Cerebral palsy research news

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Interventions and Management

1.Assessment of trunk movement and posture in spastic and dyskinetic cerebral palsy: A scoping review

No authors listed

Dev Med Child Neurol. 2026 May 20. Online ahead of print.

Abstract
No abstract available
PMID: 42163445

2.Intraoperative Hip Arthrography to Guide Decision-Making in Cerebral Palsy Hip Reconstruction

Lennert R Plasschaert, Colyn J Watkins, Patricia E Miller, Brian D Snyder, H Kerr Graham, M Wade Shrader, Benjamin J Shore

J Pediatr Orthop. 2026 May 15. Online ahead of print.

Background: Hip reconstruction surgery is indicated in nonambulatory children with cerebral palsy (CP). The decision to perform a pelvic osteotomy (PO) with a proximal femoral varus derotational osteotomy (VDRO) is subjective. Our hypothesis was that evaluation of dynamic stability and labral pathoanatomy using intraoperative hip arthrography (IHA) would reduce the performance of concomitant PO without adversely affecting outcomes. The capability of IHA to correctly guide intraoperative decision-making was evaluated using midterm outcomes in children with CP (CwCP) treated with hip reconstruction.
Methods: Single-surgeon, retrospective analysis of 154 CwCP (204 hips) undergoing hip reconstruction from 2011 to 2024, stratified by those who underwent IHA (IHA: 2016 to 2024) during the index surgery versus those who did not (NIHA: 2011 to 2016). IHA indicated the need for a PO after VDRO, based on labrum orientation and medial dye pooling. Characteristics were compared using $\chi 2$ tests, t tests, and Mann-Whitney U tests, as appropriate. Radiographic outcomes and failure rates (hip resubluxation) >2 years after the index procedure were compared between cohorts, leveraging generalized estimating equations (GEE) modeling and propensity-score-matched (PSM) analyses, adjusting for confounding characteristics.
Results: IHA reduced the rate of PO from 82% to 48%, for a 34% reduction, and this was clinically significant (P=0.001). All hips with upsloping labrums underwent PO, 92% of hips with medial dye-pool underwent PO, whereas downsloping labrums were protective of PO (88.5% underwent VDRO alone). Ten hips failed at a median of 6 years (range: 2.0 to 9.0); however, there were no differences based on ±IHA (GEE-adjusted likelihood of failure 6.3% IHA vs. 8.7% NIHA, P=0.59) or ±PO (6.9% + PO vs. 8.0% VDRO alone, P=0.81). Results of the PSM cohort were equivalent for PO performance (57% IHA vs. 75% NIHA, P=0.03), failure rates, and radiographic outcomes.
Conclusions: For patients with CP undergoing hip reconstruction, evaluation of dynamic stability and labral pathoanatomy using IHA reduced the performance of concomitant PO without adversely affecting outcomes. Failures were unrelated to ±IHA or ±PO, suggesting other factors, such as unmitigated hypertonia and/or spinal deformity, were provocative.
PMID: 42149721

3.[Limited bone and soft tissue surgery combined with Ilizarov technique in treatment of adolescent severe cerebral palsy with flattened valgus foot and lower leg external rotation deformity]

Chenchen Fan, Xiaoya Li, Zhiyong Zhu, Kaikuan Tian, Yonglong Xu

Zhongguo Xiu Fu Chong Jian Wai Ke Za Zhi. 2026 May 15;40(5):772-777.

Objective: To explore the surgical technique and effectiveness of limited bone and soft tissue surgery combined with Ilizarov technique in the treatment of adolescents severe cerebral palsy with flattened valgus foot and lower leg external rotation deformity.
Methods: A retrospective analysis was conducted on 12 patients with severe cerebral palsy with flattened valgus foot and external rotation deformity of the lower leg, totaling 16 feet, admitted between January 2022 and January 2025. There were 5 males with 7 feet and 7 females with 9 feet, the age ranged from 12 to 18 years, with an average of 15 years. There were 10 cases on the left foot, 6 cases on the right foot, and 4 cases on both feet. The preoperative external rotation angle of the lower leg ranged from 20° to 35°, with an average of 26°. The preoperative visual analogue scale (VAS) score was 4.9±0.9, the American Orthopaedic Foot & Ankle Society (AOFAS) score was 68.7±12.0, the calcaneal tilt angle was (12.69±1.78)°, and the hindfoot angle was (18.69±3.55)°. Patients with bilateral lower leg deformities underwent surgery in two phases, with an interval of 3-6 months between surgeries. Select soft tissue surgery (Achilles tendon elongation, release or transposition of joint capsule and ligaments) and bone surgery (joint fusion, calcaneal osteotomy, medial wedge osteotomy, etc.) combined with tibiofibular internal rotation osteotomy and Ilizarov external fixation were selected according to the patient's condition. At 1 week after operation, the external fixators of the lower leg and ankle were slowly adjusted, and the deformities that were not completely solved in the three-dimensional correction operation were corrected. Postoperative pain relief and functional recovery were evaluated by VAS and AOFAS scores, and the improvement of foot deformity was evaluated by calcaneal tilt angle and hindfoot angle on radiographic data, and the postoperative effctiveness was evaluated according to the International Clubfoot Study Group (ICFSG).
Results: At 2 weeks after operation, the foot deformity of the patient was basically adjusted. All patients were followed up 6-36 months, with an average of 18 months. The incisions healed by first intention without nerve injury, infection, or other complications. At last follow-up, the patients recovered satisfactorily, the osteotomy sites healed, and the external rotation of the lower leg was corrected. The VAS score was 1.2±0.1 and AOFAS score was 86.7±6.8, which were significantly different from those before operation ($P<0.05$). The calcaneal tilt angle was (18.38±1.15)° and the hindfoot angle was (10.06±2.93)°, which were significantly different from those before operation ($P<0.05$). According to the ICFSG scoring standard, 13 feet were excellent and 3 feet were good, and the excellent and good rate was 100%.
Conclusion: The combination of bone and soft tissue limited surgery and Ilizarov technique is a safe, minimally invasive, and effective method for treating severe cerebral palsy in adolescents with flattened valgus foot and external rotation deformity of the lower leg. It conforms to biological principles and follows the concept of natural bone reconstruction.
PMID: 42150908

4.Effectiveness and feasibility of home-based physical exercise interventions for children and adolescents with chronic diseases: a systematic review and meta-analysis

Sofia Mendes Sieczkowska, Danilo Reis Coimbra, Fabiana Infante Smaira, Bruna Caruso Mazzolani, Gabriela Paticcié, Camila Astley, Amanda Iraha, Hamilton Roschel, Tiago Peçanha, Bruno Gualano

Br J Sports Med. 2026 May 22:bjsports-2025-110204. Online ahead of print.

