Cerebral palsy research news

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Interventions and Management

1.Using game performance measure to assess upper limb motor function in children with neuromotor disorders: a systematic review

Kevin Rose-Dulcina, Stéphane Armand, Marine Cacioppo

J Neuroeng Rehabil. PMID: 40796859. Online ahead of print.

Background: Upper limb impairments affect children with neuromotor disorders, limiting daily activities and participation. Videogames (ex: virtual reality, computer-based games) have emerged as promising tools for upper limb rehabilitation, offering better engagement and effects on upper limb movements. The capacity of video games to be used for assessing upper limb function with game-based metrics has not yet been explored, and their validation remains unclear. This systematic review aims to determine if game-based metrics can serve as relevant measures to evaluate upper limb impairments in children with neuromotor disorders.
Methods: A systematic review (PROSPERO: CRD42024550469) was conducted in PUBMED, MEDLINE, Web of Science, and Cochrane according to PRISMA guidelines. Articles published from inception to the 26th of May 2025 were screened according to inclusion/exclusion criteria and data were extracted focusing on game characteristics, outcomes measured, and their measurement properties.
Results: After screening, 26 studies on 1092 articles were included. In total, 443 children, mostly with cerebral palsy (n = 394), mean age 10.1 ± 2.4 years, underwent videogames with quantitative measurements. A total of 112 upper limb game-based outcomes were identified, measured either from the game itself or external instruments. These outcomes included kinematics (60%), game scores (24%), actimetry data (10%), electromyography (5%), and kinetics (<1%). Only 3 studies reported reliability data, with test-retest reliability ranging from poor to excellent across 7 outcomes. For discriminant validity, 8 studies included control participants, assessing 20 outcomes, of which 13 demonstrated the ability to differentiate between groups. Regarding responsiveness, pre-/post-therapy component was investigated through 12 studies across 52 outcomes. Only 29 showed significant improvements after intervention. Convergent validity, explored in 6 studies, reported moderate to high correlations with clinical assessments.
Conclusion: The present systematic review identified a wide range of game categories and upper limb game performance outcomes, involving different instrumented tools, and covering an interesting range of gestures. Despite the relevance of the game context and the use of instrumented outcomes, there is a lack of validation. To be used as research outcomes and to guide therapies in clinical practice, important work on the measurement properties has to be done.
PMID: 40796859

2.Orthopedic surgery after selective dorsal rhizotomy in children with cerebral palsy: A matched cohort study

No authors listed

Dev Med Child Neurol. 2025 Aug 10. Online ahead of print.

Abstract
No abstract available.
PMID: 40785152

3.Incidence and risk factors of hip dislocation in children with cerebral palsy: A systematic review and pooled analysis

Gabriele Giuca, Ilaria Sanzarello, Daniela Alessia Marletta, Salvatore Calaciura, Matteo Nanni, Danilo Leonetti

J Clin Orthop Trauma. 2025 Jul 28;69:103141. eCollection 2025 Oct.

Background: Hip displacement and dislocation are among the most disabling musculoskeletal sequelae of cerebral palsy (CP) yet reported incidence and risk-factor estimates vary widely across studies. We undertook a systematic review and pooled analysis to quantify cumulative incidence across Gross Motor Function Classification System (GMFCS) strata and identify reproducible clinical and radiographic predictors.
Methods: A protocol was registered in PROSPERO (CRD420251026860). MEDLINE (PubMed), Embase, CINAHL and CENTRAL were searched from inception to March 30, 2025. Eligible longitudinal studies enrolled ≥30 children with CP aged 2–18 years, provided ≥2 years' follow-up without confounding hip-directed intervention, and reported migration percentage (MP) data or equivalent permitting derivation. Hip displacement and dislocation were harmonized as MP >30% and >50%, respectively. Study quality was appraised with ROBINS I. Proportions were stabilized with the Freeman-Tukey double-arcsine transformation and pooled in random-effects (REML) models; odds ratios (ORs) for candidate predictors were combined using inverse-variance random-effects methods. Heterogeneity (I^2, τ^2), prediction intervals, influence diagnostics, Hartung-Knapp sensitivity and Egger tests were performed. Certainty was graded with adapted GRADE.
Results: Nineteen studies met inclusion; nine natural-history cohorts (n = 1556; median follow-up 5.1 y) contributed extractable incidence data. The pooled cumulative incidence of hip displacement/dislocation was 38.2% (95% CI 31.7–45.1%; I^2 = 77%; prediction interval 6.0–53.8%). Incidence was 17.1% in ambulant children (GMFCS I–III) and 71.9% in non-ambulant children (IV–V), yielding an OR 3.72 (95% CI 2.56–5.40) for non-ambulant vs ambulant groups. A baseline MP ≥30% quadrupled subsequent risk (OR 4.48, 95% CI 2.66–7.54; I^2 = 0%). Pelvic obliquity ≥10° was associated with increased risk in a single cohort (OR 2.70, 95% CI 1.34–5.46) and should be regarded as suggestive pending replication. No consistent effects were found for sex, gestational age or CP subtype.
Conclusions: Approximately four in ten children with CP, and more than two thirds of those in GMFCS IV–V, develop clinically important hip displacement without targeted intervention. GMFCS IV–V status and an early MP ≥30% are robust, actionable triggers for intensifying hip surveillance to six-monthly radiography; pelvic obliquity ≥10° may further stratify risk but requires confirmation. Uniform MP thresholds, time-to-event analyses and reporting of modifiable exposures are needed in future multicenter cohorts to refine preventive care.
PMID: 40814403

