Cerebral palsy research news

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CP Alliance Chair of Cerebral Palsy Research

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Interventions and Management

1.Effectiveness of hand-arm bimanual intensive therapy including lower extremities in the rehabilitation of children with cerebral palsy: a systematic review protocol

Ya-Lan Qu, Dzalani Harun, Siaw Chui Chai, Daniela Ebner-Karestinos, Rodrigo Araneda, Asfarina Zanudin

BMJ Open . 2025 Mar 3;15(3):e091062. doi: 10.1136/bmjopen-2024-091062.

Introduction: Cerebral palsy (CP) is a paediatric disorder with permanent impairment of movement and posture with a prevalence of about 2.11 in 1000 births in the world. Given the therapeutic effect of hand-arm bimanual intensive therapy including lower extremities (HABIT-ILE) in children with CP, a systematic review of the available literature on this topic is warranted. The objective of this study is to systematically review the effectiveness of HABIT-ILE on upper extremity, lower extremity and trunk outcomes within the domains of body functions and structures, activity and participation of the International Classification of Functioning, Disability and Health in children with CP.
Methods and analysis: This study will be conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. Searches will be conducted in six databases: MEDLINE, PubMed, Cochrane Library, Scopus, OT seeker and Web of Science for available published literature. The grey literature sources will include WorldCat, National Technical Information Service, Agency for Healthcare Research and Quality, Open Grey, WHO and OpenDOAR. Manual searches of citations of included papers will be performed to collect all experimental studies of HABIT-ILE in children with CP. The level of evidence for included articles will be classified according to the level of evidence in the guidelines for systematic reviews on the American Occupational Therapy Association website. Based on the study design of the included articles, the risk of bias will be assessed using the revised Cochrane risk-of-bias tool, the Cochrane Risk Of Bias In Non-randomised Studies - of Interventions tool and the quality assessment tool recommended by the American Occupational Therapy Association. In order to synthesise the data, narrative synthesis will be used, along with meta-analysis, if available.
Ethics and dissemination: As this study only reviewed previously published articles, ethical approval was not required. The findings will be published in a peer-reviewed scientific journal.
Prospero registration number: CRD42024518179.
PMID: 40032384

2.Caregiver determinants and capacity for participation in constraint-induced movement therapy

Hunter G Moore, Amy Ayala, Bhooma R Aravamuthan, Alyssa E Smith, Sharon L Ramey, Catherine R Hoyt

Front Pediatr . 2025 Feb 20:13:1487781. doi: 10.3389/fped.2025.1487781. eCollection 2025.

Aim: Hemiplegic cerebral palsy affects 1 in every 1,100 children, making it the most common pediatric motor disability. Constraint-Induced Movement Therapy (CIMT) is an evidence-based intervention that significantly improves upper extremity function when implemented with high fidelity. Despite its effectiveness, CIMT's intensive nature-requiring daily therapy for up to twenty days-limits its availability. This study examined caregivers' perspectives on implementing and adapting home-based CIMT to identify practical solutions for improving intervention accessibility.
Method: Caregivers of a child who has a diagnosis associated with upper extremity motor impairment consistent with cerebral palsy were recruited from the Cerebral Palsy Center at the St. Louis Children's Hospital. Caregivers completed a semi-structured interview to share their CIMT experiences, as well as their ideas and opinions related to modified versions of CIMT. All interviews were coded and analyzed for themes using descriptive analysis.
Results: Twelve interviews were conducted and revealed that caregivers would be interested in CIMT with an at-home model. Those who had experience with CIMT stated they found meaningful results from their participation in CIMT. Caregivers communicated potential challenges such as their child remaining engaged in at-home therapy, caregiver confidence in implementing the therapy, and the time required for implementing caregiver-led, home-based CIMT.
Interpretation: Study findings identified that caregivers see value in a modified, at-home CIMT program. Developing a modified version of CIMT is needed to increase access to this beneficial intervention.
PMID: 40051911

3.Efficacy of Task-Oriented Circuit Training on Gait Kinematics, Pelvic Symmetry and Trunk Endurance in Children with Hemiplegia: A Randomized Controlled Trial

Mohamed Salah El-Sayed, Ayman Kilany, Samah Attia El Shemy

Randomized Controlled Trial J Musculoskelet Neuronal Interact . 2025 Mar 1;25(1):36-46. doi: 10.22540/JMNI-25-036.