Objective: (1) To synthesise the available evidence on the clinical effectiveness of home-based physical exercise interventions in improving aerobic capacity, functional capacity, muscle strength and quality of life in children and adolescents with chronic diseases, as well as to evaluate their feasibility; and (2) to assess the reporting quality of these interventions using the Consensus on Exercise Reporting Template, with the aim of identifying gaps in methodological transparency that may limit reproducibility and scalability.
Design: Systematic review and meta-analysis.
Data sources: Medline (via PubMed), Web of Science, Cochrane Central Register of Controlled Trials (CENTRAL), SportDiscus and CINAHL database (via EBSCOhost) were searched until 31 December 2025.
Eligibility criteria: Eligible studies included intervention designs (randomised controlled trials (RCTs), non-randomised trials and before-after studies) that evaluated home-based physical exercise interventions in children and adolescents with chronic diseases. Studies were required to include a comparator (eg, centre-based interventions, alternative home-based interventions, such as motor imagery, constraint-induced movement therapy or hand-arm bimanual intensive therapy or no intervention) or to report within-group (baseline-to-follow-up) comparisons. Outcomes of interest were aerobic capacity, functional capacity, muscle strength and quality of life.
Results: A total of 81 studies were included, comprising 2923 children and adolescents. The most frequently represented conditions were cerebral palsy (n=26; 32.1%), cystic fibrosis (n=10; 12.3%) and idiopathic arthritis (n=8; 9.8%). Of the 45 RCTs identified, 19 met the criteria for inclusion in the meta-analysis. Home-based physical exercise interventions were effective in increasing aerobic capacity ($p<0.0001$; standardised mean differences: 0.53; 95% CI 0.32 to 0.74) compared with the control group. No significant differences were observed between home-based interventions and control conditions for functional capacity or quality of life. However, functional capacity gains are similar when comparing centre-based and home-based approaches. A meta-analysis of muscle strength could not be performed due to insufficient data. Adherence to home-based physical exercise interventions was higher than 80% in 27 of the 50 studies that reported this information. Most studies reported no adverse events of home-based physical exercise interventions, with few studies reporting only mild adverse effects (eg, muscle soreness, stiffness and fatigue).
Conclusions: Our meta-analysis of randomised controlled trials comparing home-based interventions with control conditions suggests that home-based physical exercise is feasible and improves aerobic capacity, but does not confer significant benefits for functional capacity, muscle strength or quality of life in children and adolescents with chronic diseases. Suboptimal reporting quality, risk of bias and inconsistent adherence/safety data necessitate cautious interpretation.
PMID: 42173662

5.Longitudinal Trajectories of Sedentary Time and Physical Activity in Children With Cerebral Palsy: Time to Move

Ineke Verreydt, Olaf Verschuren, Marieke De Craemer, Lauraine Staut, Daisy Rymen, Els Ortibus, Kaat Desloovere, Anja Van Campenhout

J Phys Act Health. 2026 May 20:1-12. Online ahead of print.

Background: Children with cerebral palsy (CP) have reduced movement abilities, limiting physical activity (PA) and increasing sedentary behavior. No study so far applied a longitudinal design to examine changes in sedentary behavior and different levels of PA in relation to increasing age.
Methods: Forty-five ambulant children with spastic CP, aged 2-11 years, participated in this longitudinal study, totaling 108 assessments (2-4 assessments/child). PA and sedentary behavior were measured using ActiGraph wGT3X-BT triaxial accelerometers, placed on the right hip. Linear mixed-effects models fitted effect of age on sedentary time and PA, for the total sample and Gross Motor Function Classification System (GMFCS) subgroups. Results were compared with cross-sectional data of 49 typically developing peers including data on sleep problems.
Results: Based on linear mixed-effects models, sedentary time increased with 0.79%/year ($P = .0094$), light PA decreased with 1.17%/year ($P < .0001$), and moderate-to-vigorous PA increased with 0.33%/year ($P = .0003$) in the total sample of children with CP. Children with GMFCS levels II/III presented with more sedentary time and less PA than children with GMFCS I, already at the age of 2 years old. Significant lower levels of light and moderate-to-vigorous PA, more sedentary time, and more sleep problems ($P < .05$) were seen for the CP compared with the typically developing group.
Conclusions: The unique longitudinal results indicate that with increasing age, light PA decreases, along with a greater increase in sedentary time compared with moderate-to-vigorous PA. The variability in individual trajectories highlights the importance of patient-tailored advice to optimize how children with CP spend their waking hours, especially with increasing age.
PMID: 42167361

6.Retraction: Clinical efficacy of neurofacilitation technology combined with rehabilitation training based on cerebral blood flow velocity and cerebral metabolism in children with cerebral palsy

Frontiers Editorial Office

Front Med (Lausanne). 2026 May 4:13:1867338. eCollection 2026.

Abstract
[This retracts the article DOI: 10.3389/fmed.2025.1599712.].
PMID: 42158128

7.[Effectiveness of T 1 nerve root transection in treatment of spastic hand contracture in cerebral palsy]

Yongqing Xu, Teng Wang, Xingbo Cai, Haiyang Zong, Wei Lin, Xi Yang, Shaoquan Pu, Xia Li

Zhongguo Xiu Fu Chong Jian Wai Ke Za Zhi. 2026 May 15;40(5):788-792.

Objective: To assess the effectiveness of T 1 nerve root transection for treating spastic hand contracture in patients with cerebral palsy.
Methods: A clinical data of 12 patients with spastic hand contracture caused by cerebral palsy, who admitted between March 2024 and February 2025 and treated with T 1 nerve root transection, was retrospectively analyzed. There were 7 males and 5 females, with a mean age of 35.6 years (range, 13-67 years). Before operation, muscle tone was grading 3-4 according to the Modified Ashworth Scale (MAS); muscle strength of the affected hand was grading 2-4 for flexor muscles and grading 0-4 for extensor muscles according to the Medical Research Council (MRC) scale; hand function was grading 0-4 according to the modified House Functional Classification (HFC); upper limb function scoring was 5.5 (0.5, 10.3) according to the Action Research Arm Test (ARAT) score.
Results: All incisions healed by first intention, and no complication occurred. All patients were followed up 6-18 months (mean, 12.6 months). At last follow-up, the spastic contracture of the affected hand obviously reduced, the muscle tone decreased, and hand function improved. The MAS grade, HFC grade, and ARAT score all showed significant improvement when compared with preoperative values ($P<0.05$). However, there was no significant improvement in flexor or extensor muscle strength of the affected limb, and no significant difference in MRC grade between pre- and post-operation ($P>0.05$).
Conclusion: T 1 nerve root transection is a safe and effective treatment for spastic hand contracture in patients with cerebral palsy. It can significantly reduce muscle tone, relieve flexion contracture, and improve hand function. However, it does not appear to improve muscle strength.
PMID: 42150911

8.Management of spastic diplegic cerebral palsy using ayurveda

Ranjana Pandey, Balgovind Tiwari, Amber Kumar, Keerti Swarnkar, Danish Javed, Prateek Behera