4.Plain Anteroposterior Radiographs Underestimate Neuromuscular Acetabular Dysplasia in Cerebral Palsy: A Comprehensive Three-Dimensional Evaluation and Comparison

Hillary B Nguyen, Ata M Kiapour, Pratik Pradhan, Mohammadreza Movahhedi, Mallika Singh, Eduardo V Novais, Benjamin J Shore

J Pediatr Orthop. 2025 Aug 13. Online ahead of print.

Background: Neuromuscular acetabular dysplasia is believed to be posterior in children with cerebral palsy (CP). While an anteroposterior (AP) pelvic radiograph is the current standard-of-care for CP hip surveillance, the 3-dimensional (3D) nature of the acetabulum makes accurate assessment difficult using 2-dimensional imaging (2D).
Methods: Over a 12-year period at a single tertiary care institution, a consecutive sample of 285 children with CP were retrospectively identified across Gross Motor Function Classification System Level (GMFCS) levels (age: 3 to 22 y, average: 9.3±3.5 years, 43% females). A cohort of age-matched and sex-matched children (n=285) without CP were used for comparison. Using a validated automatic segmentation and anatomy measurement program (Virtual Hip, Musculoskeletal Digital Innovation and Informatics Program, Boston's Children Hospital, Boston, MA), 3D hip models from 3-dimensional computed tomography (3D-CT) scans were developed to automatically measure acetabular index (AI) or acetabular angle (AA), and acetabular rim lateral extension (ARLE) from posterior (9 o'clock) to anterior (3 o'clock). AI/AA was also measured on corresponding radiographs. Mixed linear models were used to compare measurements around the clockface and between 3D -CT and radiographs (for AI and AA only). Linear regression investigated age-related changes.
Results: The acetabulum is significantly underdeveloped in both the posterior and anterior regions relative to the superior region in skeletally mature and immature patients with CP, as demonstrated by increasing AI ($P<0.05$) and AA ($P<0.01$)—and decreasing ARLE ($P<0.01$)—at nearly all positions of the acetabulum clockface relative to 12 o'clock. Greater acetabular dysplasia correlated with increasing GMFCS level compared with our control cohort ($P<0.01$). Finally, singular 2D radiographic measurements of AI and AA were only accurate for the most superior 12 o'clock position but significantly underestimated acetabular deficiency everywhere else ($P<0.05$).
Conclusions: Severity of neuromuscular acetabular dysplasia is underestimated using plain radiographs. Using 3D-CT, acetabular deficiency is appreciated globally and worsens with increasing GMFCS level. Measuring the 3D ARLE for preoperative planning in neuromuscular acetabular dysplasia can provide more information than plain radiographic measurements.
PMID: 40799183

5.Evaluating Upper Extremity Selective Motor Control and Its Relationship with Trunk Control and Balance in Spastic CP

Bayram Sırrı, Bülent Elbasan

J Mot Behav. PMID: 40788481. Online ahead of print.

Abstract
Upper extremity Selective Voluntary Motor Control (SVMC) is a key factor influencing upper extremity functions in children with Cerebral Palsy (CP), but differences in SVMC of the upper extremity between unilateral and bilateral CP and its association with trunk control and balance remain unclear. This study aims to examine differences in upper extremity SVMC and its association with trunk control and balance in 58 children (31 unilateral, 27 bilateral) with spastic CP. SVMC, balance, and trunk control were assessed using the Selective Control of Upper Extremity Scale (SCUES), Pediatric Balance Scale (PBS), and the Trunk Control Measurement Scale (TCMS), respectively. No significant difference in SCUES scores was found between unilateral and bilateral CP ($p > 0.05$). SCUES scores correlated with TCMS in both types ($p < 0.05$), with a stronger correlation in bilateral CP (unilateral rho = 0.38, bilateral rho = 0.87). PBS correlated with SCUES only in bilateral cases ($p < 0.01$, rho = 0.88). In conclusion, impaired upper extremity SVMC is common in spastic CP and more linked to trunk control and balance in bilateral than unilateral cases. Addressing this difference may guide the development of tailored interventions for both types.
PMID: 40788481

6.Outcomes of Extra-Articular Subtalar Arthrodesis for Valgus Deformity of the Hindfoot in Patients with Cerebral Palsy: A Radiographic and Pedobarographic Study

Byoung Kyu Park, Sharkawy Wagih Abdel-Baki, Isaac Rhee, Kun-Bo Park, Hoon Park, Kyeong-Hyeon Park, Hyun Woo Kim

J Bone Joint Surg Am. 2025 Aug 14. Online ahead of print.