Objectives: Children with hemiplegia often experience motor problems that primarily affect one side of their body. They frequently struggle with asymmetrical gait patterns, pelvic imbalance affecting stability, and reduced trunk muscle endurance, all of which impact their overall mobility and coordination. The purpose of this study was to examine the effect of task-oriented circuit training program in improving kinematic gait parameters, pelvic symmetry, and trunk endurance in children with hemiplegia.
Methods: A total of forty children diagnosed with hemiplegia between the ages of 7 and 10 years were randomized into both control and study groups. The control group was given a specially designed physiotherapy program, while the study group was given the identical program applied to the control group, combined with a 12-week task-oriented circuit training intervention. Gait kinematics were assessed using two-dimensional motion analysis, pelvic symmetry was evaluated through a palpation meter inclinometer, and trunk endurance was measured using four validated tests.
Results: A significant improvement was observed in both groups in all outcome measures post-treatment when compared to the baseline mean values in favor to the study group ($p<0.05$).
Conclusions: Task-oriented circuit training in conjunction with a designed physiotherapy program is more effective in improving gait kinematics, pelvic symmetry, and endurance of trunk muscles among children with hemiplegia.
Clinicaltrials: gov ID: NCT04761263.
PMID: 40024226

4.Conjunct Effects of Transcranial Direct Current Stimulation with Mirror Therapy on Motor Control and Muscle Performance in Spastic Quadriplegic Cerebral Palsy Children: A Randomized Clinical Trial

Shoaib Waqas, Ashfaq Ahmad, Juliana Barbosa Goulardins, Zainab Hassan, Asif Hanif, Muhammad Tariq

J Multidiscip Healthc . 2025 Feb 27:18:1195-1216. doi: 10.2147/JMDH.S506784. eCollection 2025.

Background: Cerebral palsy (CP) is a birth-related non-progressive neuromotor brain disorder characterized by abnormalities of muscular tonicity, gross and fine motor skills, gait, and posture. It impacts motor control and muscle performance, which are emergent rehabilitation challenges in cerebral palsy children. Mirror therapy (MT) and transcranial direct current stimulation (tDCS) are novel treatment strategies to enhance muscle performance and motor control.
Methods: A randomized clinical trial was conducted at Ghurki Hospital Lahore, Pakistan. One hundred and five spastic quadriplegic CP (SQCP) children aged three to seven years were included. Randomization was carried out using Version 1.0 of Randomized Allocation Software. Allocation was done to three groups (35 in each group) with a 1:1:1 ratio with a unique identity number. Group I (tDCS+MT+Routine Physical Therapy (RPT), Group II (MT+RPT), and Group III (tDCS + RPT). Each patient received ten sessions of tDCS and MT, lasting for 15 minutes per side along with 20 minutes of RPT five days a week for ten weeks. Motor control was assessed by the Fugl-Meyer assessment tool, and muscle performance was measured using an isokinetic dynamometer and assessed at baseline, the 2nd, and the 10th week of follow-up and was analyzed using SPSS version 26.
Results: The results indicated a significant improvement after 10 weeks in the mean scores of motor control upper extremities, lower extremities, and trunk) with P-values of <0.000, <0.001, and <0.001, respectively. The mean scores of muscle performance (isokinetic strength) for right and left-sided elbow and knee flexors and extensors showed significant changes with P-values of 0.04, 0.01, 0.02, 0.02, 0.03, 0.05, 0.05, and 0.02, respectively. Similarly, muscle performance (isokinetic power) for these muscle groups also demonstrated significant changes, with P-values of 0.04, 0.01, 0.04, 0.02, 0.03, 0.05, 0.05, and 0.02, respectively.
Conclusion: tDCS and MT in combination significantly impacted motor control and muscle performance, enhancing elbow and knee musculature strength and power among SQCP patients.
Trial registration: IRCT20231227060542N1 on 26-01-2024 https://irct.behdasht.gov.ir/.
PMID: 40035031

5.Effect of leg pedaling exercise from an inclined position on functional ability and strength in children with diplegia

Amira F El-Sheikh, Alaa B Hassan, Nanees E Mohamed

J Taibah Univ Med Sci . 2025 Feb 12;20(1):73-80. doi: 10.1016/j.jtumed.2025.01.001. eCollection 2025 Feb.

