Cerebral palsy research news

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Interventions and Management

1.Clinical utility of the upper limb-motor learning strategy tool: exploring occupational therapists' experiences

Atefeh Taghizadeh, Brian Hoare, Kate E Webster, Anoo Bhopti

Disabil Rehabil. 2025 Aug 22:1–16. Online ahead of print

Abstract
Purpose: To investigate the clinical utility of the newly developed Upper Limb-Motor Learning Strategy Tool (UL-MLST) within the upper limb therapy models for children with cerebral palsy.
Material and method: A qualitative interpretive phenomenological approach was used, incorporating four components of clinical utility to explore clinicians' experience of using the UL-MLST in practice. Semi-structured interviews were conducted with a convenience sample of seven Australian-based occupational therapists who attended a three-session Online Training Program on the use of the UL-MLST and later used the tool in their clinical practice 4 to 6 weeks after the program. Interviews were analysed for themes and subthemes using thematic analysis and constant comparison methods.
Results: Six themes were generated from the interviews. Two themes highlighted unanimously that the UL-MLST "Builds the clinicians' capacity" and "Strengthens the clinicians and family partnerships." The remaining four themes identified, were "Strengths" of using the UL-MLST, "Navigating practical constraints" of its use, "Suggested changes," and its "Future use."
Conclusions: The clinicians' experience of using the UL-MLST confirmed its clinical utility highlighting that it is appropriate, practicable and acceptable for use with upper limb therapy models for children with cerebral palsy, and that its accessibility is highly important.
Plain language summary
The Upper Limb-Motor Learning Strategy Tool (UL-MLST) is a valid, reliable, and clinically useful self-reflective tool for clinicians who provide therapy to children with cerebral palsy. It builds professional expertise through improved knowledge development, clinical reasoning, and skill development. It builds trust and collaboration between clinicians and families. It has a potential to strengthen communication and information exchange between clinicians and other healthcare professionals.
PMID: 40844992

2.ABILHAND-kids young CP: a measure of manual ability in young children with cerebral palsy aged 2 to 7

Carlyne Arnould, Julie Paradis, Massimo Penta, Jean-Louis Thonnard, Yannick Bleyenheuft

J Rehabil Med. 2025 Aug 20:57:jrm42691. Online ahead of print

Objective: Hand dysfunction is one of the main factors contributing to daily activity limitations in children with cerebral palsy (CP). As a latent variable, manual ability is not easily measurable, especially in young children. This study aimed to develop ABILHAND-Kids Young CP, a Rasch-built manual ability measure in young children with CP.
Design: Prospective study/questionnaire development.
Subjects/patients: 107 CP children aged 2 to 7 (59% unilateral CP).
Methods: Responses of children's parents to an 80-item experimental questionnaire were analyzed using RUMM2020 software to select items presenting the best psychometric qualities.
Results: ABILHAND-Kids Young CP includes 17 items with well-discriminated response categories and defines a valid, unidimensional, and linear scale. It presents high measurement precision (R = 0.94) and is invariant allowing the measurement of young children with CP whatever their age, gender, clinical form, and Manual Ability Classification System (MACS) levels. Its measures are significantly related to age (r = 0.22), school education, clinical form, MACS (r = -0.63) and Pediatric Evaluation of Disability Inventory (r = 0.74) (all $p < 0.001$, except age at $p = 0.023$).
Conclusion: ABILHAND-Kids Young CP is a unidimensional and linear scale specifically developed to measure manual ability in young children with CP. Its psychometric properties show promising potential in monitoring children's evolution related to neurorehabilitation.
PMID: 40833249

3.Longitudinal assessment of the upper limb in adults with cerebral palsy

Prue Morgan

Developmental Medicine & Child Neurology. 2025 Aug 17. Online ahead of print

Abstract
No abstract available.
PMID: 40820395

4.Surgical and health outcomes of non-ambulatory children with cerebral palsy and severe scoliosis: A population-based, longitudinal study

Svend Vinje, Terje Terjesen, Joachim Horn, Sandra Julsen Hollung, Thomas Kibsgård

Dev Med Child Neurol. 2025 Aug 20. Online ahead of print

Aim: To evaluate medium-term surgical outcomes, complications, mortality, and health-related quality of life (HRQoL) in non-ambulatory children with cerebral palsy (CP) and severe scoliosis, and to analyse outcomes and mortality rates in children who had not undergone surgery.
Method: Data on non-ambulatory children with CP and severe scoliosis born from 2002 to 2008 were extracted from the Norwegian Quality and Surveillance Registry for Cerebral Palsy. Seventy-five children (44 males, 31 females) were included. Thirty-eight (51%; mean age at surgery 14 years 4 months; SD = 2 years 4 months; range = 8–18 years) underwent surgical correction and posterior spinal fusion, with a mean preoperative Cobb angle of 90° (range = 49°–140°), while 37 (49%) children had non-surgical treatment. HRQoL was measured with the Caregiver Priorities and Child Health Index of Life with Disabilities (CPCHILD).
Results: Eighteen children (47%) had postoperative complications; 5 of 38 (13%) children underwent further surgery. Surgical treatment improved sitting posture and back pain. The mean CPCHILD score was 49.0 (range = 19–84). Among non-surgically treated children, 15 of the 31 children considered too fragile to undergo spinal surgery (48%) died during the follow-up; the mean CPCHILD score for the remaining children was 36.4 points (range = 9–59).
Interpretation: Although surgical correction of scoliosis in non-ambulatory children with CP carried a high risk of complications and re-operations, it resulted in improved sitting posture and reduced back pain. Children who were not eligible for surgical treatment had a high mortality rate.
PMID: 40836580

5.Fall experiences of ambulatory children and adults with cerebral palsy: A qualitative study using thematic content analysis

Marissa Esterley, Linda E Krach, Kari Pederson, Sandy Callen Tierney, Nathan G Wandersee, Elizabeth R Boyer; Cerebral Palsy Research Network

Dev Med Child Neurol. 2025 Aug 21. Online ahead of print

Abstract
Aim: To qualitatively assess the causes, adaptations, and psychosocial impact of falls, and solutions for safer environments, as shared by individuals diagnosed with cerebral palsy (CP).
Method: Ambulatory adults with CP (n = 165; age median [interquartile range], range: 30 years [25–50], 18–76 years); 101 females, 59 males, five non-binary/not specified) and caregivers of ambulatory children with CP (n = 151; age median [interquartile range], range: 10 years [7–14 years], 5–17 years; 64 females, 83 males, four non-binary/not specified) responded to four open-ended prompts regarding falls. Deductive and inductive thematic content analysis was conducted.
Results: Eight themes were identified (psychological, physical, avoidance, adaptation, people, environment, policy, healthcare). Participants elaborated on the causes of falls (aging, physical, mental, environmental, situational), mechanics (most often trips), repercussions (psychological and physical), adaptations, difficulty getting up, and aspirations for themselves and society. Caregivers and adults detailed several adaptations to, or deliberate avoidance of, high-risk situations (e.g. uneven surfaces, crowds). Specific suggestions for environmental accessibility (e.g. more handrails), societal behavioral responses (e.g. give autonomy, be patient), healthcare practice, and policy were made.
Interpretation: This study offers deep insights into how individuals with CP navigate the challenges of falls and how people and surroundings both positively and negatively affect their fall-related experiences. Many issues identified were multifactorial, requiring multidimensional, non-ableist solutions. Participants were offered simple, but impactful, actions that could be taken immediately to support the creation of safer physical and psychological environments. More research and clinical practice guidelines are warranted.
PMID: 40842201