Background: Extra-articular subtalar arthrodesis generally has been recommended for treating severe valgus deformities of the hindfoot in patients with cerebral palsy (CP). However, it is unknown whether restricted subtalar joint motion affects the shape of the foot during continued growth in children. The purpose of the present study was to evaluate the effectiveness and longevity of extra-articular subtalar arthrodesis in ambulatory patients with spastic CP, with a specific focus on its impact on the final foot shape and plantar pressure distribution.
Methods: The present retrospective study included 99 feet in 60 children with a mean age (and standard deviation) of 7.6 ± 2.1 years at the time of surgery and 16.6 ± 4.7 years at the latest follow-up. Radiographic changes were analyzed both during the early postoperative period and at extended follow-up. At the latest follow-up, the feet were classified into 3 categories (hindfoot valgus, neutral, or varus) on the basis of the valgus/varus index obtained from dynamic pedobarographs.
Results: All radiographic parameters improved at 6 months after surgery. However, at the latest follow-up, all measurements except for the lateral talocalcaneal angle indicated overcorrection of the hindfoot valgus deformity. The overall valgus/varus index decreased from 0.54 ± 0.25 before surgery to -0.29 ± 0.35 at the latest follow-up. Five feet (5.1%) were classified as hindfoot valgus, 41 feet (41.4%) as neutral, and 53 feet (53.5%) as varus. Patients with hindfoot varus were younger at the time of surgery, and a lower anteroposterior talus-first metatarsal angle at 6 months after surgery was found to be the only significant radiographic predictor of the development of hindfoot varus. Revision procedures were performed on 22 feet (41.5%) in the varus group.
Conclusions: Extra-articular subtalar arthrodesis is associated with a high risk of progressive hindfoot varus deformity in patients with CP. Our findings highlight the need to reevaluate traditional surgical indications for correcting hindfoot valgus deformity, which have largely been based on the severity of the deformity observed on radiographs. Decision-making also should account for growth-related changes associated with restricted subtalar motion and the intraoperative position of the hindfoot and forefoot.
PMID: 40811496

7.Influence of lower limb spasticity on vertical jump capacity in para-athletes with cerebral palsy

Matías Henríquez, Alba Roldan, María Isabel Cornejo, Javier Yanci, Raul Reina

PM R. 2025 Aug 13. Online ahead of print.

Background: Spasticity is a common feature in individuals with cerebral palsy (CP) that may impair muscle function and affect explosive movements such as jumping. Although vertical jump performance is a key indicator of neuromuscular capacity in para-athletes, the specific effects of lower-limb spasticity remain unclear, particularly when comparing unilateral and bilateral profiles.
Objective: To compare spasticity scores between less and more affected legs as well as across CP profiles, examine differences in vertical jump performance variables between CP participants with unilateral spasticity (US) and bilateral spasticity (BS) profiles and footballers without disabilities, and determine the association between spasticity and jump force-time variables during a countermovement jump (CMJ).
Methods: In total, 53 parafootballers with CP and 33 footballers without disabilities as a control group (CG) were recruited. Spasticity was assessed in lower limb muscle groups using the Australian Spasticity Assessment Scale, focusing on knee and ankle plantar flexion. Performance variables were evaluated using the CMJ test on a force platform.
Results: Significant differences in spasticity of the more affected leg were found between the subgroups with BS and US ($p < .01$). In addition, significant differences in jump height were observed between footballers with CP and the CG ($p < .01$). A negative correlation was found between spasticity scores and vertical jump performance ($\rho = -0.27$ to -0.28, small), and a positive correlation was found between spasticity scores and the maximal rate of force development ($\rho = 0.28$ to 0.33, small to moderate).
Conclusions: Lower-limb spasticity differs across CP profiles and negatively affects CMJ height performance. This study offers new insights into how spasticity influences sport-specific actions in para-athletes with CP, particularly those requiring muscle power for high-speed movements such as jumping.
PMID: 40801154

8.Can inter-stride variability capture signs of mixed tone in individuals with cerebral palsy? An exploratory study

Gilad Sorek, Marije Goudriaan, Itai Schurr, Simon-Henri Schless

Eur J Paediatr Neurol. 2025 Aug 5;58:74–80. Online ahead of print.

Introduction: The identification of dystonia in addition to spasticity (mixed-tone) for individuals with cerebral palsy (CP) is important, as it can alter clinical management. This study aims to examine if the inter-stride variability of conventionally used gait features can be used for recognizing mixed-tone during gait in individuals with CP.
Methods: Retrospective treadmill-based 3D gait-analysis data for 20 individuals (mean ± SD age 10.4 ± 3.3 years) with mixed-tone CP were extracted (mixed-tone-group). A control group of individuals diagnosed with spastic-CP and no dystonia during gait were individually matched (spastic-group). Gait-kinematics were evaluated using Spatiotemporal characteristics and the Gait-Profile-Score (GPS). Selective-motor-control was assessed by the dynamic-motor-control-index (walk-DMC). Inter-stride variability was calculated per-individual using the coefficient-of-variation (CV; (SD/mean)*100).
Results: The mixed-tone-group presented with significantly smaller step-length and higher CV only in spatiotemporal parameters ($p < 0.050$). After controlling for walking-speed, only the CV for cadence remained significant ($p < 0.001$); a cut-off of 11.5% CV in cadence could identify individuals with mixed-tone CP with 65% sensitivity and 85% specificity.
Interpretation: Larger inter-stride variability was identified for spatiotemporal characteristics in individuals with mixed-tone CP, compared to individuals with spastic CP. Capturing the highly variable movements may be a biomarker of dystonia during gait. Further prospective studies with larger sample size are needed.
PMID: 40795448

9.Impact of Bilateral GPi Deep Brain Stimulation on Dystonia, Functional Outcomes, and Caregiver Burden in Patients with Dystonic Cerebral Palsy

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J Clin Med. 2025 Jul 30;14(15):5382.

