Cerebral palsy research news

Monday 06 January 2025

Cerebral Palsy Alliance is delighted to bring you this free weekly bulletin of the latest published research into cerebral palsy. Our organisation is committed to supporting cerebral palsy research worldwide - through information, education, collaboration and funding. Find out more at cerebralpalsy.org.au/our-research

Professor Nadia Badawi AM
CP Alliance Chair of Cerebral Palsy Research

Subscribe to CP Research News

Interventions and Management

1.Retention of bimanual performance following hand arm bimanual intensive therapy in children with unilateral cerebral palsy: A six-month longitudinal study

Shailesh S Gardas, Christine Lysaght, Charity Patterson, Swati M Surkar

PLoS One . 2024 Dec 31;19(12):e0313018. doi: 10.1371/journal.pone.0313018. eCollection 2024.

Abstract
Hand-arm bimanual intensive therapy (HABIT) enhances upper extremity (UE) function and bimanual coordination in children with unilateral cerebral palsy (UCP). Previous studies assessed immediate improvements in UE function using clinical and self-reported measures, which may not accurately reflect real-world UE performance and their long-term retention effects. Therefore, this study aims to investigate the retention of real-world bimanual performance gains over time following HABIT in children with UCP. Thirty children with UCP, age 6-16 years underwent HABIT (6 hours/day for 5 days). Bimanual performance was assessed using GT9X Link accelerometers, worn on bilateral wrists for 3 days pre-, post-, 3-, and 6-month of HABIT. Accelerometer-derived variables-use ratio (UR), magnitude ratio (MR), bilateral magnitude (BM), median acceleration (MA), and acceleration variability (AV)-quantified bimanual performance during real-world activities. UE function was measured with standardized assessments. A mixed model analysis with repeated measures and paired t-tests analyzed the differences real-world bimanual performance and UE function respectively. There was a significant main effect of time in UR ($F = 2.72$, $p = 0.05$), BM ($F = 4.36$, $p = 0.007$), and MA ($F = 3.68$, $p = 0.016$). Post-hoc analysis (mean differences, 95% confidence interval [CI]) revealed improvements immediately post- compared to pre-HABIT in BM (14.99, 4.35-25.63) and MA (7.46, 2.55-12.36). However, subsequent assessments at 3- and 6-months displayed a regression in these gains, suggesting a lack of retention. A decline was observed at 3 months) and 6 months (BM; 16.94, 6.3-27.4, MA; 6.51, 1.61 -11.41) in BM and MA compared to post-HABIT. UE capacity measures also showed improvements ($p < 0.05$) post-HABIT. Although HABIT initially may enhance performance of real-world bimanual tasks, its benefits diminish within six months, suggesting a need for repeating HABIT every 3-6 months to retain long-term improvements.

PMID: 39739775

2.Effect of selective dorsal rhizotomy on bladder dysfunction in children with spastic cerebral palsy

Wenbin Jiang, Junlu Wang, Pierre A Robe, Min Wei, Sen Li, Rui Wang, Qijia Zhan, Bo Xiao

Sci Rep . 2024 Dec 30;14(1):31687. doi: 10.1038/s41598-024-81512-w.

Abstract
This study investigated the prevalence and severity of lower urinary tract symptoms (LUTS) in children with spastic cerebral palsy (SCP) and evaluated the effect of selective dorsal rhizotomy (SDR) in alleviating these symptoms. The study also explored the correlation between postoperative LUTS improvement and intraoperative electrophysiological findings. Prospective data were collected from a consecutive cohort of 247 children with SCP who underwent SDR and were retrospectively analyzed. Pre- and post-operative assessments included muscle tone, motor function, LUTS and intraoperative electrophysiology data were analyzed. Preoperatively, 94 patients (38.1%) had LUTS, and the severity of LUTS negatively correlated with motor function (R=-0.32, P < 0.0001). After SDR, muscle tone decreased, motor function improved (P < 0.0001), and LUTS resolved in 49/94 patients (52.1%). LUTS improvement correlated with a higher proportion of sensory nerves evoking anal sphincter EMG > 20μV. SDR effectively reduces spasticity, improves motor function, and alleviates LUTS in most children with SCP. Intraoperative neurophysiology may predict improvements, warranting further research.