6.Movement Disorders Rating Scale for Children Aged 0–3 years: A Revision Study Design

Roberta Battini, Roberta Scalise, Valentina Menici, Eleonora Gazzanelli, Eleonora Bonaventura, Roberta Di Pietro, Camilla Antonelli, Andrea Guzzetta, Giuseppina Sgandurra, Giovanni Cioni

Pediatr Neurol. 2025 Aug 5;171:100–106. Online ahead of print

Background: Movement Disorders – Childhood Rating Scale (MD-CRS 0–3) is a tool aimed to evaluate movement disorders in the first 3 years of life; however, with the experience gained in 10 years clinical practice, it has been possible, and necessary, to improve the characterization of the scale defining age-appropriate tasks according to age time windows and moving the MD severity from a three-point to a five-point scoring system. By using the scale in our clinical practice and in research, we realized that it was necessary to have more quantitative specifications, allowing a more precise scoring and a better definition of the psychometric properties. This study is a measurement-focused study of recorded video sessions and of video sessions which were carried out in in- and out-patient settings of IRCCS Fondazione Stella Maris aiming to revise the MD-CRS 0–3 and create the MD-CRS 0–3 R to promote and increase its use by improving its structure and items.
Methods: A clinical sample of 90 eligible individuals—30 females and 60 males, mean age 2 years and 6 months, and age range 3 months–3 years and 11 months—was included. Five raters independently and blindly scored the videotapes according to the MD-CRS 0–3 and the MD-CRS 0–3 R, with an interval of at least 6 months.
Results: Inter-rater and Intraclass Correlation Coefficient values in all indexes of MD-CRS 0–3 R all exceeded 0.85. Standard Errors of the Measurement and Minimally Detectable Differences were very low. Overall, the MD-CRS 0–3 R exhibited improved psychometric properties compared to the original scale.
Conclusions: The present study supports the use of the revised MD-CRS 0–3 in children under 4 years as a trustworthy, sensitive tool for longitudinal assessments of movement disorder severity.
PMID: 40829291

7.Assessing gross motor function in cerebral palsy: What standardized scores do not tell us

Peter Rosenbaum

Dev Med Child Neurol. 2025 Aug 19. Online ahead of print

Abstract
No abstract available.
PMID: 40828996

8.Effects of focus of attention on gait parameters and balance performance in children with unilateral cerebral palsy: a randomized controlled trial

Rabia Zorlular, Murat Akinci, Bulent Elbasan

Disabil Rehabil. 2025 Aug 21:1–13. Online ahead of print

Abstract
Purpose: This randomized controlled trial examined the effects of a treatment program based on external focus of attention (EFA) and internal focus of attention (IFA) on spatiotemporal gait parameters and balance performance in children with unilateral cerebral palsy (uCP).
Methods: Twenty-four children with uCP, aged 6–12 years, were randomly assigned to EFA (n = 12) or IFA (n = 12) groups. Both groups received the same balance and gait exercises for six weeks, differing only in attentional focus instructions. Assessments included the C-Mill VR+ gait system, Single-Leg Stance Test, Pediatric Balance Scale (PBS), and Trunk Control Measurement Scale.
Results: After the intervention, the EFA group showed significantly greater improvements in cadence (+15.8 steps/min), affected limb stance phase (+4.17%), and PBS scores (+5 points) compared to the IFA group. Cadence and PBS changes suggest clinical relevance, though the stance phase increase may reflect compensation rather than functional improvement.
Conclusion: Both attentional focus and gait and balance parameters improved. EFA-based training was more effective than IFA in improving some parameters of gait and balance. These findings suggest that externally focused instructions can enhance motor learning in children with uCP, though further research is warranted to assess the clinical relevance of smaller differences.
Plain language summary
Clinically meaningful improvements in gait and balance can be achieved through the combination of external attentional focus strategies and task-specific training in rehabilitation programs. Professionals are recommended to schedule follow-up assessments to determine whether improvements achieved through attentional focus are maintained over time. Future rehabilitation programs should investigate the effectiveness of attentional focus interventions in other types of cerebral palsy.
PMID: 40839080

9.The E-words for promoting development and neuroplasticity for infants with or at high risk for cerebral palsy

Diane L Damiano

Dev Med Child Neurol. 2025 Aug 22. Online ahead of print

Abstract
For children with cerebral palsy (CP) who sustain brain insults during early development, animal research on earlier intervention offers the possibility of recovery not yet realized in humans. Inspired by and similar to the F-words in childhood disability, this narrative review aims to highlight essential components for promoting motor and overall development that may be used with or modified for infants with CP to enhance behavioral and neural outcomes, summarized here by seven E-words: earlier, engagement, exploration, enriched environments, experiences, everyday, and exercise. A preliminary list of E-words was used as search terms in combination with 'infant', 'cerebral palsy', or 'development'. Two more E-words emerged during the literature search. Key messages are (1) the developing brain is highly responsive to the quality, quantity, and timing of early sensorimotor experiences, and (2) the infant's active participation is essential to drive this process which is experienced uniquely by each infant and family. The concepts presented through these E-words may stimulate the design of novel intervention strategies or provide new insights for clinical practice. These also have important implications for learning, health, and well-being across the lifespan for those with or without cerebral palsy, as well as setting the stage for the F-words.
PMID: 40847471

10.Toward Home-Based Telerehabilitation for Cerebral Palsy Patients: A Qualitative Study on Feasibility, Barriers and Facilitators

Faridokht Salahshoori, Majid Jangi, Ebrahim Sadeghi-Demneh, Farhad Fatehi, Alireza Rahimi

Health Sci Rep. 2025 Aug 18;8(8):e71131. eCollection 2025 Aug. Online ahead of print

Background and aim: Telerehabilitation has emerged as a promising solution to address accessibility, cost-effectiveness, and continuity of care for patients requiring long-term rehabilitation, like cerebral palsy (CP) patients. This study aimed to qualitatively explore the perceptions of clinical specialists, and CP patients regarding the feasibility, barriers, and facilitators of home-based telerehabilitation.
Methods: This qualitative study conducted a thematic analysis approach. Participants include two groups: 17 medical informatics and rehabilitation professionals and 13 CP patients and/or their caregivers. Participants were selected via expert and snowball sampling. Interviews were semi-structured, transcribed, and analyzed using the Braun-Clarke thematic analysis technique and MAXQDA software.
Results: Thematic analysis revealed four dominant themes including feasibility, barriers, facilitators, and advantages. Feasibility was affected by technological infrastructure (internet connectivity, data security), human resources (availability of multidisciplinary specialists), legal aspects (patient data privacy), and financial sustainability. Key barriers included low digital literacy, limited access to specialized rehabilitation technologies, cultural resistance, legal regulations, and financial constraints. The findings also highlighted several advantages of home-based telerehabilitation, including cost savings, improved accessibility to rehabilitation, and enhanced patient engagement in therapy.
Conclusion: The current study suggested that home-based telerehabilitation can be a feasible alternative for CP patients in Iran, but a variety of technological, financial, legal, and cultural barriers must first be addressed for its successful development. Overcoming such barriers requires targeted investments, supportive policies, and cultural education for successful implementation.
PMID: 40837718

11.Managing Pain in Cerebral Palsy Patients Using Ethanol Hip Joint Injection: A Retrospective Chart Review

