Cerebral palsy research news

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Interventions and Management

1. Psychometric properties of upper limb kinematics during functional tasks in children and adolescents with dyskinetic cerebral palsy
Inti Vanmechelen, Saranda Bekteshi, Marco Konings, Hilde Feys, Kaat Desloovere, Jean-Marie Aerts, Elegast Monbaliu

PLoS One. 2022 Sep 23;17(9):e0266294. doi: 10.1371/journal.pone.0266294. eCollection 2022.

Dyskinetic cerebral palsy (DCP) is characterised by involuntary movements, and the movement patterns of children with DCP have not been extensively studied during upper limb tasks. The aim of this study is to evaluate psychometric properties of upper limb kinematics in participants with DCP and typically developing (TD) participants. In current repeatability and validity study, forty individuals with typical development (n = 20) and DCP (n = 20) performed a reach forward/sideways and a reach and grasp task during motion analysis on two occasions. Joint angles at point of task achievement (PTA) and spatio-temporal parameters were evaluated within-and between-sessions using intra-class correlation coefficients (ICC) and standard error of measurement (SEM). Independent t-tests/Mann-Whitney-U tests were used to compare parameters between groups. Within-session ICC values ranged from 0.45 to 1.0 for all parameters for both groups. Within-session SEM values ranged from 1.1° to 11.7° for TD participants and from 1.9° to 13.0° for participants with DCP. Eight within-session repetitions resulted in the smallest change in ICC and SEM values for both groups. Within-session variability was higher for participants with DCP in comparison with the TD group for the majority of the joint angles and spatio-temporal parameters. Intrinsic variability over time was small for all angles and spatio-temporal parameters, whereas extrinsic variability was higher for elbow and scapula angles. Between-group differences revealed lower shoulder adduction and higher elbow flexion, pronation and wrist flexion, as well as higher trajectory deviation and a lower maximal velocity for participants with DCP. This is the first study to assess the psychometric properties of upper limb kinematics in children and adolescents with DCP, showing that children with DCP show higher variability during task execution, requiring a minimum of eight repetitions. However, their variable movement pattern can be reliably captured within-and between-sessions, confirming the potential of three-dimensional motion analysis for assessment of rehabilitation interventions in DCP.

PMID: 36149848

2. Hand Use and Grasp Sensor System in Monitoring Infant Fine Motor Development
HsinHung Kuo, Jing Wang, Manon M Schladen, Taeun Chang, Olga M Morozova, Ugo Della Croce, Sahana N Kukke, Peter S Lum

Arch Rehabil Res Clin Transl. 2022 May 13;4(3):100203. doi: 10.1016/j.arrct.2022.100203. eCollection 2022 Sep.

Objective: To assess the feasibility of a hand use and grasp sensor system in collecting and quantifying fine motor development longitudinally in an infant's home environment. Design: Cohort study. Researchers made home visits monthly to

participating families to collect grasp data from infants using a hand use and grasp sensor. Setting: Data collection were conducted in each participant's home. Participants: A convenience sample of 14 typical developmental infants were enrolled from 3 months to 9 months of age. Two infants dropped out. A total of 62 testing sessions involving 12 infants were available for analysis (N=12). Interventions: At each session, the infant was seated in a standardized infant seat. Each instrumented toy was hung on the hand use and grasp sensor structure, presented for 6 minutes in 3 feedback modes: visual, auditory, and vibratory. Main outcome measures: Infant grasp frequency and duration, peak grasping force, average grasping force, force coefficient of variation, and proportion of bimanual grasps. Results: A total of 2832 recorded grasp events from 12 infants were analyzed. In linear mixed-effects model analysis, when interacting with each toy, infants' peak grasp force, average grasp force, and accumulated grasp time all increased significantly with age (all P<.001). Bimanual grasps also occupied an increasingly greater percentage of infants' total grasps as they grew older (bar toy P<.001, candy toy P=.021). Conclusions: We observed significant changes in hand use and grasp sensor outcome measures with age that are consistent with maturation of grasp skills. We envision the evolution of hand use and grasp sensor technology into an inexpensive and convenient tool to track infant grasp development for early detection of possible developmental delay and/or cerebral palsy as a supplement to clinical evaluations.

PMID: 36123986

3. In-hospital complications after cervical fusion in cases with versus without cerebral palsy
Anoop R Galivanche, Stephen M Gillinov, Michael R Mercier, Christopher A Schneble, Arya G Varthi, Jonathan N Grauer, David B Frumberg

N Am Spine Soc J. 2022 Sep 6;12:100167. doi: 10.1016/j.xnsj.2022.100167. eCollection 2022 Dec.

