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Interventions and Management

1. In-depth quantification of bimanual coordination using the Kinarm exoskeleton robot in children with unilateral cerebral palsy

Lisa Decraene, Jean-Jacques Orban de Xivry, Lize Kleeren, Monica Crotti, Geert Verheyde, Els Ortibus, Hilde Feys, Lisa Mailleux, Katrijn Klingels

J Neuroeng Rehabil. 2023 Nov 11;20(1):154. doi: 10.1186/s12984-023-01278-6.

Background: Robots have been proposed as tools to measure bimanual coordination in children with unilateral cerebral palsy (uCP). However, previous research only examined one task and clinical interpretation remains challenging due to the large amount of generated data. This cross-sectional study aims to examine bimanual coordination by using multiple bimanual robotics tasks in children with uCP, and their relation to task execution and unimanual performance. **Methods:** The Kinarm exoskeleton robot was used in 50 children with uCP (mean age: 11 years 11 months \pm 2 years 10 months, Manual Ability Classification system (MACS-levels: I = 27, II = 16, III = 7)) and 50 individually matched typically developing children (TDC). All participants performed three tasks: object-hit (hit falling balls), ball-on-bar (balance a ball on a bar while moving to a target) and circuit task (move a cursor along a circuit by making horizontal and vertical motions with their right and left hand, respectively). Bimanual parameters provided information about bimanual coupling and interlimb differences. Differences between groups and MACS-levels were investigated using ANCOVA with age as covariate ($\alpha < 0.05$, [Formula: see text]). Correlation analysis (r) linked bimanual coordination to task execution and unimanual parameters. **Results:** Children with uCP exhibited worse bimanual coordination compared to TDC in all tasks ($p \leq 0.05$, [Formula: see text] = 0.05-0.34). The ball-on-bar task displayed high effect size differences between groups in both bimanual coupling and interlimb differences ($p < 0.001$, [Formula: see text] = 0.18-0.36), while the object-hit task exhibited variations in interlimb differences ($p < 0.001$, [Formula: see text] = 0.22-0.34) and the circuit task in bimanual coupling ($p < 0.001$, [Formula: see text] = 0.31). Mainly the performance of the ball-on-bar task ($p < 0.05$, [Formula: see text] = 0.18-0.51) was modulated by MACS-levels, showing that children with MACS-level III had worse bimanual coordination compared to children with MACS-level I and/or II. Ball-on-bar outcomes were highly related to task execution ($r = -0.75$ - -0.70), whereas more interlimb differences of the object-hit task were moderately associated with a worse performance of the non-dominant hand ($r = -0.69$ - -0.53). **Conclusion:** This study gained first insight in important robotic tasks and outcome measures to quantify bimanual coordination deficits in children with uCP. The ball-on-bar task showed the most discriminative ability for both bimanual coupling and interlimb differences, while the object-hit and circuit tasks are unique to interlimb differences and bimanual coupling, respectively.

PMID: [37951867](https://pubmed.ncbi.nlm.nih.gov/37951867/)

2. Anterior Distal Femoral Hemiepiphyodesis Does Not Change Pelvic Tilt in Children With Cerebral Palsy

Alison M Hanson, Tishya A L Wren, Susan A Rethlefsen, Eva Ciccodicola, Boris Rubel, Robert M Kay

J Pediatr Orthop. 2023 Nov 16. doi: 10.1097/BPO.0000000000002568. Online ahead of print.