Shea I Buckley, Sterling C Kneedler, David A Yngve

Cureus. 2025 Aug 20;17(8):e90603. eCollection 2025 Aug. Online ahead of print

Background: In people with cerebral palsy (CP), some painful hips are too dysplastic for reconstruction by femoral or acetabular osteotomies. For these hips, a less invasive treatment than a bone-removing salvage operation is needed. The nonoperative management of this pain is not well-studied. The purpose of this study is to evaluate the use of ethanol hip joint injection to alleviate hip pain. This study aims to evaluate the outcomes of ethanol hip joint injections administered by a single surgeon and to evaluate their effectiveness in alleviating hip joint pain.
Methods: We included 57 consecutive patients with 71 hips in this study, with moderate-to-severe or severe pain. They had a total of 104 injections. Injections consisted of 10 mL to 15 mL of 75% ethanol into the hip joint under C-arm control, using a sterile field and general anesthesia. Gross Motor Function Classification System (GMFCS) was 4 or 5 for all. Data was collected from January 2010 to March 2023. The primary outcome was hip pain as recorded in the medical record. This was based on caregivers' perceptions and patients' facial expressions during physical exams in the clinic. Pain was evaluated on a scale of 1 to 5 (1: mild, 2: mild-moderate, 3: moderate, 4: moderate to severe, 5: severe). Following injection, a reduction in pain to a level less than 4 was considered a clinical success. The average follow-up period for these patients was 43 months (0.5–144 months). Short follow-up times gave information on the early onset, while longer follow-up times gave information on the duration of action. The total number of follow-up clinic visits for these patients was 202, and each clinic visit was used for pain score and follow-up time. A time-to-event analysis was done using Kaplan-Meier cumulative event curves to evaluate (1) time to a self-reported subjective pain score below 4 following the first injection and (2) to estimate the duration of pain control after the first injection. The event of interest was the time to the second injection in a patient who had reported a pain score below 4 after their first injection.
Results: The average patient age was 16 years. Of the 71 hips treated with a first ethanol hip joint injection, 61 (86%) showed a decrease in pain score to below 4. The median time to documentation of pain control after a first injection was four months. Within 10 months, 85% of the patients' hips reported pain control. Of those 61 hips with a decrease in pain score to below 4, 19 (31%) required a second injection. The median time to second injection after achieving pain control with the first injection was 33 months. When looking at all 104 injections, 36% experienced pain relapse. In our population who had hip joint injections, 11 hips (15%) had salvage surgeries and six hips (8%) developed avascular necrosis of the femoral head as an incidental X-ray finding.
Conclusion: This is the first study of an important modality. For our population of patients with CP and GMFCS level of 4 or 5, an injection of 10 mL to 15 mL of 75% ethanol into the affected hip joint, along with other procedures, provided pain control in 86%, with 31% of patients having a second injection after a median of 33 months. Based on these results, ethanol injection into the hip joint in those with severe or moderately severe pain should be further studied and considered as a treatment modality.
PMID: 40843064

12.Spontaneous swallowing frequency in the evaluation of swallowing function

Lucilla Guidotti, Daniel Espano, Noemí Tomsen, Pere Clavé, Omar Ortega

Expert Rev Gastroenterol Hepatol. 2025 Aug 21. Online ahead of print

Abstract
Introduction: Oropharyngeal dysphagia (OD) is a common but underdiagnosed condition associated with serious complications such as malnutrition, aspiration pneumonia, and increased mortality. Spontaneous swallowing frequency (SSF) has recently emerged as a potential noninvasive biomarker for dysphagia screening.
Areas covered: This narrative review explores the current state of knowledge on SSF in both healthy individuals and patients with OD, including stroke, Parkinson's disease, head and neck cancer, and cerebral palsy. The review discusses the physiological and neurological bases of SSF, summarizes the available measurement techniques (such as acoustic, electromyography, accelerometry), and examines its diagnostic and therapeutic implications. The literature search was conducted in PubMed, Scopus, and Web of Science, without publication date restrictions; studies included were published between 1965 and 2023. Literature was selected based on relevance, novelty, and methodological robustness, focusing on recent clinical studies and technical advances.
Expert opinion: SSF holds promise as a clinical tool to assess brainstem function and detect dysphagia, particularly when integrated with AI-based systems. However, standardization of methods and large-scale validation are essential for its widespread implementation. In the future, SSF may complement existing assessments, enabling earlier and more precise management of OD.
PMID: 40836833

13.Effectiveness of the Positive deviance and parent facilitator training strategies on the nutritional status of children and youth with cerebral palsy: A quasi-randomised trial with a factorial design

Lukia Hamid Namaganda, John Ssenkusu, Asige Elizabeth, Carin Andrews, Angelina Kakooza Mwesige, Fred Wabwire Mangen, Hans Forssberg

PLOS Glob Public Health. 2025 Aug 19;5(8):e0005027. eCollection 2025. Online ahead of print

Abstract
High malnutrition among children with CP in low-income countries underscores the need for community-based nutrition strategies. This study aimed to describe the effectiveness of two caregiver-led interventions including, the positive deviance (PD) and the parent facilitator training (PFT) interventions on malnutrition among children and youth (C&Y) with CP in rural Eastern Uganda. This was a 2x2 factorial quasi-randomized trial among 124 pairs of caregiver-malnourished C&Y with CP aged 2–24 years, at the Iganga Mayuge Health and Demographic Surveillance Site (IMHDSS) in Eastern Uganda. Outcome measures included three months change in weight gain, Weight-for-age-z scores and Body Mass Index-for-age-z scores. Change in weight status was modelled in a multiple linear regression adjusting for baseline characteristics. Non-factorial analysis was used to determine the effect of combining both interventions on weight status. The interaction effect between PD and PFT was not statistically significant ($p > 0.05$). Those who received the PD intervention significantly gained more weight by 520g (adjusted coefficient = 0.52, 95% CI 0.16–0.88, $p = 0.005$) and improved their BMI-for-age z-scores (adjusted coefficient = 0.65, 95% CI 0.35–0.94, $p < 0.01$) than those who did not, while those who received PFT significantly improved their Weight-for-age z-scores (adjusted coefficient = 0.42, 95% CI 0.14–0.56, $p = 0.006$). Non-factorial analysis revealed a significant higher weight gain (770g) and improved BMI-for-age z-scores among those who received both interventions (adjusted coefficient = 0.77, 95% CI 0.22–1.37, $p = 0.009$). The PD alone or combined with PFT interventions improves weight status better than the PFT intervention alone. The PD and PFT caregiver-led strategies should be merged into existing community-based nutrition programs to reduce the high burden of malnutrition among C&Y with CP in low-income settings.
PMID: 40828775

14.Polysomnographic diagnosis of obstructive sleep apnea in children with cerebral palsy – a 10-year retrospective review

Sonal Joshi, Alexander Young, Alyssa Chen, Sarah Raven, David A Zopf, Louise M O'Brien

International Journal of Pediatric Otorhinolaryngology. 2025 Aug 12;197:112512. Online ahead of print

Objective: To investigate the frequency and characteristics of OSA in children with cerebral palsy (CP) referred to a sleep laboratory.
Materials and methods: A retrospective review of pediatric patients (0–21 years) with CP who underwent PSG from January 2013 to December 2022 at a large tertiary medical center. Sleep staging and respiratory events were scored using standard criteria, with OSA defined as an apnea-hypopnea index (AHI) ≥1 event/hour. Clinical data and Gross Motor Function Classification System (GMFCS) scores were abstracted from medical records.
Results: Among 272 patients (56% male, 44% female; median age 7.7 years), 226 (83.5%) met pediatric OSA criteria: 60.6% were mild, 18.1% were moderate, and 21.1% were severe. While median AHI, Non-REM AHI, and REM AHI were 2.7, 2.3, and 4.9 events/hour, respectively, 13 children had an AHI >30 (IQR: 5.6). Furthermore, minimum SpO_2 had a median of 89% (range: 46%–96%, IQR: 7.9). More severe GMFCS levels (IV/V) were associated with higher AHI and lower SpO_2.
Conclusion: Children with cerebral palsy have a high frequency of OSA. A substantial subset of children demonstrated profound desaturations associated with severe OSA. Notably, children with the greatest functional impairment (GMFCS scores of IV/V) exhibited the highest frequency of severe OSA indicating a pressing need for providers to identify and treat OSA in these complex patients.
PMID: 40825263