Background: Patients with cerebral palsy (CP) are at increased risk for cervical spine pathology. Cervical fusion surgery may be considered in this population, but perioperative outcomes relative to patients without CP remains poorly understood. The purpose of this study was to compare in-hospital complications after cervical fusion in patients with versus without cerebral palsy (CP) using a retrospective cohort design. Methods: Cervical fusion cases with and without CP were identified in the National Inpatient Sample (NIS) database. In-hospital adverse events were tabulated and grouped into any (AAE), serious (SAE), and minor adverse events (MAE). Length of hospital stay (LOS) and mortality were assessed. Multiple logistic regression models with and without 1:1 propensity matching were used to compare outcomes between cases with and without CP, controlling for demographic and preoperative variables. Results: After weighting, 1,518,012 cases were included in the study population, of which 4,554 (0.30%) had CP. Those with CP were younger, more often male, suffered more comorbidities, more frequently operated on from a posterior or combined approach, and were more frequently addressed at more than one level. By multiple logistic regression after matching, CP cases had higher odds of AAE (OR 1.72; 95% CI 1.05-2.81; p=0.030) and MAE (OR 2.07; 95% CI 1.20-3.57; p=0.009), but no differences in odds of SAE or in-hospital mortality. Conclusions: As there is increasing awareness of potentially cervical pathology in the CP population, the current study suggests that surgical intervention for this population can be appropriately considered without severe in-hospital morbidity or mortality.

PMID: 36132746

4. Late Hip Displacement Identified in Children at Gross Motor Function Classification System II and III With Asymmetric Diplegia and Fixed Pelvic Obliquity
Stacey Miller, Lise Leveille, Maria Juricic, Kishore Mulpuri

J Am Acad Orthop Surg Glob Res Rev. 2022 Sep 21;6(9). doi: 10.5435/JAAOSGlobal-D-20-00094. eCollection 2022 Sep 1.

Risk of hip displacement in children with cerebral palsy is directly related to a child's level of motor function as classified by the Gross Motor Function Classification System (GMFCS) and is reported to be greatest at a young age. In this study, we present a series of four children with asymmetric diplegic cerebral palsy at GMFCS levels II and III, with the more involved hip showing rapid, progressive displacement at a later age. Current hip surveillance guidelines may not adequately identify hip displacement in children with asymmetric diplegia and pelvic obliquity; modifications to surveillance guidelines may be warranted. Additional investigation of hip displacement in this subset of children is required to determine whether the incidence of displacement is higher than anticipated based on the GMFCS level alone.

PMID: 36136937

5. Acute Effects of Static and Proprioceptive Neuromuscular Facilitation Stretching of the Plantar Flexors on Ankle Range of Motion and Muscle-Tendon Behavior in Children with Spastic Cerebral Palsy-A Randomized Clinical Trial
Annika Kruse, Andreas Habersack, Richard T Jaspers, Norbert Schrapf, Guido Weide, Martin Svehlik, Markus Tilp

Int J Environ Res Public Health. 2022 Sep 15;19(18):11599. doi: 10.3390/ijerph191811599.

Stretching is considered a clinically effective way to prevent muscle contracture development in children with spastic cerebral palsy (CP). Therefore, in this study, we assessed the effects of a single session of proprioceptive neuromuscular facilitation (PNF) or static stretching (SS) on ankle joint range of motion (RoM) and gastrocnemius muscle-tendon behavior in children with CP. During the SS (n = 8), the ankle joint was held in maximum dorsiflexion (30 s). During the PNF stretching (n = 10), an isometric contraction (3-5 s) was performed, followed by stretching (~25 s). Ten stretches were applied in total. We collected data via dynamometry, 3D motion capture, 2D ultrasound, and electromyography, before and after the stretching sessions. A mixed ANOVA was used for the statistical analysis. Both ankle RoM and maximum dorsiflexion increased over time ($F(1,16) = 7.261$, p < 0.05, $\eta^2 = 0.312$; and $F(1,16) = 4.900$, p < 0.05, $\eta^2 = 0.234$, respectively), without any difference between groups. An interaction effect ($F(1,12) = 4.768$, $p = 0.05$, $\eta^2 = 0.284$) was observed for muscle-tendon unit elongation (PNF: -8.8%; SS: +14.6%). These findings suggest a positive acute effect of stretching on ankle function. However, SS acutely increased muscle-tendon unit elongation, while this decreased after PNF stretching, indicating different effects on the spastic muscles. Whether PNF stretching has the potential to cause positive alterations in individuals with CP should be elucidated in future studies.

