



CEREBRAL PALSY | INSTITUTE

CP Research News

Monday 11 August 2008

This free weekly bulletin lists the latest research on cerebral palsy (CP), as indexed in the NCBI PubMed (Medline) and Entrez (GenBank) databases.

To subscribe, please email Robyn Cummins rcummins@tscnsw.org.au with 'Subscribe to CP Research News' in the subject line, and your name and email address in the body of the email.

You may unsubscribe at any time by emailing Robyn with your 'unsubscribe' request.

1: Childs Nerv Syst. 2008 Aug 8. [Epub ahead of print]

Two cases of improvement of smooth pursuit eye movements after selective posterior rhizotomy.

Hořínek D, Hoza D, Cerný R, Vyhnálek M, Sturm D, Bojar M, Libý P, Oweimrin M, Tichý M.

Department of Neurosurgery, Central Military Hospital, First Faculty of Medicine, Charles University, U Vojenské nemocnice 1200, 160 00, Prague 6, Czech Republic, dhoří@email.cz.

OBJECTIVE: Selective posterior rhizotomy (SPR) represents a standard neurosurgical approach in the treatment of spasticity in children with cerebral palsy (CP). Beside the reduction of spasticity in lower limbs, SPR may have suprasegmental effects, considerably above the surgery site. In this communication, we report on the improvement of smooth pursuit eye movements (SPEM) in two children after SPR. **MATERIAL AND METHODS:** Four children with CP underwent SPR. Eye movements were registered by infrared video-oculography before and after the surgery. **RESULTS:** The analysis of SPEM showed the improvement of the correlation coefficient of the eye response to the stimulus after SPR in two subjects. Improvement of SPEM performance was largely due to suppression of spontaneous fixation nystagmus. **CONCLUSION:** SPR may lead to the improvement of SPEM in children with CP. The influence of SPEM improvement on quality of life in a group of severely disabled nonambulant children with CP remains to be assessed.

PMID: 18688617 [PubMed - as supplied by publisher]

2: Stem Cell Rev. 2008 Aug 5. [Epub ahead of print]

Cord Blood Stem Cells: A Review of Potential Neurological Applications.

Harris DT.

Department of Immunobiology, University of Arizona, Tucson, AZ, 85724, USA,



Please join us in February 2009 at the 3rd International Cerebral Palsy Conference in Sydney, Australia. Hosted by the CP Institute, keynote speakers include some of the world's leading cerebral palsy researchers. Earl bird registrations close 10 December 2008 www.cp2009.com.au

davidh@email.arizona.edu.

It is estimated that as many as 128M individuals in the United States, or 1 in 3 people, might benefit from regenerative medicine therapy. Many of these usages include applications that affect the nervous system, including cerebral palsy, stroke, spinal cord injury and neurodegenerative disease such as Parkinson's. The numbers of such individuals affected range from 10,000 (for cerebral palsy) to 700,000 annually (for stroke) at a cost of more than \$65B. For the foreseeable future, regenerative medicine entrée to the clinic will depend upon the development of adult or non-embryonic stem (ES) cell therapies. Currently, non-ES cells easily available in large numbers from affected individuals can be found in the bone marrow, adipose tissue and umbilical cord blood (CB). It is our belief that CB stem cells are the best alternative to ES cells as these stem cells can be used to derive tissues from the mesodermal, endodermal and ectodermal germ lineages. CB contains a mixture of different types of stem cells in numbers not seen in any other location including embryonic-like stem cells, hematopoietic stem cells, endothelial stem cells, epithelial stem cells, mesenchymal stem cells and unrestricted somatic stem cells. This review will summarize the findings reported in the literature with regards to the use of CB stem cells to neurological applications including in vitro work, pre-clinical animal studies, and patient clinical trials.

PMID: 18679834 [PubMed - as supplied by publisher]

3: Gait Posture. 2008 Aug 2. [Epub ahead of print]

Foot contact event detection using kinematic data in cerebral palsy children and normal adults gait.

Desailly E, Daniel Y, Sardain P, Lacouture P.

Laboratoire de Mécanique des Solides, Université de Poitiers, UMR-6610, CNRS, SP2MI, BP-30179, 86962 Futuroscope Cedex, France; Fondation Ellen Poidatz, 77310 St Fargeau-Ponthierry, France.