Bioinformation. 2026 Mar 31;22(3):1760-1765. eCollection 2026.
Abstract
Spastic cerebral palsy is a leading cause of childhood disability, with spastic diplegia being one of the most common subtypes and multidisciplinary approach in integrated form will be useful for reducing spasticity. Integrative intervention may provide less harmful and easy mode of treatment for CP children. Therefore, it is of interest to observe the effect of Ayurvedic treatment with Swarna Prashan on reducing spasticity in children with spastic diplegic cerebral palsy. An observational pre-post study was conducted at AIIMS Bhopal over 12 weeks and the total duration of study was 12 months. Twenty children aged 6 months to 10 years with pre-diagnosed spastic diplegic cerebral palsy (Modified Ashworth Scale ≤ 3) were included. Interventions comprised of oral Swarna Prashan and Panchakarma therapy (Mahanarayan and Mahamaash oil massage) every 2 weeks for 12 weeks. Spasticity (Modified Ashworth Scale), gross motor function (GMFCS-E & R) and anthropometric parameters were recorded pre- and post-intervention.
PMID: 42145399

9.Protracted speech development in cerebral palsy: Longitudinal insights and communication intervention implications

Katy Caynes

Dev Med Child Neurol. 2026 May 22. Online ahead of print.

Abstract
No abstract available
PMID: 42175535

10.Network Pharmacology Perspectives on Cerebral Palsy: Mechanistic Insights From Ayurvedic Formulations With Emphasis on Kalyanaka Ghritam

Preetham Pai, Parag Bajirao Gaikwad, Sreelatha Shetty, Roopesh Shridhar Jadhav

Cureus. 2026 Apr 20;18(4):e107376. eCollection 2026 Apr.

Abstract
Cerebral palsy is a non-progressive neurodevelopmental disorder arising from early brain injury and characterised by persistent motor dysfunction accompanied by cognitive, sensory, and behavioural impairments. Current management strategies remain largely supportive and symptomatic, reflecting the limited availability of interventions capable of addressing underlying molecular and network-level pathology. Increasing recognition of cerebral palsy as a multifactorial condition involving neuroinflammation, oxidative stress, synaptic dysregulation, and impaired neurodevelopment underscores the need for multi-target therapeutic frameworks. This narrative review adopts a structured methodology involving systematic database searches (PubMed, Scopus, Web of Science, Google Scholar, and AYUSH Research Portal) covering literature from 2015 to 2025, with predefined inclusion criteria focusing on phytochemical profiling, molecular targets, signalling pathways, and translational relevance to neurodevelopmental disorders. Particular emphasis was placed on studies integrating network pharmacology approaches to map compound-target-pathway interactions relevant to cerebral palsy. This narrative review aims to examine network pharmacology perspectives on Ayurvedic formulations, with emphasis on Kalyanaka Ghritam, to elucidate mechanistic relevance in cerebral palsy. A narrative synthesis of literature published between 2015 and 2025 was conducted using biomedical and traditional medicine databases, focusing on phytochemical constituents, molecular targets, biological pathways, and translational evidence. Phytochemical constituents relevant to this disease context include flavonoids (e.g., quercetin, kaempferol, luteolin) with antioxidant and anti-inflammatory properties; alkaloids and glycosides involved in neuromodulation of cholinergic, glutamatergic, and GABAergic systems; terpenoids contributing to mitochondrial protection and membrane stabilisation; and phenolic compounds and saponins that enhance neurotrophic signalling and mitigate apoptotic pathways. These bioactive classes collectively target key pathological processes in cerebral palsy, including oxidative stress, neuroinflammation, excitotoxicity, and impaired synaptic plasticity. Integrated analysis highlights that Kalyanaka Ghritam contains diverse bioactive compounds capable of modulating interconnected gene and protein networks associated with inflammatory regulation, redox homeostasis, neurotrophic signalling, synaptic plasticity, and neuroprotection. Such systems-level modulation aligns with the complex pathobiology of cerebral palsy and supports its potential adjunctive role within integrative care models. Network pharmacology emerges as a robust methodological bridge linking traditional therapeutic knowledge with contemporary systems biology, facilitating rational evaluation of multi-component interventions. Further experimental validation, standardisation, and controlled clinical studies remain essential to advance translational application and clinical integration.
PMID: 42170139

11.The prevalence of mental health difficulties and mental disorders among children with cerebral palsy

Manjula Manikandan, Claire Kerr, Jennifer Fortune, Reuel Jalal, Aisling Walsh, Aoife Twohig, Ian McClelland, Jessica Burke, Kimberley J Smith, Mary Cannon, Michael Walsh, Ruth Kevlin, Jennifer M Ryan

BMC Psychiatry. 2026 May 21. Online ahead of print.

Aim: To investigate prevalence of mental health difficulties and mental disorders among children with cerebral palsy (CP) in Ireland, and identify associated risk factors.
Methods: A cross-sectional survey was conducted with participants aged 6-17 years with CP. Data were collected via a survey that included demographics, CP characteristics, psychopathology (Strengths and Difficulties Questionnaire (SDQ)), mental disorders, physical well-being, and social factors. Linear and logistic regression were used to explore associations between risk factors and mental health outcomes.
Results: 330 participants completed the survey. The mean (SD) SDQ total difficulties score was 13.4 (6.6), with 29% of participants being at risk for emotional and behavioural problems and 21% diagnosed with at least one mental disorder, of which anxiety was the most prevalent (14%). Higher SDQ total difficulties scores were associated with intellectual disability, poor sleep, challenges in forming friendships, bullying, and family dysfunction ($p < 0.05$). Female participants and those with low physical activity participation were more likely to experience mental disorders ($p < 0.05$).
Interpretation: These findings highlight the multiple health and social factors associated with mental health difficulties emphasising the urgent need for targeted mental health interventions for young people with CP in Ireland to enhance overall mental well-being.
PMID: 42168953

12.Oral Melatonin Supplementation for Sleep Disturbances in Children with Cerebral Palsy: A Randomized Double-Blind Controlled Trial - Authors' Reply

Smita Mundada, Janhavi Zambani

Indian J Pediatr. 2026 May 19. Online ahead of print.

Abstract
No abstract available
PMID: 42154159

13.User-Centered Design of a Replayable VR Game for Children with HCP

Susanne Werking, Tung Khau, David Flaig, Gerrit Meixner

Stud Health Technol Inform. 2026 May 21:336:2314-2318.