PMID: 39738149

3.Impact of body-height increase on gastrocnemius muscle stiffness in children with cerebral palsy: A one-year prospective cohort study

Shinya Nakamura, Minoru Kimoto, Masahiko Wakasa, Akira Saito, Hitoshi Sakamoto, Akiko Misawa, Uki Kawanobe, Kyoji Okada

Am J Phys Med Rehabil . 2025 Jan 3. doi: 10.1097/PHM.0000000000002684. Online ahead of print.

Objective: To investigate whether the impacts of height increase on gastrocnemius muscle (GM) stiffness are greater in children with spastic cerebral palsy (CP) than in those with typical development (TD).
Design: This one-year cohort study enrolled children (CP, 23; TD, 23) who underwent two measurements conducted at entry and after one year. Lateral and medial GM-strain ratios representing muscle stiffness were obtained using elastography.
Results: All regression equations (dependent variable, rate of change [RoC] of height; independent variable, RoC of the GM-strain ratios) were significant and all R2s in children with CP (all p < 0.001; lateral GM's R2 = 0.81; medial GM's R2 = 0.74) were greater than those in children with TD (p < 0.001 and R2 = 0.49; medial GM's R2 = 0.49). The coefficients of equations in children with CP were significantly larger than those in TD (p < 0.05).
Conclusion: The greater R2 values in CP than TD could explain how the variation in height predicts the variations in GM stiffness more accurately in CP than in TD. GM stiffness worsens more in children with CP than that in TD.

PMID: 39748164

4.Frame Running as a community-based exercise option for young people with moderate-to-severe walking

impairments: a feasibility study

Georgia Andreopoulou, Marietta L van der Linden, Nicola Theis, Elizabeth G Thacker, Gary P McEwan, Pelagia Koufaki, Kavi C Jagadamma, Eleanor Curnow, Shaun M Phillips, Petra E M van Schie, Jennifer M Ryan

Disabil Rehabil Assist Technol . 2024 Dec 29:1-11. doi: 10.1080/17483107.2024.2442710. Online ahead of print.

Purpose: Frame Running is an adapted community-based exercise option for people with moderate-to-severe walking impairments. This mixed-methods study aimed to examine the feasibility of 1) community-based Frame Running by young people with moderate-to-severe walking impairments and 2) conducting future studies on the impact of Frame Running on functional mobility and cardiometabolic disease risk factors.
Materials and Methods: Weekly training sessions and data collection occurred in two sites. Quantitative data were collected at baseline, and after 12 (both sites) and 24 (one site) weeks of training, followed by interviews or focus groups. Consent and retention rates, attendance and outcome measure completion rates were calculated. Qualitative data were analysed abductively using concurrent inductive and deductive thematic content analysis. Data for the assessments at baseline, 12 and 24 weeks were available for 23, 15 and 5 participants respectively.
Results: Participants were aged 5-25 with most diagnosed with cerebral palsy (GMFCS II-IV). Consent, intervention drop-out and adherence rates were 55%, 17% and 83% respectively with no serious adverse events. Outcome measure completion rates ranged between 60% and 98%. Themes related to facilitators to participating in Frame Running were mostly identified in the personal and social domains with barriers more common in the environmental and policy domains.
Conclusions: The study results support the existing evidence that Frame Running is a safe and acceptable community-based exercise option for those with moderate-to-severe walking impairments. Themes identified in personal, social, environmental and policy domains can guide the implementation of community-based Frame Running participation. Our feasibility data can inform the design of future definitive studies.

Plain language summary
Frame Running is a safe and acceptable community-based exercise option for young people with moderate-to-severe walking impairments.The identified key themes related to personal, social, environmental and policy domains will aid clinicians, sports officials and policy makers with the implementation of Frame Running in community settings.Participants observed improvements in their activities of daily living related performance after participating in Frame Running for 12 weeks or more.

PMID: 39733454

5.Telehealth in arts therapies for neurodevelopmental and neurological disorders: a scoping review

Ērika Reitere, Jana Duhovska, Vicky Karkou, Kristīne Mārtinsone

Front Psychol . 2024 Dec 18:15:1484726. doi: 10.3389/fpsyg.2024.1484726. eCollection 2024.