PMID: 36141875

6. Use of Automated Kinematic Diadochokinesis Analysis to Identify Potential Indicators of Speech Motor Involvement in Children With Cerebral Palsy
Kristen M Allison, Ignatius S B Nip, Panying Rong

Am J Speech Lang Pathol. 2022 Sep 20;1-12. doi: 10.1044/2022_AJSLP-21-00241. Online ahead of print.

Purpose: This study examined multiple variables obtained from an automated measure of lip movement during a diadochokinesis (DDK) task to identify those with potential to detect mild speech motor involvement in school-age children diagnosed with cerebral palsy (CP). Method: Eight children with CP and high speech intelligibility and a matched group of eight children with typical development (TD) completed a DDK task while their lip and jaw movements were recorded. A custom MATLAB algorithm was used to automatically extract 23 kinematic measures of children's lip movements during production of the DDK sequences. Mann-Whitney U tests were used to compare groups on the kinematic measures, and receiver operating characteristic (ROC) analysis was used to evaluate the diagnostic accuracy of measures that significantly differed between groups. Results: Five of the 23 kinematic variables differed significantly between the CP and TD groups. These were two measures of overall DDK performance (i.e., duration of the DDK sequence and number of cycles) and three spatial and temporal measures of lip movement. Duration of the DDK sequence and the mean displacement of the lips across cycles had the highest diagnostic accuracy, differentiating CP and TD groups with 88% sensitivity and 88% specificity. Conclusions: Automatically derived kinematic measures of DDK sequences differentiated children with CP and high intelligibility from typically developing children. Future research is needed to determine the clinical utility of these measures for detecting speech motor impairment.

PMID: 36126294

7. Children with Cerebral Palsy can imagine actions like their normally developed peers
Jessica Galli, Gioacchino Garofalo, Sara Brunetti, Erika Loi, Michela Portesi, Giovanni Pelizzari, Andrea Rossi, Elisa Fazzi, Giovanni Buccino

Front Neurol. 2022 Sep 6;13:951152. doi: 10.3389/fneur.2022.951152. eCollection 2022.

The present study aimed at assessing whether children with Cerebral Palsy (CP) can imagine object directed actions similarly to their normally developed peers. We asked children with CP (n = 12) and paired healthy controls (n = 12) to imagine in first person perspective eight daily actions, after observing them through videoclips presented on a computer screen. During motor

imagery (MI) children were interrupted at a specific timepoint (e.g., at 2.5 s) from the start. Two frames extracted from the videoclips were then presented on the screen. One of the two depicted the correct timepoint at which the imagined action was interrupted, while the other represented an earlier or later timepoint. Children had to respond by pressing the key associated to the correct frame. Children also underwent VMIQ-2 questionnaire. Both groups performed similarly in the questionnaire and in the requested task, where they showed the same error rate. Errors mainly concerned the later frame, suggesting a similar strategy to solve the task in the two groups. The results support the view that children with CP can imagine actions similarly to their normally developed peers. This encourages the use of MI as a rehabilitative tool in children with motor impairment.

PMID: 36147045

8. Evaluation of salivary parameters and Streptococcus' Mutans count in children with cerebral palsy in Egypt: a case control study
Sara M Quritum, Amel M Ali, May M Raouf, Tarek E I Omar, Karin M L Dowidar

BMC Oral Health. 2022 Sep 19;22(1):411. doi: 10.1186/s12903-022-02447-0.

Background: Children with cerebral palsy (CP) are at high risk for dental caries. Alteration of some salivary properties encountered among them compared to healthy children, could play a role in this elevated risk. Objectives: The aim of the present study was to assess salivary physicochemical properties; including total antioxidant (TAC), flow rate, viscosity, pH and buffering capacity, as well as Streptococcus mutans level among children with CP, also to correlate these variables to their caries experience. Materials and methods: This case control study included 80 children with CP, study group (SG) and matched number of healthy children for control group (CG). Interview-based questionnaire, clinical examination, salivary biochemical and microbiological investigations using MALDI-TOF were done. Results: In SG, the caries experience in primary teeth dmft and S. mutans log value were significantly higher than CG ($P = 0.039$, $P = 0.002$) while unstimulated salivary flow rate, buffering capacity and salivary TAC were significantly lower ($P < 0.0001$). Multivariate linear regression showed that the presence of CP was significantly associated with the greatest variation in caries experience in the primary teeth and permanent teeth. Higher unstimulated salivary flow rate, or an increase in buffering capacity by 1 ml of acid/ml of saliva were associated with lower number of the affected primary and permanent teeth. On the other hand, One-unit increase in S. mutans log count and higher salivary TAC were associated with higher caries experience. Conclusion: Children with CP have higher caries experience (dmf) due to lower salivary protective factors and higher S. mutans counts.