Initial contact (IC) and toe off (TO) times are essential measurements in the analysis of temporal gait parameters, especially in cerebral palsy (CP) gait analysis. A new gait event detection algorithm, called the high pass algorithm (HPA) has been developed and is discussed in this paper. Kinematics of markers on the heel and metatarsal are used. Their forward components are high pass filtered, to amplify the contact discontinuities, thus the local extrema of the processed signal correspond to IC and TO. The accuracy and precision of HPA are compared with the gold standard of foot contact event detection, that is, force plate measurements. Furthermore HPA is compared with two other kinematics methods. This study has been conducted on 20 CP children and on eight normal adults. For normal subjects all the methods performed equally well. True errors in HPA (mean \pm standard deviation) were found to be 1 \pm 23ms for IC and 2 \pm 25ms for TO in CP children. These results were significantly ($p<0.05$) more accurate and precise than those obtained using the other algorithms. Moreover, in the case of pathological gaits, the other methods are not suitable for IC detection when IC is flatfoot or forefoot. In conclusion, the HPA is a simple and robust algorithm, which performs equally well for adults and actually performs better when applied to the gait of CP children. It is therefore recommended as the method of choice.

PMID: 18676147 [PubMed - as supplied by publisher]

4: Arch Pediatr Adolesc Med. 2008 Aug;162(8):748-55.

Community supports after surviving extremely low-birth-weight, extremely preterm birth: special outpatient services in early childhood.

Hintz SR, Kendrick DE, Vohr BR, Poole WK, Higgins RD; National Institute of Child Health and Human Development (NICHD) Neonatal Research Network.

Collaborators (90)

Oh W, Hensman A, Vohr B, Noel L, Fanaroff AA, Walsh MC, Newman N, Wilson-Costello D, Siner B, Stoll BJ, Jain L, Hale E, Stark AR, Fournier K, Lemons JA, Appel DD, Miller L, Dusick A, Richard L, Ste-

venson DK, VanMeurs K, Ball MB, Hintz SR, Carlo WA, Collins M, Cosby S, Peralta-Carcelen M, Phillips V, Donovan EF, Grisby C, Alexander B, Shively J, Mincey H, Steichen J, Gratton T, Duara S, Everett R, Bauer CR, Papile L, Lacy CB, Lowe J, Korones S, Yolton K, Williams M, Tyson JE, McDavid G, Akpa EG, Franco CY, Cluff PA, Lis AE, Morris BH, Bradt PJ, Lupton AR, Madison S, Hensley G, Miller N, Heyne R, Broyles S, Hickman J, Shankaran S, Bara R, Muran G, Johnson Y, Kennedy D, Ehrenkranz RA, Gettner P, Romano E, Oh W, Walsh M, Stoll BJ, Stark AR, Lemons J, Stevenson D, Carlo WA, Schibler K, Jobe A, Papile L, Korones S, Lupton A, Tyson JE, Shankaran S, Ehrenkranz RA, Das A, Poole WK, Hastings B, Zaterka-Baxter K, Huitema CP, Wright L, Higgins RD, McClure E.

Division of Neonatal and Developmental Medicine, Department of Pediatrics, Stanford University School of Medicine, Palo Alto, California 94304, USA. srhintz@stanford.edu

OBJECTIVE: To determine special outpatient services (SOS) use, need, associated factors, and neurodevelopmental and functional outcomes among extremely preterm infants at 18 to 22 months' corrected age. **DESIGN:** Retrospective analysis. **SETTING:** National Institute of Child Health and Human Development (NICHD) Neonatal Research Network. **PARTICIPANTS:** Infants younger than 28 weeks' gestational age who had been born weighing less than 1000 g at an NICHD Neonatal Research Network center from January 1, 1997, to December 31, 2000, and who were receiving follow-up at 18 to 22 months' corrected age. **INTERVENTIONS:** Questionnaires were administered at the 18- to 22-month follow-up visit regarding SOS use since hospital discharge and the current need for SOS (social work, visiting nurse, medical specialty, early intervention, speech and language services, occupational therapy and physical therapy, and neurodevelopmental and behavioral services). **MAIN OUTCOME MEASURES:** The use of and need for SOS were analyzed by gestational age. Logistic regression analysis identified factors independently associated with the use of more than 5 services and with the need for any services. **RESULTS:** Of 2315 infants, 54.7% used more than 3 SOS by 18 to 22 months, and 19.1% used 6 to 7 SOS. The need for any SOS was reported by approximately 37%. The following variables that were commonly associated with adverse neurodevelopmental outcomes were also associated with the use of more than 5 SOS: sepsis, birth weight, postnatal corticosteroid use, bronchopulmonary dysplasia, and cystic periventricular leukomalacia or grade 3 or 4 intraventricular hemorrhage. Male sex was associated with the need for any SOS. Although high SOS use was more likely among children with adverse neurodevelopmental outcomes, a reported need for SOS was common even among those with mild developmental impairment (39.7%) and mild cerebral palsy (42.2%). **CONCLUSIONS:** High SOS use is common, has identifiable neonatal risk factors, and is associated with neurodevelopmental impairment. Extremely preterm survivors have substantial need for community supports regardless of their impairment level. Efforts to improve comprehensive delivery of family-centered community-based services are urgently needed.