Objectives: Children with spastic diplegic cerebral palsy (SDCP) can develop various complications that affect their daily activities and quality of life, such as impaired functional ability, trunk control, and muscle weakness. This study evaluated the effects of lower extremity pedaling exercise from an inclined position on functional ability, trunk control, and muscle strength in these children.
Methods: Thirty children diagnosed with SDCP, aged 6-9 years, were randomly assigned to two groups: a study group (Group A) and a control group (Group B). Both groups followed a designated physical therapy program for 45 min three times weekly for two consecutive months. Group A performed leg pedaling exercises for 30 min per session from an inclined position. Functional ability, trunk control, and muscle strength were assessed before and after the study using the Gross Motor Function Measure, Trunk Control Measurement Scale, and a handheld dynamometer, respectively.
Results: Both groups demonstrated statistically significant improvements in the assessed variables post-treatment ($P < 0.05$). Group A exhibited substantial improvements in functional ability, trunk control, and muscle strength following treatment ($P < 0.05$).
Conclusions: For children with SDCP, integrating leg pedaling exercises from an inclined position into their therapeutic program can improve their functional ability, trunk control, and muscle strength.
PMID: 40026412

6.Changes in Kinematic and Spatiotemporal Gait Parameters With a Biarticular Lower Limb Exosuit for Adolescents With Crouch Gait During Level Walking and Stair Climbing

Chiara Basla, Philippe Durrenberger, Peter Wolf, Robert Riener, Hubertus J A van Hedel

IEEE Trans Neural Syst Rehabil Eng . 2025:33:966-974. doi: 10.1109/TNSRE.2025.3543606.

Abstract
Crouch gait is a prevalent walking abnormality among children with cerebral palsy, characterized by excessive knee and hip flexion during walking. This condition often limits children's engagement in physical activities and daily life. Current exoskeleton solutions targeting the knee joint in this population are either tethered or bulky, hindering practical integration into daily routines. In this cross-sectional study, we evaluated the impact of a biarticular cable-driven exosuit, originally designed for adults, on the gait pattern of adolescents with crouch gait. Participants completed level walking and stair climbing trials under three conditions: without the exosuit (noMyo), with the exosuit inactive (MyoOff), and with the exosuit active (MyoOn). Kinematic and spatiotemporal gait metrics were analyzed using 3D motion capture. Five male adolescents with mild to moderate crouch participated. Results revealed significant improvements in mean knee and hip extension during the assisted phase (5 to 50% of the gait) with MyoOn compared to noMyo, increasing by 6 (range: 0 - 12) and 12 (range: 4 - 24) degrees, respectively, during level walking. During stair climbing, knee and hip extension improved in the stance phase of the trailing leg in the MyoOn condition compared to MyoOff. Only the hip angles improved in the MyoOn condition compared to noMyo. Spatiotemporal metrics showed no improvement. Stride length shortened significantly in both MyoOn and MyoOff. These findings demonstrate the exosuit's potential to address extension deficits in crouch gait, although its weight may limit improvements in spatiotemporal gait characteristics. Developing a lighter, child-specific version could expand accessibility to a broader pediatric population.
PMID: 40036402

7.Tranexamic acid in elective pediatric orthopedic surgery: a comprehensive review

Gina Ledesma Negreiros, Dalmiro Zúñiga Baca, José Caballero-Alvarado, Carlos Zavaleta-Corvera

J Pediatr Orthop B . 2025 Feb 27. doi: 10.1097/BPB.0000000000001244. Online ahead of print.

Abstract
Tranexamic acid (TXA), approved initially for medical bleeding, has expanded its utility to various surgical contexts, including pediatric orthopedic and trauma surgery, though limited research has been conducted in this population. This study aimed to evaluate TXA's efficacy and safety in pediatric orthopedic and trauma surgeries, focusing on its impact on blood loss reduction and transfusion requirements. Through a comprehensive literature review following Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines, eight retrospective studies were analyzed, all involving pediatric patients with cerebral palsy undergoing orthopedic surgery. TXA dosing regimens varied across studies, with loading doses ranging from 10 to 50 mg/kg and maintenance doses from 1 to 10 mg/kg/h. Consistently, TXA administration was associated with a significant decrease in intraoperative blood loss and transfusion needs compared with nonadministered groups, with no reported thromboembolic events, indicating its safety in pediatric orthopedic and trauma surgeries.
PMID: 40047151

8.Effect of Universal Exercise Unit Versus Functional Electrical Stimulation on Genu Recurvatum in Diplegic Cerebral Palsy Children

Mahmoud R Elsharkawy, Abd Elaziz A Sherif, Engi E Sarhan, Osama A El-Agamy, Sara Y Elsebahy

Randomized Controlled Trial J Musculoskelet Neuronal Interact . 2025 Mar 1;25(1):109-118. doi: 10.22540/JMNI-25-109.