PMID: 36123671

9. Novel weight estimation equation for children with cerebral palsy in low-resource settings: Validation in a population -based cohort
Israt Jahan, Maria de Las Mercedes Ruiz Brunner, Mohammad Muhit, Iskander Hossain, Eduardo Cuestas, M Elisabeth Cieri, Ana L Condinanzi, L Johana Escobar Zuluaga, Nadia Badawi, Gulam Khandaker

Dev Med Child Neurol. 2022 Sep 20. doi: 10.1111/dmcn.15413. Online ahead of print.

Aim: To validate a novel equation to estimate weight from mid-upper arm circumference (MUAC) among children with cerebral palsy (CP) in rural Bangladesh. Method: Children with CP aged 2 to 18 years registered in the Bangladesh CP Register were randomly selected. Data on sociodemographics, Gross Motor Function Classification System level, and anthropometric measurements were extracted. Bland-Altman plots with a 95% agreement limit and Lin's concordance correlation coefficient with 95% confidence intervals (CI) were reported to measure agreement between observed and estimated weight. Percentage error was used to determinate the method's accuracy. Results: There were 497 participants with a mean age at assessment of 9 years (SD 4 years 11 months) (47.7% female). Lin's concordance correlation coefficient between the observed and estimated weights was 0.90 (95% CI 0.89-0.92). Bland-Altman plots showed a reasonable accuracy of the equation in the study cohort. The mean percentage error of the equation was 5.04%. The average difference between observed and estimated weights was -1.02 kg (SD 5.1). The differences between observed and estimated weights were significantly greater among children with weight-for-age, height-for-age, or BMI-for-age z-scores less than or equal to -4. Interpretation: It is possible to predict the weight of children with CP from MUAC with sufficient accuracy. The equation can be used for populations in low-resources and low- and middle-income countries.

PMID: 36126148

10. Impact of Outborn/Inborn Birth Status of Infants Born at <29 Weeks of Gestation on Neurodevelopmental Impairment: A Nationwide Cohort Study in Korea
In Young Cho, Hye Mi Lee, Sae Yun Kim, Eun Sun Kim

Int J Environ Res Public Health. 2022 Sep 16;19(18):11718. doi: 10.3390/ijerph191811718.

This study designed to evaluate the short- and long-term outcomes of outborn and inborn preterm infants enhancing the regional perinatal system in South Korea. It is a prospective cohort study of the Korean neonatal network database for infants born at <29 weeks of gestation between 2013 and 2015. Of 2995 eligible infants, 312 were outborn, and 976 completed the assessment of long-term outcome at 18-24 months of corrected age. The mean gestational age was significantly younger in outborn infants than in inborn infants ($p = 0.004$). The mean Apgar score at 5 min was higher in inborn infants ($p = 0.046$). More inborn preterm infants died before discharge ($p < 0.001$); however, most of the other short-term outcomes occurred significantly more often in outborn infants than in inborn infants. The outborn infants had higher odds of neurodevelopmental impairment (adjusted odds ratio (aOR) 2.412, 95% confidence interval (CI) 1.585-3.670), cerebral palsy (aOR 4.460, 95% CI 2.249-8.845) and developmental impairment (aOR 2.238, 95% CI 1.469-3.408). In preterm infants, the location of birth may be a key factor influencing short- and long-term outcomes. Thus, to provide adequate care and efficiently allocate medical resources to high-risk preterm infants, nationwide regional perinatal systems need to be improved and standardized.

PMID: 36141991

11. An Ecological Analysis of Hospitalization Patterns for Diseases of the Nervous System in England and Wales over the Last 20 Years
Abdallah Y Naser, Eman Zmaily Dahmash, Tamara Al-Daghastani, Hassan Alwafi, Sawsan Abu Hamdah, Zahra K Alsairafi, Fatemah M Alsaleh

Healthcare (Basel). 2022 Sep 1;10(9):1670. doi: 10.3390/healthcare10091670.