15."It's caused our whole family to enjoy each other:" a family's perspective on the impact of disability and AAC on the family system

Jessica Caron, Tara O'Neill Zimmerman, Megan Meneskie, Salena Babb, Meghan Wendelken

Augment Altern Commun. 2025 Aug 22:1–12. Online ahead of print

Abstract
This study explored the lived experiences of family members of a focal child (Nick), a 6-year-old child with cerebral palsy who used AAC. The aim of this study was to gain the family system's perspective on the impact of CP and AAC on their lives and their family system. A qualitative case study design utilized semi-structured interviews of eight members of the family system, including Nick. Participants described how Nick's intrinsic skills and challenges were a driving force behind life and intervention priorities. Each family member had unique roles and relationships within the family microsystem, as well as influences from the school and community. The family used a variety of communication strategies, including relying on unaided communication to resolve communication breakdowns and planning outings intentionally to make accommodations for Nick and his AAC use. Ultimately, the family perspectives revealed how they were an interdependent family system that adapted to changed circumstances (i.e., the introduction of AAC) to achieve a healthy family homeostasis. Collaborative teaming with families characterized by open communication and an understanding of the demands and needs of family life must be prioritized by professionals implementing AAC in order to ensure optimal communication, participation, and family outcomes.
PMID: 40844864

16.Wearable Robots for Rehabilitation and Assistance of Gait: A Narrative Review

Jun Min Cha, Juntaek Hong, Jehyun Yoo, Dong-Wook Rha

Annals of Rehabilitation Medicine. 2025 Aug 18. Online ahead of print

Abstract
Wearable robotic exoskeletons have emerged as promising technologies for enhancing gait rehabilitation and providing mobility assistance in individuals with neurological and musculoskeletal disorders. This narrative review summarizes recent advances in wearable robots—including both rigid exoskeletons and soft exosuits—and evaluates their clinical application across diverse conditions such as stroke, spinal cord injury, cerebral palsy, and Parkinson's disease. For rehabilitation purposes, these devices enable repetitive, task-specific gait training that promotes motor learning, reduces therapist burden, and facilitates improvements in walking speed, balance, and endurance. Rigid exoskeletons provide substantial joint support and are particularly effective for patients with severe gait impairments, whereas soft exosuits offer lightweight assistance suited to individuals with milder deficits or fatigue, albeit with limited capacity to deliver high-torque support. Beyond rehabilitation, wearable robots are increasingly used as assistive devices to compensate for permanent gait limitations and restore mobility in daily life. However, widespread clinical adoption remains constrained by several challenges, including a lack of standardized protocols; limited evidence from large-scale, multicenter studies; and practical issues such as device weight, comfort, and ease of use in community settings. Recent developments—such as adaptive control algorithms, volition-adaptive assistance, and artificial intelligence integration—are addressing these barriers by enabling more personalized and responsive support. With continued research investment, user-centered design, and supportive policies, wearable exoskeletons hold considerable potential to improve independence, participation, and quality of life for individuals across a broad spectrum of mobility impairments.
PMID: 40819657

17.Mobility development of children, adolescents and young adults with cerebral palsy in high-, and low-/middle-income countries: a scoping review

Elton Duarte Dantas Magalhães, Paula Silva de Carvalho Chagas, Deisiane Oliveira Souto, Lívia Alonso Coutinho, Ricardo Rodrigues de Sousa Junior, Filipe Machado Barcelos, Leonardo Cury Abrahão, Peter Rosenbaum, Robert J Palisano, Ana Cristina R Camargos, Hércules Ribeiro Leite

Disabil Rehabil. 2025 Aug 23:1–11. Online ahead of print

Purpose: To review research on mobility development in children, adolescents and young adults with cerebral palsy (CP).
Methods: This scoping review included longitudinal studies on mobility development of children and young people (19–21 years) with CP. Findings were reported considering mobility capacity and performance of individuals with CP, observed in low - and middle- or high-income countries. The results were analyzed by two physicians and a mother of a child with CP, using Patient and Public Involvement (PPI) strategy.
Results: Eleven studies included 3,047 individuals with CP. Lower Gross Motor Function Classification Measure (GMFCS) levels were associated with better mobility capacity and performance. Additionally, the lower the GMFCS level, the more stability is achieved at older ages. Ten studies in high-income countries showed that mobility capacity stabilized before performance. The only study conducted in a low-income country showed a decline in mobility capacity in early adolescence.
Interpretations: The development of mobility capacity and performance may be related to the presence of different contextual factors in socioeconomically diverse countries. The findings of this review are important for sharing, discussing, and managing mobility development patterns with family members.
Plain language summary
Mobility capacity stability occurs before mobility performance. Children with lower levels of GMFCS (higher gross motor function) show stability in mobility development later than children with higher levels of GMFCS. Longitudinal data are scarce in low- and middle-income countries, and both personal and environmental factors should be considered when analysing the prognosis.
PMID: 40848234

18.Cost-effectiveness of livelihood interventions for families of children with cerebral palsy in rural Bangladesh

Nuruzzaman Khan, Manik Chandra Das, Mahmudul Hassan Al Imam, Israt Jahan, Delwar Akbar, Mohammad Muhit, Nadia Badwai, Gulam Khandaker

PLoS One. 2025 Aug 21;20(8):e0326653. eCollection 2025. Online ahead of print

Abstract
Background: Families of children with Cerebral Palsy (CP) often experience extreme poverty, compounded by limited livelihood opportunities and the added demands of caregiving, which further restrict their ability to earn an income. Targeted livelihood interventions may help improve their economic well-being. This study aimed to assess the cost-effectiveness of livelihood interventions to improve household incomes of ultra-poor families of children with CP in rural Bangladesh.
Method: This was a mixed-methods study utilising a subgroup of a pragmatic, open-label, cluster randomised controlled trial (RCT). This subgroup was part of the "Supporting People in Extreme Poverty with Rehabilitation and Therapy (SUPPORT CP)" trial (ACTRN12619001750178), which was implemented in three rural subdistricts of Sirajganj district, Bangladesh. This RCT involved 251 children across three arms—integrated microfinance-based livelihood and community-based rehabilitation (IMCBR), community-based rehabilitation (CBR), and care-as-usual. We investigated 80 children with CP whose parents received an IMCBR program as part of the SUPPORT CP trial. Additionally, in-depth interviews were conducted with 21 participants from the IMCBR arm. Descriptive statistics to depict respondent characteristics and the average return on investment (ROI) were calculated to evaluate the most cost-effective livelihood support. Furthermore, thematic analysis was performed with the interview data to explore the advantages and disadvantages of different livelihood products.
Results: The parents/caregivers of included children with CP were given five forms of livelihood support: Chickens (n = 3, 15 for each), Sewing machine (n = 11, 1 for each), Ghee making utensils (n = 1, 1 for each), Lamb (n = 7, 2 for each), and Goat (n = 59, 2 for each). The average cost of livelihood intervention per family was 65.9 USD. The net return on investment after 12 months was 59.0% for lamb, 70.0% for ghee-making tools, 24.0% for goat, 34.0% for sewing machines, and -25.0% for chicken. Lambs proved to be advantageous due to their sustainability, minimal space requirements, and disease resistance.
Conclusions: This study suggests that the provision of lambs as livelihood support is the most effective intervention for empowering ultra-poor families with CP in Bangladesh. This experience can potentially enhance the well-being of ultra-poor families in Bangladesh and other low- and middle-income countries.
PMID: 40839576