Background: Anterior distal femoral hemiepiphyodesis (ADFH) is a surgical treatment choice to correct flexed knee gait and

fixed knee flexion deformities in children with cerebral palsy who are skeletally immature. Increased anterior pelvic tilt has been reported after surgeries that correct knee flexion deformities, including hamstring lengthening (HSL) and distal femoral extension osteotomies, but anterior pelvic tilt has not been studied after ADFH. We hypothesized that anterior pelvic tilt would increase after ADFH, especially when combined with HSL, and it would correlate with the change in minimum knee flexion in stance and dynamic hamstring lengths. Methods: Thirty-four eligible participants (age: 13.0, SD: 2.0) were included. Change in mean pelvic tilt across the gait cycle was compared as a function of clinical and gait parameters using linear mixed models. The relationship of change in pelvic tilt to change in other variables was examined using Pearson correlation. Results: Overall, anterior pelvic tilt increased significantly after ADFH by 4.4 degrees ($P = 0.02$). Further, the analysis revealed anterior pelvic tilt only increased significantly in the group that had concurrent HSL (11.1 degrees, $P < 0.001$). Overall, minimum knee flexion significantly decreased (increase in knee extension) in stance (-19.1 degrees, $P < 0.001$) and there was an increase in maximum normalized dynamic hamstring lengths (0.03, $P < 0.001$). The anterior pelvic tilt increased significantly in Gross Motor Function Classification System levels III to IV (5.9 degrees, $P = 0.02$) but did not change significantly in Gross Motor Function Classification System I to II (2.5 degrees, $P = 0.37$). Change in pelvic tilt was correlated with change in maximum dynamic hamstring lengths ($r = 0.87$, $P < 0.0001$) and change in minimum knee flexion in stance ($r = -0.71$, $P < 0.0001$). Conclusions: Anterior distal hemiepiphysiodesis without concurrent HSL for flexion knee deformities does not result in increased anterior pelvic tilt. Surgeons should consider anterior distal hemiepiphysiodesis in patients with cerebral palsy and flexed knee gait, who preoperatively have long dynamically modeled hamstrings, are skeletally immature, and when maintenance of pelvic tilt is desired. Level of evidence: Level III-retrospective comparative study.

PMID: [37970741](#)

3. [Surgical procedures for treatment of spasticity] [Article in German] [Abstract in English, German]

Helene Hurth, Matthias Morgalla, Johannes Heinzel, Adrien Daigeler, Jonas Kolbenschlag, Martin Schuhmann

Review Nervenarzt. 2023 Nov 13. doi: 10.1007/s00115-023-01568-3. Online ahead of print.

Background: The causes of spasticity are various and include cerebral palsy, spinal cord injury, stroke, multiple sclerosis or other congenital or acquired lesions of the central nervous system (CNS). While there is often a partial functional component, spasticity also results in varying degrees of impairment of the quality of life. Objective: A review of surgical treatment options for spasticity. Material and methods: A systematic PubMed review of the literature on epidemiology and treatment options with a focus on neurosurgical interventions for spasticity and developments in the last 20 years as well as inclusion of still valid older landmark papers was carried out. Illustration of indications, technique, follow-up, and possible pitfalls of the different methods for the surgical treatment of spasticity. Results: Depending on the affected region, the number of muscle groups, and the extent of spasticity, focal (selective peripheral neurotomy, nerve transfer), regional (selective dorsal rhizotomy), or generalized (baclofen pump) procedures can be performed. The indications are usually established by an interdisciplinary team. Conservative (physiotherapy, oral medications) and focally invasive (botulinum toxin injections) methods should be performed in advance. In cases of insufficient response to treatment or only short-term relief, surgical methods can be evaluated. These are usually preceded by test phases with, for example, trial injections. Conclusion: Surgical methods are a useful adjunct in cases of insufficient response to conservative treatment in children and adults with spasticity.

PMID: [37955654](#)

4. An Integrated Approach for Real-Time Monitoring of Knee Dynamics with IMUs and Multichannel EMG

Nebojsa Malesevic, Ingrid Svensson, Gunnar Hägglund, Christian Antfolk

Sensors (Basel). 2023 Nov 3;23(21):8955. doi: 10.3390/s23218955.

