome tools. **CONCLUSIONS::** The outcome evaluation instrument set tested in our study helps to adopt common tools, to be integrated in an evidence-based

practice and to compare health status and treatment outcome between countries, specifically in different linguistic environments like in European countries. LEVEL OF EVIDENCE:: Level 1-Testing of previously developed diagnostic criteria in series of consecutive patients.

PMID: 18580376 [PubMed - as supplied by publisher]

#### **4: Gait Posture. 2008 Jun 24. [Epub ahead of print]**

##### **An investigation of the action of the hamstring muscles during standing in crouch using functional electrical stimulation (FES).**

Stewart C, Postans N, Schwartz MH, Rozumalski A, Roberts AP.

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The hamstring muscle moment arms indicate that they act as hip extensors and knee flexors. Previous work using induced acceleration (IA) analysis and functional electrical stimulation (FES) has, however, revealed counter-intuitive muscle actions, particularly for biarticular muscles during the stance phase of normal gait. In conditions such as cerebral palsy the hamstrings have been associated with the development of pathological gait patterns, particularly crouch gait. This study examines the role of these muscles in the control of crouched standing postures. Five unimpaired adult subjects had their muscles stimulated during quiet standing in different degrees of crouch. Kinematic and kinetic changes were observed and measured using a 3D motion analysis system. The hamstring muscles were shown to act strongly to retrovert the pelvis and extend the hip. The action at the knee changes as crouch increases, moving from flexing to extending.

PMID: 18579383 [PubMed - as supplied by publisher]

#### **5: Indian J Pediatr. 2008 Jun 23. [Epub ahead of print]**

##### **Effect of serial casting in spastic cerebral palsy.**

Jain S, Mathur N, Joshi M, Jindal R, Goenka S.

Department of Physical Medicine and Rehabilitation, SMS Hospital, SMS Medical College, Jaipur, Rajasthan, 302004, India.

Cerebral palsy (CP) is a range of non progressive syndromes of posture and motor impairment due to an insult to developing brain. Spasticity and incoordination are major causes of disability in these children which can be managed by different modalities like casting, botulinum toxin, surgery etc. Cast application in spastic equinus is a well established procedure in CP. A study was conducted on 22 children of spastic CP in age range of 3-8 years with bilateral involvement of hip, knee and ankle in 20 cases, hip and ankle in one case and only ankle in one case. Sixty eight % children were spastic diplegics. Serial weekly cast with (11 cases) or without abductor bar (11 cases) was applied for four weeks. They were followed up variably with an average period of 7 months. Significant improvement was noticed in range of motion around hip, knee and ankle which was maintained over hip and knee after average follow up. Spasticity was also reduced as measured by modified Ashworth scale. This ultimately improved the ambulatory status and functional ability of these children. Thus serial casting is a very simple, safe and cost effective procedure which can be applied even in children with mental subnormality having all three major joints involved bilaterally.

PMID: 18574577 [PubMed - as supplied by publisher]

**6: Res Dev Disabil. 2008 Jun 21. [Epub ahead of print]**

**Fostering locomotor behavior of children with developmental disabilities: An overview of studies using treadmills and walkers with microswitches.**

Lancioni GE, Singh NN, O'Reilly MF, Sigafos J, Didden R, Manfredi F, Putignano P, Stasolla F, Basili G.

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This paper provides an overview of studies using programs with treadmills or walkers with microswitches and contingent stimulation to foster locomotor behavior of children with developmental disabilities. Twenty-six studies were identified in the period 2000-2008 (i.e., the period in which research in this area has actually taken shape). Twenty-one of the studies involved the use of treadmills (i.e., 13 were aimed at children with cerebral palsy, 6 at children with Down syndrome, and 2 at children with Rett syndrome or cerebellar ataxia). The remaining five studies concerned the use of walkers with microswitches and contingent stimulation with children with multiple disabilities. The outcomes of the studies tended to be positive but occasional failures also occurred. The outcomes were analyzed considering the characteristics of the approaches employed, the implications of the approaches for the participants' overall functioning situation (development), as well as methodological and practical aspects related to those approaches. Issues for future research were also examined.