Publication Types:

Research Support, N.I.H., Extramural

PMID: 18678807 [PubMed - in process]

5: Eur J Neurol. 2008 Aug;15(8):787-91.

Upper limb corticomotor projections and physiological changes that occur with botulinum toxin-A therapy in children with hemiplegic cerebral palsy.

Redman TA, Gibson N, Finn JC, Bremner AP, Valentine J, Thickbroom GW.

Princess Margaret Hospital for Children, and School of Population Health, University of Western Australia, Perth, WA, Australia. tonideutz@optusnet.com.au

AIM: To investigate the corticomotor projection to the upper limb in children with hemiplegic cerebral palsy (CP) and the changes that occur with botulinum toxin (BTX)-A. **METHODS:** The study design is a pilot prospective randomized trial. Twenty-two children with hemiplegic CP aged 7 years to 13 years 11 months were recruited. Treatment group (12) received one series of BTX-A injections into the upper limb. Control group (10) did not receive upper limb BTX-A. All participants except one treatment group

participant also received lower limb BTX-A. Transcranial magnetic stimulation (TMS) was performed at baseline, and 1, 3 and 6 months post-injection. Outcome measures were: change in position of affected and unaffected side first dorsal interosseous optimal site of stimulation (OPTx). RESULTS: A shift in affected and unaffected side OPTx was observed for both treatment and control groups, and there was no statistically significant difference between groups at 1, 3 or 6 months. Poor tolerance of TMS cortical stimuli >80% was observed. CONCLUSION: Corticomotor projections associated with the upper limb in children with hemiplegic CP show significant variability over a 6-month period. This variability may reflect central motor reorganization because of systemic BTX-A effect or developmental changes. Upper limb BTX-A therapy is associated with reorganization of both affected and unaffected projections. Poor tolerance of the TMS procedure, in conjunction with higher cortical thresholds, may limit the usefulness of TMS as an investigatory tool in young children with movement disorders.

PMID: 18684310 [PubMed - in process]

6: Gait Posture. 2008 Aug 1. [Epub ahead of print]

Determination of gait patterns in children with spastic diplegic cerebral palsy using principal components.

Carriero A, Zavatsky A, Stebbins J, Theologis T, Shefelbine SJ.

Department of Bioengineering, Imperial College London, UK.

This study developed an objective graphical classification method of spastic diplegic cerebral palsy (CP) gait patterns based on principal component analysis (PCA). Gait analyses of 20 healthy and 20 spastic diplegic CP children were examined to define gait characteristics. PCA was used to reduce the dimensionality of 27 parameters (26 selected kinematics variables and age of the children) for the 40 subjects in order to identify the dominant variability in the data. Fuzzy C-mean cluster analysis was performed plotting the first three principal components, which accounted for 61% of the total variability. Results indicated that only the healthy children formed a distinct cluster; however it was possible to recognise gait patterns in overlapping clusters in children with spastic diplegia. This study demonstrates that it is possible to quantitatively classify gait types in CP using PCA. Graphical classification of gait types could assist in clinical evaluation of the children and serve as a validation of clinical reports as well as aid treatment planning.

PMID: 18676146 [PubMed - as supplied by publisher]

7: Hong Kong Med J. 2008 Aug;14(4):286-91.

Overprotection and the psychological states of cerebral palsy patients and their caretakers in Hong Kong: a preliminary report.

Ho SM, Fung BK, Fung AS, Chow SP, Ip WY, Lee SF, Leung EY, Ha KW.

Department of Orthopaedics and Traumatology, Queen Mary Hospital, Pokfulam, Hong Kong.

OBJECTIVE. To examine the relation between perceived overprotection and the psychological states of cerebral palsy patients and their primary caretakers in Hong Kong. DESIGN. Cross-sectional survey, in which data of 14 pairs of cerebral palsy patients and their caretakers were analysed. SETTING. Duchess of Kent Children's Hospital, Hong Kong. PARTICIPANTS. Cerebral palsy patients and their primary caretakers in Hong Kong. MAIN OUTCOME MEASURES. Perceived overprotection and psychological states. RESULTS. Nearly two thirds of the 14 patients (mean age of 15 years) and 86% of the 14 primary caretakers (mean age of 47 years) perceived various levels of overprotection. For both patients and caretakers, perceived overprotection was positively associated with anxiety and unhappiness. The patients' and caretakers' psychological states and perception of overprotection were not related to the actual motor ability of the patients. Perceived overprotection of the patients was not related to that of the

caretakers. **CONCLUSION.** Caretakers should be mindful that a well-meaning move may have undesirable consequences. More support and child-rearing education should be considered for caretakers.