Objective: This study evaluated the effects of the Universal Exercise Unit (UEU) versus Functional Electrical Stimulation (FES) on genu recurvatum in children with diplegic cerebral palsy (CP).
Method: Thirty children (8 males, 22 females) aged 4-8 years with diplegic CP and genu recurvatum were randomly assigned to two groups (n=15 each). Study group I received UEU therapy and an exercise program for three weeks for 12 weeks. Study group II received FES applied to the hamstring and tibialis anterior muscles during walking, with the same exercise program and frequency. Genu recurvatum and muscle strength were assessed pre- and post-treatment using a digital goniometer and Lafayette muscle tester.
Results: Both groups improved significantly in all variables post-treatment, with Study Group I (UEU) showing greater improvements in reducing genu recurvatum and increasing muscle strength ($p<0.05$).
Conclusion: UEU and FES were effective in treating genu recurvatum in children with diplegic CP, but UEU provided superior results.
Clinicaltrials: gov ID: NCT06332729.
PMID: 40024234

9.Personalizing muscle tendon parameters of cerebral palsy patient's digital model

Tinghan Xu, Yuanhao Liang, Lin Feng, Li Liu, Eric Yeung, Rong He, Michael To, Yong Hu

IEEE Trans Neural Syst Rehabil Eng . 2025 Feb 24:PP. doi: 10.1109/TNSRE.2025.3544551. Online ahead of print.

Abstract
As computer science progresses, neuromusculoskeletal models are increasingly applied in clinical settings, particularly when studying abnormal characteristics in patients with cerebral palsy. Digital neuromusculoskeletal models enable researchers and clinicians to gain a deeper understanding of movement mechanisms, providing additional insights for diagnosis and treatment. While biomechanical simulation platforms like OpenSim offer standardized neuromusculoskeletal models for simulation, relying on generic healthy models to simulate movements in cerebral palsy patients can lead to inaccuracies. Therefore, personalized muscle-tendon parameters are essential for cerebral palsy patient models. In this study, we collected ultrasound video data of the semitendinosus muscle from two patients with cerebral palsy during the passive knee extension process. We proposed a muscle-tendon parameter personalization method and developed the individualized OpenSim models for the patients using this data. We validated the personalized models' output fiber length and pennation angle through a series of hip flexion movement tests. The experimental results demonstrate that using the personalized muscle model for cerebral palsy patients produces muscle fiber length and pennation angle more closely aligned with ultrasound-measured values. After personalization, the RMSE between model output and ultrasound measurement of muscle fiber length and pennation angle decreased by 96.80% and 61.80%, respectively, averaged across both subjects. This study introduces a method for determining muscle-tendon parameters in cerebral palsy patients' digital neuromusculoskeletal models, providing researchers and clinicians with more precise biomechanical information. These insights can better inform the treatment of cerebral palsy patients, ultimately enhancing therapeutic outcomes.
PMID: 40031624

10.Higher Self-Than Parent-Reported Health-Related Quality of Life in Adolescents With Cerebral Palsy; a Register Study

Selma Mujezinović Larsen, Kjersti Ramstad, Sandra Julsen Hollung, Guro L Andersen, Trond H Diseth

Acta Paediatr . 2025 Mar 7. doi: 10.1111/apa.70055. Online ahead of print.