PMID: 18573637 [PubMed - as supplied by publisher]

**7: Clin Neurol Neurosurg. 2008 Jun 20. [Epub ahead of print]**

**Vagal nerve stimulation: Exploring its efficacy and success for an improved prognosis and quality of life in cerebral palsy patients.**

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Cerebral palsy (CP) continues to pose a cause for major socioeconomic concern and medical challenge worldwide. It is associated with a multi-faceted symptomatology warranting a multi-dimensional management-approach. Recent recognition of neurocognitive impairment and its hopefully possible treatment has opened up a new dimension in its management to the neurologists. Vagal nerve stimulation (VNS) technique is presently emerging as an effective alternative anti-epileptic therapeutic measure in intractable epilepsy. VNS has recently been shown to possess a suppressive effect also on interictal epileptiform discharges (IEDs) that are now being widely accepted as established associates of neurocognitive impairment. In this paper, the author proposes VNS technique implantation in CP patients on account of its dual therapeutic effectiveness, i.e. anti-epileptic and IED-suppression. These two effects are likely to control seizures that are quite often drug-resistant and also improve neurocognition in CP patients, thus hoping for a better overall prognostic outcome and an improved quality of life of the CP patients by VNS.

PMID: 18572305 [PubMed - as supplied by publisher]

**8: Early Hum Dev. 2008 Jun 19. [Epub ahead of print]**

**Quality of general movements and psychiatric morbidity at 9 to 12 years.**

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Department of Paediatrics — Developmental Neurology, University Medical Center Groningen, Developmental Neurology, Hanzeplein 1, 9713 GZ Groningen, The Netherlands.

**BACKGROUND:** General movements (GMs) form the basic motility of young infants. The quality of GMs may predict neurological outcome, but little is known about relationships between GM-quality and behavioral problems, including those resulting in overt psychiatric morbidity. **AIM:** To explore relationships between abnormal GMs and behavioral problems, in particular relationships between abnormal GMs and Attention Deficit Hyperactivity Disorder (ADHD) with or without psychiatric co-morbidity at school-age. **METHODS:** Twenty-five low-risk full term infants and 16 infants at high risk for neurodevelopmental disorder but without cerebral palsy were studied prospectively. GM-quality was assessed during 'writhing' age (around term till 2 months post-term) and 'fidgety' age (2-4 months post-term). GMs were classified into normal and abnormal movements. When the children were 9-12 years, parents completed the Child Behavior Checklist (CBCL) and provided information on the presence of psychiatric diagnoses; teachers completed the Teachers Report Form (TRF). Both parents and teachers completed a questionnaire on ADHD-like behavior. **RESULTS:** Abnormal GMs at 'writhing' and 'fidgety' age were related to the presence of ADHD with psychiatric co-morbidity ( $p < 0.05$ ), but not to isolated ADHD. Abnormal GMs at 'fidgety' age were weakly related to problematic behavior at school (TRF-scores) and hyperactive behavior at home (ADHD-questionnaire). **CONCLUSIONS:** This explorative study suggests that abnormal GMs in early infancy may be associated with an increased risk for behavioral problems, in particular for ADHD with psychiatric co-morbidity at school-age.

PMID: 18571881 [PubMed - as supplied by publisher]

### **9: Eur J Paediatr Neurol. 2008 Jun 19. [Epub ahead of print]**

#### **Frequency of participation of 8-12-year-old children with cerebral palsy: A multi-centre cross-sectional European study.**

Michelsen SI, Flachs EM, Uldall P, Eriksen EL, McManus V, Parkes J, Parkinson KN, Thyen U, Arnaud C, Beckung E, Dickinson HO, Fauconnier J, Marcelli M, Colver A.

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Participation in home, school and community is important for all children; and little is known about the frequency of participation of disabled children. Frequency of participation is a valuable outcome measure for evaluating habilitation programmes for disabled children and for planning social and health services. We investigated how frequency of participation varied between children with cerebral palsy and the general population; and examined variation across countries to understand better how the environmental factors such as legislation, public attitudes and regulation in different countries might influence participation. We undertook a multi-centre, population-based study in children with and without cerebral palsy. Working from the Life-H instrument, we developed a questionnaire to capture frequency of participation in 8-12-year-old children. In nine regions of seven European countries, parents of 813 children with cerebral palsy and 2939 children from the general populations completed the questionnaire. Frequency of participation for each question was dichotomised about the median; multivariable logistic regressions were carried out. In the general population, frequency of participation varied between countries. Children with cerebral palsy participated less frequently in many but not all areas of everyday life, compared with children from the general population. There was regional variation in the domains with reduced participation and in the magnitude of the differences. We discuss how this regional variation might be explained by the different environments in which children live. Attending a special school or class was not associated with further reduction in participation in most areas of everyday life.

PMID: 18571944 [PubMed - as supplied by publisher]

**10: Acta Ophthalmol. 2008 Jun 18. [Epub ahead of print]****Risk factors of ophthalmic disorders in children with developmental delay.**

Sandfeld Nielsen L, Jensen H, Skov L.