PMID: 18685161 [PubMed - in process]

8: J Bone Joint Surg Am. 2008 Aug;90(8):1712-21.

Changes in dynamic foot pressure after surgical treatment of valgus deformity of the hindfoot in cerebral palsy.

Park KB, Park HW, Lee KS, Joo SY, Kim HW.

Severance Children's Hospital, Yonsei University College of Medicine, Seoul, South Korea.

BACKGROUND: Calcaneal lengthening osteotomy and extra-articular arthrodesis of the subtalar joint are two methods used for the correction of valgus deformity of the heel and forefoot abduction. The purpose of this study was to compare the operative results of these procedures in patients with cerebral palsy who were able to walk. We focused primarily on changes in radiographic parameters and how altered mobility of the subtalar joint by the two operative methods would modify pressure distribution over the plantar surface of the foot. **METHODS:** A total of eighty-one feet in forty-seven patients were included in the study. The mean age at the time of surgery was eight years and one month, and the mean follow-up period was thirty-nine months. The subjects were divided into two groups; Group I consisted of thirty-seven feet in twenty-two patients who underwent a calcaneal lengthening osteotomy, and Group II comprised forty-four feet in twenty-five patients who underwent an extra-articular subtalar arthrodesis. Preoperative and final follow-up radiographs and dynamic pedobarographs were used to evaluate the results. **RESULTS:** The feet in both groups were found to be similarly deformed before surgery, by radiographic measurements and dynamic foot-pressure analysis. Both operative procedures led to improved radiographic indices; however, calcaneal pitch failed to improve after the subtalar arthrodesis. After surgery, the relative vertical impulse was decreased for the hallux, first metatarsal head, and medial aspect of the midfoot in both groups, while it was increased for the lateral aspect of the midfoot and calcaneus. On the other hand, postoperatively, the relative vertical impulse of the medial aspect of the midfoot was higher and the relative vertical impulse of the first through fourth metatarsal heads was lower in the group that had subtalar arthrodesis compared with the group that had a calcaneal lengthening osteotomy and the normal control subjects. **CONCLUSIONS:** Extra-articular subtalar arthrodesis appears to be an effective means to achieve predictable correction of severe valgus deformity of the heel in patients with cerebral palsy who are able to walk; however, supination deformity of the forefoot remains and calcaneal equinus is not corrected. On the other hand, we believe that the calcaneal lengthening osteotomy is the treatment of choice because postoperative foot-pressure distribution more closely approximates the normal foot-pressure distribution.

PMID: 18676902 [PubMed - in process]

9: J Mol Biol. 2008 Jul 25. [Epub ahead of print]

Hypertonia-Associated Protein Trak1 Is a Novel Regulator of Endosome-to-Lysosome Trafficking.

Webber E, Li L, Chin LS.

Department of Pharmacology, Emory University School of Medicine, Atlanta, GA 30322-4218, USA.

Hypertonia, which is characterized by stiff gait, abnormal posture, jerky movements, and tremor, is associated with a number of neurological disorders, including cerebral palsy, dystonia, Parkinson's disease, stroke, and spinal cord injury. Recently, a spontaneous mutation in the gene encoding trafficking protein, kinesin-binding 1 (Trak1), was identified as the genetic defect that causes hypertonia in mice. The sub-cellular localization and biological function of Trak1 remain unclear. Here we report that Trak1 interacts with hepatocyte-growth-factor-regulated tyrosine kinase substrate (Hrs), an essential component of the

endosomal sorting and trafficking machinery. Double-label immunofluorescence confocal studies show that the endogenous Trak1 protein partially colocalizes with Hrs on early endosomes. Like Hrs, both overexpression and small-interfering-RNA-mediated knockdown of Trak1 inhibit degradation of internalized epidermal growth factor receptors through a block in endosome-to-lysosome trafficking. Our findings support a role for Trak1 in the regulation of Hrs-mediated endosomal sorting and have important implications for understanding hypertonia associated with neurological disorders.

PMID: 18675823 [PubMed - as supplied by publisher]

10: *Pediatr Res.* 2008 Jul 23. [Epub ahead of print]

Sulfonylurea receptor 1 in the germinal matrix of premature infants.

Simard JM, Castellani RJ, Ivanova S, Koltz MT, Gerzanich V.