Background: Dystonic cerebral palsy (DCP) is a complex, disabling manifestation of secondary dystonia, which significantly impacts motor function, quality of life, and well-being. Conventional pharmacologic therapies frequently do not relieve symptoms sufficiently. Deep brain stimulation (DBS) of the globus pallidus internal segment (GPi) has gained increasing attention as a neuromodulatory therapy for refractory dystonia. Still, the experience of the effect of GPi DBS treatment in adults with DCP has, until recently, been limited.
Methods: We performed a retrospective, two-center case series of 11 adult patients with medically refractory DCP who underwent bilateral GPi-DBS. The clinical outcomes were evaluated based on the Burke-Fahn-Marsden Dystonia Rating Scale (BFMDRS), the Functional Independence Measure (FIM), the Gross Motor Function Classification System (GMFCS), and the Caregiver Burden Scale (CBS). The assessments were done preoperatively and at 1-year follow-up. Changes in continuous variables were analyzed using paired t-tests.
Results: At the 1-year follow-up, the mean BFMDRS score improved from 69.6 ± 27.6 to 54.3 ± 36.5 ($p = 0.001$), indicating a significant reduction in overall dystonia severity. Functional independence also improved, demonstrated by the rise in FIM scores from 65.3 ± 33.9 to 79.2 ± 43.4 ($p = 0.006$). Although GMFCS levels did not change in most patients ($p = 0.125$), the burden on caregivers decreased significantly, with CBS scores falling from 35.7 ± 18.8 to 32.0 ± 17.1 ($p = 0.015$). There were no surgical complications.
Conclusions: In adults, bilateral GPi-DBS is a safe and effective intervention for DCP, improving motor control and increasing functional independence while decreasing caregiver burden. These findings lend support to its role in the multidisciplinary management of DCP.
PMID: 40807004

10.The efficacy of physical activity or exercise among individuals with cerebral palsy: An umbrella review of systematic reviews

Majed M Alhumaid, Faris Yahya I Asiri, Mohamed A Said, Justin A Haegele

Complement Ther Med. 2025 Aug 7;93:103228. Online ahead of print.

Abstract
Introduction: Cerebral palsy (CP) is the most common childhood disability, affecting 1.5–3 per 1000 live births. Physical exercises have been shown to improve muscle and limb outcomes in CP. This systematic review critically appraises existing systematic reviews on the effects of physical activity and exercise on physical, functional, and psychosocial outcomes in individuals with CP compared to those without.
Methods: Using a PICO framework, the question was: In patients with CP, do physical activity and exercise improve muscle- and limb-related outcomes compared to no intervention or usual care? PubMed, Cochrane, ISI Web of Science, and Embase were searched for systematic reviews meeting inclusion criteria. Seven reviews focusing on exercise-related outcomes in CP were synthesized.
Results: Exergaming significantly improved fine motor dexterity (SMD = 3.12) but not gross manual dexterity. Progressive resistance and general physical activity increased muscle strength (SMD = 0.59), while aerobic exercise showed mixed results. Task-oriented training led to large improvements in gross motor function (SMD = 6.04–11.05) and functional independence (SMD = 6.44). VR-based and aerobic interventions had modest or nonsignificant effects on mobility, balance, and walking. Adverse events were infrequently reported and generally mild. Task-oriented and VR-assisted training showed the most consistent benefits, though heterogeneity and incomplete reporting limit conclusions.
Conclusion: Physical exercises, particularly task-oriented and VR-assisted training, improve motor and limb functions in CP. Future research with longer follow-up, larger samples, and better safety reporting is needed to confirm clinical impact.
PMID: 40783112

11.Considerations when assessing cognition in children with cerebral palsy

Lena Elin Lorentzen, Sandra Julsen Hollung, Kristine Stadskleiv

Clin Neuropsychol. 2025 Aug 14:1–22. Online ahead of print.

Objective: To describe cognitive assessment results in relation to clinical characteristics in children with cerebral palsy (CP) and to compare methods for calculating composite scores, taking their motor impairments into account.
Method: All children registered in the Norwegian Quality and Surveillance Registry for Cerebral Palsy born 2002–2014 were included. The contribution of clinical characteristics per assessment results were investigated using one-way ANOVA (eta-squared (η^2) effect size) and multiple linear regression analyzes. Composite scores were compared with paired samples t-test (Cohen's d effect size).
Results: Of the 1532 children with CP registered, 972 (63.4%) had a cognitive assessment. An Intelligence Quotient (IQ) score was available for 451 (46.4%) of the assessed children (range 40–129, mean 82.3). Twenty-two percent had an intellectual disability. Mean IQ was lowest in children with spastic quadriplegic CP, epilepsy, and/or severe hearing impairment (effect sizes were small, $\eta^2 = 0.05$, 0.05 and 0.01, respectively). The Verbal Comprehension Index score was highest and Visual Spatial Index lowest, with moderate effect size, $d = 0.7$. Fine motor skills and speech ability contributed most towards explaining variability in Wechsler Full Scale IQ (FSIQ). General Ability Index, Fluid Reasoning Index and Nonmotor Full Scale Score were higher than FSIQ, with small to moderate effect sizes of $d = 0.61$, 0.46 and 0.62, respectively.
Conclusions: Variability in cognitive functioning underscores the importance of individual assessments. Better scores were obtained on composite measures using subtests that did not place high demands on fine motor skills, indicating a need for tailoring assessment practice to children with CP.
PMID: 40810513