Abstract
Hemiparetic Cerebral Palsy, a form of Cerebral Palsy affecting one side of the body, limits physical activity, as children tend to rely on their less-affected hand. This condition significantly increases the risk of long-term health issues. Immersive Virtual Reality (VR) games have shown potential to improve mobility; however, existing systems often lack varied stimuli and sustained engagement. This work explores the use of Procedural Content Generation to enhance engagement by dynamically generating replayable game content. A user-centered design process, informed by interviews with four experts, guided the development of an immersive VR game that promotes physical activity and upper-limb mobility. The prototype integrates Pseudo-Random Number Generators and Markov chains to adapt object spawning and maintain variety. A pilot study with 24 healthy participants evaluated usability and user experience, showing high enjoyment and ease of use, while highlighting the need for clearer goals, social interaction, and achievement elements to further improve replayability.
PMID: 42175350

14.Automated gait classification: Comparison of automated algorithms to expert classification

Karen M Kruger, Joseph J Krzak, Ross S Chafetz, Susan Sienko, Jeremy P Bauer

Clin Biomech (Bristol). 2026 May 9:137:106864. Online ahead of print.

Background: Accurate classification of gait patterns in children with cerebral palsy (CP) is critical for guiding treatment but requires expert interpretation of data. Automated methods have potential to improve consistency and scalability; however, clinically meaningful automated tools are limited. This work aimed to determine if automated algorithms based on established gait classifications can reproduce expert clinical classification in children with CP.
Methods: An automated MATLAB algorithm was developed to assign gait classifications using two established systems (Rodda & Graham and Rozumalski & Schwartz). A sample of children with CP who met criteria for crouch gait underwent automated classification. Three expert gait analysts independently classified all trials using standardized definitions corresponding to each system. Fleiss's κ quantified inter-rater reliability, while Cohen's κ, weighted κ, percent agreement, and macro F1 scores quantified agreement between each reviewer and the automated classifications.
Findings: Inter-rater reliability among reviewers was substantial for Rodda & Graham ($\kappa = 0.753$), with high agreement between reviewers. Inter-rater reliability among reviewers was moderate for Rozumalski & Schwartz ($\kappa = 0.456$) and agreement between raters was lower and more variable, with some classifications demonstrating full disagreement among reviewers.
Interpretation: Automated gait classification based on quantitative gait criteria can achieve agreement with gait analysis experts for systems with clear biomechanical boundaries. More complex cluster-based systems yield lower agreement, reflecting inherent ambiguity in cluster overlap. These findings support use of automated tools as reliable, objective ground-truth for large-scale analyses and for training markerless or video-based assessment algorithms aimed at expanding gait evaluation beyond specialized motion laboratories.
PMID: 42172880

15.Caregiver perspectives on daily use of technology in young children with unilateral cerebral palsy in Spain: a qualitative study

Irene González-Eiroa, Verónica Robles-García, Juliet Goldbart, Rocío Palomo-Carrión, Carmen Lillo-Navarro

Disabil Rehabil Assist Technol. 2026 May 21:1-14. Online ahead of print.

Purpose: To explore usage of available technology in daily life by children with unilateral cerebral palsy (UCP) and to examine the experiences and perspectives of their families.
Material and methods: Fifteen caregivers of children with UCP aged 3-7 years participated in online semi-structured interviews. Interviews consisted of open-ended questions related to usage of technology, participation of the affected upper limb (UL) when using it and parents' perceptions when being used at home. The interviews were video-recorded and transcribed verbatim. For each interview, framework analysis was conducted by three independent coders.
Results: The following thematic categories were extracted: (1) "daily use of technology", describing the kind of technology used, amount and purposes; (2) "attitudes related to technology" explaining children's attitudes, related to joy, and parents' attitudes, being positive when helping with the rehabilitation process, but against it for recreational purposes; (3) "benefits to the UL using technology", highlighting the role of technology as an element to increase spontaneous use; (4) "barriers and limitations for technological use", describing the barriers experienced by children with UCP in using technology.
Interpretation: This qualitative study provides information about how technology is used by children with UCP and how their parents perceive that technology can help to increase spontaneous use of the affected UL. Findings highlight the role of technology as a motivational element that would allow families and professionals to encourage spontaneous use.
Plain language summary
Integrating technology into daily home routines could encourage spontaneous bimanual activities, increasing children's motivation, engagement and opportunities for upper limb practice. Clinicians should assess caregivers' attitudes towards technology individually before selecting or tailoring technological recommendations, as families show heterogeneous perspectives on its use for children with UCP. Therapists should support parents in integrating technology in ways that align with their therapeutic goals, promoting functional gains and complementing rehabilitation, while avoiding framing it as purely recreational screen time. Therapists should identify and address barriers that limit technology use, adapting tools to the child's abilities and interests to maximise practice dosage, functional outcomes and the transfer of gains to everyday life. Clinicians should select and adapt technological interventions that naturally promote bimanual use and align with therapy objectives, while monitoring their impact on daily life and engagement.
PMID: 42166567

16.School attendance in individuals with cerebral palsy in Brazil

Ricardo Rodrigues de Sousa Junior, Luana Cristina da Silva, Ana Cristina Resende Camargos, Eliane Beatriz Cunha Policiano, Lívia Ferreira Coutinho Alonso, Nadia Badawi, Israt Jahan, Gulam Khandaker, Maria De Las Mercedes Ruiz Brunner, Paula Silva de Carvalho Chagas, Hércules Ribeiro Leite

Dev Med Child Neurol. 2026 May 21. Online ahead of print.

Aim: To identify factors associated with school attendance among Brazilian children, adolescents, and young adults with cerebral palsy (CP) using population-based data from the Brazilian Cerebral Palsy Register (BrCPR).
Method: This cross-sectional study analysed data from 774 individuals aged 4 to 21 years with CP registered in the BrCPR. Variables included sociodemographic and clinical characteristics (Gross Motor Function Classification System, Manual Ability Classification System, and speech limitations), and school attendance. Descriptive and bivariate analyses were conducted using $\chi 2$ tests; multivariable logistic regression models were applied to estimate adjusted odds ratios (aORs) with corresponding 95% confidence intervals (CIs).
Results: Among participants, 76% attended school, although 62% could not read and write. Adolescents with CP aged 13 to 21 years were less likely to attend school compared to those aged 4 to 12 years (aOR = 0.49, 95% CI = 0.3-0.7), as were those classified in Gross Motor Function Classification System levels IV and V compared to levels I to III (aOR = 0.29, 95% CI = 0.1-0.4). Additionally, the presence of speech limitations was associated with reduced school attendance (aOR = 0.12, 95% CI = 0.1-0.3).
Interpretation: Although school attendance rates for Brazilian individuals with CP are relatively high compared to other low- and middle-income countries, major barriers persist. Addressing speech support, and mobility-related inclusion, is essential to improve both school attendance and meaningful involvement.
PMID: 42165431

17.Implementation of goal directed therapy and assistive devices as part of the Akwenda Intervention Program for children and young people with cerebral palsy in Uganda

Elizabeth Asige, Gillian Saloojee, Eric Kintu, Carin Andrews, Lukia H Namaganda, Angelina Kakooza-Mwesige, Diane L Damiano, Hans Forssberg

Disabil Rehabil. 2026 May 19:1-15. Online ahead of print.