19.Head dimensions in children with and without cerebral palsy in Kano

Abdulsalam Hassana, Tela Idris Abdu

Afr Health Sci. 2025 Jun;25(2):259–264. Online ahead of print

Background: Cerebral palsy (CP) is a chronic motor function disorder which occurs in children.
Aim: To evaluate the head dimensions in children who have CP and those without in Kano.
Methodology: A cross-sectional study of 110 normal and 70 children who have CP. The age, sex, head breadths (HB), head circumferences (HC), and head lengths (HL) were obtained. The data were analyzed in Minitab 17.0 and expressed as mean ± Standard Deviation (SD). Student's t-test and Pearson's correlations were used to determine the differences and relationships between variables. P-values <0.05 were considered significant.
Results: Children without CP had significantly larger head dimensions ($p < 0.05$) compared to those with CP. No sexual dimorphism ($p > 0.05$) was observed in head dimensions for children with or without CP. In children with CP, age showed significant correlations ($p < 0.05$) with head dimensions, with the strongest correlation found for head circumference ($p < 0.001$). Head length and head breadth were significantly correlated ($p < 0.001$) in both groups, with a stronger correlation in children with CP.
Conclusion: This study concludes that children with cerebral palsy (CP) have smaller head dimensions compared to non-CP children, however, no observed sexual dimorphism observed among the two groups.
PMID: 40837660

20.Epidemiology of cerebral palsy in Malawi

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Dev Med Child Neurol. 2025 Aug 20. Online ahead of print

Abstract
Aim: To describe the epidemiology of cerebral palsy (CP) among children in rural areas of Malawi.
Method: This was a cross-sectional study on children with CP younger than 18 years from a rural district registered in the Malawi Cerebral Palsy Register. Community child protection workers, trained as CP key informants, identified children with CP using a population-based approach. A multidisciplinary medical team ascertained the CP diagnosis before registration. The children's baseline characteristics, CP risk factors, and comorbidities were documented. Descriptive and inferential analyses were completed.
Results: A total of 911 children were screened (December 2023–June 2024), and 538 were registered (median [interquartile range] age = 5 years 11 months [range: 2 years 7 months–11 years 10 months], 59.3% male). Bilateral spastic CP was the most common type (46.3%), with most children (90.5%) classified in Gross Motor Function Classification System levels III to V. The observed CP prevalence was 1.7 per 1000 children. Perinatal asphyxia (40.5%) and cerebral malaria (12.3%) were the most common 'probable causes'. Institutional deliveries were reported in 95.1% and prolonged or obstructed labour was the most reported labour complication (42.7%).
Interpretation: Our findings suggest that preventable causes are the main drivers of CP in Malawi. As such, factors in the health care system that contribute to these causes need to be evaluated.
PMID: 40836484

21.Genetic Testing of Neurodevelopmental Disorders in Israel

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JAMA Network Open. 2025 Aug 1;8(8):e2527464

Importance: Genetic testing is the criterion standard for diagnosing neurodevelopmental disorders (NDDs), with chromosomal microarray analysis (CMA) used as a first-line test for autism, intellectual disability, or global developmental delay. Despite advancements in genetic testing technologies and integration into health care systems, data on clinical use remain limited.
Objective: To evaluate genetic counseling and testing rates in patients with major NDDs and these individuals' clinical and sociodemographic characteristics.
Design, setting, and participants: This longitudinal, retrospective, population-based cohort study analyzed electronic health records of individuals born between 2000 and 2020 and insured by Clalit Health Services, the largest health maintenance organization in Israel. Follow-up extended through December 6, 2023. Patients diagnosed with autism spectrum disorder, intellectual disability or global developmental delay, epilepsy, or cerebral palsy (major NDDs) were included.
Exposure: Neurodevelopmental disorders.
Main outcomes and measures: The outcome was the rate of genetic counseling, CMA testing, and NDD diagnosis measured using descriptive statistics.
Results: Of 2 406 763 individuals born in Israel between 2000 and 2020, 25 403 (1.06%; mean [SD] age at December 6, 2023, 11.9 [4.3] years; 68.7% male) were diagnosed with a major NDD. The cohort was predominantly of middle socioeconomic status (56.5%), and autism was the most common diagnosis (40.6%). Among 18 709 children indicated for CMA (ie, those with autism, intellectual disability or global developmental delay, or multiple diagnoses), 7233 (38.7%) received genetic counseling, and 4592 (24.5%) underwent testing (63.5% of those counseled). Genetic testing rates were higher in children with multiple co-occurring NDDs (1478 of 4005 [36.9%]) compared with those with autism alone (2189 of 10 311 [21.2%]). Genetic counseling rates were lowest for cerebral palsy and epilepsy as guidelines were less established. Genetic evaluation rates increased with more recent birth cohorts. While evaluation rates were similar across subpopulations for children with a diagnosis, initial autism diagnosis rates were 54% to 83% lower in lower socioeconomic status and minority populations, limiting access to counseling and testing.
Conclusions and relevance: A key finding of this cohort study was that more than one-third of patients who received genetic counseling did not undergo testing. Furthermore, low socioeconomic status and minority populations experienced drastic underdiagnosis of autism. These findings underscore the need for national initiatives to improve awareness and access to counseling and testing for all major NDDs and the recognition of autism in minority groups.
PMID: 40828538

22.Development of an assessment protocol to operationalize the core set of the International Classification of Functioning for people with cerebral palsy

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Archivos Argentinos de Pediatría. 2025 Aug 21. Online ahead of print

Abstract
The core sets (CS) of the International Classification of Functioning, Disability and Health (ICF) for cerebral palsy (CP) have been applied in different contexts but have not been operationalized in the CP population in Argentina. To select instruments for implementation, a four-stage cross-sectional study was conducted: training in ICF, consensus on instruments, evaluation of intra- and interobserver agreement, and pilot testing. Sixtynine professionals participated in the training, and 13 in the consensus. In the first round, agreement was reached in 15 of 24 categories (92.8%), and new options were proposed for the remaining ones. The second round achieved 95.6% agreement. Intra-observer agreement was 0.84, and inter-observer agreement was 0.86. The pilot test (n = 7) allowed five categories to be adjusted. The first national protocol for assessing ICF CS in children with CP is thus proposed.
PMID: 40827997

23.Brain lesion extent, growth, and body composition in children with cerebral palsy

Dev Med Child Neurol. 2025 Aug 20. Online ahead of print

Abstract
No abstract available.
PMID: 40836614

24.The effects of environmental enrichment in infants with or at high risk of cerebral palsy: an updated systematic review and meta-analysis

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BMC Pediatr. 2025 Aug 23;25(1):642. Online ahead of print