12.Core outcome set and measures of chest health in children and young people with cerebral palsy in the community setting: the CHESTI study protocol

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BMJ Open. 2025 Aug 11;15(8):e105309.

Introduction: Poor chest health is the leading cause of early mortality in children with cerebral palsy (CP). It is also the most common reason to seek healthcare, accruing significant costs and reducing quality-of-life for children and families. Clinical trials examining chest health interventions in CP are characterised by inconsistent outcome measures, limiting the capacity for evidence synthesis to inform clinical application. The study aims to develop a core outcome set (COS) and related measurement instruments to assess, monitor and evaluate chest health in children with CP, both in research and routine clinical practice. The COS will reflect the views of children, young people, parent/carers, clinicians and researchers, emphasising under-represented groups in research and those at risk of poorer chest health.
Methods and analysis: A 3-phase methodology will be conducted in line with the Core Outcome Measures in Effectiveness Trials (COMET) Initiative. (1) Candidate outcomes will be identified through a qualitative evidence synthesis and interviews with key stakeholders. Findings will be mapped to COMET-taxonomy, generating a list of candidate outcomes. (2) An international e-Delphi survey will invite stakeholders to rate the importance of each outcome, followed by a consensus meeting to ratify the COS. (3) A structured review, guided by health measurement taxonomy, will evaluate relevant instruments, with a final meeting to agree on recommended measures for each COS domain.
Ethics and dissemination: Ethical approval was provided by the University of Plymouth Research Ethics Committee for the qualitative interview study (ID5116), e-Delphi study and consensus meeting (ID5636). Study findings will be published open access in a peer-reviewed journal and presented at relevant national and international conferences.
PMID: 40789728

13.Gaze responses in children with cerebral palsy, cerebral visual impairment, and severe intellectual and developmental disabilities

No authors listed

Dev Med Child Neurol. 2025 Aug 10. Online ahead of print.

Abstract
No abstract available.
PMID: 40785157

14.Effectiveness of virtual reality for functional disorders in cerebral palsy: an overview of systematic reviews and meta -analyses

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Front Neurol. 2025 Jul 30;16:1582110. eCollection 2025.

Objective: Cerebral palsy (CP), a pediatric neuromotor disorder, profoundly impacts functional independence and participation. Virtual reality (VR) has developed as a potential neurorehabilitation tool, yet its therapeutic efficacy remains inconsistently validated. This overview aims to synthesize evidence from systematic reviews (SRs) and meta-analyses (MAs) to evaluate VR's effectiveness in CP rehabilitation.
Methods: Systematic searches across ten databases—Embase, Web of Science, Cochrane Library, PubMed, CINAHL, JBI, China National Knowledge Infrastructure (CNKI), China Science and Technology Journal Database (VIP), China Bio-Medical Literature Service System (Sino-Med), and Wanfang Database—identified SRs/MAs on VR for CP from inception to November 10, 2024. The duplicate rate of primary studies was assessed by calculating the corrected covered area (CCA) through the establishment of a literature overlap matrix. Methodological rigor, reporting quality, bias risk, and evidence quality were appraised using the Assessment of Multiple Systematic Reviews 2 (AMSTAR-2), the Preferred Reporting Items for Systematic Reviews and Meta-Analyses 2020 (PRISMA2020), the Risk of Bias in Systematic Reviews (ROBIS), and the Grading of Recommendations Assessment, Development and Evaluation (GRADE) tools, respectively.
Results: Sixteen SRs/MAs (5 low quality, 11 very low quality, according to AMSTAR-2) were included. The CCA was calculated as 0.135, indicating a high degree of overlap. PRISMA 2020 compliance revealed incomplete reporting in 37% of items. ROBIS indicated low bias risk in 13 studies. GRADE assessments classified 58 outcomes: 9 moderate (15.5%), 21 low (36.2%), and 28 very low (48.3%) quality. VR demonstrated clinical potential for improving motor function and activities of daily living (ADL), particularly in younger children with higher intervention dosages. However, heterogeneity in outcome measures, CP subtypes, and VR protocols limited generalizability.
Conclusion: VR shows potential in improving motor dysfunction and ADL in CP. However, the included SRs/MAs typically exhibited low methodological and evidence quality. Therefore, caution must be taken when interpreting these findings. Moreover, high-quality randomized controlled trials and standardized VR protocols are urgently needed to establish evidence-based guidelines for CP rehabilitation.
PMID: 40808917

15.Cerebral palsy in young children: bridging the global data gap

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Lancet Glob Health. 2025 Aug 11. Online ahead of print.