Aim: To investigate health-related quality of life (HRQoL) in adolescents with cerebral palsy (CP), compare self-reporting with parental proxy-reporting and identify factors associated with low HRQoL.
Methods: Adolescents aged 15-17 years with normal to mildly impaired cognitive function enrolled in the Norwegian Quality and Surveillance Registry for CP were eligible. Adolescents with both self- and parental proxy-report on HRQoL (Paediatric Quality of Life; PedsQL) were included. Self- and proxy-reported physical and psychosocial domain HRQoL scores were analysed for associations by sex, mobility, pain and mental health (Strengths and Difficulties Questionnaire; SDQ).
Results: Seventy-two adolescent-parent HRQoL dyads were retrieved. Self-reported HRQoL was higher than parental proxy-reported HRQoL in all domains. Females reported lower HRQoL. A higher level of mobility was associated with higher physical, but not with higher psychosocial functioning in both self- and proxy-reports. Pain was associated with decreased proxy-reported psychosocial functioning. Increased SDQ total difficulties scores were associated with decreased self- and proxy-reported psychosocial functioning and proxy-reported physical functioning.
Conclusion: Adolescents with CP reported a higher HRQoL than their parents proxy-reported. The severity of motor impairment was not associated with psychosocial well-being. Mental health issues decreased both self- and parental proxy-reported HRQoL. Pain decreased parental proxy-reported HRQoL.
PMID: 40052342

11.Epidemiological and Functional Profile of Children With Cerebral Palsy Assisted at the Unicamp Clinical Hospital

Kemle Caroline Merhy, Marina Fischer de Oliveira, Geruza Perlato Bella, Claudia Vianna Maurer-Morelli

Pediatric Health Med Ther . 2025 Mar 1:16:47-59. doi: 10.2147/PHMT.S500983. eCollection 2025.

Introduction: Cerebral Palsy (CP) is caused by multiple risk factors bringing motor and postural control disruptions with a variety of clinical signs.
Objective: To describe the epidemiological and functional profile of children with CP attended at the Physiotherapy Clinic for Motor Rehabilitation (PCMR) of the Clinical Hospital (CH) of the University of Campinas (Unicamp).
Methods: Children up to 12 years old with CP were included. Epidemiological data were collected through interviews, followed by the scales: Gross Motor Function Classification System (GMFCS), Pediatric Evaluation of Disability Inventory (PEDI), Gross Motor Function Measure (GMFM-66), International Classification of Functioning, Disability, and Health for Children and Youth with CP (ICF-CY-CP) Core Sets, and the GMFCS Family Report Questionnaire.
Results: A total of 37 children were assessed, with an average age of 7 years. It was found that 87% of the mothers received prenatal care, 61% of the children were born at a low weight, with 36% of cases being extreme or very premature births. The primary perinatal complication was neonatal anoxia (50%), while the most common postnatal complication was stroke (11%). CP was diagnosed at an average age of 12 months, with bilateral spastic CP being the most prevalent (63%). Orthopedic complications were present in 80% of cases, even though only 39% of children had orthopedic monitoring. In the functional analysis, 65% were classified at levels IV and V of the GMFCS, highly correlated with GMFCS Family Report Questionnaire (Kappa = 0.88; 95% IC 0.79-0.96). The scores of 3 and 4 on the ICF-CY-CP Core Sets in most activities involving motor functions, along with scores below 30 on the PEDI, indicate severe motor impairment.
Conclusion: Parents had a realistic perception of the children's functionality. The results highlight the severity of motor impairment in these children and emphasize the need for multidisciplinary assistance.
PMID: 40046271

12.The 24-Hour Activity Checklist for Cerebral Palsy: Translation, Content Validity and Test-Retest Reliability of Portuguese Versions

Fabio Vila-Nova, Cristina Dos Santos Cardoso de Sá, Hércules Ribeiro Leite, Ana Cadete, Teresa Folha, Egmar Longo, Maria Elisabete Martins, Raul Oliveira

Child Care Health Dev . 2025 Mar;51(2):e70057. doi: 10.1111/cch.70057.

