

Monday 17 February 2014

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Professor Nadia Badawi

Macquarie Group Foundation Chair of Cerebral Palsy
PO Box 560, Darlinghurst, New South Wales 2010 Australia

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Interventions and Management

1. Phys Ther. 2014 Feb 13. [Epub ahead of print]

Research Summit III Proceedings on Dosing in Children With An Injured Brain or Cerebral Palsy.

Kolobe TH, Christy JB, Gannotti ME, Heathcock JC, Damiano DL, Taub E, Majsak MJ, Gordon AM, Fuchs RK, O'Neil ME, Caiozzo VJ; Section on Pediatrics Research Summit III Participants.

Children with injured brains or cerebral palsy comprise a large percentage of pediatric clients served by physical therapists. There is no consensus on what the basic parameters should be for different treatment protocols. A very important parameter of intervention that is pivotal for treatment efficacy is dosing. Dosing decisions are complex. To date the minimum doses for changing structure and function, activity, and participation in children with various disabilities are unknown. This paper describes the process and outcomes of a Research Summit whose dual goal was to: a) foster a critical debate that would result in recommendations for the development of large scale second generation research proposals to address thresholds for effective dosing of interventions for children with injured brains or cerebral palsy (CP), and b) enhance the research capacity of pediatric physical therapists through collaborative research networks. The summit brought together an interdisciplinary cadre of researchers (physical therapists, basic- and clinical scientists), representatives from funding agencies, and consumers to an intensive 2.5-day think-tank. The Summit targeted questions of treatment dosage related to three areas: practice and neuroplasticity, structure-behavior connections, and designing clinical trials. The consensus was that first the intervention must demonstrate some evidence of effectiveness before optimal dosing can be investigated. Constraint-Induced Movement therapy is used as an example of an intervention that has demonstrated effectiveness, and that requires dosing-related research. Summit results, including factors that merit special consideration and recommendations for future dose-related studies, are highlighted.

[PMID: 24525862](https://pubmed.ncbi.nlm.nih.gov/24525862/) [PubMed - as supplied by publisher]

2. Dev Med Child Neurol. 2014 Feb 11. doi: 10.1111/dmcn.12395. [Epub ahead of print]**Assessment of upper limb capacity in children with unilateral cerebral palsy: construct validity of a Rasch-reduced Modified House Classification.**

Geerdink Y, Lindeboom R, de Wolf S, Steenbergen B, Geurts AC, Aarts P.

AIM: The aim of this study was to test and improve the unidimensionality and item hierarchy of the Modified House Classification (MHC) for the assessment of upper limb capacity in children with unilateral cerebral palsy (CP) using Rasch analysis. The construct validity of the Rasch-reduced item set was evaluated. METHOD: Modified House Classification items were scored from 369 videotaped assessments of 159 children with unilateral CP (98 males, 61 females; median age 6y 6mo, range 2y 1mo-17y 5mo). Construct validity was tested in 40 other children with unilateral CP (21 males, 19 females; median age 8y 2mo, range 3y 3mo-17y 6mo) by comparing total scores with the Manual Ability Classification System (MACS) and the ABILHAND-Kids scale. RESULTS: Fifteen MHC items could be included in the Rasch analysis. The excluded items were either too easy or too difficult. Fourteen items fitted the unidimensional model ($\chi^2 = 41.3$, $df=39$, $p=0.37$). The hierarchy of these items was different from the original MHC. There was a significant correlation with the MACS ($r=-0.901$, $p<0.001$) and the ABILHAND-Kids scale ($r=0.558$, $p<0.001$). INTERPRETATION: The original item hierarchy of the MHC can be improved in order to use its sum score for the assessment of upper limb capacity in children with unilateral CP. The Rasch-reduced 14-item MHC with weighted sum score shows good construct validity to measure functional capacity of the affected hand in children with unilateral CP.

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[PMID: 24517893](#) [PubMed - as supplied by publisher]

3. Appl Opt. 2014 Jan 20;53(3):503-10. doi: 10.1364/AO.53.000503.**Motor response investigation in individuals with cerebral palsy using near infrared spectroscopy: pilot study.**

Chaudhary U, Hall M, Gonzalez J, Elbaum L, Bloyer M, Godavarty A.