Objectives: This study aims to provide a comprehensive overview of the hospitalization pattern of nervous system diseases from 1999 to 2019. Methods: This is ecological research based on data from the Hospital Episode Statistics database in England and the Patient Episode Database in Wales, both of which are publicly available. Data on hospital admissions were collected between April 1999 and March 2019. Diagnostic codes (G00-G09: inflammatory diseases of the central nervous system, G10-G14: systemic atrophies primarily affecting the central nervous system, G20-G26: extrapyramidal and movement disorders, G30-G32: other degenerative diseases of the nervous system, G35-G37: demyelinating diseases of the central nervous system, G40-G47: episodic and paroxysmal disorders, G50-G59: nerve, nerve root and plexus disorders, G60-G65: polyneuropathies and other disorders of the peripheral nervous system, G70-G73: diseases of myoneural junction and muscle, G80-G83: cerebral palsy and other paralytic syndromes, and G89-G99: other disorders of the nervous system) from the tenth edition of the International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) were used to identify hospital admissions. A Poisson model was used to examine the trend in hospital admissions. Results: During the study period, hospital admission rate increased by 73.5% (from 474.44 (95% CI 472.58-476.31) in 1999 to 823.37 (95% CI 821.07-825.66) in 2019 per 100,000 persons, trend test, $p < 0.01$). The most prevalent diseases of the nervous system hospital admissions causes were episodic and paroxysmal disorders, nerve, nerve root, and plexus disorders, and demyelinating diseases of the central nervous system which accounted for 37.4%, 22.1%, and 9.3%, respectively. Hospital admission rate between females increased by 79.1% (from 495.92 (95% CI 493.25-498.58) in 1999 to 888.33 (95% CI 884.97-891.68) in 2019 per 100,000 persons). Hospital admission rate between males was increased by 67.5% (from 451.88 (95% CI 449.28-454.49) in 1999 to 756.82 (95% CI 753.69-759.96) in 2019 per 100,000 persons). Conclusion: In the United Kingdom, hospital admissions for diseases of the nervous system are on the rise. Future research is needed to identify high-risk groups and suggest effective interventions to reduce the prevalence of these disorders.

PMID: 36141282

12. Risk of COVID-19 hospitalizations among school-aged children in Scotland: A national incident cohort study
Ting Shi, Jiafeng Pan, Emily Moore, Srinivasa Vittal Katikireddi, Annemarie B Docherty, Lynda Fenton, Colin McCowan, Utkarsh Agrawal, Steven Kerr, Syed Ahmar Shah, Sarah J Stock, Colin R Simpson, Chris Robertson, Aziz Sheikh, Public Health Scotland and the EAVE II Collaborators

J Glob Health. 2022 Sep 23;12:05044. doi: 10.7189/jogh.12.05044.

Background: There is considerable policy, clinical and public interest about whether children should be vaccinated against SARS-CoV-2 and, if so, which children should be prioritised (particularly if vaccine resources are limited). To inform such deliberations, we sought to identify children and young people at highest risk of hospitalization from COVID-19. Methods: We used the Early Pandemic Evaluation and Enhanced Surveillance of COVID-19 (EAVE II) platform to undertake a national incident cohort analysis to investigate the risk of hospitalization among 5-17 years old living in Scotland in risk groups defined by the living risk prediction algorithm (QCOVID). A Cox proportional hazard model was used to derive hazard ratios (HR) and 95% confidence intervals (CIs) for the association between risk groups and COVID-19 hospital admission. Adjustments were made for age, sex, socioeconomic status, co-morbidity, and prior hospitalization. Results: Between March 1, 2020 and November 22, 2021, there were 146 183 (19.4% of all 752 867 children in Scotland) polymerase chain reaction (PCR) confirmed SARS-CoV-2 infections among 5-17 years old. Of those with confirmed infection, 973 (0.7%) were admitted to hospital with COVID-19. The rate of COVID-19 hospitalization was higher in those within each QCOVID risk group compared to those without the condition. Similar results were found in age stratified analyses (5-11 and 12-17 years old). Risk groups associated with an increased risk of COVID-19 hospital admission, included (adjusted HR, 95% CIs): sickle cell disease 14.35 (8.48-24.28), chronic kidney disease 11.34 (4.61-27.87), blood cancer 6.32 (3.24-12.35), rare pulmonary diseases 5.04 (2.58-9.86), type 2 diabetes 3.04 (1.34-6.92), epilepsy 2.54 (1.69-3.81), type 1 diabetes 2.48 (1.47-4.16), Down syndrome 2.45 (0.96-6.25), cerebral palsy 2.37 (1.26-4.47), severe mental illness 1.43 (0.63-3.24), fracture 1.41 (1.02-1.95), congenital heart disease 1.35 (0.82-2.23), asthma 1.28 (1.06-1.55), and learning disability (excluding Down syndrome) 1.08 (0.82-1.42), when compared to those without these conditions. Although our Cox models were adjusted for a number of potential confounders, residual confounding remains a possibility. Conclusions: In this national study, we observed an increased risk of COVID-19 hospital admissions among school-aged children with specific underlying long-term health conditions compared with children without these conditions.