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Purpose: To identify diagnoses that increase the risk of ophthalmic disorders in developmentally delayed children. Methods: A cross-sectional study of 1126 Danish children with developmental delay (IQ  $\leq$  80), aged 4-15 years [mean age 10 years 1 month; standard deviation (SD) 3 years 2 months; 702 boys, 424 girls]. Ophthalmological and paediatric data were obtained from 719 children. The relative risks (RRs) of ophthalmic disorders were calculated for low IQ, low birth weight, low gestational age, asphyxia, cerebral palsy (CP), epilepsy, neuroradiologically verified cerebral abnormalities, Down's syndrome and other genetic syndromes. Results: Adjusted RR showed that visual impairment was correlated to CP [RR 2.3, 95% confidence interval (CI) 1.3-4.2], epilepsy (RR 2.5, 95% CI 1.5-4.2), verified cerebral changes (RR 1.9, 95% CI 1.1-3.3) and Down's syndrome (RR 2.7, 95% CI 1.2-6.3). Adjusted RR showed that refractive errors were correlated to CP (RR 1.5, 95% CI 1.1-2.1) and Down's syndrome (RR 2.2, 95% CI 1.5-3.2). Adjusted RR showed that strabismus was correlated to cerebral changes (RR 1.8, 95% CI 1.2-2.5). Conclusion: The RR of ophthalmic disorders in developmentally delayed children is increased if the child has CP, epilepsy, verified cerebral abnormalities or a genetic syndrome; referral for ophthalmological evaluation should be performed on suspicion of these conditions.

PMID: 18577186 [PubMed - as supplied by publisher]

**11: Gait Posture. 2008 Jun 18. [Epub ahead of print]****Personalized MR-based musculoskeletal models compared to rescaled generic models in the presence of increased femoral anteversion: Effect on hip moment arm lengths.**

Scheys L, Van Campenhout A, Spaepen A, Suetens P, Jonkers I.

Medical Image Computing (Radiology – ESAT/PSI), UZ Leuven Campus Gasthuisberg, Herestraat 4, B-3000 Leuven, Belgium; Department of Kinesiology, FABER/K.U. Leuven, Tervuursevest 101, B-3000 Leuven, Belgium.

Advanced biomechanical analysis of muscle function during gait relies on the use of a musculoskeletal model. In clinical practice, personalization of the model is usually limited to rescaling a generic model to approximate the patient's anthropometry, even in the presence of bony deformities, as in the case of cerebral palsy (CP). However, the current state of the art in biomechanics allows highly detailed subject-specific models to be built based on magnetic resonance (MR) images. We hypothesized that moment arm length (MAL) calculations from MR-based models would be more accurate than those from rescaled generic musculoskeletal models. Our study compared hip muscle MAL estimated by (1) a personalized model based on full-leg MR scans and (2) a rescaled generic model of both lower limbs in six children presenting with increased femoral anteversion. Personalized MR-based models were created using a custom-built workflow. Rescaled generic models were created based on three-dimensional positions of anatomical markers measured during a standing trial. For all 12 lower limb models, the hip flexion, adduction and rotation MAL of 13 major muscles were analyzed over a physiological range of hip motion using Software for interactive musculoskeletal modelling (SIMM) (Motion Analysis Corporation, USA). Our results showed that rescaled generic models, which do not take into account the subject's femoral geometry, overestimate MAL for hip flexion, extension, adduction, abduction and external rotation, but underestimate MAL for hip internal rotation. The differences in MAL introduced by taking the aberrant femoral geometry into account in the MR-based model were consistent with major gait characteristics presented in CP patients.

PMID: 18571416 [PubMed - as supplied by publisher]