Background: Arts therapies, encompassing art therapy, music therapy, drama therapy, and dance movement therapy with the broader practice of expressive arts therapies, have demonstrated positive outcomes in the treatment of neurodevelopmental and neurological disorders (NNDs). Integrating arts therapies into telehealth has become increasingly important to improve accessibility for people with mobility impairments or those living in remote areas. This study aims to map the existing body of literature to provide an in-depth overview of telehealth in arts therapies for individuals with NNDs.
Methodology: This scoping review followed the PRISMA guidelines. Six databases were systematically searched, with 2,888 articles screened for eligibility. Inclusion criteria focused on primary research peer-reviewed articles in English that addressed telehealth arts therapies for NNDs.

Results: Seventeen telehealth studies published between 2009 and March 2024 were included, with a notable increase in publications after 2020. The studies covered various neurodevelopmental disorders, including autism spectrum disorders, attention deficit hyperactivity disorder (ADHD), Rett syndrome, and neurological disorders such as stroke, epilepsy, cerebral palsy, central nervous system (CNS) tumors, dementia, Alzheimer's disease, Parkinson's disease, spinal cord injuries, and mild cognitive impairment. Music therapy was the most widely studied modality. Interventions ranged from therapeutic singing and songwriting to virtual reality experiences. Different platforms and specialized virtual environments were used alongside pre-recorded sessions. Positive benefits included psychological enrichment, social connectivity, cognitive improvements, and brain changes, although some studies reported mixed or no significant effects in certain areas.

Conclusion: Telehealth in arts therapies significantly benefits individuals with NNDs, improving accessibility and providing psychological, emotional, social, and cognitive benefits. The positive benefits observed highlight the potential of these interventions to improve overall well-being and daily functioning. Future research may focus on high-quality qualitative studies and neuroimaging assessments to further validate the impact of telehealth arts therapies.
PMID: 39744037

6.Exploring the role of the rock climbing Treadwall as a novel therapy tool in physical rehabilitation

Kathryne Bartolo, Katelyn Prais, Ella D'Amico, Ghaith J Androwis, Jenfu Cheng, Hannah Aura Shoval

PM R . 2025 Jan 3. doi: 10.1002/pmrj.13283. Online ahead of print.

Background: Rock climbing offers numerous health benefits, but accessibility and safety concerns limit its therapeutic use, especially for individuals with disabilities. No prior studies have explored the potential benefits of integrating the Treadwall, a rotating climbing wall with improved accessibility and safety, into rehabilitation protocols.
Objective: To evaluate the safety and feasibility of implementing a Treadwall climbing intervention as a novel therapy tool for children with hemiplegic cerebral palsy. Additionally, we seek to explore potential functional benefits derived from the Treadwall intervention.

Design: This prospective, observational, single-site study assessed Treadwall training in a cohort of children with hemiparetic cerebral palsy while attending a 3-week intensive therapy program.

Setting: The study was conducted at the BECOME Program in Children's Specialized Hospital, Mountainside, NJ.

Participants: A total of 10 participants, aged 4 to 9 years, diagnosed with hemiparesis, were enrolled, with nine completing the intervention.

Interventions: The intervention involved 15 10-minute climbing sessions during the 3-week intensive therapy program. Participants' climbing distance, intensity, and active mobility rate were recorded.

Main outcome measure(s): Primary outcome measures included climbing distance, intensity, and active mobility rate. Secondary measures, the Assisting Hand Assessment (AHA) and Melbourne Assessment of Unilateral Upper Limb Function, were collected to assess upper limb function.

Results: The study demonstrated significant improvements in distance climbed ($p < .01$), intensity ($p < .05$), and active mobility rate ($p < .05$). Participants showed enhanced upper limb function, indicated by improved AHA and Melbourne Assessment scores ($p < .01$). Qualitative therapist reports showed positive feedback regarding the Treadwall's potential benefits.

Conclusions: The study supports the feasibility and safety of using the rock climbing Treadwall as a novel therapy tool for children with hemiplegic cerebral palsy. The intervention showed promising results in improving climbing skills, motor learning, and coordination. Future investigations should explore dosing and long-term outcomes to fully assess the Treadwall's therapeutic potential.

PMID: 39749801

7.Use of Nebulized Hypertonic Saline in Patients With Neuromuscular Diseases or Cerebral Palsy in the United Kingdom

Natalia Galaz-Souza, Hui-Leng Tan, Matthew Hurley, Andrew Bush

Pediatr Pulmonol . 2024 Dec 31:e27464. doi: 10.1002/ppul.27464. Online ahead of print.