Measuring human joint dynamics is crucial for understanding how our bodies move and function, providing valuable insights into biomechanics and motor control. Cerebral palsy (CP) is a neurological disorder affecting motor control and posture, leading to diverse gait abnormalities, including altered knee angles. The accurate measurement and analysis of knee angles in individuals with CP are crucial for understanding their gait patterns, assessing treatment outcomes, and guiding interventions. This paper presents a novel multimodal approach that combines inertial measurement unit (IMU) sensors and electromyography (EMG) to measure knee angles in individuals with CP during gait and other daily activities. We discuss the performance of this integrated approach, highlighting the accuracy of IMU sensors in capturing knee joint movements when compared with an optical motion-tracking system and the complementary insights offered by EMG in assessing muscle activation patterns. Moreover, we delve into the technical aspects of the developed device. The presented results show that the angle measurement error falls within the reported values of the state-of-the-art IMU-based knee joint angle measurement devices while enabling a high-quality EMG recording over prolonged periods of time. While the device was designed and developed primarily for measuring knee activity in individuals with CP, its usability extends beyond this specific use-case scenario, making it suitable for applications that involve human joint evaluation.

PMID: [37960654](#)

5. Satisfaction survey toward an innovative orthosis for children with cerebral palsy with pes planovalgus

Lisa Viillard, Sébastien Cordillet, Julie Dohin, Odile Gaultier, Laurane Maignan, Hélène Rauscent, Isabelle Bonan

Prosthet Orthot Int. 2023 Nov 14. doi: 10.1097/PXR.000000000000273. Online ahead of print.

Background: Pes planovalgus (PPV) is common in children with cerebral palsy and can cause pain and gait alterations over time. Initial treatment of flexible PPV includes orthotics, despite a lack of consensus on the type of orthosis. We developed an innovative ankle-foot orthosis (RAFO). RAFO is a one-piece orthosis designed to correct both the valgus and the flat of the foot. Its conception situated above the malleolar enables a moderate anti equinus effect. Its precise description and fabrication's process is detailed. Objectives: We wanted to assess user's satisfaction after several months of use and looked for clinical criteria of satisfaction. Study design: Retrospective. Methods: We conducted a satisfaction study through a telephonic QUEST (Quebec User Evaluation of Satisfaction with Assistive Technology) survey analysing the device and the process in children and parents. 24 parents were contacted, whose child was wearing RAFO on a daily basis for at least 4 months. 20 parents answered the questionnaire. The results were then related to clinical data to research satisfaction' criteria. Results: Mean QUEST satisfaction was 4.25/5 (4.18/5 for device and 4.38/5 for process). Advantages reported concerned weight and dimensions (95%), although 20% reported the necessity to change to a shoe size above, ease of use (90%) and level of comfort (80%). Parent's satisfaction regarding perceived effectiveness was 80%. Children with equinus due to triceps surae spasticity were more susceptible to develop pain with our orthosis. Conclusions: Parents were overall very satisfied with the orthosis. Its technical characteristics allowing both to be a corrector of flat foot and valgus and at the same time to be comfortable and discreet makes it innovative. The presence of spastic equinus is a limit for its utilization.

PMID: [37962349](#)

6. The Effect of Additional Whole-Body Vibration on Musculoskeletal System in Children with Cerebral Palsy: A Systematic Review and Meta-Analysis of Randomized Clinical Trials

Review Márk Ágoston Pulay, Rita Nagy, Tamás Kóí, Andrea Harnos, Nóra Zimonyi, Miklós Garami, Ákos Gasparics, Péter Hegyi, Ibolya Túri, Éva Feketéné Szabó

J Clin Med. 2023 Oct 25;12(21):6759. doi: 10.3390/jcm12216759.