PMID: 36134546

13. Stability Study of Baclofen in an Oral Powder Form Compounded for Pediatric Patients in Japan
Jumpei Saito, Takehisa Hanawa, Ayuna Ozawa, Takahiro Matsumoto, Nozomi Yoshikawa, Tsutomu Harada, Kana Iwahashi, Akimasa Yamatani

Children (Basel). 2022 Aug 29;9(9):1313. doi: 10.3390/children9091313.

Baclofen is used as a skeletal muscle relaxant for multiple sclerosis patients and pediatric patients with cerebral palsy and is prescribed to pediatric patients at 0.3 to 1.0 mg/kg/dose. Baclofen tablets, an oral drug, are usually administered as a powder in pediatric wards after a formulation change by the pharmacist. However, there is no information about stability and assurance of quality for compounded products. The purpose of this study was to design a 10 mg/g oral powder of baclofen and to investigate the stability and changes in the physical properties of this compounded product. A 10 mg/g baclofen powder was prepared by adding extra-fine crystal lactose hydrate to crushed and filtrated baclofen tablets and was stored in a polycarbonate amber bottle with desiccant or in a coated paper laminated with cellophane and polyethylene. The stability of baclofen at 25 ± 2 °C/60 ± 5%RH was tested for 120 days in 'bottle (closed)', 'bottle (in use)', and 'laminated' storage conditions. Baclofen concentrations ranged from 90.0% to 110.0% of the initial concentration under all storage conditions. No crystallographic or dissolution changes were observed after storage. This information can help with the management of baclofen compounded powder in pharmacies.

PMID: 36138622

14. Role of Transcription Factors in the Management of Preterm Birth: Impact on Future Treatment Strategies
Akshaya Meher

Review Reprod Sci. 2022 Sep 21. doi: 10.1007/s43032-022-01087-7. Online ahead of print.

Preterm birth is defined as the birth of a neonate before 37 weeks of gestation and is considered as a leading cause of the under five deaths of neonates. Neonates born preterm are known to have higher perinatal mortality and morbidity with associated risks of low birth weight, respiratory distress syndrome, gastrointestinal, immunologic, central nervous system, hearing, and vision problems, cerebral palsy, and delayed development. India leads the list of countries with the greatest number of preterm births. The studies focusing on the molecular mechanisms related to the etiology of preterm birth have described the role of

different transcription factors. With respect to this, transcription factors like peroxisome proliferator activated receptors (PPAR), nuclear factor kappa β (NF-kβ), nuclear erythroid 2-related factor 2 (Nrf2), and progesterone receptor (PR) are known to be associated with preterm labor. All these transcription factors are linked together with a common cascade involving inflammatory processes. Thus, the current review describes the possible cross-talk between these transcription factors and their therapeutic potential to prevent or manage preterm labor.

PMID: 36131222

15. A rare dichorionic triamniotic triplet pregnancy with spontaneous twin anemia-polycythemia sequence between two dichorionic fetuses
Ditte S Jørgensen, Lone Nikoline Nørgaard, Charlotte Kvist Ekelund, Lisa Neerup Jensen, Karin M Sundberg

Case Reports Fetal Diagn Ther. 2022 Sep 16. doi: 10.1159/000527030. Online ahead of print.

Introduction This report presents a rare case of spontaneous twin anemia-polycythemia sequence (TAPS) between two dichorionic fetuses in a spontaneous, homozygotic, dichorionic, triamniotic, triplet pregnancy treated with multiple intrauterine blood transfusions and partial exchange transfusions. Case presentation The pregnancy was diagnosed with stage IV TAPS at gestational week 25+1. The patient was treated with laser surgery combined with multiple intrauterine blood transfusions and partial exchange transfusions. The triplets were delivered at a planned caesarean section at gestational week 28+1 with postnatal hemoglobin values of 18.21, 26.43 and 11.92 g/dl in triplet 1, 2 and 3, respectively. At four years of age triplet 1 is considered healthy, triplet 2 is diagnosed with mild mental retardation, and triplet 3 with profound mental retardation and dystonic cerebral palsy. Discussion/conclusion This is an extremely rare case of TAPS between dichorionic fetuses in a triplet pregnancy and routine surveillance with measurement of MCA-PSV in dichorionic pregnancies may contribute to the detection of similar cases in the future. Furthermore, this case contributes with rare long-term follow-up data of children treated for high stage TAPS with multiple IUTs and PETs.