**12: J Orthop Surg. 2008 Jun 10;3:23.**

**Treatment of neuromuscular scoliosis with posterior-only pedicle screw fixation.**

Modi HN, Suh SW, Song HR, Fernandez HM, Yang JH.  
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**ABSTRACT: BACKGROUND:** To determine whether posterior-only approach using pedicle screws in neuromuscular scoliosis population adequately addresses the correction of scoliosis and maintains the correction over time. **METHODS:** Between 2003 and 2006, 26 consecutive patients (7 cerebral palsy, 10 Duchenne muscular dystrophy, 5 spinal muscular atrophy and 4 others) with neuromuscular scoliosis underwent posterior pedicle screw fixation for the deformity. Preoperative, immediate postoperative and final follow-up Cobb's angle and pelvic obliquity were analyzed on radiographs. The average age of the patients was 17.5 years (range, 8-44 years) and the average follow-up was 25 months (18-52 months). **RESULTS:** Average Cobb's angle was 78.53 degrees before surgery, 30.70 degrees after surgery (60.9% correction), and 33.06 degrees at final follow-up (57.9% correction) showing significant correction ( $p < 0.0001$ ). There were 9 patients with curves more than 90 degrees showed an average pre-operative, post operative and final follow up Cobb's angle 105.67 degrees, 52.33 degrees (50.47% correction) and 53.33 degrees (49.53% correction) respectively and 17 patients with curve less than 90 degrees showed average per operative, post operative and final follow up Cobb's angle 64.18, 19.24(70% correction) and 21.41(66.64 correction); which suggests statistically no significant difference in both groups ( $p = 0.1284$ ). 7 patients underwent Posterior vertebral column resection due to the presence of a rigid curve. The average spinal-pelvic obliquity was 16.27 degrees before surgery, 8.96 degrees after surgery, and 9.27 degrees at final follow-up exhibited significant correction ( $p < 0.0001$ ). There was 1 poliomyelitis patient who had power grade 3 in lower limbs pre-operatively, developed grade 2 power post-operatively and gradually improved to the pre-operative stage. There was 1 case of deep wound infection and no case of pseud-arthritis, instrument failures or mortality. **CONCLUSION:** Results indicate that in patients with neuromuscular scoliosis, acceptable amounts of curve correction can be achieved and maintained with posterior-only pedicle screw instrumentation without anterior release procedure.

PMID: 18544164 [PubMed - in process]  
PMCID: PMC2435103

**13: Arch Pediatr. 2008 Jun;15(5):849-851.**

**Cerebral palsy, neurologically impaired children and oral health. [Article in French]**

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PMID: 18582777 [PubMed - as supplied by publisher]

**14: J Intellect Dev Disabil. 2008 Jun;33(2):127-36.**

**Professionals' views on the roles and needs of family carers of adults with cerebral palsy and complex communication needs in hospital.**

Hemsley B, Balandin S, Togher L.

The University of Sydney, Australia.

**Background** The aim of this study was to explore the views of hospital and disability service staff on the roles and needs of family carers of adults with cerebral palsy (CP) and complex communication needs (CCN) in hospital. **Method** We conducted a focus group with six hospital and disability service staff, analysed the content themes of the group discussion, and verified the analysis with participants. **Results** Participants highlighted the family carers' expertise and roles in emotional and communication support, advocacy, and providing information. They acknowledged that there is a gap between the ideal of hospital staff being able to provide all necessary care to the patient with CP, and the reality of hospital staff relying upon family carers for their expertise and provision of patient care. **Conclusions** Hospital and disability staff do not expect family carers to replace the nurse in caring for the patient with CP and CCN in hospital. Nevertheless, family carers provide valuable support in hospital. This includes support with communication, advocacy, protection, information exchange, direct care, and emotional support. Family carers with a high level of expertise in providing care may need support in adapting to the culture of care on the ward and in transferring their roles and expertise in direct care to hospital staff. In addition, they need emotional and practical support through the stressful experience of having a family member hospitalised.

PMID: 18569400 [PubMed - in process]

**15: Rev Med Liege. 2008 Apr;63(4):199-207.**

#### **Care and follow-up of premature infants after discharge [Article in French]**

Senterre T, Beauduin P, Dubru JM, Rigo J.

Service Universitaire de Néonatalogie, CHR Citadelle, Liège, Belgique.

Prematurity remains a public health problem with a considerable psychosocial impact. Premature infants are discharged home more fragile and more precociously than infants born at term. Post-discharge nutrition and growth of the preterm infants should be carefully followed because of specific needs of these infants. Infections and cardiorespiratory abnormalities are more frequent in ex-premature infants. Some cerebral lesions may be shown by brain imaging suggesting future sequelae. However, estimation of their real consequences remains imperfect and long term prognosis contains many uncertainties. Cerebral palsy seems to be less severe nowadays, but all current gravity is due to disabilities which express later: hearing disorders, visual impairments, alterations of eye-hand coordination skills, attention deficit disorders, psychological troubles and school difficulties. Multidisciplinary consultations are designed for these children because early screening and adapted care can improve long term prognosis. All this underlines the importance of prolonged follow-up program after discharge for premature infants and others who presented worse suffer from hypoxic/ischemic encephalopathy.

Publication Types:  
English Abstract

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