Background: The importance of 24-h movement behaviour, including sleep, physical activity (PA) and sedentary behaviour (SB), has gained prominence due to its significant impact on the health and development of children, including those with cerebral palsy (CP). The 24-h activity checklist for CP, a tool developed in the Netherlands to monitor the activity in CP paediatric population, requires translation and cultural adaptation to Portuguese for use in Brazil and Portugal.
Methods: This cross-sectional methodological study involved translating and culturally adapting the 24-h activity checklist for CP into Brazilian Portuguese (BP) and European Portuguese (EP) languages. The process included forward translation, synthesis and backward translation, expert panel evaluation and pretesting. Brazilian and Portuguese experts appraised content validity, assessed by the individual item (I-CVI) and scale level content validity index scores (S-CVI/Ave). Sixty parents of children with CP participated in the test-retest analysis, reported with the Intraclass Correlation Coefficients (ICCs).
Results: I-CVI scores were higher than 0.78 for both versions. S-CVI/Ave scores were considered excellent for BP (0.91) and EP version (1.0). Expert's appraisal results in the inclusion of a question about sleep-related time indicators and the split of sleep, PA, and screen time questions for weekdays and weekends. Brazilian and Portuguese parents of children with CP reported understanding on instructions, questions, and answer options. The ICC values range from 0.81 to 0.99 and 0.6 to 0.98, for BP and EP, respectively.
Conclusions: The BP and EP versions of 24-h activity checklist for CP demonstrated good content validity and test-retest reliability, supporting its use in Brazil and Portugal. This tool can contribute to improving communication between families and healthcare professionals to monitor and develop tailored interventions for healthy movement behaviours in children with CP.
PMID: 40045483

13.Validation and reliability of the Persian version of Gillette functional assessment questionnaire in patients with cerebral palsy

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Disabil Rehabil . 2025 Mar 4:1-6. doi: 10.1080/09638288.2025.2472985. Online ahead of print.

Purpose: This research aimed to evaluate the content, concurrent validity and test-retest reliability of The Gillette Functional Assessment Questionnaire (FAQ) for assessing functional mobility in children and adolescents with cerebral palsy (CP).
Materials and methods: The Persian FAQ were translated and verified according to international standards. To assess concurrent validity, Spearman's coefficient was used to correlate the FAQ scores with the Gross Motor Function Classification System (GMFCS) levels and Functional Mobility Scale (FMS) ratings of 148 participants. In addition, test-retest reliability was evaluated among 30 participants by calculating weighted kappa coefficients.
Results: The study demonstrated almost perfect test-retest reliability ($\kappa w = 0.836$, $p < 0.001$) and strong concurrent validity. Spearman correlation coefficients between the FAQ and GMFCS were -0.913, while correlations between the FAQ and FMS were calculated separately for each of the three FMS distances, ranging from 0.880 to 0.914 ($p < 0.001$).
Conclusions: These findings confirm the validity and reliability of the Persian FAQ in assessing functional mobility across diverse settings for children with CP. The Persian FAQ proves to be a valuable tool for clinicians and researchers in understanding and addressing functional mobility challenges in children with CP.
Plain language summary
The Persian version of the Gillette Functional Assessment Questionnaire (FAQ) demonstrates almost perfect intra-rater reliability and strong concurrent validity, making it a reliable tool for assessing functional mobility in Persian-speaking children with cerebral palsy (CP).By capturing functional mobility in the life environment, the Persian FAQ provides therapists with a comprehensive understanding of the capabilities and challenges of children with CP, aiding in the development of targeted intervention plans.Utilizing the Persian FAQ can facilitate evidence-based decision-making, ultimately improving the quality of care and promoting optimal mobility and independence in Persian-speaking children and adolescents with CP.
PMID: 40035459

14.Health literacy of primary caregivers of children with cerebral palsy in low- and middle-income countries: a systematic review

Genevieve Lilian Perrins, Catherine King, Kousar Azhdari, Israt Jahan, Rosalie Power, Rashidul Hashan, Nadia Badawi, Gulam Khandaker

BMJ Open . 2025 Mar 3;15(3):e091679. doi: 10.1136/bmjopen-2024-091679.

Objective: We aimed to synthesise existing literature on the health literacy of primary caregivers (PCGs) of children with cerebral palsy (CP) in low- and middle-income countries (LMICs).
Design: Systematic review informed by Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines.
Data sources: Ovid MEDLINE, Ovid EMBASE, CINAHL via EBSCO, Scopus and Web of Science were searched from inception to January 2024.
Eligibility criteria: Original studies including observational or experimental data, examining health literacy and/or health literacy proxies using Optimising Health Literacy and Access domains as indicators (eg, education, social support, self-efficacy, health attitudes, reading and writing skills) in primary caregivers of children with CP in LMICs.
Data extraction and synthesis: Data from included studies were systematically recorded using an Excel template, with information extracted independently by two reviewers. We used the Study Quality Assessment Tool developed by the National Health, Lung, and Blood Institute.
Results: The systematic review yielded 2734 articles, with 15 eligible for inclusion. None used health literacy (HL) measurement tools, and there was limited reporting on specific HL domains. Studies spanned 11 LMICs across 5 major regions. PCGs, predominantly mothers, exhibited varying levels of service awareness, service utilisation and social support. Literacy levels significantly impacted HL proficiency, exposing a notable research gap in LMICs.
Conclusions: This study presents the first comprehensive analysis of health literacy among PCGs of children with CP in LMICs. Findings reveal a striking absence of tailored health literacy literature, impacting current considerations of PCGs' understanding and management of their child's condition. Additionally, challenges in social support, healthcare navigation and low literacy levels further hinder effective caregiving in LMICs.
PMID: 40032378