Abstract
No abstract available.
PMID: 40812330

16.Rural South African mothers' perspectives on strategies to mitigate cerebral palsy caregiving

Ngokwana C Rachamose

Afr J Disabil. PMID: 40799408. Online ahead of print.

Background: Ample evidence suggests that primary caregivers of children with cerebral palsy experience barriers relating to their caregiving role; however, these caregivers also reported encountering factors that facilitate their caregiving experience.
Objectives: This article aimed to explore factors that facilitate and support caregivers of children living with cerebral palsy in rural South Africa.
Method: An exploratory qualitative research design was employed. Purposive convenience and snowball sampling were used to select 10 primary caregivers of children living with cerebral palsy between the ages of 3 years and 18 years. A semi-structured interview was used to collect data. Data were analysed using thematic analysis.
Results: This research identified several factors for facilitating and supporting caregivers of children living with cerebral palsy. These include social support, caregivers' ability to understand and accept their children's disability, mental health support and caregivers' access to resources.
Conclusion: The study found that caregivers looking after children living with cerebral palsy in rural communities have access to certain support systems that aid their caregiving experiences; however, such systems of support need to be strengthened and sustained to reduce the burden of care.
Contribution: This article highlights the facilitators and supportive factors of caring for children living with cerebral palsy in rural communities of South Africa to inform stakeholders on possible intervention strategies for maternal mental health in the context of raising a child with limiting disabilities.
PMID: 40799408

17.Risk factors for spastic cerebral palsy: a retrospective cross-sectional study and literature review

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Ital J Pediatr. 2025 Aug 12;51(1):250.

Background: Cerebral Palsy (CP), a lifelong neurodevelopmental disorder, primarily manifests in early childhood, with spastic CP constituting 70% of cases. This study investigates spastic CP risk factors through a retrospective cross-sectional analysis of medical records and literature review to guide clinical strategies for reducing its incidence.
Methods: The study analyzed the records of patients with spastic CP from Xi'an Encephalopathy Hospital affiliated to Shaanxi University of Chinese Medicine, between October 2021 and September 2022, aged 4–14 years old. Demographic and risk factor analysis was conducted among 231 patients, utilizing count data and percentages. Additionally, recent literature on spastic CP risk factors was reviewed.
Results: Among the 231 cases, 55.41% were male, and 52.84% were urban residents. Age distribution was most concentrated at 4 years old (18.18%), followed by 5 years old (11.69%), and 8 years old (11.26%). Disease duration ranged from less than 3 months (10.82%) to 12–24 months (30.30%). Identified risk factors included neonatal diseases such as neonatal asphyxia (63.20%), premature birth (49.78%), and low birth weight (49.35%). Maternal prenatal illnesses and medication use (4.76%), delivery methods including cesarean section (32.90% preterm), and environmental pollutants were also significant.
Conclusion: This study enhances the understanding of spastic CP risk factors and provides actionable insights for prevention and management. Key recommendations include improved prenatal care (e.g., regular monitoring and infection control) and reducing maternal exposure to modifiable risks like environmental toxins, alcohol, and unnecessary medications. These findings support earlier, personalized interventions for at-risk cases.
PMID: 40796871

18."The caregiver's life is the uncared-for life": experiences of mothers of children with cerebral palsy in mental health care in Brazil

Danton Matheus de Souza, João Vitor de Jesus Santana, Letícia Cristina Pereira Coelho, Sofia de Souza Cruz, Ana Paula Scoleze Ferrer, Jaqueline Lemos de Oliveira, Lisabelle Mariano Rossato

J Pediatr Psychol. 2025 Aug 7:jsaf044. Online ahead of print.

Objective: To understand the experiences of mothers of children with cerebral palsy (CP) regarding the impact of caregiving on their mental health and their engagement with Brazil's psychosocial care network.
Method: This descriptive-exploratory qualitative study employed the theoretical framework of Symbolic Interactionism by Herbert Blumer. Interviews were conducted with Brazilian women aged 18 years or older, who had at least one child with CP aged between 28 days and under 19 years. Data collection focused on their experiences with mental health care and their interactions with Brazil's psychosocial care network. The interviews were transcribed and subjected to thematic content analysis.
Results: Fifteen women participated, with an average age of 36 years, predominantly with high school and higher education, who were distanced from the workforce and were married. Two central categories emerged from the interactions analyzed: "My life is not normal": Maternal life with a child with CP amidst mental health demands; and "If you need me, I'm here": The pursuit of maternal self-care, the obstacles faced, and an alternative route, with interconnected subcategories.
Conclusion: The mental health of Brazilian mothers of children with CP is marked by invisibility and multiple challenges. Their social interactions influence their psychosocial well-being, which, while acknowledged, is often neglected in favor of caregiving for their child. These challenges extend to the psychosocial care network in Brazil, characterized by barriers to accessing appropriate care for their needs. As an alternative, mothers engage in self-care activities to reconnect with their personal needs as women.
PMID: 40795258

19.Obstructive sleep apnea syndrome in children with cerebral palsy in Brazil: a multicenter study

Bruno Leonardo Scofano Dias, Fernanda Marinho de Lima, Daniela Fava, Fernanda Jordão Pinto Marques, Frederico José de Carvalho Godinho, Alessandra Lemos de Carvalho, Sara Virgínia Paiva Santos, Fernanda de Lourdes da Cunha Pinto, Danielle Bruno Jardim, Wilerson Marques Bessa

J Pediatr (Rio J). 2025 Aug 8:101432. Online ahead of print.