Nowadays, whole-body vibration (WBV) has become increasingly popular as an additional therapy in the intervention of patients with cerebral palsy (CP). However, the impact of WBV remains a subject of debate. Consequently, a systematic review and meta-analysis were undertaken to evaluate the effects of WBV on the musculoskeletal system in children with CP. Randomized controlled trials (RCTs) were sought in the most frequent databases. The intervention studied was WBV combined with conventional physiotherapy (PT) compared with conventional PT as the control; the main outcomes were changes in the musculoskeletal system. Weighted mean differences with 95% CIs were calculated. A random-effects model was applied, and the publication bias was checked using funnel plots. On the basis of the inclusion and exclusion criteria, 16 articles, including 414 patients, were considered in the final analysis. The improvement in walking performance (speed and step length) was statistically significant ($p < 0.05$), and although there were no significant differences in the further outcomes, a clear positive tendency was visible in the case of improved muscle strength, decreased spasticity, enhanced gross motor functions, and overall stability. Based on the findings, a clear assessment of the usefulness of this intervention cannot be made; nonetheless, due to the promising results, it would be worthwhile to conduct additional RCTs to enhance the available evidence in this field. Due to the wide range of vibration configurations, including varying durations and intensities, it is suggested to establish guidelines and a strategy for the incorporation of this additional treatment.

PMID: [37959224](#)

7. Sleep problems in children with cerebral palsy and their parents

No authors listed

Dev Med Child Neurol. 2023 Nov 13. doi: 10.1111/dmcn.15810. Online ahead of print.

No abstract available

PMID: [37960895](#)

8. The effect of functional independence levels on sleep and constipation in children with cerebral palsy

Elif Irem Gunaydin, Aysenur Tuncer

Rev Assoc Med Bras (1992). 2023 Nov 13;69(12):e20230765. doi: 10.1590/1806-9282.20230765. eCollection 2023.

Objective: The study aimed to examine the effect of functional independence levels on sleep behavior and constipation in children with cerebral palsy. **Methods:** This cross-sectional observational single-center study was carried out in a special rehabilitation center in Istanbul. Inclusion criteria were those aged between 4 and 18 years with Gross Motor Function Classification System III-IV-V functional independence levels. Those who had surgery concerning intestinal health, had a chronic infectious bowel disease, had congenital intestinal anomalies, had received botox treatment in the last 6 months, had uncontrolled epileptic seizures, had complained of constipation in the last 6 months, and had cardiopulmonary disease were excluded from the study. The sociodemographic characteristics of the participants and the Gross Motor Function Classification System were recorded. Pediatric Functional Independence Scale (Functional Independence Measure for Children) was used to measure the functional independence level, Pediatric Sleep Questionnaire was used to measure the level of sleep problems, and Constipation Severity Scale was used to measure constipation severity. **Results:** A total of 60 children who were diagnosed with cerebral palsy were included. According to Gross Motor Function Classification System, 46.7% of the cases were Level III, 35% were Level IV, and 18.3% were Level V. There was a negative moderate significant correlation between Functional Independence Measure for Children and Pediatric Sleep Questionnaire ($r=-0.303$; $p=0.019$) and between Functional Independence Measure for Children and Constipation Severity Scale ($r=-0.342$; $p=0.007$). **Conclusion:** We described that lower functional independence levels were related to worse sleep and constipation symptoms. The results suggest that effective strategies for developing functional independence levels may be beneficial for both sleep and constipation symptoms in the concept of cerebral palsy management.

PMID: [37971130](#)

9. Functional outcome after selective dorsal rhizotomy: a retrospective case control study

C P Chow, L Y Wong, C Y C Poon, B P H Yiu, T P S Wong, M Wong, K Y Yam, S P C Ngai

Childs Nerv Syst. 2023 Nov 18. doi: 10.1007/s00381-023-06213-7. Online ahead of print.

Purpose: This study examines long-term benefit on functional outcomes and quality of life after selective dorsal rhizotomy (SDR) in children with spastic diplegia in Hong Kong. **Method:** This is a case control study. Individuals with spastic diplegia who were at 6 to 12 years post-SDR were recruited. Age, gender, cognition, and Gross Motor Function Classification System level-matched individuals with spastic diplegia who had not undergone SDR were recruited as controls. Outcome measures included physical level, functional level, physiological level, and quality of life. All data were compared by independent t-test. **Results:** Individuals post-SDR ($n = 15$) demonstrated a significantly better range of ankle dorsiflexion in knee extension by $-5.7 \pm 10.9^\circ$ than the control group ($n = 12$). No other significant differences were observed. **Conclusion:** SDR is a safe, one-off procedure and provides long-term reduction in spasticity with no major complications. With the heterogeneity, we did not demonstrate between-group differences in long-term functional outcomes.