Department of Neurosurgery [J.M.S., S.I., M.T.K., V.G.], Department of Pathology [J.M.S., R.J.C.], Department of Physiology [J.M.S.], University of Maryland School of Medicine, Baltimore, MD 21201.

Germinal matrix (GM) hemorrhage (GMH) is a major cause of mortality and of life-long morbidity from cerebral palsy (CP). GMH is typically preceded by hypoxic/ischemic events and is believed to arise from rupture of weakened veins in the GM. In the CNS, hypoxia/ischemia upregulate sulfonylurea receptor 1 (SUR1)-regulated NCCa-ATP channels in microvascular endothelium, with channel activation by depletion of ATP being responsible for progressive secondary hemorrhage. We hypothesized that this channel might be upregulated in the GM of preterm infants at risk for GMH. Here, we studied expression of the regulatory subunit of the channel, SUR1, and its transcriptional antecedent, hypoxia inducible factor 1 (HIF1), in postmortem tissues of premature infants who either were at risk for or who sustained GMH. We found regionally specific upregulation of HIF1 and of SUR1 protein and mRNA in GM tissues, compared to remote cortical tissues. Upregulation was prominent in most progenitor cells, whereas in veins, SUR1 was found predominantly in infants who had sustained GMH compared to those without hemorrhage. Our data suggest that the SUR1-regulated NCCa-ATP channel may be associated with GMH, and that pharmacological block of these channels could potentially reduce the incidence of this devastating complication of prematurity.

PMID: 18679166 [PubMed - as supplied by publisher]

11: *J Pediatr (Rio J).* 2008 Jul-Aug;84(4):289-99.

Early diagnosis of abnormal development of preterm newborns: assessment instruments.

Santos RS, Araújo AP, Porto MA.

Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro, RJ, Brazil.

OBJECTIVE: To review the literature regarding screening psychomotor tests for the early identification of developmental problems. **SOURCES:** A search on SciELO, PubMed and Google Scholar was performed using the terms "prematurity," "developmental delay," "cerebral palsy," "early diagnosis" and "evaluation tests." **SUMMARY OF THE FINDINGS:** A total of 455 references were listed, and 174 studies were selected for this review based on title, relevance, and abstract. Only original and electronically available material, from 1985 forward, with information on design, applicability, and psychometric properties of those tests was included. **CONCLUSIONS:** Screening tests are important to speed the beginning of treatment measures in order to allow for better developmental outcome. Among the many tests that can be employed for this purpose, the DENVER II and the Alberta Infant Motor Scale are the most often used in Brazilian studies. The Movement Assessment of Infants is starting to be used in our country. Two other tests are recommended in the literature due to their high sensibility and specificity: the Test of Infant Motor Performance and the General Movements.

PMID: 18688553 [PubMed - in process]

12: Arch Pediatr. 2008 Mar;15(3):334-9. Epub 2008 Mar 4.

Arterial ischemic stroke in the healthy child. Practical approach (neonate and foetus excluded)
[Article in French]

Hernandez L, Landrieu P, Toulgoat F, Lasjaunias P.

Service de neurologie pédiatrique, CHU de Paris-Sud, hôpital Bicêtre, 78, avenue Gal-Leclerc, 94270 Le-Kremlin-Bicêtre, France.

Primary stroke can be due to embolism or an obstructive process of the vascular wall. Embolism may come from a parietal lesion of a large artery in the neck (traumatic dissections), from a cryptic cardiopathy, from a venous thrombosis associated with a right-left shunt. Among pathologies of endocranial arteries, the most frequent is the acute, postviral arteriopathy of the sus-clinoïd carotid, which evolves toward stabilisation or regression. Insidious obstructive arteriopathies of the Willis circle, including development of a transparenchymal suppletive circulation (Moya-Moya disease), cumulate chronic circulatory insufficiency and repetitive strokes. Inflammatory multifocal cerebral arteriopathies mainly involve mean and small arteries. Most of them are secondary to a multisystemic disease, but some are primary. The basic investigation is anatomical and begins with MRI. Emergency conventional cerebral angiography is discussed when heparinotherapy is difficult to decide (evolutive thrombosis), or when an endovascular intervention appears possible (anoeurism). Secondly, conventional angiography is indicated in any chronic situation where a precise anatomical follow-up is necessary. Investigations of the cardiovascular system, of the thrombophilic risk, of a dysimmune process are discussed according to the clinico-anatomical diagnosis.

Publication Types:
English Abstract

PMID: 18295463 [PubMed - indexed for MEDLINE]



The CP Institute is
proudly supported by the
CP Foundation