PMID: 36116430

16. To study the association between various levels of cord serum albumin (CSA) and significant neonatal hyperbilirubinemia requiring interventions like phototherapy or exchange transfusion
Apeksha Pathak, R Siddalingesha, Kamal N Prasad, Nibha Kamal, Archana Sinha, Ananya Ghosh, Bhuwan K Singh, Pankaj Kumar, R Surekha

J Family Med Prim Care. 2022 Jun;11(6):2483-2487. doi: 10.4103/jfmpc.jfmpc_1450_21. Epub 2022 Jun 30.

Introduction: Hyperbilirubinemia is most common normal physiological phenomenon in neonates affecting almost one third of newborn.it may lead to neuro disability leading to deafness and cerebral palsy which can be prevented if detected and treated as soon as possible. Albumin is produced in seventh week of intrauterine life and it can be measured by cord blood and in this study we can establish serum albumin with neonatal hyperbilirubinemia and can be treated by phototherapy or exchange transfusion. Material and method: The study consists of 55 randomly selected eligible term neonates delivered at Rajendra Institute of Medical sciences from March 2019 to August 2020. Conclusion: In this study, in term neonates, level of serum albumin in umbilical cord less than 2.8 g/dl has no correlation with occurrence significant hyperbilirubinemia, so a level <2.8 gm/dl of serum albumin in umbilical cord blood can be used as critical value indicator in triaging predict the risk of occurring of significant hyperbilirubinemia in term neonates.level >3.4 gm/dl is considered safe in neonates who are the candidates for early discharge in the absence of other risk factors.

PMID: 36119320

17. A Val 66 Met polymorphism is associated with weaker somatosensory cortical activity in individuals with cerebral palsy
Michael Trevarrow, Jennifer N Sanmann, Tony W Wilson, Max J Kurz

Heliyon. 2022 Sep 6;8(9):e10545. doi: 10.1016/j.heliyon.2022.e10545. eCollection 2022 Sep.

Background: The brain-derived neurotrophic factor (BDNF) protein plays a prominent role in the capacity for neuroplastic change. However, a single nucleotide polymorphism at codon 66 of the BDNF gene results in significant reductions in neuroplastic change. Potentially, this polymorphism also contributes to the weaker somatosensory cortical activity that has been extensively reported in the neuroimaging literature on cerebral palsy (CP). Aims: The primary objective of this study was to use magnetoencephalography (MEG) to probe if BDNF genotype affects the strength of the somatosensory-evoked cortical activity seen within individuals with CP. Methods and procedures: and Procedures: Twenty individuals with CP and eighteen neurotypical controls participated. Standardized low resolution brain electromagnetic tomography (sLORETA) was used to image the somatosensory cortical activity evoked by stimulation of the tibial nerve. BDNF genotypes were determined from saliva samples. Outcomes and results: The somatosensory cortical activity was weaker in individuals with CP compared to healthy controls (P = 0.04). The individuals with a Val66Met or Met66Met BDNF polymorphism also showed a reduced response compared to the individuals without the polymorphism (P = 0.03), had higher GMFCS levels (P = 0.04), and decreased walking velocity (P = 0.05). Conclusions and implications: These results convey that BDNF genotype influences the strength of the somatosensory activity and mobility in individuals with CP. What this paper adds: Previous literature has extensively documented altered sensorimotor cortical activity in individuals with CP, which ultimately contributes to the clinical deficits in sensorimotor processing documented in this population. While some individuals with CP see vast improvements in their sensorimotor functioning following therapeutic intervention, others are clear non-responders. The underlying basis for this discrepancy is not well understood. Our study is the first to identify that a polymorphism at the gene that codes for brain derived neurotrophic factor (BDNF), a protein well-known to be involved in the capacity for neuroplastic change, may influence the altered sensorimotor cortical activity within this population. Potentially, individuals with CP that have a polymorphism at the BDNF gene may reflect those that have difficulties in achieving beneficial outcomes following intervention. Thus, these individuals may require different therapeutic approaches in order to stimulate neuroplastic change and get similar benefits from therapy as their neurotypical peers.