No abstract available

PMID: 39739351

8.A Combined Comprehensive Palliative and Rehabilitative Care Plan for a Child With Cerebral Palsy

Raktim Swarnakar, Shiv L Yadav

Case Reports Cureus . 2024 Dec 3;16(12):e75010. doi: 10.7759/cureus.75010. eCollection 2024 Dec.

Abstract
Cerebral palsy (CP) is a group of neurological disorders that affect movement, muscle tone, and motor skills. Here, we present a case of an 11-year-old female patient who presented with tightness in both lower limbs, since birth, and delayed walking, accompanied by difficulty walking due to spasticity. She was diagnosed with spastic diplegic cerebral palsy. This case highlights the combined use of palliative and rehabilitative care. Developmental milestones were delayed, and she was diagnosed with CP at an early age. A comprehensive treatment plan was implemented, including physical therapy, speech therapy, and pharmacological treatment with baclofen to reduce spasticity. Non-pharmacological treatments such as neurodevelopmental therapy, biofeedback, and orthotic support were also employed. The child's rehabilitation progress included improved mobility, speech fluency, and reduced spasticity, with notable benefits in gait. Palliative care played a critical role in addressing the emotional, psychological, and social aspects of the child's condition and providing the family support, counseling, and guidance on managing the care burden. This integrated approach emphasizes the importance of early palliative care alongside rehabilitation to optimize a child's quality of life. This case highlights how a multidisciplinary approach addressing both physical and emotional needs can lead to better overall outcomes for children with cerebral palsy, improving not just mobility but also their well-being and family support system.

PMID: 39749062

9.Efficacy, Indications, and Safety of Intrathecal Baclofen Pump: A Narrative Review

Alan D Kaye, Se Yun Cheon, Morgan H Roque, Caroline Gibbs, Karlee R Mott, Alex M Wandler, Syeda T Munir, Junyu Lin, Shahab Ahmadzadeh, Harish Siddaiah, Sarah H Myers, Kristin Nicole Bembenick, Sahar Shekoohi

Curr Pain Headache Rep . 2025 Jan 4;29(1):9. doi: 10.1007/s11916-024-01310-x.

Purpose of review: Baclofen, a muscle relaxant that reduces the release of excitatory neurotransmitters in the pre-synaptic neurons stimulating inhibitory neuronal signals in post-synaptic neurons, has been around for over 5 decades. Baclofen is used primarily for spasticity and since 1982, has had a role as an intrathecal agent. In the present investigation, we review research trends and updates on safety and efficacy of intrathecal baclofen (ITB) pumps.
Recent findings: Evaluation of safety and efficacy of ITB pumps in spasticity and relevant conditions was evaluated in the present investigation. PubMed and ClinicalTrials.gov were used to review appropriate related literature. Commonly reported aspects regarding ITB efficacy include comparison with alternative treatments, maintenance efficacy, and long-term outcomes. Safety considerations and risk factors associated with ITB include postoperative complications, withdrawal symptoms, tolerance issues, long-term management, and contraindications. In summary, the present investigation reveals that ITB is efficacious for muscle spasticity; however, efforts should be made to enhance safety and efficacy by providing improved best practice guidelines on maximum safe dose with the least amount of risk with individualized treatments.

PMID: 39754631

10.Intraventricular baclofen for the treatment of pediatric spasticity in cerebral palsy: technique and outcomes

Martin G Piazza, Swetha Thambireddy, Anisha Mandava, Taylor J Abel, Robert G Kellogg

J Neurosurg Pediatr . 2025 Jan 3:1-6. doi: 10.3171/2024.10.PEDS24228. Online ahead of print.

Objective: Intraventricular baclofen (IVB) administration is used for the treatment of secondary dystonia associated with cerebral palsy (CP), but it has not been reported as a first-line infusion technique for spasticity. In this study, the authors report outcomes of patients with mixed or isolated spasticity treated with IVB administration.

Methods: A retrospective analysis was performed of consecutive patients treated with IVB between 2019 and 2023. Demographics, baseline clinical variables, and complications data were collected. The primary outcome of the study was the change in spasticity and dystonia as measured by the modified Ashworth Scale (MAS) and Barry-Albright Dystonia Scale (BADS) scores, respectively. Wilcoxon rank-sum tests were performed to compare the change in the pre- and postoperative scores.