Background: This systematic review and meta-analysis aimed to evaluate the effects of environmental enrichment (EE) in infants with or at high risk of cerebral palsy (CP), as well as to identify the most effective age window for intervention.
Methods: PubMed, Embase, the Cochrane Library, the Cumulative Index to Nursing and Allied Health Literature, the Web of Science Core Collection, Psychological Information Database, and Sociological Index were searched from database inception to 27 February 2025. All data analysis was performed using Stata 17.0. Differences were expressed using standard mean difference (SMD) with 95% confidence interval (CI). Outcomes, including motor development, gross motor function, fine motor function, and cognitive development, were investigated.
Results: Fourteen randomized controlled trials with 592 participants were included. Of the 14 included articles, 50% were assessed as low risk, 36% were assessed as some concerns, and 14% were assessed as high risk. EE interventions significantly improved motor development (SMD = 0.35; 95% CI = 0.11 to 0.60; p = 0.004), gross motor function (SMD = 0.25; 95% CI = 0.06 to 0.44; p = 0.011), and cognitive development (SMD = 0.32; 95% CI = 0.10 to 0.54; p = 0.004) in infants with or at high risk of CP. No significant effect was observed on fine motor function. Subgroup analyses indicated that the optimal age window for EE is 6–18 months for motor development and 6–12 months for cognitive development. The overall quality of evidence ranged from high to low.
Conclusions: EE interventions significantly improve motor development, gross motor function, and cognitive development in infants with or at high risk of CP.
PMID: 40847391

25.Clinical and genetic analysis of ERCC8-Related cockayne syndrome: hepatic dysfunction as a biomarker, anhidrosis as a rare feature, and rehabilitation outcomes for ankle contractures

Jing Chen, Wei Su, Dan Gao, Fangfang Liu, Shuang Chen, Wenhan Zhang, Min Peng, Tao Lei, Hongmin Zhu

Front Genet. 2025 Aug 6:16:1591551. eCollection 2025. Online ahead of print

Objectives: Cockayne syndrome (CS), a rare hereditary neurodegenerative disorder caused by pathogenic variants in ERCC6 (CSB) and ERCC8 (CSA), often clinically overlaps with cerebral palsy (CP), leading to misdiagnosis. This study evaluates the role of genetic testing in differential diagnosis, examines hepatic dysfunction as a biomarker of disease severity, and delineates clinical characteristics of CSA-related CS.
Methods: A retrospective case series of eight CSA-related CS patients was conducted. Clinical data, neuroimaging, genetic profiles, and hepatic function were analyzed. Disease severity was classified according to established CS subtypes (I–III).
Results: All patients (6 males, 2 females) presented with early-onset motor delay and spasticity, initially misdiagnosed as CP. Genetic testing identified pathogenic ERCC8 variants, including exon deletions (Exon4; Exon6–12), a nonsense (c.856A>T), frameshift (c.394_398del), and splice-site (c.618-2A>G) variant, confirming autosomal recessive inheritance (compound heterozygous/homozygous). Subtype distribution included CS I (n = 5), CS II (n = 2), and CS III (n = 1). CS II cases exhibited earlier diagnosis and classic CS features. Hepatic dysfunction correlated with disease severity, worsening with progression. Achilles tendon contractures developed in all patients; systematic rehabilitation (n = 5) significantly reduced contracture severity compared to non-rehabilitated cases (n = 3). Two patients displayed anhidrosis, a rarely reported dermatological manifestation.
Conclusion: Genetic testing is essential to differentiate CSA-related CS from CP. Hepatic dysfunction serves as a biomarker for disease progression, warranting routine monitoring. Rehabilitation therapy mitigates Achilles tendon contractures, underscoring its clinical value. This study expands the phenotypic spectrum of CSA-related CS by identifying anhidrosis as a rarely reported feature, providing insights for diagnosis and management.
PMID: 40842628

26.Kienböck's Disease in a Patient With Cerebral Palsy: Case Report and Literature Review

Paula Sousa, Mafalda Reis, Andreia Ferreira, Domingues Rodrigues, Mafalda Santos

Cureus. 2025 Jul 19;17(7):e88286. eCollection 2025 Jul. Online ahead of print

Abstract
Kienböck's disease is a rare condition characterized by avascular necrosis of the lunate bone, with a multifactorial etiology that remains not fully understood. Since its first reported association with cerebral palsy (CP), several factors have been suggested to contribute to its higher prevalence in this population. We present the case of a 17-year-old adolescent with CP and spastic-dyskinetic tetraparesis who developed left wrist pain without any history of trauma. Initial radiographs raised suspicion of lunate mild sclerosis, and magnetic resonance imaging confirmed the diagnosis of Kienböck's disease. The patient was treated with botulinum toxin injections, resulting in pain relief and functional improvement. A review of the literature supports the observation that Kienböck's disease may be more prevalent in individuals with CP than in the general population, although it is likely underdiagnosed. Conservative management, including the use of botulinum toxin A (BoNT-A), may be effective in controlling pain and preserving function. Early recognition of Kienböck's disease in this population is essential for appropriate and individualized management, taking into account each individual's functional and cognitive profile.
PMID: 40837901

27.Outpatient Care of the Premature Infant

Michael Bybel, Catherine A Delaney, Katie Coble

Am Fam Physician. 2025 Aug;112(2):153–161. Online ahead of print

Abstract
Family physicians oversee the complex care of premature infants after discharge from the neonatal intensive care unit, taking into consideration the degree of prematurity and unique complications that can occur. Early family engagement is critical for these infants. Before hospital discharge, at least two caregivers should demonstrate the ability to appropriately feed and provide necessary care for the infant. Premature infants are at risk of hypoxic-ischemic encephalopathy, periventricular leukomalacia, retinopathy of prematurity, bronchopulmonary dysplasia, necrotizing enterocolitis, and intraventricular hemorrhage. Routine vaccination is recommended. This includes newer prevention options for respiratory syncytial virus (e.g., nirsevimab [Beyfortus]) and the prenatal vaccine Abrysvo. Growth of premature infants is monitored using corrected age and may improve with use of breast milk fortifiers or enriched formulas. Premature infants are also at risk for neurodevelopmental disabilities, including cerebral palsy, intellectual disability, and vision and hearing impairment. Developmental screening using corrected age is recommended at ages 9, 18, and 30 months, with screening for autism spectrum disorder at 18 and 24 months.
PMID: 40834372

28.Quality of life in families and children with medical complexity

Pablo Gómez Garrido, Enrique Villalobos Pinto, Azucena Retuerta Oliva, María Suárez-Bustamante Huélamo, Raquel Jiménez García

Archivos Argentinos de Pediatría. 2025 Aug 21. Online ahead of print

Introduction. Specialized units for children with medical complexity (CMC) aim to improve the quality of life of these patients. The objective of this study is to analyze the characteristics of patients and families evaluated in a recently created CMC specialized unit, as well as factors related to their quality of life. Population and methods. Analytical cross-sectional study that included CMCs seen in a monographic consultation between 2020 and 2024. Clinical data were collected, and parents completed a questionnaire with questions taken from quality-of-life scales. Results. We included 60 of the 217 children who were seen. The mean age was 7.18 years. 68.3% were male. 41.7% had cerebral palsy; 38.3% were dependent on technical support. About the questions, 11/19 related to parents and 1/12 related to patients showed negative answers. Risk factors were non-Spanish origin, behavioral disorders, and sleep disturbances. Conclusions. Our results showed different perspectives on quality of life between CMCs and their families, identifying origin, behavior, and sleep as risk factors.
PMID: 40827999

29.Consensus-Based Development and Validation of Iranian ICF Core Set for 6-12-Year-Old Children with Cerebral Palsy: Iranian Occupational Therapists' Perspectives

Alireza Amiri, Seyed Ali Hosseini, Nazila Akbarfahimi

Physical & Occupational Therapy in Pediatrics. 2025 Aug 18:1–20. Online ahead of print