Objectives: To evaluate the prevalence of high risk for obstructive sleep apnea syndrome (HR-OSAS) in Brazilian children with cerebral palsy (CP) using the Pediatric Obstructive Sleep Apnea Screening Tool (PosaST) and to analyze its association with demographic, clinical and functional (Gross Motor Function Classification System [GMFCS]) variables.
Methods: Multicenter, cross-sectional, exploratory study.
Results: There were 312 children (median age 6.0 years, IQR 5.0–8.0) included. The prevalence of HR-OSAS in GMFCS I–V was 9.0%. The prevalence of HR-OSAS in GMFCS V (14.7%) was significantly higher compared to GMFCS I–IV (6.4%) and to the frequency of OSAS in typically developing (TD) children assessed by polysomnography (5.8%) according to literature data. Significantly higher frequencies of palatine tonsil hypertrophy, hospitalizations and outpatient antibiotic use for respiratory causes (last 12 months), gastroesophageal reflux disease, drooling and epilepsy were found in GMFCS V. Palatine tonsil hypertrophy was significantly associated with HR-OSAS. GMFCS V was significantly correlated with HR-OSAS at the expense of its significantly higher prevalence of palatine tonsil hypertrophy.
Conclusions: The prevalence of HR-OSAS in Brazilian children with CP (GMFCS V) was higher than the frequency of OSAS in TD children assessed by polysomnography. HR-OSAS was significantly more prevalent in GMFCS V compared with GMFCS I–IV. Palatine tonsil hypertrophy was significantly associated with HR-OSAS. GMFCS V was significantly correlated with HR-OSAS due to its significantly higher prevalence of palatine tonsil hypertrophy. PosaST may be a reliable questionnaire for Brazilian children with CP, but studies are needed to define the HR-OSAS cutoff score in this population.
PMID: 40789332

20.Application of the Gross Motor Function Measure in children with conditions other than cerebral palsy: A systematic review

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Aim: To investigate the application and evaluate the measurement properties of the Gross Motor Function Measure (GMFM) in children with conditions other than cerebral palsy (CP).
Method: A systematic review was conducted using five electronic databases to identify studies that used the GMFM in children with conditions other than CP. Methodological quality and measurement properties were evaluated using established standards for assessing outcome measures.
Results: We identified 210 studies across various paediatric conditions. Measurement property studies examined eight conditions: acquired brain injury, spinal muscular atrophy, Fukuyama congenital muscular dystrophy, Down syndrome, osteogenesis imperfecta, acute lymphoblastic leukaemia (ALL), leukodystrophy, and Pompe disease. Evidence quality was generally low to very low owing to small sample sizes and methodological limitations. Reliability showed sufficient ratings across most conditions. Content validity was examined only for ALL and demonstrated sufficient ratings. Responsiveness and construct validity showed variable results across conditions. Clinical application analysis revealed inadequate methodological reporting and widespread use without appropriate validation.
Interpretation: GMFM validation for conditions other than CP remains insufficient despite widespread use. Content validity verification and enhanced methodological rigor are critically needed. Clinicians should interpret results cautiously until robust validation is established.
PMID: 40813751

21.Suicidal Ideation in Individuals with Cerebral Palsy: A Narrative Review of Risk Factors, Clinical Implications, and Research Gaps

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Background: Cerebral palsy (CP) is a lifelong neurodevelopmental disorder characterised by motor impairment and commonly associated with comorbidities such as cognitive, communicative, and behavioural difficulties. While the physical and functional aspects of CP have been extensively studied, the mental health needs of this population remain largely underexplored, particularly concerning suicidal ideation and self-injurious behaviours. The purpose of this review is to synthesise the existing literature on suicidality in individuals with CP, explore theoretical and clinical risk factors, and identify key gaps in the current evidence base.
Methods: A narrative literature review was conducted focusing on studies addressing suicidal ideation, self-harm, or related psychiatric outcomes in individuals with CP. Additional literature on risks and protective factors was included to support theoretical inferences and clinical interpretations.
Results: Only a limited number of studies addressed suicidality directly in CP populations. However, several reports document elevated rates of depression, anxiety, and emotional distress, particularly among adults and individuals with higher levels of functioning. Communication barriers, chronic pain, social exclusion, and lack of accessible mental health services emerged as critical risk factors. Protective elements included strong family support, inclusive environments, and access to augmentative communication.
Conclusions: Suicidality in individuals with CP is a neglected yet potentially serious concern. Evidence suggests underdiagnosis due to factors such as communication barriers and diagnostic overshadowing. Future research should prioritise disability-informed methodologies and validated tools for suicidal ideation, while clinicians should incorporate routine, adapted mental health screening in CP care to ensure early detection and person-centred management.
PMID: 40807206

22.Individualized telehealth home program for children with cerebral palsy during the COVID-19 pandemic

No authors listed

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Abstract
No abstract available.
PMID: 40782362

23.Enforcing the rights of persons with childhood-onset disabilities: An international statement

John Coughlan, Deirdre Fitzgerald

Dev Med Child Neurol. 2025 Aug 9. Online ahead of print.