Purpose: To describe the implementation of goal-directed therapy (GDT) and provision of assistive devices (ADs) within the Akwenda Intervention Program, a structured community-based rehabilitation program, and to examine goal attainment, AD use, and caregiver perspectives in a rural setting in eastern Uganda.
Materials and methods: This study included 50 children and young people aged 2-23 years with cerebral palsy. The intervention formed part of an 11-month multi-component program including caregiver training, therapist-led sessions, communication and advocacy, GDT, and AD-provision. Therapists received structured training in collaborative goal setting using Goal Attainment Scaling (GAS). ADs, including wheelchairs, standing frames, posture support chairs, walkers, orthoses, and toileting devices, were provided with training and follow-up. Goal attainment was evaluated using GAS, while AD use and caregiver satisfaction were assessed through usage diaries and a structured questionnaire.
Results: A total of 146 goals were set, of which 63% were achieved. Most goals targeted activity (56%) and participation (32%). Participants with milder motor impairments demonstrated higher goal attainment than those with more severe impairments ($p = 0.04$). Goal attainment was moderately associated with reduced caregiver assistance in self-care ($r = 0.41$, $p = 0.006$) and reduced caregiver burden ($r = 0.40$, $p = 0.008$), but not with other child-related outcomes. Twenty-four participants received 66 ADs, of which 85% remained in use after six months. Caregiver satisfaction exceeded 80% across domains.
Conclusion: GDT and AD-provision were feasible to implement within a community-based rehabilitation program in a rural Ugandan setting, supporting meaningful functional outcomes.
Plain language summary
Goal directed therapy (GDT) can be implemented in rural resource limited settings when therapists receive training and ongoing support. Involving caregivers in goal setting and intervention planning supports the achievement of meaningful goals in everyday contexts. Locally produced, low-technology assistive devices (ADs) can be integrated into daily routines and may support participation while reducing caregiver burden. Goal setting and structured processes for assessment, fitting, training, and follow-up may contribute to sustained use of ADs. Combining GDT and AD-provision within community-based rehabilitation programs may strengthen service delivery in low-resource settings.
PMID: 42153298

18.Factors Influencing Attendance to Physical Therapy Services Among Children with Cerebral Palsy in Saudi Arabia

Mohammed S Alghamdi, Abdulaziz Awali, Mansour Abdullah Alshehri, Mushari Alonazi, Aqeel M Alenazi

Patient Prefer Adherence. 2026 May 13:20:596418. eCollection 2026.

Objective: To examine child, caregiver, and physical therapy (PT) service-related factors associated with regular versus irregular attendance to PT services among children with cerebral palsy (CP).
Methods: A cross-sectional study was conducted with 108 caregivers of children with CP aged 2-12 years in Saudi Arabia. Caregivers completed an online survey about child and caregiver characteristics, PT characteristics, perceived difficulties related to PT services, and caregiver-reported burden. Attendance was categorized as regular or irregular based on caregiver report and differences were examined. Regular attendance reflected consistent participation in scheduled sessions, whereas irregular attendance reflected missed, delayed, or inconsistent attendance.
Results: Regular attendance was reported by 42.6% of participants. Regular attendance was associated with younger age of children ($p = 0.003$, $d = 0.59$) and lack of children's educational enrollment ($p = 0.014$, $\varphi = 0.24$). No significant differences were found between groups for child sex, Gross Motor Function Classification System level, CP type, caregiver characteristics, or PT service characteristics. Irregular attendees reported greater difficulties related to appointment booking policies ($r = 0.30$), access to therapists ($r = 0.26$), agreement on treatment plans ($r = 0.22$), child behavior management ($r = 0.25$), and caregiver-child interaction during home exercises ($r = 0.29$), as well as higher financial ($r = 0.21$) and psychological burden ($r = 0.19$).
Conclusion: Attendance to PT services for children with CP was associated more with caregiver-perceived difficulties and burden than with demographic or service characteristics. Addressing service processes and caregiver experiences may support more consistent PT attendance.
PMID: 42153179

19.Experiences and challenges of caregivers of children with cerebral palsy in Magba subdivision, Cameroon: a qualitative analysis

Helen Lonn, Antor Odu Ndep, Bernadine Nsa Ekpenyong, Lynn Cockburn, Awa Jacques Chirac, Agho Tsangue Glory Tchiaze, Golda H M Jingkuo, Eucheria E Abua, Msughaondo Check Isho

BMC Neurol. 2026 May 16. Online ahead of print.

Background: Cerebral palsy (CP) is one of the most common childhood neurodisability globally and disproportionately affects children in low- and middle-income countries. In Cameroon, limited epidemiological data, weak rehabilitation infrastructure, and entrenched sociocultural beliefs shape how CP is understood and managed. Children with CP often require lifelong support, placing substantial physical, emotional, and economic demands on family-caregivers, most commonly mothers. Understanding caregivers' lived experiences within specific cultural and resource-limited contexts is critical for informing inclusive and effective interventions. This study explored the lived experiences and challenges of family-caregivers of children with CP in Magba Subdivision, West Region of Cameroon.
Method: This study employed a qualitative exploratory design using in-depth interviews and inductive content analysis. Participants were family caregivers of children with CP, purposively recruited through community-based rehabilitation (CBR) services. In-depth, face-to-face interviews were conducted in English or local languages, audio-recorded, transcribed, and translated. Data were analysed using inductive content analysis following Elo and Kyngäs' approach. Findings were interpreted using Raina et al.'s multidimensional caregiving model.
Results: All participants, aged 15-49 years, were family caregivers of children with CP, aged 4-15 years. Six interrelated themes emerged: (1) sociocultural challenges, including stigma, discrimination, and harmful spiritual beliefs framing CP as witchcraft, ancestral punishment, 'snake', or 'marine spirit'; (2) economic constraints arising from inability to engage in paid work and the absence of social protections; (3) physical caregiving burden characterised by exhaustion, chronic pain, and musculoskeletal strain; (4) inadequate specialized services and health information; (5) limited social/family support; and (6) limited access rehabilitation services. These challenges intensified caregiver isolation and emotional distress.
Conclusion: Caregiving for children with CP in Magba is shaped by intersecting sociocultural, economic, and systemic factors that extend beyond individual coping capacity. Strengthening culturally sensitive community-based rehabilitation, improving access to early diagnosis and rehabilitation, and implementing disability- and gender-responsive social protection policies are essential to reduce caregiver burden and promote inclusive child and family wellbeing in Cameroon.
PMID: 42143268

20.Shedding light on a highly complex causal network in cerebral palsy

Luigi Gagliardi

Dev Med Child Neurol. 2026 May 22. Online ahead of print.