Results: Fifteen patients were implanted with IVB pumps for spasticity related to CP between 2019 and 2023. The median change in the MAS score was 2 (interquartile range [IQR] = 1) and the median change in the BADS score was 1 (IQR = 2). The Wilcoxon rank-sum test revealed a statistically significant change in both scores following IVB pump placement (BADS $z = 2.90$, $p = 0.003$; MAS $z = 3.2$, $p = 0.001$). Three patients (20%) experienced minor perioperative complications, all of which were self-limiting and none required additional surgery.

Conclusions: This study reported on 15 cases of mixed or isolated spasticity and showed a relative improvement in the MAS and BADS scores after IVB pump placement. These results provide evidence that IVB can be a safe and effective treatment for spasticity-related CP in addition to dystonia. IVB may be advantageous when an intraventricular route of baclofen administration is preferred.

PMID: 39752717

11.Dental care and services of children and young people with cerebral palsy in Australia: A comprehensive survey of oral health-related quality of life

Karen Lansdown, Kim Bulkeley, Margaret McGrath, Michelle Irving, Claudia Zagreanu, Hayley Smithers-Sheedy

Spec Care Dentist . 2025 Jan-Feb;45(1):e13098. doi: 10.1111/scd.13098.

Aims: To investigate caregiver-reported dental care experiences and oral health-related quality of life (OHRQoL) of children and young people with cerebral palsy (CP).

Methods: Between May and August 2023, caregivers of children and young people from three Australian states were invited to complete questionnaires, including the Child Oral Health Impact Profile (COHIP-SF 19).

Results: Sixty-eight caregivers participated in the survey. Most children and young people had spastic CP (69.1%) with unilateral spasticity most common (51.1%). The COHIP-SF 19 average score was 51.9% ± 12.4, indicating moderate OHRQoL. Gender, communication, oral health daily routine, participation in dental exams and treatment, special arrangements needed to attend the practice, and urgent dental care due to pain or other problem(s) all significantly impacted OHRQoL ($p < 0.05$).

Conclusion: OHRQoL of children and young people with CP is moderately impacted, as indicated by the COHIP-SF 19 scores. To improve OHRQoL in this population group, it is crucial to prioritize key factors such as upskilling dental professionals and creating more inclusive dental environments.

PMID: 39754555

12.Automating radiological measurements of the hip in children with cerebral palsy

Peter Thompson, Mohammed Khattak, P J Joseph, Daniel C Perry; Medical Annotation Collaborative; Timothy F Cootes, Claudia Lindner, Dileep Karthikappallil, Hesham Zaman, Grace Airey, Saad Maqsood, Tom Hughes, Shuja Ahmad, James McEvoy, Graeme Wilson, Ha P Do Le, Fatima Tariq, Sohan Shah, Dhawal Patel, Ross McAllister, Anil Singh Dhadwal, Joseph Fennelly, William Lloyd, Amir Varasteh, Kieran Almond, Henry Crouch-Smith

Bone Joint J . 2025 Jan 1;107-B(1):124-132. doi: 10.1302/0301-620X.107B1.BJJ-2024-0894.

Aims: The aims of this study were to develop an automatic system capable of calculating four radiological measurements used in the diagnosis and monitoring of cerebral palsy (CP)-related hip disease, and to demonstrate that these measurements are sufficiently accurate to be used in clinical practice.

Methods: We developed a machine-learning system to automatically measure Reimer's migration percentage (RMP), acetabular index (ACI), head shaft angle (HSA), and neck shaft angle (NSA). The system automatically locates points around the femoral head and acetabulum on pelvic radiographs, and uses these to calculate measurements. The system was evaluated on 1,650 pelvic radiographs of children with CP (682 females and 968 males, mean age 8.3 years (SD 4.5)). Each radiograph was manually measured by five clinical experts. Agreement between the manual clinical measurements and the automatic system was assessed by mean absolute deviation (MAD) from the mean manual measurement, type 1 and type 2 intraclass correlation coefficients (ICCs), and a linear mixed-effects model (LMM) for assessing bias.

Results: The MAD scores were 5.7% (SD 8.5%) for RMP, 4.3° (SD 5.4°) for ACI, 5.0° (SD 5.2°) for NSA, and 5.7° (SD 6.1°) for HSA. Overall ICCs quantifying the agreement between the mean manual measurement and the automatic results were 0.91 for RMP, 0.66 for ACI, 0.85 for NSA, and 0.73 for HSA. The LMM showed no statistically significant bias.