PMID: [37979014](#)

10. [Significant medical improvements with CPUP - a combined follow-up program and national quality registry for cerebral palsy] [Article in Swedish]

Gunnar Hägglund, Ann Alriksson-Schmidt, Kate Himmelmann, Elisabet Rodby Bousquet, Per Åstrand

Lakartidningen. 2023 Nov 15:120:23136.

CPUP is a combined follow-up program and national quality registry for cerebral palsy (CP). Since its inception in southern Sweden in 1994, CPUP has expanded geographically to cover all of Sweden, and similar programs are used in several northern European countries. Over 95% of all children with CP in Sweden, and a growing proportion of adults, are followed according to CPUP. The content of CPUP has been developed to involve most professions working with CP. CPUP has led to significant medical improvements. As an example, the percentage of individuals developing hip dislocation has decreased from 10% to 0.5%. The program's strengths include its interdisciplinary collaboration, user involvement, and the ability to inform and improve the quality of care systematically. Nevertheless, challenges include the need for ongoing funding and support. CPUP's success exemplifies how national quality registers can integrate into healthcare, enabling a shift from reactive to proactive care.

PMID: [37965934](#)

11. Translation, reliability and validity of the Greek version of the Child Engagement in Daily Life in children with cerebral palsy

Rigas Dimakopoulos, Marianna Papadopoulou, Roser Pons, Arietta Spinou

Child Care Health Dev. 2023 Nov 14. doi: 10.1111/cch.13202. Online ahead of print.

Background: Participation in family, recreational activities and self-care is an integral part of health. It is also a main outcome

of rehabilitation services for children and adolescents with disabilities. However, there are currently no available tools in Greek to assess participation in young children. Methods: The Child Engagement in Daily Life (CEDL) was cross-culturally translated into Greek using forward-backward translation, review by expert committee, pretest application and final review. Parents with children who have been diagnosed with cerebral palsy (CP) and were 18 months to 5 years old were recruited. Internal consistency was evaluated using the Cronbach alpha and test-retest reliability in 2 weeks using intra-class correlation coefficient (ICC) and Bland-Altman plot for the agreement of each domain score. Measurement error was assessed utilising the standard error of measurement (SEM) and the smallest detectable change (SDC) and interpretability was assessed using the floor and ceiling effects. Validity was evaluated using the 'known groups' method, that is, assessing parents of children with typical development (TD). Results: One hundred and seven children with CP (mean age 43.63 ± 13.5 months), Gross Motor Function Classification System (GMFCS) levels I-V and 97 children with TD (mean age 43.63 ± 14.4 months) were included. Significant differences ($p < 0.01$) between children with CP and children with TD were recorded for all CEDL domains. Mean \pm standard deviation of the CEDL domains 'frequency of participation', 'enjoyment of participation' and 'self-care' were 58.8 ± 14.5 , 3.9 ± 0.9 and 49.7 ± 23.5 , respectively for children with CP and 62.3 ± 9.1 , 4.4 ± 0.9 and 74.2 ± 15 for children with TD. Internal consistency of all domains was high; Cronbach alpha for 'frequency of participation' was 0.83, for 'enjoyment of participation' was 0.76 and for 'self-care' was 0.92. Test-retest reliability (ICC) was excellent for the 'self-care' (0.95) and good for 'frequency of participation' and 'enjoyment of participation' domains (0.90 and 0.88, respectively) while Bland-Altman analysis revealed no systematic differences or bias between the two measurements. SEM was 0.8, 0.05 and 1.6 for frequency of participation, enjoyment and self-care with SDC of 2.4, 0.16 and 4.5, respectively. No relevant floor and ceiling effects were observed. Conclusion: The Greek CEDL has good reliability, validity and interpretability. It can be used to evaluate participation in Greek young children with CP. Future studies should investigate the validity of this tool in longer periods and its responsiveness to intervention.