Abstract
No abstract available
PMID: 42175548

21.Young adults with cerebral palsy as research partners - a qualitative evaluation of a mentoring program

Alexandra Cotton, Jordan Koder, Sera Harris, Margaret Wallen

Dev Neurorehabil. 2026 May 22:1-13. Online ahead of print.

Background and objective: Research which will have a meaningful impact for young people with CP needs to be informed by individuals with lived experience so that issues and outcomes that are important for people with CP are prioritized. These consumer research partners (CRP) may experience barriers and facilitators which influence the productivity and authenticity of their involvement. A mentor program was implemented to support young adults with cerebral palsy (CP) in their roles as CRP. This study aimed to explore the mentor program from the perspectives of the CRP and mentors regarding aspects they found beneficial, unhelpful, or that needed improvement.
Methods: Qualitative description guided the study. Participants were CRP and mentors contributing to a CP-specific research group, CP-Achieve, who participated in semi-structured interviews.
Results: Six CRP (four females, two males) aged between 21 and 30 years of age (median = 23), and eight mentors/potential mentors (five females, two males, one preferred not to specify) aged between 28 and 39 years (median = 32.5) participated in the study. CRP identified that mentoring helped develop confidence in, and benefits beyond, their role. Mentors recognized the need to establish effective partnerships and skills which assisted in their role, and identified benefits and challenges. Themes common to both groups were a desire to improve and develop the mentor program, strategic use of technology and that one's own characteristics contributed to a successful mentoring relationship.
Discussion: The findings of this evaluation contribute to research about the implementation and experience of mentor programs from the perspective of young adults living with CP and their mentors. The mentor program appeared to be of benefit to both mentors and mentees. The study has provided recommendations to inform revision and development of the mentor program to optimize the experience for participants, and the impact of CRP, including enhancing matching and orientation to roles, clarity of expectations, ongoing monitoring and support for mentors and mentees, and orchestrating formal closure of mentor relationships.
PMID: 42170753

22.Reliability and stability of cerebral palsy classification scales for individuals with STXBP1- and SYNGAP1-related disorders

No authors listed

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Abstract
No abstract available
PMID: 42168833

23.Inosine Ameliorates the Injurious Microenvironment for Oligodendrocyte Precursor Cells by Suppressing Microglial Activation and Neuroinflammation In Vitro

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Neurochem Res. 2026 May 20;51(3):166.

Abstract
Neonatal white matter injury (WMI), a leading cause of cerebral palsy, results from microglial-driven neuroinflammation that affects oligodendrocyte precursor cell (OPC) survival and differentiation. Our prior in vivo research indicated that inosine may protect against maternal inflammation-induced WMI by modulating microglial polarization and inhibiting TLR4/MyD88/NF-κB signaling, but its direct effects on microglia are unknown. This in vitro study used a microglia-conditioned medium (MCM)-OPC approach to explore this question. Primary microglia were stimulated with lipopolysaccharide (LPS) and treated with inosine, followed by the measurement of inflammatory cytokines (TNF-α, IL-1β, IL-6) and TLR4 pathway proteins via ELISA and Western blot. MCM derived from differentially treated microglia was then applied to OPC cultures, where OPC viability, death, proliferation, and differentiation were assessed using CCK-8 assay, propidium iodide (PI) staining, immunofluorescence, and Western blot. Inosine co-treatment significantly decreased LPS-induced secretion of TNF-α, IL-1β, and IL-6 from microglia ($P < 0.05$) and downregulated TLR4, MyD88, and p-NF-κB p65 expression ($P < 0.001$, $P < 0.01$). MCM from inosine-treated microglia mitigated OPC damage caused by activated microglia, as demonstrated by enhanced OPC viability ($P < 0.01$), reduced apoptosis (evidenced by decreased PI positivity and Cleaved Caspase-3 expression, $P < 0.01$, $P < 0.05$), increased proliferation (indicated by elevated Ki67 positivity and NG2 expression, $P<0.001$, $P < 0.01$), and improved differentiation (reflected by increased expression of CNPase, Olig2, and MBP, $P < 0.001$, $P < 0.01$). These findings suggest that inosine can directly inhibit the overactivation and inflammatory response of microglia in vitro, an effect associated with TLR4/MyD88/NF-κB downregulation. Furthermore, it can indirectly ameliorate the injurious microenvironment for OPC, thereby providing cellular-level mechanistic clues for explaining its neuroprotective role in vivo.
PMID: 42159816

24.A case of dopa-responsive dystonia with a novel GCH1 variant c.579 C > G (p.Ile193Met)

Maogeng Li, Bo Song, Xiaoyun She

Case Reports Neurol Sci. 2026 May 19;47(6):505.

Background: Dopa-responsive dystonia (DRD) is an underdiagnosed inherited movement disorder characterized by childhood-onset progressive dystonia, diurnal symptom luctuation, and exquisite responsiveness to low-dose levodopa. Misdiagnosis as epilepsy, cerebral palsy, or juvenile Parkinsonism is common due to overlapping phenotypes and non-specific auxiliary examinations.
Case presentation: A 22-year-old Chinese female presented with an 18-year history of right-sided limb and perioral involuntary movements, slurred speech, and progressive hypertonia. She was misdiagnosed with epilepsy for over a decade with no response to antiepileptic therapy. Brain MRI, EEG, and routine laboratory tests were unremarkable. Whole-exome sequencing (WES) identiied a heterozygous guanosine triphosphate cyclohydrolase-1 (GCH1) variant c.579C>G (p.Ile193Met), classified as a variant of uncertain signiicance (VUS) per American College of Medical Genetics and Genomics (ACMG) guidelines. Low-dose levodopa/benserazide (Madopar 0.125 g tid) induced dramatic symptomatic improvement, with sustained remission at 6-month follow-up.
Conclusion: This case expands the GCH1 mutational spectrum of DRD and highlights the critical role of levodopa trial in unexplained dystonia, even in the absence of diurnal luctuation. Early recognition and intervention are pivotal for favorable prognosis.
PMID: 42154052

25.Beyond "low tone". What do the General Movements Assessment and Motor Optimality Score tell us about infants with developmental central hypotonia? A scoping review

Álvaro Hidalgo-Robles, Daniele Soares-Marangoni, Olena Chorna, Pragashnie Govender, Roslyn Livingstone, Ginny Paleg, Riclef Schomerus, Javier Merino-Andrés, Andrea Guzzetta