Abstract
No abstract available.
PMID: 40782359

Prevention and Cure

24.A Reconciled Method for Evaluating the Cost-Effectiveness of Implementation Programmes: Illustrated by Quality Improvement Programmes to Increase the Uptake of Magnesium Sulphate in Preterm Births

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Appl Health Econ Health Policy. 2025 Aug 12. Online ahead of print.

Background: Methods for the economic evaluation of implementation initiatives to increase the uptake of cost-effective healthcare interventions are not standardised. Value of implementation and policy cost-effectiveness are two proposed approaches. This research aims to compare these two methods and propose a standardised approach. To illustrate this, we evaluated two implementation programmes to increase magnesium sulphate ($MgSO_4$) uptake in preterm labour to reduce the risk of cerebral palsy: (i) the National PReCePT Programme (NPP), which provided regional support and funded clinical time in maternity units in England, and (ii) an enhanced support programme (ESP) with additional unit-level coaching and extra funded time, which was nested within the NPP and subject to a cluster randomised control trial.
Methods: After summarising value of implementation and policy cost-effectiveness methods, we explored the extent to which the two methods can be viewed as mathematically equivalent for the purpose of evaluating the NPP (versus pre-existing trends) and the ESP (versus the NPP) calculating their incremental cost-effectiveness ratios, net monetary benefits and their probability of being cost-effective.
Results: We demonstrate how the value of implementation and policy cost-effectiveness approaches can be expressed in equivalent terms and set out our standardised stepwise method for evaluating the NPP (versus pre-existing trends) and the ESP (versus the NPP). Our method found that the NPP generated a net monetary benefit of £30,247 per maternity unit over 12 months, with a 98% probability of being cost-effective. In contrast, the ESP generated a net monetary loss of £28,682 per unit compared with the NPP, with a 22% probability of being cost-effective.
Discussion: Our standardised method could promote a more systematic assessment of the value for money of implementation interventions.
PMID: 40794240

25.Development and validation of a conventional MRI-based model to predict cerebral palsy in infants (aged 6–24 months) with periventricular white matter injury: a multicentre, retrospective cohort study

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Background: Periventricular white matter injury (PVWMI) is the most common form of brain injury and the leading cause of cerebral palsy (CP). Early prediction of CP within the first 2 years of life is crucial for timely and effective intervention. Early CP prediction tools for infants with PVWMI are lacking. This study aimed to develop and validate a conventional Magnetic Resonance Imaging (MRI)-based model to predict CP in infants with PVWMI.
Methods: In this multicentre retrospective cohort study in China, infants with PVWMI who underwent conventional MRI between 6 and 24 months of corrected age (CA) were included from five hospitals and confirmed to have CP or non-CP by 5 years of age. Between April 2013 and September 2018, a multivariable regression logistic model was developed and internally validated using data from one hospital to identify significant independent MRI features associated with CP, followed by external validation across four other hospitals. A visual nomogram was constructed based on these factors. Predictive performance was evaluated via the area under the receiver operating characteristic curve (AUC), calibration curves, and decision curves. Between October 2018 and January 2021, data from one hospital was included in a multiple readers test cohort (nine radiologists and two paediatric neurologists with varying experience) to assess the diagnostic performance and generalisability of the model. Subgroup analyses were conducted by age and sex.
Findings: Across the two recruitment periods, 383 infants (65% male) with MRI-diagnosed PVWMI were included: 191 infants (122 with CP) in the derivation cohort, 115 (75 with CP) in the external validation cohort, and 77 (46 with CP) in the multiple readers test cohort. Five MRI features were associated with CP: abnormal signals in the posterior limb of the internal capsule (odds ratio [OR] 16.52; 95% confidence interval (CI) 5.78–52.67; $P < 0.001$), corticospinal tract in centrum semiovale (13.01; 3.49–62.30; $P < 0.001$), and cerebral peduncle (5.54; 1.20–32.15; $P = 0.04$), abnormal signals or atrophy in the thalamus (4.76; 1.41–19.32; $P = 0.02$) and lenticular nucleus (4.58; 1.24–21.35; $P = 0.03$). The model yielded an AUC of 0.94 (95% CI 0.91–0.98) in the derivation cohort. Similar AUCs were achieved in the internal (0.96 [0.93–0.99]) and external (0.92 [0.86–0.97]) validation cohorts. In the multiple readers test cohort, the average AUC, average sensitivity, and average specificity of 11 readers were 0.96 (95% CI 0.93–0.99), 0.90 (0.84–0.96), and 0.88 (0.77–0.98), respectively. Subgroup analyses were robust, yielding similar AUCs.
Interpretation: The conventional MRI-based model showed good performance for predicting CP in infants aged 6–24 months with PVWMI and also had good diagnostic performance and generalisability, which may assist in identifying high-risk infants of CP and facilitating timely interventions. Future work with external validation in diverse countries and socioeconomic contexts are needed.
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