Conclusion: The results showed excellent agreement between the manual and automatic measurements for RMP, good agreement for NSA, and moderate agreement for HSA and ACI. The performance of the system is sufficient for application in clinical practice to support the assessment of hip migration based on RMP. The system has the potential to save clinicians time and to improve patient care by enabling more comprehensive, consistent, and reliable monitoring of hip migration in children with CP.

PMID: 3974067

13.Exoskeleton gait training on real-world terrain improves spatiotemporal performance in cerebral palsy

Emmanuella A Tagoe, Ying Fang, Jack R Williams, Julie L Stone, Zachary F Lerner

Front Bioeng Biotechnol . 2024 Dec 17:12:1503050. doi: 10.3389/fbioe.2024.1503050. eCollection 2024.

Introduction: Walking is essential for daily life but poses a significant challenge for many individuals with neurological conditions like cerebral palsy (CP), which is the leading cause of childhood walking disability. Although lower-limb exoskeletons show promise in improving walking ability in laboratory and controlled overground settings, it remains unknown whether these benefits translate to real-world environments, where they could have the greatest impact.
Methods: This feasibility study evaluated whether an untethered ankle exoskeleton with an adaptable controller can improve spatiotemporal outcomes in eight individuals with CP after low-frequency exoskeleton-assisted gait training on real-world terrain.

Results: Comparing post- and pre-assessment, assisted walking speed increased by 11% and cadence by 7% ($p = 0.003$; $p = 0.006$), while unassisted walking speed increased by 8% and cadence by 5% ($p = 0.009$; $p = 0.012$). In the post-assessment, assisted walking speed increased by 9% and stride length by 8% relative to unassisted walking ($p < 0.001$; $p < 0.001$). Improvements in walking speed were more strongly associated with longer strides than higher cadence ($R 2 = 0.92$; $R 2 = 0.68$). Muscle activity outcomes, including co-contraction of the soleus and tibialis anterior, did not significantly change after training.

Discussion: These findings highlight the spatiotemporal benefits of an adaptive ankle exoskeleton for individuals with CP in real-world settings after short-term training. This work paves the way for future randomized controlled trials (RCTs) to evaluate the isolated effects of adaptive ankle exoskeletons on gait performance and neuromuscular outcomes in individuals with CP in real-world environments.
PMID: 39741499

14.Early detection of cerebral palsy in low- and middle-income countries: Challenges for implementation in clinical practice

Adriana Dos Santos

Dev Med Child Neurol . 2024 Dec 28. doi: 10.1111/dmcn.16213. Online ahead of print.

No abstract available

PMID: 39731758

15.Cause-Specific Secular Trends and Prevention Measures of Post-Neonatally Acquired Cerebral Palsy in Victoria and Western Australia 1975-2014: A Population-Based Observational Study

E Waight, S McIntyre, S Woolfenden, S Goldsmith, S Reid, L Watson, P N Britton, A Webb, M Hansen, N Badawi, H Smithers-Sheedy

J Paediatr Child Health . 2025 Jan 2. doi: 10.1111/jpc.16760. Online ahead of print.

Aim: To describe the timing and causes of post-neonatally acquired cerebral palsy (PNN-CP) and map the implementation of relevant preventive strategies against cause-specific temporal trends in prevalence.
Methods: Data for a 1975-2014 birth cohort of children with PNN-CP (brain injury between 28 days and 2 years of age) were drawn from the Victorian and Western Australian CP Registers. Descriptive statistics were used to report causal events and timing. Poisson regression models were used to investigate the strength of evidence for cause-specific temporal trends in prevalence. Preventive strategies were mapped alongside cause-specific trends.
Results: Amongst 512 children, causes of PNN-CP included infections (31%, n = 157), head injuries (24%, n = 121) and cerebrovascular accidents (CVAs) (23%, n = 119). Infections were the only main causal group of PNN-CP that declined significantly (p = 0.014). Fifty two percent (n = 267) of the PNN-CP cohort acquired their brain injury before 6 months of age, the majority having an infectious cause (57%, n = 90). Improved clinical care and a range of preventive strategies, including childhood vaccination programs, occurred during this period.
Conclusion: Infants under 6 months are a priority group for preventive strategies for PNN-CP. Declining temporal trends were observed for PNN-CP caused by infection, and the causal subgroup of CVAs associated with surgery. Interventions aimed at further reducing the risk of head injury, CVAs and infections, are needed to reduce the prevalence of PNN-CP.