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Developmental central hypotonia is a broad clinical term describing low muscle tone secondary to non-degenerative brain impairment. Because there is no widely implemented, standardized way to quantify hypotonia in young children, and low tone is still judged largely through subjective clinical examination, early motor phenotyping remains challenging. We conducted a scoping review to map how Prechtl's General Movements Assessment (GMA) and the Motor Optimality Score -Revised (MOS-R) have been used in infants with developmental central hypotonia aged <5 months corrected age. PubMed, Scopus, ProQuest, Web of Science and the Cochrane Library were searched from inception to November 2025. Included studies assessed preterm or term infants with developmental central hypotonia using GMA and/or MOS-R. Fourteen studies met inclusion criteria, covering 12 diagnoses and etiologies (including Cornelia de Lange syndrome, hypotonic cerebral palsy, Cri du chat syndrome, Down syndrome, Prader-Willi syndrome, Smith-Magenis syndrome, and West syndrome). Across conditions, spontaneous motor behavior showed a consistent pattern: reduced variability and complexity, a below-age-expected repertoire, and atypical posture, with predominantly slow or monotonous movement character. Atypical fidgety patterns were frequent, although fidgety movements could still be present in infants diagnosed with Down syndrome or Prader-Willi syndrome. Evidence was limited and heterogeneous, with most studies small and descriptive. GMA and MOS-R are feasible, reliable tools to assess early motor phenotypes in developmental central hypotonia and may strengthen detection and surveillance pathways. Prospective longitudinal studies should standardize MOS-R subdomain reporting and evaluate clinical utility by examining associations with later functional and hypotonia trajectories, and responsiveness to early intervention.
PMID: 42143978

26.Reflections on participation in the community, as self-reported by young people with cerebral palsy

Jacinta Quartermaine, T A Rose, Megan Auld, Leanne Johnston

Dev Neurorehabil. 2026 May 16:1-18. Online ahead of print.

Background and objective: This study focused on the community-based participation experiences of young people with cerebral palsy (CP), investigating the factors that make participation easier or harder.
Methods: Accessible methods were utilized to explore the perspectives of 15 young people with CP aged 15 to 26 years with diverse motor and communication abilities (Gross Motor Function Classification System I = 4, II = 6, III = 1, IV = 3, V = 1, Viking Speech Scale I = 7, II = 4, III = 3, IV = 1). Participants provided regular written reflections, photographs, or videos about their community-based participation. Data were analyzed using reflexive thematic analysis.
Results: Self-reported reflections were grouped inductively into 421 codes, then 22 subthemes and 6 themes: (i) My CP characteristics can make participation in the community more difficult; (ii) My own thoughts, emotions, confidence, and sense of achievement influence the things I do in the community; (iii) Accessibility of the environment and availability of equipment influences my participation in the community; (iv) The range of supports I have available influences my participation in the community; (v) Whether the community activity has been adjusted to include and involve me influences my participation; and (vi) The attitudes, actions, and level of acceptance from others in the community influences my participation.
Discussion: Key factors influencing community-based participation for young people included CP characteristics, thoughts, emotions, confidence, environment, equipment, supports, accommodations, attitudes, actions, and acceptance.
Plain language summary
The current study identified factors influencing community-based participation by capturing self-reported perceptions from young people with CP using accessible methods. Many environmental factors can influence participation for young people with CP and it is necessary to now focus on creating more inclusive settings across different community environments to improve participation. Future interventions and research should establish context-based solutions that address 1) the availability of equipment and support and 2) the level of acceptance from others across different community settings such as educational institutions, workplaces, sports/public venues, gyms, and public transportation.
PMID: 42143034

Prevention and Cure

27.The Association Between Foetal Brain and Body Size Mid-Gestation and Neurodevelopmental Disorders in Childhood

Mads Langager Larsen, Gorm Greisen, Lone Krebs, Christina Engel Hoei-Hansen, Olav Bjørn Petersen

Paediatr Perinat Epidemiol. 2026 May 19. Online ahead of print.

Background: Smallness for gestational age and reduced head circumference at birth are consistently associated with later neurodevelopmental disorders (NDD), but it is unclear whether similar associations are present at foetal biometry in mid-gestation.
Objectives: To investigate associations between second-trimester foetal biometric measurements and later NDD.
Methods: We conducted a population-based cohort study using data from routine second-trimester ultrasound scans (gestational weeks 18-21) in Denmark. We included all singleton euploid live births from 2008 to 2015. Foetal biometrics included head circumference, biparietal diameter (BPD), abdominal circumference (AC), femur length, estimated foetal weight (EFW), and the head-abdomen ratio. NDD comprised cerebral palsy (CP), epilepsy, intellectual disability, and autism spectrum disorders (ASD). Children were followed from birth until diagnosis, death, emigration, or 31 December 2022. Associations were examined using multivariable Cox proportional hazards models, and cumulative incidence through age 10 years was estimated accounting for death as a competing risk. Adjusted mean differences in biometric Z-scores were examined using multivariable linear regression.
Results: Among 337,028 children, 13,414 (4.0%; 69.7% males) were diagnosed with at least one NDD. Larger BPD was associated with higher hazards of epilepsy, intellectual disability, and ASD. Larger AC and EFW were associated with lower hazard of intellectual disabilities. Individuals with epilepsy, ASD, and intellectual disabilities had slightly larger mean BPD Z-score at their second-trimester scans, compared to children without NDD. Furthermore, smaller HC was associated with lower hazards and cumulative incidence of epilepsy, whereas shorter FL was associated with higher hazards of CP and epilepsy.
Conclusions: Mid-gestation head size did not follow the expected risk pattern. These findings propose a rethinking of the relationship between restricted brain growth and neurodevelopmental impairment, suggesting that atypical early brain development may be reflected in accelerated rather than reduced growth, or that restricted growth-related causes of NDD act later in pregnancy.
PMID: 42157381

28.Impact of stem cell therapy on brain metabolic profile in cerebral palsy assessed by magnetic resonance spectroscopy in a randomized clinical trial

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Stem cell therapies have shown promise in cerebral palsy (CP). However, their effects on brain metabolites, measured by proton magnetic resonance spectroscopy (1HMRS), remain unexplored. In this randomized clinical trial, we evaluated 1HMRS measures (N-acetyl aspartate [NAA], choline [Cho], creatine [Cr], myo-inositol [mI], NAA/Cho, and NAA/Cr) within periventricular white matter (PVWM) in children with CP at baseline and 12 months after a single intrathecal injection of umbilical cord-mesenchymal stem cells (UC-MSCs:20 × 106) or umbilical cord blood-mononuclear cells (UCB-MNCs:5 × 106/kg). Generalized Estimating Equations (GEEs) were employed to assess treatment efficacy, the adjusted effects of sex, CP type, and gestational age (GA) on post-treatment findings, and the association between metabolites and gross motor function measure (GMFM-66). Seventy-three participants were included: UCB-MNC (n = 27), UC-MSC (n = 26), and sham (n = 20). Primary analyses indicated no significant time*treatment interaction effects for any of the metabolites. In exploratory analyses, a significant CP type*treatment interaction was found for the post-intervention NAA/Cho (UC-MSC vs. sham; P-value = 0.02). Significant GA status*treatment interactions were also observed for post-intervention Cho (UC-MSC vs. sham; P-value = 0.009) and post-intervention mI (UCB-MNC vs. sham; P-value = 0.03). Additionally, longitudinal increases in NAA/Cr and NAA/Cho were positively associated with GMFM-66 improvement during the follow-up in UCB-MNC and UC-MSC groups, respectively, whereas Cho*time interaction was linked to smaller functional gains in the UCB-MNC group over time. Neither UC-MSC nor UCB-MNC had a significant overall effect on measured metabolite concentrations/ratios within the PVWM at 12 months following a single injection. Exploratory findings should be interpreted cautiously. Trial registration: The trial was registered in both the Iranian Registry of Clinical Trials (IRCT201706176907N13; registered on 12/07/2017) and ClinicalTrials.gov (NCT03795974; registered on 08/01/2019).
PMID: 42156830

29.MRI evaluation of ADC values and venous variations in fetal cerebral white matter with T2WI signal hyperintensity in late gestation

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Front Med (Lausanne). 2026 Apr 30:13:1776880. eCollection 2026.