Cerebral palsy (CP) describes a group of motor impairment syndromes secondary to genetic that may be due to acquired disorders of the developing brain. In this study, near infrared spectroscopy (NIRS) is used to investigate the prefrontal cortical activation and lateralization in response to the planning and execution of motor skills in controls and individuals with CP. The prefrontal cortex, which plays a dominant role in the planning and execution of motor skill stimulus, is noninvasively imaged using a continuous wave-based NIRS system. During the study, 7 controls (4 right-handed and 3 left-handed) and 2 individuals with CP (1 right-handed and 1 left-handed) over 18 years of age performed 30 s of a ball throwing task followed by 30 s rest in a 5-block paradigm. The optical signal acquired from the NIRS system was processed to elucidate the activation and lateralization in the prefrontal region of controls and individuals with CP. The preliminary result indicated a difference in activation between the task and rest conditions in all the participant types. Bilateral dominance was observed in the prefrontal cortex of controls in response to planning and execution of motor skill tasks, while an ipsilateral dominance was observed in individuals with CP. In conjunction, similar contralateral dominance was observed during rest periods, both in controls and individuals with CP.

[PMID: 24514139](#) [PubMed - in process]

4. Hum Brain Mapp. 2014 Feb 12. doi: 10.1002/hbm.22462. [Epub ahead of print]**Reactivity of sensorimotor oscillations is altered in children with hemiplegic cerebral palsy: A magnetoencephalographic study.**

Pihko E, Nevalainen P, Vaalto S, Laaksonen K, Mäenpää H, Valanne L, Lauronen L.

Cerebral palsy (CP) is characterized by difficulty in control of movement and posture due to brain damage during early development. In addition, tactile discrimination deficits are prevalent in CP. To study the function of

somatosensory and motor systems in CP, we compared the reactivity of sensorimotor cortical oscillations to median nerve stimulation in 12 hemiplegic CP children vs. 12 typically developing children using magnetoencephalography. We also determined the primary cortical somatosensory and motor representation areas of the affected hand in the CP children using somatosensory-evoked magnetic fields and navigated transcranial magnetic stimulation, respectively. We hypothesized that the reactivity of the sensorimotor oscillations in alpha (10 Hz) and beta (20 Hz) bands would be altered in CP and that the beta-band reactivity would depend on the individual pattern of motor representation. Accordingly, in children with CP, suppression and rebound of both oscillations after stimulation of the contralateral hand were smaller in the lesioned than intact hemisphere. Furthermore, in two of the three children with CP having ipsilateral motor representation, the beta- but not alpha-band modulations were absent in both hemispheres after affected hand stimulation suggesting abnormal sensorimotor network interactions in these individuals. The results are consistent with widespread alterations in information processing in the sensorimotor system and complement current understanding of sensorimotor network development after early brain insults. Precise knowledge of the functional sensorimotor network organization may be useful in tailoring individual rehabilitation for people with CP. Hum Brain Mapp, 2014. © 2014 Wiley Periodicals, Inc.

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[PMID: 24522997](#) [PubMed - as supplied by publisher]

5. Brain Dev. 2014 Feb 5. pii: S0387-7604(14)00006-0. doi: 10.1016/j.braindev.2014.01.003. [Epub ahead of print]

An fNIRS exploratory investigation of the cortical activity during gait in children with spastic diplegic cerebral palsy.

Kurz MJ1, Wilson TW2, Arpin DJ3.