15.Nutritional aspects in patients with cerebral palsy: A multicenter observational study in Spain

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An Pediatr (Engl Ed) . 2025 Mar 1:503803. doi: 10.1016/j.anpede.2025.503803. Online ahead of print.

Introduction: Cerebral palsy (CP) encompasses a group of motor disorders that can result in swallowing difficulties, affecting food intake and contributing to poor nutritional status. The goal of the study was to describe the clinical and nutritional characteristics of Spanish children with CP.
Methods: Multicenter observational study conducted in children aged 4-14 years with a diagnosis of CP. For every patient, we collected data on sociodemographic and clinical characteristics as well as anthropometric measurements, schooling modality, nutrition received at school, nutritional support and gastrointestinal comorbidities.
Results: The sample included a total of 112 patients with a mean age of 9.2 years old. The majority (70.5%) had been classified as Gross Motor Function Classification System (GMFCS) level IV or V. Compared to children classified as GMFCS level I, II or III, the group of children with GMFCS level IV/V had significantly lower mean z scores in body weight, height, weight-to-height ratio, body mass index and upper arm circumference and a significant lower mean arm area. A higher proportion of patients with GMFCS level IV/V attended special education schools compared to patients classified as level I to III (68.4% vs. 12.1%; P < .0001). A higher proportion of children classified as level IV/V compared to children classified as levels I to III presented dysphagia (62.0% vs. 15.2%; P < .0001), constipation (51.9% vs. 27.3%, P = .0218) and gastroesophageal reflux (31.6% vs. 3.0%; P = .0005).
Conclusions: Our study shows that Spanish children with CP, especially those with severe motor impairment, are at risk of malnutrition, present gastrointestinal comorbidities and require nutritional support.
PMID: 40024833

16.The Cognitive Orientation to daily Occupational Performance approach in childhood-onset disabilities

Hortensia Gimeno, Helene Polatajko

Review Dev Med Child Neurol . 2025 Mar 3. doi: 10.1111/dmcn.16260. Online ahead of print.

Abstract
The Cognitive Orientation to daily Occupational Performance (CO-OP) approach, a goal-oriented intervention focused on participation, is designed to improve performance by addressing personal goals important to children and their families. Introduced in 2001, CO-OP involves client-chosen functional goals, identifying performance issues through a process of dynamic performance analysis, and guiding the discovery of cognitive strategies to enhance skill acquisition, all within a problem-solving framework. The objectives of the approach are skill acquisition, strategy use, generalization, and transfer of learning. Developed within a research paradigm, a review of the literature indicates that CO-OP research has expanded, documenting its use across various paediatric populations, including children with neurodevelopmental disorders, cerebral palsy, and movement disorders, addressing a myriad of functional goals. In this review we illustrate the iterative development of CO-OP from single-case experimental designs to randomized controlled trials to evaluate the approach. The Canadian Occupational Performance Measure and the Performance Quality Rating Scale are the most common outcome measures. Methodological advancements, limitations, and an initial exploration of mechanisms of action are discussed, providing a foundation for further research and clinical application. Recommendations include the use of consistent measures, robust longitudinal studies, implementation research, and health economic analyses.
PMID: 40033547

17.Neurologic Disease and Vitamin B12 Levels in Children

Betül Diler Durgut

J Child Neurol . 2025 Mar 2:8830738251319056. Doi: 10.1177/08830738251319056. Online ahead of print.