PMID: 36119851

18. Predictive value of the test of infant motor performance and the Hammersmith infant neurological examination for cerebral palsy in infants

Lindsay Pietruszewski, Melissa Moore-Clingenpeel, Gregory C J Moellering, Dennis Lewandowski, Nancy Batterson, Nathalie L Maitre

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Background: Current recommendations for early detection tools for cerebral palsy (CP) include assessments that vary in feasibility and resource requirements. The predictive value of less resource-intensive tools has not been fully explored. Aims: To determine the predictive value of the Test of Infant Motor Performance (TIMP) at 3-4 months corrected age (CA) for CP, and whether administration of both the TIMP and the Hammersmith Infant Neurological Exam (HINE) improves early CP detection. Study design: Five-year retrospective observational study of infants who received the TIMP and the HINE at 3-4 months CA in a high-risk follow-up clinic. TIMP and HINE cut-off scores (alone and in combination) were compared for CP discriminatory ability. Subjects: Of patients with HINE scores (n = 1389; 676 [48.7 %] female; median gestational age at birth 31 weeks [interquartile range 29-34 weeks]), 1343 had concurrent TIMP scores available. Outcome measures: Clinical diagnosis of CP. Results: HINE total score <57 had optimal CP predictive value (AUC = 0.815; 77 % sensitivity; 91 % specificity) compared to optimal TIMP cut-off (1 SD below the mean, AUC = 0.71; 52 % sensitivity; 94 % specificity) and all tested TIMP and HINE combinations (all p < 0.001). Conclusions: HINE total score <57 at 3-4 months CA had the best CP predictive value, confirming its value absent first-line detection tools. Concurrent administration of TIMP did not improve predictive value.

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19. Safety Profile and Lack of Immunogenicity of IncobotulinumtoxinA in Pediatric Spasticity and Sialorrhea: A Pooled Analysis

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IncobotulinumtoxinA, a pure botulinumtoxinA formulation, is free of accessory proteins. This analysis provides pooled safety data from phase 3 trials of children/adolescents (2-17 years), investigating incobotulinumtoxinA for the treatment of spasticity associated with cerebral palsy (at doses ≤20 U/kg (max. 500 U) per injection cycle (IC) for ≤6 ICs; three trials) or sialorrhea associated with neurologic disorders (at total doses of 20-75 U per IC for ≤4 ICs; one trial) for ≤96 weeks. Safety endpoints included the incidences of different types of treatment-emergent adverse events (TEAEs) and immunogenicity. IncobotulinumtoxinA dose groups were combined. Of 1159 patients (mean age 7.3 years, 60.4% males) treated with incobotulinumtoxinA, 3.9% experienced treatment-related TEAEs, with the most common being injection site reactions (1.3%) (both indications), muscular weakness (0.7%) (spasticity), and dysphagia (0.2%) (sialorrhea). Two patients (0.2%) experienced a treatment-related treatment-emergent serious adverse event, and 0.3% discontinued the study due to treatment-related TEAEs. No botulinumtoxinA-naïve patients developed neutralizing antibodies (NAbs) after incobotulinumtoxinA. All children/adolescents with known pre-treatment status and testing positive for Nabs at final visit (n = 7) were previously treated with a botulinumtoxinA other than incobotulinumtoxinA. IncobotulinumtoxinA was shown to be safe, with very few treatment-related TEAEs in a large, diverse cohort of children/adolescents with chronic conditions requiring long-term treatment and was without new NAb formation in treatment-naïve patients.

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20. Evaluation of Rhesus Macaque Models for Cerebral Palsy
Yong Zhu, Yanan Xiong, Jin Zhang, Haiyang Tong, Hongyi Yang, Qingjun Zhu, Xiaoyan Xu, De Wu, Jiulai Tang, Jinhua Li

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Animal models play a central role in all areas of biomedical research. The similarities in anatomical structure and physiological characteristics shared by non-human primates (NHPs) and humans make NHPs ideal models with which to study human disorders, such as cerebral palsy (CP). However, the methodologies for systematically evaluating NHP models of CP have rarely been assessed, despite the long history of using NHP models to understand CP. Such models should be evaluated using multidisciplinary approaches prior to being used to research the diagnosis and treatment of CP. In this study, we evaluated rhesus macaque CP models established by partial resection of the motor cortex and intrathecal injection of bilirubin. Abnormal posture, motor dysfunction, gross and fine motor behavior, and muscular tension were evaluated, and changes in the cerebral cortex and basal ganglia were observed using 9.4 T magnetic resonance imaging. The results clearly demonstrated the utility of the established evaluation methodology for assessing CP models. This model evaluation methodology may guide researchers through the model building process.

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