Objective: The primary aim of this exploratory investigation was to determine if there are differences in cortical activation of children with spastic diplegic cerebral palsy (CP) and typically developing children during gait. **Methods:** Functional near-infrared spectroscopy was used to measure the concentration of oxygenated hemoglobin that was present in the supplementary motor area, pre-central gyrus, post-central gyrus and superior parietal lobule as the children walked on a treadmill. A sagittal plane video was concurrently collected and later digitized to quantify the temporal gait variations. **Results:** (1) The children with CP had an increased amount of activation in the sensorimotor cortices and superior parietal lobule during gait, (2) the children with CP had a greater amount of variability or error in their stride time intervals, and (3) an increased amount of error in the temporal gait kinematics was associated with an increased amount of activity across the cortical network. **Conclusion:** Our results suggest that the perinatal damage and subsequent neural reorganization that occurs with spastic diplegic CP may impact the functional cortical activity for controlling gait. Furthermore, our results imply the increased cortical activity of the somatosensory cortices and superior parietal cortices may underlie the greater amount of error in the temporal gait kinematics.

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[PMID: 24508407](#) [PubMed - as supplied by publisher]

6. Reg Anesth Pain Med. 2014 Feb 7. [Epub ahead of print]

Dyskinesia Caused by Ziconotide-Baclofen Combination in an Adolescent Affected by Cerebral Palsy.

Pozzi M, Piccinini L, Giordano F, Carnovale C, Perrone V, Pellegrino P, Antoniazzi S, Turconi AC, Radice S, Clementi E.

OBJECTIVE: To report on the first case of ziconotide-induced dyskinesia. Ziconotide, a synthetic peptide analogue of the ω -conotoxin MVIIA that blocks selectively N-type voltage-sensitive calcium channels, has been used in intrathecal administration for 30 years. Ziconotide is a drug of choice for chronic pain because of its efficacy and flexibility because it can substitute or complement other intrathecal therapies including morphine or baclofen. Whereas substantial information is available regarding its efficacy, systematic data regarding the safety of ziconotide remain scant. The adverse reactions to ziconotide described so far regard only the coordination and

execution of intentional movements. **CASE REPORT:** A 15-year-old male patient developed dyskinesia affecting the head and upper limbs 2 days after administration of ziconotide as an add-on therapy to an established regimen of treatment with baclofen. The strict temporal relationship between ziconotide administration and dyskinesia, together with the absence of any other clinical alteration, led to the hypothesis of a possible adverse drug reaction. Ziconotide was thus withdrawn, and the symptoms disappeared within 2 days. **CONCLUSIONS:** An analysis of the signaling pathways of baclofen and ziconotide revealed a possible drug interaction that allowed ziconotide to trigger dyskinesia.

[PMID: 24513956](#) [PubMed - as supplied by publisher]

7. Dev Med Child Neurol. 2014 Feb 10. doi: 10.1111/dmcn.12394. [Epub ahead of print]

Duration and patterns of habitual physical activity in adolescents and young adults with cerebral palsy.

Shkedy Rabani A, Harries N, Namoori I, Al-Jarrah MD, Karniel A, Bar-Haim S.

AIM: Adolescents and young adults with cerebral palsy (CP) show reduced motor function and gait efficiency, and lower levels of habitual physical activity (HPA), than adolescents with typical development and children with CP. This study examined activity duration and patterns in this population in the Middle East through long-term monitoring of a large sample using accelerometers. **METHOD:** Adolescents and young adults with bilateral CP at Gross Motor Function Classification System (GMFCS) levels II, III, and IV, were monitored in their habitual environment for four consecutive days with ActivPAL3 monitors. Time spent in sedentary, standing, and walking activities, and frequency of walking steps and transitions, were analysed for each GMFCS level. **RESULTS:** Measurements were made on 222 participants (132 males, 90 females; mean age 16y 9mo SD 2y, range 13y 4mo-22y). The Mann-Whitney U test demonstrated significant differences ($p < 0.05$) between GMFCS levels, showing reduced walking and standing activity and increased sedentary duration at higher GMFCS levels ($p < 0.001$), except for increased standing time between GMFCS levels II and III ($p = 0.07$). Participants in educational facilities exhibited less sedentary behaviour than those who were homebound ($p < 0.05$). **INTERPRETATION:** These descriptions of duration and frequency of active and sedentary behaviours may serve as a basis for recommendations to minimize inactivity in this population. Adolescents and young adults with CP in the Middle East demonstrate similar patterns of HPA to their peers in other regions.