Background and purpose: We observed that some late-term fetal prenatal magnetic resonance imaging (MRI) scans revealed normal brain structures but exhibited diffuse hyperintense signals on T2-weighted imaging (T2WI) in the cerebral white matter (white matter hyperintense signal [WMHS]). Currently, the pathological basis of this phenomenon remains unclear, and few studies have systematically investigated its impact on fetal and postnatal brain development. We aimed to compare the differences in apparent diffusion coefficient (ADC) values across distinct brain regions between fetuses with WMHS and age-matched control fetuses, to explore the potential etiology of WMHS by combining these findings with morphological changes in cerebral veins, and to conduct a comprehensive evaluation combined with clinical follow-up.
Method: We retrospectively analyzed fetal imaging data from MRI examinations performed at our hospital between January 2014 and May 2024. A total of 87 late-term fetuses (gestational age [GA]: 29-40 weeks) were identified with diffuse hyperintense signals on T2WI in the cerebral parenchyma; age-matched normal fetuses with the same sample size were enrolled as the control group. We compared differences in ADC values across distinct brain regions among fetuses with WMHS and simultaneously analyzed morphological differences in the deep cerebral veins between the two groups, combined with postnatal clinical follow-up, to explore the impact of WMHS on brain development and its clinical significance in late-term fetuses.
Results: (1) ADC values in the majority of brain regions of fetuses in the WMHS group were higher than those in the control group, with the greatest difference observed in the F2 region. (2) Compared with the control group, fetuses in the WMHS group exhibited significantly increased lumen areas of the vein of Galen (VOG) and straight sinus (SS), with a p-value of < 0.05 considered statistically significant. (3) Successful follow-up was achieved in 45 control infants and 36 WMHS cases. All control fetuses showed normal neurodevelopmental outcomes, while 33 infants in the WMHS group had normal and 3 had adverse outcomes, including cerebral palsy, developmental delay, and autism.
Conclusion: In late-term fetuses with WMHS, elevated ADC values in specific brain regions and concurrent deep cerebral venous dilation indicate underlying intracranial abnormalities. In addition, our follow-up results indicate that these combined changes may be associated with adverse neurodevelopmental outcomes in some infants.
PMID: 42145735

30.Birth-Related Subdural Haemorrhage in Asymptomatic Moderate-to-Late Preterm Neonates: Magnetic Resonance Imaging Features and Temporal Evolution

Thomas Doolin, Jane E Harding, Patrick Kelly, Greg D Gamble, David Perry

J Med Imaging Radiat Oncol. 2026 May 17. Online ahead of print.

Introduction: Birth-related subdural haemorrhages (SDH) are common in asymptomatic neonates. While most resolve without long-term effects, their natural history in moderate-to-late preterm (MLP) neonates remains uncertain. Rebleeding into birth-related SDH is also sometimes suggested as an alternative explanation for SDH findings in suspected abusive head trauma. We aimed to assess the prevalence, distribution, risk factors and temporal evolution of birth-related SDH in asymptomatic MLP neonates, and to compare these to those reported in term neonates.
Method: We reviewed a cohort of asymptomatic neonates born 32 + 0 to 36 + 6 weeks of gestation who underwent brain MRI scans shortly after birth (scan 1) and at term-equivalent age (scan 2). The presence, location and size of SDH were assessed using Four Quadrant Subdural (FQS) scoring reflecting the sum of the maximal thickness of SDH in each quadrant. Demographic and clinical factors were compared between neonates with and without SDH.
Results: SDH was identified in 48/189 neonates (25.4%) at scan 1. Most had multifocal haemorrhages in the posterior cranial fossa or posterior supratentorial regions. Neonates with SDH had higher birth weights than those without SDH and were more likely to be born vaginally. By scan 2, SDH had resolved in 75% and mean FQS score decreased by 71% in the remainder.
Conclusion: SDH is common in MLP neonates, with a distribution similar to that of term neonates. Risk factors include higher birth weight and vaginal birth. Most birth-related SDH resolves by term-equivalent age, making it an unlikely explanation for SDH in older infants with suspected abusive head trauma.
PMID: 42144863

31.Neural stem cell extracellular vesicle-mediated delivery of astragaloside IV attenuates hypoxic-ischemic brain damage by activating the mTOR pathway

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Naunyn Schmiedebergs Arch Pharmacol. 2026 May 16. Online ahead of print.

Abstract
Hypoxic-ischemic brain damage (HIBD) is a primary cause of neonatal neurological dysfunction, such as cerebral palsy, characterized by complex cascades of neuronal death. Despite the urgent need, effective therapeutic strategies are scarce, and the efficacy of standard interventions, such as therapeutic hypothermia, remains limited. Astragaloside IV (AS-IV), a promising neuroprotective agent, is hindered from wide clinical applications by poor permeability across the blood-brain barrier (BBB) and low bioavailability. To overcome this bottleneck, we developed a novel targeted delivery system based on neural stem cell-derived extracellular vesicle, designated AS-EV, which efficiently deliver AS-IV to the HIBD-affected brain region. AS-EV were successfully prepared via ultracentrifugation and sonication-loading, exhibiting typical exosomal characteristics, and favorable drug-loading efficiency. In vivo experiments confirmed that AS-EV effectively crossed the BBB to accumulate in the injured brain region with satisfying biocompatibility. Mechanistic investigation using primary cortical neurons revealed that the core therapeutic mechanism of AS-EV is mediated by mTOR activation, which consequently suppressed HIBD-induced neuronal apoptosis, an effect that was abrogated by mTOR inhibition. Furthermore, functional and histological assessments demonstrated that AS-EV intervention significantly promoted neurological function recovery, alleviated brain tissue pathology, protected white matter integrity, facilitated neural structural remodeling, and inhibited glial scar proliferation in neonatal HIBD rats. In conclusion, NSC-EV-mediated delivery of AS-IV exerts multifaceted neuroprotective and reparative effects by activating the mTOR pathway, offering a promising therapeutic strategy for HIBD.
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