Abstract
Introduction: Vitamin B12 deficiency is a well-known cause of neurologic symptoms, prompting routine measurement in patients with neurologic conditions. However, elevated B12 levels are also observed in some cases. Recent studies suggest a potential link between high B12 levels and neurologic or neurodevelopmental disorders. This study aims to evaluate vitamin B12 levels in children with neurologic disorders compared with those in general pediatric populations. Materials and Methods: This single-center retrospective study analyzed pediatric patients' vitamin B12 levels between 2000 and 2023. Exclusion criteria included incomplete data and vitamin supplementation. Patients were grouped based on B12 levels (<200 pg/mL, 201-660 pg/mL, 661-1000 pg/mL, > 1000 pg/mL). Age, gender, and diagnoses were assessed, focusing on patients with elevated B12 levels (>660 pg/mL) in the neurology clinic. Vitamin B12 levels were measured using Roche Cobas e 601 analyzers. Results: Over 3 years, 4142 pediatric clinic and 2638 pediatric neurology patients were reviewed. Elevated B12 levels were more frequent in the neurology clinic. Patients with elevated B12 levels (n = 338) had a mean age of 8.67 months and a mean B12 level of 894.7 pg/mL. Of 137 patients with follow-up B12 measurements, 40.1% normalized, while 17.5% remained > 1000 pg/mL. The most common diagnosis in patients with persistently high B12 levels was epilepsy, followed by prematurity, cerebral palsy, autism, intellectual disability, and language delay. Conclusions: Elevated vitamin B12 levels were associated with pediatric neurologic disorders, particularly epilepsy. Further research is needed to clarify the mechanisms and clinical implications of this finding.
PMID: 40025751

Prevention and Cure

18.Funisitis Increases the Risk of Death or Cerebral Palsy in Extremely Preterm Infants

Viral G Jain, Nehal A Parikh, Matthew A Rysavy, Vivek V Shukla, Shampa Saha, Susan Hintz, Alan Jobe, Waldemar A Carlo, Namasivayam Ambalavanan; Eunice Kennedy Shriver NICHD Neonatal Research Network

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Background: The relationship between histological chorioamnionitis (inflammation of fetal membranes) and funisitis (inflammation of umbilical cord), both commonly associated with preterm birth, with subsequent development of cerebral palsy remains controversial.
Objective: To determine if extremely preterm infants (<27 weeks) exposed to histological chorioamnionitis or funisitis are at a higher risk of death or cerebral palsy compared to those without these exposures.
Study design: Multicenter cohort study of prospectively collected data of preterm infants in the National Institute of Child Health and Development Neonatal Research Network. Infants born 2012-2019 who were 22 to 266/7 weeks gestation, received active treatment, and had placental pathology available were included. Because preterm birth, as measured by gestational age, lies on the causal pathway for cerebral palsy, we used mediation analysis to evaluate whether the indirect mediated effect of gestational age on death or cerebral palsy contributed to the relationships of histological chorioamnionitis and funisitis with death or cerebral palsy.
Main outcomes and measures: The primary outcome was the composite outcome of death or cerebral palsy defined by the Amiel-Tison standardized exam and Gross Motor Function Classification System ≥1 at 22-26 months corrected age.
Results: A total of 6,949 infants met the eligibility criteria. Of these, 3971 (57%) infants had histological chorioamnionitis, and 2,978 (43%) did not have histological chorioamnionitis. About 90% (6248/6949) of infants had follow-up and complete cerebral palsy data. Similarly, 1057 (28%) infants had funisitis, and 2,689 (72%) did not have funisitis. Of these, primary outcome data were available for 87% (3,267/3,746) infants. On multivariable analysis, histological chorioamnionitis was not associated with death or cerebral palsy [RR: 0.98 (95% CI: 0.91, 1.05)]. Exposure to funisitis was associated with a higher risk of death or cerebral palsy [RR: 1.09 (1.01, 1.21)] that was primarily mediated by preterm birth. There was a higher risk of cerebral palsy among surviving infants exposed to funisitis [RR: 1.23 (1.04, 1.51)] compared to those without funisitis. This association was partially (40%) mediated by preterm birth [RR: 1.08 (1.05, 1.12)], but the major effect (60%) appears to be a direct adverse effect of funisitis exposure on cerebral palsy development [RR:1.13 (0.97, 1.40)].
Conclusion: Funisitis was associated with an increased risk of the combined outcome of death or cerebral palsy. In surviving infants, the direct adverse effects of funisitis appear to lead to cerebral palsy, independent of preterm birth.

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