Abstract
Aims: To develop and validate the Iranian ICF-CS for 6-12-year-old children with CP from the perspective of Iranian Occupational Therapists (OTs).
Method: In the first phase, using the Delphi technique, a three-round electronic-mail-survey was conducted from January to May 2022 among 22 experienced Iranian OTs working with children with CP. The experts were asked to identify and reach consensus on the most relevant ICF categories concerning the patients' problems, resources, and environmental aspects in children with CP. In the second phase, a new sample of 12 Iranian OTs rated the essentiality and relevancy of categories identified in the Delphi phase, with Content Validity Ratio (CVR), Item-Content Validity Index (I-CVI), Modified Kappa, and Scale-Content Validity Index/Average (S-CVI/Ave) calculated to ensure robust validation.
Results: Among 154 proposed categories of the Delphi process, 119 categories were confirmed in the validation phase including 6 Body-structures, 37 Body-functions, 52 Activity-and-participation, and 24 Environmental-factors with the CVR and I-CVI ranges of 0.67–1.00 and 0.83–1.00 respectively. The S-CVI/Ave of 0.93 was obtained as the scale-level CVI.
Conclusion: The Iranian ICF-CS for 6-12-year-old children with CP, consisting of 119 categories, demonstrated strong content validity from the perspective of Iranian OTs.
PMID: 40826520

30.Analysis of value-based healthcare (VBHC) framework by incremental cost-effectiveness of surgical and therapeutic interventions: a retrospective study at tertiary private health group

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BMC Health Services Research. 2025 Aug 18;25(1):1093

Background: Rising healthcare costs have led to the adoption of value-based healthcare (VBHC), emphasizing patient outcomes and cost efficiency. This study evaluates VBHC in a tertiary private health group, focusing on cost-effectiveness using the median incremental cost-effectiveness ratio (ICER).
Methodology: A retrospective cohort study analyzed 1576 patients treated between 2021 and 2024 in Almoosa Health Group, Al-Ahsa, Saudi Arabia. Patients underwent surgeries and therapies for Anterior Cruciate Ligament (ACL) injuries, knee and hip replacements, cerebral palsy, low back pain, and multiple sclerosis (MS). The study applied median ICER methodology to evaluate value-based healthcare by comparing pre-and post-treatment costs with improvements in mobility, pain management, activity levels, self-care, and Functional Independence Measure (FIM) scores. Statistical significance was assessed through non-parametric tests, and analysis was performed in R Studio.
Results: Out of a total of 1576 patients, the surgeries included ACL (n = 112, 7.1%), knee replacement (n = 52, 3.3%), cerebral palsy (n = 46, 2.9%), stroke (n = 178, 11.2%), hip replacement (n = 12, 0.7%), low back pain (LBP, n = 1124, 71.3%), and multiple sclerosis (MS, n = 52, 3.2%). The study revealed that improvements in mobility (b = –0.469, p = 0.006), pain management (b = –1.175, p = 0.024), and self-care (b = –0.33, p < 0.001) significantly reduced healthcare costs, particularly in TKR and ACL patients. Additionally, ICER values were positively associated with better functional outcomes in MS and stroke patients, with mobility (b = 1.027, p = 0.003) and activity (b = 1.768, p < 0.001). For cerebral palsy, cost change (b = 0.298, p = 0.022) was significantly linked to improved functional independence. Improvements in mobility, self-care, pain management, activity, and FIM were all associated with cost savings, with lower ICER values.
Conclusion: This study represents one of the earliest investigations of its kind conducted in the Kingdom of Saudi Arabia. VBHC, assessed through median ICER methodology, effectively assessed improved outcomes while reducing costs. Knee and ACL therapies were the most cost-effective, while lower cost-effectiveness in CP and LBP treatments may stem from the chronic nature, variable patient responses, and high resource use. Improving patient selection, standardizing treatment protocols, and enhancing early intervention and care coordination can boost efficiency and outcomes. These findings support VBHC adoption for evidence-based resource allocation especially in KSA region.
PMID: 40826099

Prevention and Cure

31.Probiotic Receipt and Neurodevelopmental Outcomes of Infants <29 Weeks' Gestation: A Cohort Study

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J Pediatr. 2025 Aug 20:114783. Online ahead of print

Abstract
Objective: To examine neurodevelopment and growth following probiotic receipt in neonatal intensive care units.
Study design: A national, population-representative, multi-center, retrospective cohort study was conducted on children born at <29 weeks' gestation between January 1, 2014, and December 31, 2020, from 21 neonatal units in Canada who survived and then underwent follow-up between ages 18–30 months. Children who received vs did not receive probiotics were compared for the primary outcome of significant neurodevelopmental impairment defined as any of: Bayley-III cognitive, language, or motor score <70; cerebral palsy with Gross Motor Function Classification System III–V; hearing aid or cochlear implant; or bilateral visual impairment. Equivalence analyses utilizing 4% margin for outcomes between groups were conducted using logistic regression and propensity score-matched analyses to calculate adjusted risk difference (aRD) and CIs.
Results: A total of 2749 children in the probiotics group (median gestation 26 weeks and birth weight 920 grams) and 2442 in the no probiotics group (median gestation 26 weeks and birth weight 890 grams) were evaluated. Baseline characteristics were similar between groups. For the outcome of significant neurodevelopmental impairment, logistic regression analyses indicated that probiotics were equivalent to no probiotics (aRD -0.23%, 95%CI: -2.61%, 2.15%), whereas propensity score-matched analyses (1474 pairs of children) indicated probiotics were non-equivalent and potentially superior (aRD -4.01%, 95%CI: -6.92%, -1.01%). Results of the majority of secondary outcomes were similar including growth outcomes.
Conclusions: Probiotics were not associated with harm in neurodevelopment and growth of surviving preterm neonates and may be potentially superior to no probiotics for neurodevelopment and growth among surviving preterm neonates <29 weeks' gestation.
PMID: 40846205

32.Early Prognostic Model for Predicting Adverse Outcomes in Neonates with Hypoxic-Ischemic Encephalopathy before Therapeutic Hypothermia

Tomonori Kurimoto, Takuya Tokuhisa, Itaru Hayasaka, Hiroshi Ohashi, Tsuyoshi Yamamoto, Eiji Hirakawa, Takatsugu Maeda, Masato Kamitomo, Satoshi Ibara

Ther Hypothermia Temp Manag. 2025 Aug 22. Online ahead of print

Abstract
Hypoxic-ischemic encephalopathy (HIE) affects 1.3–1.7 per 1000 live births and remains a major cause of neurodevelopmental impairment (NDI). Despite therapeutic hypothermia (TH), nearly half of infants with moderate to severe HIE experience death or NDI. Identifying early prognostic indicators before TH initiation is crucial for improving management and outcomes. We conducted a retrospective case-control study of 144 infants with HIE treated with TH at Kagoshima City Hospital (2000–2022); 100 underwent developmental evaluations at 18 months. Clinical parameters, including amplitude-integrated EEG (aEEG), Thompson scores, and resuscitation details, were analyzed. Logistic regression identified predictors of adverse outcomes: death, cerebral palsy, or developmental quotient <70. Univariate analysis revealed significant predictors, including low Apgar scores, low umbilical artery pH, aEEG abnormalities, high Thompson scores, and resuscitation details. Multivariate regression identified three independent predictors: aEEG abnormalities (adjusted odds ratios [aOR] 7.1, 95% confidence interval [CI]: 1.3–38.2), Thompson score ≥12 (aOR 5.4, 95% CI: 1.5–18.7), and chest compressions (aOR 31.6, 95% CI: 4.3–231.6). We developed and derived early prognostic model from these predictors, assigning +2 points for aEEG abnormalities, +2 points for a Thompson score ≥12, and +3 points for chest compressions. A total score ≥4 achieved high sensitivity (70.4%) and specificity (90.4%), with an area under the curve of 0.87 (95% CI: 0.77–0.94). The early prognostic model may serve as an effective tool for early risk stratification in neonates with HIE before TH initiation, supporting individualized treatment decisions. This score could help identify high-risk neonates who may benefit from additional neuroprotective strategies.
PMID: 40844408