PMID: 39748548

16.Genetics of Cerebral Palsy: Diagnosis, Differential Diagnosis, and Beyond

Dae-Hyun Jang, Jaewon Kim, Aloysia Leisanne Schwabe, Timothy Edward Lotze

Ann Rehabil Med . 2024 Dec;48(6):369-376. doi: 10.5535/arm.240081. Epub 2024 Dec 23.

Abstract
Cerebral palsy (CP) is the most common motor disability in children, characterized by diverse clinical manifestations and often uncertain etiology, which has spurred increasing interest in genetic diagnostics. This review synthesizes findings from various studies to enhance understanding of CP's genetic underpinnings. The discussion is structured around five key areas: monogenic causes and copy number variants directly linked to CP, differential genetic disorders including atypical CP and mimics, ambiguous genetic influences, co-occurrence with other neurodevelopmental disorders, and polygenic risk factors. Case studies illustrate the clinical application of these genetic insights, underscoring the complexity of diagnosing CP due to the phenotypic overlap with other conditions and the potential for misdiagnosis. The review highlights the significant role of advanced genetic testing in distinguishing CP from similar neurodevelopmental disorders and assessing cases with unclear clinical presentations. Furthermore, it addresses the ongoing challenges in establishing a consensus on genetic contributors to CP, the need for comprehensive patient phenotyping, and the integration of rigorous genetic and functional studies to validate findings. This comprehensive examination of CP genetics aims to pave the way for more precise diagnostics and personalized treatment plans, urging continued research to overcome the current limitations and refine diagnostic criteria within this field.
PMID: 39736497

17.Psychosocial and Economic Burden on Families of Children With Cerebral Palsy: A Correlation With Locomotor Severity

Falak Naaz, Bibhu Prasad Nayak, Sumanta Panigrahi, Nirmal Kumar Mohakud

Cureus . 2025 Jan 2;17(1):e76794. doi: 10.7759/cureus.76794. eCollection 2025 Jan.

Background: Cerebral palsy (CP) is a condition that often has significant psychosocial and economic impacts on the caregivers of affected children.

Objective: This study aimed to assess the association between the Gross Motor Function Classification System (GMFCS) level and the psychosocial and economic impact on caregivers of children with CP.

Methodology: A hospital-based cross-sectional observational study was conducted on children with CP aged 2-14 years, admitted to the Inpatient Department (IPD) or attending the District Early Intervention Center (DEIC) for physiotherapy at a teaching hospital in Odisha, from December 2020 to November 2022. In DEIC, appropriate screening and therapy as per requirement is given to the high-risk infants. Early detection of CP is done. Children with CP come here with their parents for physiotherapy, occupational therapy, hearing, vision, and development assessment. Tools used included the GMFCS - Expanded and Revised (GMFCS-ER), a five-level classification system, the Modified Updated Kuppuswamy Socioeconomic Scale (2021) for socioeconomic status (SES), and the Pai and Kapur Family Burden Interview Scale.

Results: A total of 160 children with CP were included in the study, with 98 males and 62 females, resulting in a male-to-female ratio of 1.58:1. Out of 160 children with CP, the socioeconomic distribution showed that 73 (45.6%) belonged to the upper-lower class, 68 (42.5%) to the lower-middle class, 9 (5.6%) to the lower class, and 10 (6.3%) to the upper-middle class. Regarding functional levels of 160 children with CP, 22 (13.8%) of children were in GMFCS class I, 30 (18.8%) in class II, 16 (10%) in class III, 17 (10.6%) in class IV, and 75 (46.7%) in class V. Financially, out of 160 families of children with CP, 75 (46.9%) families were moderately burdened, 84 (52.5%) were severely burdened, and only 1 (0.6%) reported no financial burden. Regarding psychosocial impact, 94 (58.8%) families experienced moderate disruption of family leisure, while 44 (27.5%) experienced severe disruption. Physical health was moderately affected in 73 (45.6%) families, and 14 (8.8%) reported a severe impact. Mental health was moderately affected in 88 (55%)of families, while 33 (20.6%) experienced severe mental health issues. There was a statistically significant association between the GMFCS level of the child and the psychosocial and economic burden on families.