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[PMID: 24506509](#) [PubMed - as supplied by publisher]

8. Disabil Rehabil Assist Technol. 2014 Feb 11. [Epub ahead of print]

Influence of computerized sounding out on spelling performance for children who do and do not rely on AAC.

McCarthy JH, Hogan TP, Beukelman DR, Schwarz IE.

Purpose: Spelling is an important skill for individuals who rely on augmentative and alternative communication (AAC). The purpose of this study was to investigate how computerized sounding out influenced spelling accuracy of pseudo-words. Computerized sounding out was defined as a word elongated, thus providing an opportunity for a child to hear all the sounds in the word at a slower rate. **Methods:** Seven children with cerebral palsy, four who use AAC and three who do not, participated in a single subject AB design. **Results:** The results of the study indicated that the use of computerized sounding out increased the phonologic accuracy of the pseudo-words produced by participants. **Conclusion:** The study provides preliminary evidence for the use of computerized sounding out during spelling tasks for children with cerebral palsy who do and do not use AAC. Future directions and clinical implications are discussed. **Implications for Rehabilitation** We investigated how computerized sounding out influenced spelling accuracy of pseudowords for children with complex communication needs who did and did not use augmentative and alternative communication (AAC). Results indicated that the use of computerized sounding out increased the phonologic accuracy of the pseudo-words by participants, suggesting that computerized sounding out might assist in more accurate spelling for children who use AAC. Future research is needed to determine how language and reading abilities influence the use of computerized sounding out with children who have a range of speech intelligibilityabilities and do and do not use AAC.

[PMID: 24512195](#) [PubMed - as supplied by publisher]

9. Int J Speech Lang Pathol. 2014 Feb 13. [Epub ahead of print]

An evaluation of the effectiveness of prompt therapy in improving speech production accuracy in six children with cerebral palsy.

Ward R, Leitão S, Strauss G.

This study evaluates perceptual changes in speech production accuracy in six children (3-11 years) with moderate-to-severe speech impairment associated with cerebral palsy before, during, and after participation in a motor-speech intervention program (Prompts for Restructuring Oral Muscular Phonetic Targets). An A1BCA2 single subject research design was implemented. Subsequent to the baseline phase (phase A1), phase B targeted each participant's first intervention priority on the PROMPT motor-speech hierarchy. Phase C then targeted one level higher. Weekly speech probes were administered, containing trained and untrained words at the two levels of intervention, plus an additional level that served as a control goal. The speech probes were analysed for motor-speech-movement-parameters and perceptual accuracy. Analysis of the speech probe data showed all participants recorded a statistically significant change. Between phases A1-B and B-C 6/6 and 4/6 participants, respectively, recorded a statistically significant increase in performance level on the motor speech movement patterns targeted during the training of that intervention. The preliminary data presented in this study make a contribution to providing evidence that supports the use of a treatment approach aligned with dynamic systems theory to improve the motor-speech movement patterns and speech production accuracy in children with cerebral palsy.

[PMID: 24521506](#) [PubMed - as supplied by publisher]

10. Dev Med Child Neurol. 2014 Mar;56(3):201. doi: 10.1111/dmcn.12380.

Classifying eating and drinking ability in people with cerebral palsy.

Scott S.

[PMID: 24512344](#) [PubMed - in process]

11. Rev Port Pneumol. 2014 Feb 10. pii: S0873-2159(13)00109-8. doi: 10.1016/j.rppneu.2013.08.001. [Epub ahead of print]

Non-invasive ventilation in complex obstructive sleep apnea - A 15-year experience of a pediatric tertiary center [Article in English, Portuguese]

Girbal IC1, Gonçalves C2, Nunes T2, Ferreira R2, Pereira L2, Saianda A2, Bandeira T2.