33.Cerebral palsy predictive value of 4 months-AIMS in newborns with hypoxic-ischaemic encephalopathy

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Pediatr Neonatol. 2025 Aug 14:S1875-9572(25)00155-X. Online ahead of print

Aim: Predicting motor outcomes in hypoxic-ischaemic encephalopathy (HIE) is challenging. We aimed to assess the value of the four-month Alberta Infant Motor Scale (4M-AIMS) in predicting motor development at 18 months of age.
Method: A retrospective cohort study was conducted at Sainte-Justine University Hospital Centre (Canada), including patients with hypoxic-ischemic encephalopathy (HIE) who underwent therapeutic hypothermia between 2009 and 2016. Neurodevelopmental follow-ups were conducted at two and four months with the AIMS, and motor outcomes were classified at 18 months according to the Gross Motor Function Classification System. Ordinal regression was used to assess the predictive value of AIMS scores and brain MRI for motor outcome.
Results: Of the 52 newborns included: 16 children (31%) had normal motor development, 25 (48%) displayed motor delays, and 11 patients (21%) had cerebral palsy. Forty-one (79%) infants had an abnormal 4M-AIMS score (below the 10th percentile). Early brain MRI and 4M-AIMS scores were both predictive of altered motor outcomes ($\chi^2 = 6.1$, $p = 0.013$ and $\chi^2 = 4.9$, $p = 0.029$, respectively). A normal four-month AIMS assessment is considered a reliable indicator for excluding a future cerebral palsy.
Interpretation: Complementary assessment with brain MRI and 4M-AIMS with a score below the 10th percentile provides accurate prediction of motor outcomes at 18 months.
Short title**:** Cerebral Palsy predictive value of AIMS.
PMID: 40835510

34.Histological chorioamnionitis and neurodevelopment at 5 years of age among infants born very preterm: EPIPAGE-2 cohort study

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Arch Dis Child Fetal Neonatal Ed. 2025 Aug 19:fetalneonatal-2025-329023. Online ahead of print

Abstract
Objective: To assess the association between histological chorioamnionitis without maternal clinical symptoms and neurodevelopmental disabilities at age 5 years in children born very preterm.
Design: French national prospective population-based cohort study, EPIPAGE-2 (Etude épidémiologique sur les petits âges gestationnels).
Setting: All births from 22 to 34 weeks of gestational age in France in 2011 were eligible.
Population: Infants born alive between 24+0 and 31+6 weeks following preterm labour (PTL) or preterm premature rupture of membranes (PPROMs).
Exposure: Histological chorioamnionitis without maternal clinical symptoms, also called isolated histological chorioamnionitis, was defined as the presence of neutrophils in the chorionic plate, excluding clinical chorioamnionitis.
Main outcome measures: Neurodevelopmental disabilities, a composite outcome including cerebral palsy, developmental coordination disorders, sensory impairment, developmental cognitive deficiencies or behavioural difficulties. These assessments were comprehensive, standardised and conducted by trained neuropsychologists and paediatricians at age 5 years.
Results: Among 1296 children alive at 5 years of age, 486 (36.3%) were born in a context of isolated histological chorioamnionitis. Overall, 47% vs 33.6% of children exposed and not exposed to isolated histological chorioamnionitis had mild neurodevelopmental disabilities, and 13.8% vs 13.3% had moderate-to-severe neurodevelopmental disabilities. After multiple imputation and multivariable analysis, isolated histological chorioamnionitis was found not to be associated with the occurrence of mild or moderate-to-severe neurodevelopmental disabilities (adjusted OR: 1.0, 95% CI: 0.7 to 1.4 and 0.9, 0.6 to 1.2).
Conclusion: We did not find any association between isolated histological chorioamnionitis and neurodevelopmental disabilities at age 5 years in children born very preterm after PTL or PPROM.
PMID: 40830036

35.Predictive value and ranking of writhing and fidgety movements for cerebral palsy: A meta-analysis based on the Superiority Index

Taotao Wang, Bo Zheng, Hong Yang, Hongyan Liu, Yun Zhou, Zhijie Wen, Yuanfei Ye, Long Guo

Medicine (Baltimore). 2025 Aug 15;104(33):e43813

Abstract
Background: This meta-analysis assessed the diagnostic value of writhing and fidgety general movements (GMs) for predicting cerebral palsy.
Methods: We searched PubMed, EMBASE, Cochrane Library, CINAHL, and Web of Science for cohort or case-control studies evaluating GMs. We calculated the superiority index (S), sensitivity, specificity, likelihood ratios, diagnostic odds ratio (DOR), and area under the curve (AUC) using STATA.
Results: Eight studies were included. For writhing movements, S = 1, sensitivity = 0.99, specificity = 0.69, AUC = 0.91, and DOR = 166. For fidgety movements, S = 3, sensitivity = 0.95, specificity = 0.87, AUC = 0.97, and DOR = 144. Subgroup analyses by study design, risk population, and sample size consistently showed better predictive performance of fidgety movements. For example, in high-risk children, AUC was 0.98 for both periods, but DOR was higher for fidgety (169 vs 302 for writhing). Across subgroups, the Superiority Index of fidgety remained stable at 3.
Conclusion: Fidgety GMs have significantly greater predictive value for cerebral palsy than writhing GMs. This advantage remains consistent across study types, populations, and sample sizes.
PMID: 40826691

36.Admissions and outcomes after perinatal asphyxia and hypoxic-ischaemic encephalopathy before and after therapeutic hypothermia: a retrospective population-based study

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BMJ Paediatrics Open. 2025 Aug 17;9(1):e003530

Background: Hypoxic-ischaemic encephalopathy (HIE) is the leading cause of brain injury in term infants, and therapeutic hypothermia (TH) has been shown to improve outcomes for infants with moderate/severe HIE. We aimed to describe admission rates and outcomes after perinatal asphyxia and HIE before and after the implementation of TH in June 2007.
Methods: This single-centre, retrospective, population-based study included term/near-term infants born between January 2003 and December 2011 and admitted to a level III neonatal unit with International Statistical Classification of Diseases and Related Health Problems, 10th Revision diagnoses P20, P21, P90 and/or P91, and a clinical picture compatible with asphyxia/HIE. Outcome measures were clinical characteristics during neonatal admission and survival without cerebral palsy (CP) at 9–10 years. Data were collected from medical records and the Norwegian Quality and Surveillance Registry for CP.
Results: The admission rate related to perinatal asphyxia was 7.63 per 1000 term/near-term live births and did not change over time. The incidence of HIE increased significantly after the implementation of TH (from 2.69 to 4.21 per 1000 term/near-term live births, incidence rate ratio 1.56 (95% CI 1.06 to 2.34)). Among 255 included infants (62% boys, mean birth weight 3691 g), significantly more infants were diagnosed with HIE after the implementation of TH compared with before (54% vs 36%, respectively, p=0.005). A total of 227 (92%) of 247 infants survived without CP, with no difference between the time periods. Among infants with moderate/severe HIE born after the implementation of TH, 20 (67%) of 30 infants were cooled and 80% of cooled and 33% of non-cooled infants survived without CP.
Conclusions: Admission rates and outcomes were stable during these 9 years, but more infants were reported with HIE after the implementation of TH. Non-cooled infants with moderate/severe HIE born after the implementation of TH had poor outcomes, and early clinical HIE evaluation remains a major challenge.
PMID: 40819853