Conclusions: The study concludes that higher GMFCS levels in children with CP are associated with a greater psychosocial and economic burden on their families.

PMID: 39748880

18.Experiences of participation in daily life of adolescents and young adults with cerebral palsy: A scoping review

No authors listed

Dev Med Child Neurol . 2025 Jan 3. doi: 10.1111/dmcn.16228. Online ahead of print.

No abstract available

PMID: 39754332

19.Impact of Chorionicity in Neurodevelopmental Outcomes in Preterm Twins

Catarina Leuzinger Dias, Catarina Cordeiro, Margarida Camacho-Sampaio, Andreia Lomba, Adelaide Taborda

Cureus. 2024 Dec 3;16(12):e75029. doi: 10.7759/cureus.75029. eCollection 2024 Dec.

Abstract
Introduction Multifetal pregnancies, which account for 2-4% of births worldwide, have increased in recent years. Twin pregnancies carry a higher risk of preterm birth and associated neonatal morbimortality, with monochorionic twins considered at greater risk. This study investigates the influence of chorionicity on neurodevelopmental outcomes in preterm twins. Methods A retrospective cohort study was conducted, including preterm twins born before 32 weeks of gestational age and/or with a birth weight of less than 1500 grams, admitted to a tertiary-hospital neonatal intensive care unit from 2013 to 2021. Neurodevelopmental outcomes were evaluated at 24 months of corrected age using the Griffiths II Mental Development Scales. Moderate to severe neurodevelopmental impairment was determined by the occurrence of one or more of the listed criteria: global development quotient <70, severe visual impairment, cerebral palsy, or profound sensorineural deafness. Results A total of 125 preterm twins were evaluated, of which 45% (n=56) were monochorionic. Overall, 5.6% (n=7) of the infants had moderate to severe neurodevelopmental impairment (NDI), with higher comorbidity rates in this group. No significant differences were found in NDI or other prematurity-related comorbidities between monochorionic and dichorionic twins. Gestational age over 27 weeks and birth weight over 1010 grams were identified as accurate predictors for an absence of moderate to severe NDI in these infants. Conclusion Chorionicity alone does not appear to independently affect neurodevelopmental outcomes in preterm twins when complications are effectively managed. Improved prenatal monitoring and appropriate treatment of twin pregnancies, especially monochorionic, are crucial to mitigate risks associated with moderate to severe neurodevelopmental impairment.

PMID: 39749066

20.Diagnostic accuracy of early neonatal MRI in predicting adverse motor outcomes in children born preterm: Systematic review and meta-analysis

Karen H Mistry, Roslyn N Boyd, Alex M Pagnozzi, Samudragupta Bora, Robert S Ware, Joanne M George

Review Dev Med Child Neurol . 2025 Jan 2. doi: 10.1111/dmcn.16216. Online ahead of print.

Aim: To examine the diagnostic accuracy of Early structural and diffusion-weighted magnetic resonance imaging (MRI) (acquired at < 36 weeks postmenstrual age) to detect cerebral palsy (CP) or other adverse motor outcomes at or beyond 3 years corrected age in infants born preterm.

Method: In this systematic review and meta-analysis, we searched the CINAHL, Embase, PubMed, and Web of Science databases for studies without language restrictions and a prospectively registered protocol up to October 2023. We extracted the study details, associations presented, and meta-analyses conducted with pooled sensitivity and specificity.

Results: Twenty-seven articles met the overall inclusion criteria. White matter injury, cerebellar haemorrhage, intraventricular haemorrhage, and lower thalamic volume were associated with poorer motor outcomes. Abnormal Early structural MRI detected infants with a later diagnosis of CP (n = 448, eight studies) with a pooled sensitivity of 98% (95% confidence interval [CI] = 86-100), specificity of 75% (95% CI = 51-93), and adverse motor outcomes (n = 215, four studies), with a pooled sensitivity of 39% (95% CI = 20-59) and a specificity of 90% (95% CI = 88-94).

Interpretation: Early abnormal structural MRI predicted later CP with high sensitivity and specificity, while specificity was higher than sensitivity in predicting adverse motor outcomes using the Movement Assessment Battery for Children, Second Edition. Further research into diagnostic accuracy and association between Early MRI and long-term motor outcomes is warranted.

PMID: 39745804