INTRODUCTION: Obstructive sleep apnea (OSA) affects approximately 1-3% of pediatric population and is associated with significant morbidity. As adenotonsillar hypertrophy (ATH) is its primary cause in children, elective adenotonsillectomy is the first treatment of choice. Noninvasive ventilation (NIV) has been increasingly considered as an option, mainly for children with complex diseases, ineligible or waiting for surgeries, or after surgery failure. **OBJECTIVES:** To describe the experience in the management of children with complex OSA, and to evidence the feasibility and advantages of NIV. **METHODS:** This was a retrospective cohort study of 68 children on NIV, in whom complex OSA was the main indication for ventilation, in a Pediatric Respiratory Unit at a University Hospital between January 1997 and March 2012. Demographic and clinical data were collected on the underlying diagnosis, therapeutic interventions prior to NIV, NIV related issues and outcome. **RESULTS:** Forty (59%) children were male, median age at starting NIV was 6 years and 7 months, with interquartile range (IQR) of 15-171 months. Twenty-two (32%) were infants and 25 (37%) adolescents. The most common diagnosis was congenital malformations and genetic disorders in 34 (50%) patients. Nine patients had cerebral palsy, 8 were post treatment for central nervous system tumors and 6 had inborn errors of metabolism. Three children had ATH and three obesity. The majority of patients (76%) had exclusively obstructive OSA and started CPAP. Ten patients had minor complications. Twenty-two patients stopped NIV due to clinical improvement, 8 were non-compliant and 8 patients died. NIV median

duration was 21.5 months (IQR: 7-72). CONCLUSIONS: NIV is feasible and well tolerated by children with OSA associated with complex disorders, and has been shown to have few complications even in infants and toddlers.

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[PMID: 24525398](#) [PubMed - as supplied by publisher]

12. Dev Med Child Neurol. 2014 Mar;56 Suppl 2:2-77. doi: 10.1111/dmnc.12368.

Abstracts of the 7th Biennial Conference of the Australasian Academy of Cerebral Palsy and Developmental Medicine, 11-14 March 2014, Hunter Valley, Australia.

[No authors listed]

[PMID: 24506472](#) [PubMed - in process]

Prevention and Cure

13. Childs Nerv Syst. 2014 Feb 14. [Epub ahead of print]

Neuroprotective effect of levetiracetam on hypoxic ischemic brain injury in neonatal rats.

Komur M, Okuyaz C, Celik Y, Resitoglu B, Polat A, Balci S, Tamer L, Erdogan S, Beydagi H.

PURPOSE: Hypoxic-ischemic brain injury that occurs in the perinatal period is one of the leading causes of mental retardation, visual and auditory impairment, motor defects, epilepsy, cerebral palsy, and death in neonates. The severity of apoptosis that develops after ischemic hypoxia and reperfusion is an indication of brain injury. Thus, it may be possible to prevent or reduce injury with treatments that can be given before the reperfusion period following hypoxia and ischemia. Levetiracetam is a new-generation antiepileptic drug that has begun to be used in the treatment of epilepsy. **METHODS:** The present study investigated the effects of levetiracetam on neuronal apoptosis with histopathological and biochemical tests in the early period and behavioral experiments in the late period. **RESULTS:** This study showed histopathologically that levetiracetam reduces the number of apoptotic neurons and has a neuroprotective effect in a neonatal rat model of hypoxic-ischemic brain injury in the early period. On the other hand, we demonstrated that levetiracetam dose dependently improves behavioral performance in the late period. **CONCLUSIONS:** Based on these results, we believe that one mechanism of levetiracetam's neuroprotective effects is due to increases in glutathione peroxidase and superoxide dismutase enzyme levels. To the best of our knowledge, this study is the first to show the neuroprotective effects of levetiracetam in a neonatal rat model of hypoxic-ischemic brain injury using histopathological, biochemical, and late-period behavioral experiments within the same experimental group.

[PMID: 24526342](#) [PubMed - as supplied by publisher]

14. Clin Perinatol. 2014 Mar;41(1):191-208. doi: 10.1016/j.clp.2013.09.006.

Steroids and Injury to the Developing Brain: Net Harm or Net Benefit?

Malaeb SN1, Stonestreet BS2.

Deleterious effects result from both glucocorticoid insufficiency and excess glucocorticoid tissue exposure in the developing brain. Accumulating evidence suggests a net benefit of postnatal glucocorticoid therapy when administered shortly after the first week of life to premature infants with early and persistent pulmonary dysfunction, particularly in those with evidence of relative adrenal insufficiency. The decision to treat with steroids should ensure maximum respiratory benefit at the lowest possible neurologic risk, while avoiding serious systemic complications. Ongoing clinical trials must validate this approach.