PMID: [37964491](#)

12. Identifying Longer-Term Health Events and Outcomes and Health Service Use of Low Birthweight CALD Infants in Australia

Shae Karger, Emmanuel U Ndayisaba, Joanne Enticott, Emily J Callander

Matern Child Health J. 2023 Nov 18. doi: 10.1007/s10995-023-03819-w. Online ahead of print.

Introduction: Approximately one-third of all births in Australia each year are by culturally and linguistically diverse (CALD) women. CALD women are at an increased risk of adverse pregnancy and birth outcomes including prematurity and low birthweight. Infants born weighing less than 2500 g are susceptible to increased risk of ill health and morbidities such as cognitive defects including cerebral palsy, and neuro-motor functioning. Methods: An existing linked administrative dataset, Maternity 1000 was utilized for this study which has identified all children born in Queensland (QLD), Australia, between 1st July 2012 to 30th June 2018 from the QLD Perinatal Data Collection. This has then been linked to the QLD Hospital Admitted Patient Data Collection, QLD Hospital Non-Admitted Patient Data Collection, QLD Emergency Department Data Collection, and Medicare Benefits Schedule and Pharmaceutical Benefits Scheme Claims Records between 1 and 2012 to 30th June 2019. Results: Culturally and linguistically diverse infants born with low birthweight had higher mean and standard deviation of all health events and outcomes; potentially preventable hospitalisations, hospital re-admissions, ED presentations without admissions, and development of chronic diseases compared to non-CALD infants born with low birthweight. Discussion: Results from this study highlight the disparities in health service use and health events and outcomes associated with low birthweight infants, between both CALD and Australian born women. This study has responded to the knowledge gap of low birthweight on the Australian economy by identifying that there are significant inequalities in access to health services for CALD women in Australia, as well as increased health events and poor birth outcomes for these infants when compared to those of mothers born in Australia.

PMID: [37979121](#)

13. Letter to the Editor. Cerebellar DBS in cerebral palsy

Vengalathur Ganesan Ramesh

J Neurosurg. 2023 Nov 17:1. doi: 10.3171/2023.9.JNS232031. Online ahead of print.

No abstract available

PMID: [37976501](#)

14. Continuity of care and medical complexity in children and young people with cerebral palsy are distinct interrelated concepts

Olivier Fortin

Dev Med Child Neurol. 2023 Nov 15. doi: 10.1111/dmcn.15805. Online ahead of print.

No abstract available

PMID: [37968866](#)

15. Symptomatic spinal arachnoid cyst with spastic diplegia secondary to cerebral palsy: illustrative case

Andrew Guillotte, Abdul-Rahman Alkiswani, Kathryn A Keeler, Michael D Partington

J Neurosurg Case Lessons. 2023 Nov 13;6(20):CASE23478. doi: 10.3171/CASE23478. Print 2023 Nov 13.

Background: Selective dorsal rhizotomy (SDR) can improve the spastic gait of carefully selected patients with cerebral palsy. Spinal arachnoid cysts are a rare pathology that can also cause spastic gait secondary to spinal cord compression. Observations: The authors present an interesting case of a child with cerebral palsy and spastic diplegia. He was evaluated by a multidisciplinary team and determined to be a good candidate for SDR. Preoperative evaluation included magnetic resonance imaging (MRI) of the spine, which identified an arachnoid cyst causing spinal cord compression. The cyst was surgically fenestrated, which provided some gait improvement. After recovering from cyst fenestration surgery, the patient underwent SDR providing further gait improvement. Lessons: SDR can be beneficial for some patients with spastic diplegia. Most guidelines do not include spinal MRI in the preoperative evaluation for SDR. However, spinal MRI can be beneficial for surgical planning by localizing the level of the conus. It may also identify additional spinal pathology that is contributing to the patient's spasticity. In rare cases, such as this one, patients may benefit from staged surgery to address structural causes of spastic gait prior to proceeding with SDR.