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[PMID: 24524455](#) [PubMed - as supplied by publisher]

15. Clin Perinatol. 2014 Mar;41(1):105-117. doi: 10.1016/j.clp.2013.10.006. Epub 2013 Dec 15.

Fault and Blame, Insults to the Perinatal Brain may be Remote from Time of Birth.

Tan S.

There is a certainty in malpractice cases that neurodevelopmental deficits are caused by preventable events at birth when the onset, nature, and timing of the insult in the antenatal and natal period are unknown. The biggest problem is determining timing. Electronic fetal monitoring is given excessive importance in legal cases. Before assigning fault on events at birth, a better understanding of developmental neurobiology and limitations of the present clinical biomarkers is warranted. The issues of single versus repeated episodes, timing of antenatal insults, pros and cons of legal arguments, interaction of various etiologic and anatomic factors are discussed.

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[PMID: 24524449](#) [PubMed - as supplied by publisher]

16. Clin Perinatol. 2014 Mar;41(1):83-103. doi: 10.1016/j.clp.2013.10.009. Epub 2013 Dec 12.

Chorioamnionitis in the Pathogenesis of Brain Injury in Preterm Infants.

Chau V1, McFadden DE2, Poskitt KJ3, Miller SP4.

Chorioamnionitis (or placental infection) is suspected to be a risk factor for brain injury in premature infants. The suggested association between chorioamnionitis and cystic periventricular leukomalacia and cerebral palsy is uncertain because of the variability of study designs and definitions of chorioamnionitis. Improvements in neonatal intensive care may have attenuated the impact of chorioamnionitis on brain health outcomes. Large multicenter studies using rigorous definitions of chorioamnionitis on placental pathologies and quantitative magnetic resonance techniques may offer the optimal way to clarify the complex role of chorioamnionitis in modifying brain health and long-term outcomes.

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[PMID: 24524448](#) [PubMed - as supplied by publisher]

17. Dev Med Child Neurol. 2014 Feb 10. doi: 10.1111/dmcn.12393. [Epub ahead of print]

Neuroimaging and neurodevelopmental outcome of preterm infants with a periventricular haemorrhagic infarction located in the temporal or frontal lobe.

Soltirovska Salamon A, Groenendaal F, van Haastert IC, Rademaker KJ, Benders MJ, Koopman C, de Vries LS.

AIM: The aim of the study was to compare clinical and neuroimaging characteristics and neurodevelopmental outcome in preterm infants with a periventricular haemorrhagic infarction (PVHI) located in the temporal or frontal periventricular white matter. METHOD: The study was a retrospective hospital-based study of preterm infants with a frontal PVHI (n=21; 11 males, 10 females; mean birthweight 1527g; mean gestational age 30.3wks) or temporal PVHI (n=13; five males, eight females; mean birthweight 1205g; mean gestational age 30.2wks) admitted to the neonatal intensive care unit between 1990 and 2012. The clinical course, results of neuroimaging studies, and neurodevelopmental outcomes of preterm infants with a gestational age less than 34 weeks with a confirmed PVHI on early cranial ultrasonography and/or magnetic resonance imaging were reviewed. For assessment of neurodevelopmental outcome we used the Griffiths Mental Development Scales, the Movement Assessment Battery for Children, the Gross Motor Function Classification System, the Wechsler Preschool and Primary Scale of Intelligence, the Child Behavior Checklist, and ophthalmological assessment. An unfavourable neurodevelopmental