PMID: [37956422](#)

16. Neurodevelopment at 24 months corrected age in extremely preterm infants treated with dexamethasone alternatives during the late postnatal period: a cohort study

Nathalie Melan, Pierre Pradat, Isabelle Godber, Blandine Pastor-Diez, Eliane Basson, Jean-Charles Picaud

Eur J Pediatr. 2023 Nov 13. doi: 10.1007/s00431-023-05319-z. Online ahead of print.

The administration of dexamethasone has been associated with suboptimal neurodevelopment. We aimed to compare the development of extremely premature infants treated or not with alternatives to dexamethasone: betamethasone, hydrocortisone hemisuccinate. This retrospective cohort study included infants born before 29 weeks of gestational age, treated or not with late (day ≥ 7) postnatal steroids (betamethasone, hydrocortisone hemisuccinate). The neurodevelopment outcome was evaluated at 24 months corrected age, after adjustment on comorbidities of extreme prematurity. In order to analyse their overall development, data about growth and respiratory outcomes were collected. Among the 192 infants included, 59 (30.7%) received postnatal steroids. Suboptimal neurodevelopment concerned 37/59 (62.7%) postnatal steroid-treated and 43/133 (38.1%; $p = 0.002$) untreated infants. However, in multivariable analysis, only severe neonatal morbidity ($p = 0.007$) and male gender ($p = 0.027$) were associated with suboptimal neurodevelopment outcome at 24 months. Conclusions: Betamethasone or hydrocortisone hemisuccinate treatment was not an independent risk for suboptimal neurological development, growth and respiratory outcomes assessed at 24 months corrected age in extremely premature infants. Registration number: The study was registered on the ClinicalTrials.gov register: NCT05055193. What is Known: • Late postnatal steroids are used to treat bronchopulmonary dysplasia • Meta-analyses warned against the neurological risk of dexamethasone use during neonatal period. Early or late hydrocortisone hemisuccinate has been evaluated in multiple studies, none of which have reported an adverse effect on neurodevelopment at least to 2 years. Data about the use of betamethasone are scarce. What is New: • The risk of suboptimal neurodevelopment was higher among extremely premature infants who received postnatal steroids when compared to those who did not. • Betamethasone and hydrocortisone hemisuccinate treatment was not an independent risk factor for suboptimal neurodevelopment at 24 months corrected age.

PMID: [37955745](#)

Prevention and Cure

17. RCOR1 improves neurobehaviors and neuron injury in rat cerebral palsy by Endothelin-1 targeting-induced Akt/GSK-3 β pathway upregulation

Hai Xu, Xuetao Yu, Rong Xie, Yangyang Wang, Chunli Li

Brain Dev. 2023 Nov 15:S0387-7604(23)00171-7. doi: 10.1016/j.braindev.2023.11.001. Online ahead of print.

Background: RE1 Silencing Transcription factor (REST) corepressor 1 (RCOR1) has been reported to orchestrate neurogenesis, while its role in cerebral palsy (CP) remains elusive. Besides, RCOR1 can interact with Endothelin-1 (EDN1), and EDN1 expression is related to brain damage. Therefore, this study aimed to explore the effects of RCOR1/EDN1 on brain damage during the progression of CP. Methods: CP rats were established via hypoxia-ischemia insult, and injected with lentivirus-RCOR1, followed by examination of brain pathological conditions. The RCOR1 and EDN1 interaction was recognized using hTFtarget. Healthy rat cortical neuron cells received interference of RCOR1/EDN1 expression, and underwent oxygen-glucose deprivation/reoxygenation (OGD/R) treatment, after which phenotypic and molecular assays were conducted through the biochemical method, qRT-PCR and/or western blot. Results: RCOR1 was low-expressed but EDN1 was high-expressed in CP model rats and OGD/R-treated neurons. RCOR1 overexpression ameliorated rat neurobehaviors, alleviated brain pathological conditions, reduced TUNEL-positive cells, decreased the levels of reactive oxygen species (ROS) and malondialdehyde (MDA), increased superoxide dismutase (SOD) level and repressed EDN1 expression in the brains of CP model rats. In neurons, RCOR1 overexpression counteracted OGD/R-induced viability decrease, reduction of the levels of RCOR1, SOD, Bcl-2, caspase-3, p-Akt/Akt and p-GSK-3 β /GSK-3 β , and elevation of the levels of EDN1, ROS, Bax, and cleaved caspase-3, while EDN1 overexpression did contrarily on these events. Moreover, there was a negative interplay between RCOR1 overexpression and EDN1 overexpression in OGD/R-induced neurons. Conclusion: RCOR1 ameliorates neurobehaviors and suppresses neuronal apoptosis and oxidative stress in CP through EDN1 targeting-mediated upregulation of Akt/GSK-3 β .