outcome was defined as moderately or severely atypical neurological examination during the last visit: presence of cerebral palsy, epilepsy, a hearing or visual impairment, and/or atypical cognitive development (Griffiths Mental Development Scales developmental quotient or Wechsler Preschool and Primary Scale of Intelligence <85). RESULTS: Unfavourable outcome was observed in 12 out of 13 children with a temporal PVHI compared with six out of 21 children with a frontal PVHI ($p=0.002$). Only one of the included infants with a PVHI in the temporal white matter developed cerebral palsy, which was due to a parietal PVHI in the contralateral hemisphere. Cognitive impairment was noted in seven infants with a frontal PVHI and five with a temporal PVHI. There were more infants with a temporal PVHI who developed visual impairment ($n=5$) or behavioural problems ($n=7$) compared with those with a frontal PVHI (visual impairment ($n=2$), behavioural problems ($n=3$)). INTERPRETATION: PVHI located in the temporal or frontal lobe is almost invariably related to a typical motor outcome, but carries a risk of cognitive, behavioural, and visual problems, especially in infants with a PVHI located in the temporal lobe.

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[PMID: 24506484](#) [PubMed - as supplied by publisher]

18. J Pediatr (Rio J). 2014 Feb 5. pii: S0021-7557(14)00017-5. doi: 10.1016/j.jpeds.2013.08.012. [Epub ahead of print]

Late prematurity: a systematic review.

Machado Júnior LC1, Passini Júnior R2, Rodrigues Machado Rosa I3.

OBJECTIVE: this study aimed to review the literature regarding late preterm births (34 weeks to 36 weeks and 6 days of gestation) in its several aspects. DATA: the MEDLINE, LILACS, and Cochrane Library databases were searched, and the references of the articles retrieved were also used, with no limit of time. DATA SYNTHESIS: numerous studies showed a recent increase in late preterm births. In all series, late preterm comprised the majority of preterm births. Studies including millions of births showed a strong association between late preterm birth and neonatal mortality. A higher mortality in childhood and among young adults was also observed. Many studies found an association with several neonatal complications, and also with long-term disorders and sequelae: breastfeeding problems, cerebral palsy, asthma in childhood, poor school performance, schizophrenia, and young adult diabetes. Some authors propose strategies to reduce late preterm birth, or to improve neonatal outcome: use of antenatal corticosteroids, changes in some of the guidelines for early delivery in high-risk pregnancies, and changes in neonatal care for this group. CONCLUSIONS: numerous studies show observed mortality and morbidity in late preterm infants compared with term infants, in addition to long-term disorders. More recent studies evaluated strategies to improve the outcomes of these neonates. Further studies on these strategies are needed.

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19. Mol Genet Genomics. 2014 Feb 13. [Epub ahead of print]

The association of apolipoprotein E gene polymorphisms with cerebral palsy in Chinese infants.

Xu Y, Wang H, Sun Y, Shang Q, Chen M, Li T, Zhu D, He L, Zhu C, Xing Q.

Apolipoprotein E (APOE, protein; ApoE, gene) is a lipid transport protein abundantly present in brain cells. Previous studies have suggested that there is an association between genetic variants of ApoE and susceptibility to cerebral palsy (CP). The purpose of this study was to explore whether the ApoE gene is involved in the etiology of CP in the Chinese population. In this study, 350 CP patients and 242 healthy control children were recruited. Genomic DNA was prepared from venous blood and all five single nucleotide polymorphisms (SNPs) in ApoE (rs769446, rs405509, rs121918399, rs429358, and rs190853081) were detected by the MassARRAY platform-based genotyping approach. The SHEsis program was used to analyze the genotyping data, and we systemically analyzed the association of the ApoE SNPs with different subtypes of CP. No significant association was detected between the e4 identified by the C allele of rs429358 and CP, but there were significant differences in allelic frequencies between the CP patients and controls at rs769446 ($P = 0.005$, $P = 0.025$ after Bonferroni correction), as well as between the CP patients with preterm birth (<34 gestational weeks) and controls at rs769446 ($P = 0.001$,

P = 0.005 after Bonferroni correction). A haplotype consisting of the five SNPs rs769446(C), rs405509(C), rs121918399(C), rs429358(T), and rs190853081(G) was associated with a decreased risk of CP (P = 0.002 after Bonferroni correction). However, we found no significant association between any of the other three SNPs and CP based on different subgroup analyses. This study provides the first evidence that ApoE gene polymorphisms are a potential risk factor for CP in the Chinese population.

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