PMID: [37978036](#)

18. [Developmental outcomes of very preterm and extremely preterm infants at the 12 months corrected age] [Article in Russian] [Abstract in English, Russian]

M P Yakovenko, E I Kleshenko, D A Kayumova

Zh Nevrol Psikhiatr Im S S Korsakova. 2023;123(10):97-100. doi: 10.17116/jnevro202312310197.

Objective: To establish effect of Cortexin for development outcomes of preterm neonates born with low and extremely low body weight, with perinatal pyramidal tract (PT) damage. Material and methods: 127 children born with very low body weight and extremely low body weight were examined. I group - 22 infant with damage to the PT, treating non-drug rehabilitation during the first year. II group - 59 infant with damage to the PT, treating non-drug rehabilitation and Cortexin during the first year. III control group - 46 infant without structural changes according DTI MRI. Neurodevelopmental outcomes was evaluated by using the INFANIB scale at the 12 months corrected age. Results: Significant differences were found between groups. The results showed that at the correct age of 12 months normal neurodevelopment occurred more often in two times in second group (1 group - 18.2%, 2 group - 40.7%, $p < 0.05$). Almost of children from control group had normal psychomotor development (3 group - 93.5%). Cerebral palsy was noted significantly more often in the first group (1 group - 36.4%, 3 group - 13.6%, $p < 0.05$). Conclusions: DTI MRI has high prognostic value for very preterm and extremely preterm infants. In the same time, we can observe better development outcomes with damage to the PT in the group of children treating non-drug rehabilitation and Cortexin during the first year.

PMID: [37966446](#)

19. Antenatal Magnesium Sulfate Is Not Associated With Improved Long-Term Neurodevelopment and Growth in Very Low Birth Weight Infants

Ga Won Jeon, So Yoon Ahn, Su Min Kim, Misun Yang, Se In Sung, Ji-Hee Sung, Soo-Young Oh, Cheong-Rae Roh, Suk-Joo Choi, Yun Sil Chang

J Korean Med Sci. 2023 Nov 13;38(44):e350. doi: 10.3346/jkms.2023.38.e350.

Background: Though antenatal magnesium sulfate (MgSO₄) is widely used for fetal neuroprotection, suspicions about the long-term neuroprotection of antenatal MgSO₄ have been raised. Methods: We investigated short- and long-term outcomes of antenatal MgSO₄ use for 468 infants weighing < 1,500 g with a gestational age of 24-31 weeks. Results: Short-term morbidities and the risk of developmental delay, hearing loss, and cerebral palsy at a corrected age of 18-24 months and 3 years of age did not decrease in the MgSO₄ group (infants who were exposed to MgSO₄ for any purpose) or neuroprotection group (infants who were exposed to MgSO₄ for fetal neuroprotection) compared with the control group (infants who were not exposed to MgSO₄). The z-scores of weight, height, and head circumference did not increase in the MgSO₄ group or neuroprotection group compared with the control group. Conclusion: Antenatal MgSO₄ including MgSO₄ for neuroprotection did not have beneficial effects on long-term neurodevelopmental and growth outcomes.

PMID: [37967876](#)