Cerebral palsy research news

Monday 09 June 2025

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Interventions and Management

1.Efficacy of Hand Arm Bimanual Intensive Therapy in Improving Real-World Bimanual Performance and Identifying Predictors for Therapy Success in Children with Unilateral Cerebral Palsy

Shailesh S Gardas, Katie Woosley, Caroline Brown, Taylor Key, Natalie McBryde, Brody Morton, Christine Lysaght, Caroline Adams, Holly Holland, Swati M Surkar

Phys Occup Ther Pediatr . 2025 Jun 2:1-21. doi: 10.1080/01942638.2025.2509542. Online ahead of print.

Aim: This study assesses real-world bimanual performance improvements following Hand-Arm Bimanual Intensive Therapy (HABIT) using an objective tool (accelerometers) and to identify demographic and clinical predictors of these gains in children with unilateral cerebral palsy (UCP).
Methods: Forty children with UCP (mean age: 10.7 ± 3.24 years) participated in 30 h of HABIT. Bilateral wrist-worn accelerometers measured bimanual performance using use ratio, bilateral magnitude, and median acceleration. Self-perceived performance was measured using the Canadian Occupational Performance Measure (COPM), and upper extremity (UE) capacity with Jebsen-Taylor Hand Function Test (JTHFT), Nine-Hole Peg Test (NHPT), and Box and Block Test (BBT). Predictors such as age, sex, affected side, severity levels, and baseline capacity were analyzed.
Results: Use ratio ($p = .02$) and median acceleration ($p = .04$) showed improvements, indicating enhanced real-world performance. Gains were observed in COPM (performance and satisfaction, $p = .001$) and UE capacity (JTHFT: $p = .001$, NHPT: $p = .02$, and BBT: $p = .01$). Age, baseline NHPT and JTHFT scores explained 40.7% of the variance in use ratio, while NHPT accounted for 11.5% of the variance in median acceleration.
Conclusion: HABIT enhances real-world bimanual performance in children with UCP. Older age and more impaired baseline dexterity are significant predictors of greater therapeutic gains, offering potential strategy to maximize real-world functional gains.
PMID: 40456004

2.Quantifying structural properties of forearm flexor muscles in individuals with hemiparetic cerebral palsy using diffusion tensor imaging

Divya Joshi, Alexandra Hruby, Julius P A Dewald, Carson Ingo

Physiol Rep . 2025 Jun;13(11):e70404. doi: 10.14814/phy2.70404.

Abstract
This study investigated diffusion tensor imaging (DTI) derived macro- and micro-structural musculoskeletal adaptations in forearm flexor muscles in individuals with hemiparetic cerebral palsy (HCP) and typically developing (TD) individuals, and their relationship to reduced grip strength. In 14 individuals with HCP and 16 TD individuals, T1-weighted and diffusion-weighted magnetic resonance images of both forearms were acquired, and maximum grip strength was measured. In two forearm flexors, muscle volume, DTI-based diffusivity metrics, and probabilistic tractography derived fascicle architecture was estimated. Linear mixed-effects models evaluated interlimb differences in structural parameters and their impact on grip strength. In the HCP group, paretic muscles showed significant reductions in volume, diffusivity values, fascicle lengths, and physiological cross-sectional area as compared to nonparetic forearm and TD participants. Furthermore, reduced muscle volume and diffusivity together explained 62% of the grip strength deficit. These findings demonstrate that decreased muscle volume and altered microstructure, as indicated by reduced diffusivity, contribute significantly to functional impairments in HCP. DTI-based diffusivity metrics non-invasively reveal crucial insights into pathophysiological changes in muscle tissue, such as muscle atrophy and fibrosis. Future therapies should focus on both muscle macro- and micro-structural adaptations as targets to improve motor function in HCP.
PMID: 40474790

3.The assessment of grip strength in preschool-aged children with and without unilateral cerebral palsy

Griet Dequeker, Emma Detobel, Ellen Dillen, Marie Heymans, Lize Kleeren, Els Ortibus, Lisa Mailleux

Disabil Rehabil . 2025 Jun 4:1-6. doi: 10.1080/09638288.2025.2512586. Online ahead of print.

Purpose: To investigate reliability and validity of two grip strength devices in children with and without unilateral cerebral palsy (uCP) aged 2-6 years.
Method: We assessed grip strength in 20 pre-school-aged children with predominantly spastic uCP (mean age 4y0 ± 1y2m) and 20 age-matched children without uCP (mean age 3y11m ± 1y3m) using the Martin Vigorimeter and MyoGrip to investigate test -retest reliability (intraclass correlation coefficients; ICC), known-group validity (comparative statistics) and convergent validity (correlation analyses) in a cross-sectional design.
Results: In both groups, test-retest reliability was excellent for both devices and both hands (ICC 0.91-0.97). Grip strength of the non-preferred hand was lower in children with uCP for both devices ($p < 0.001$). Grip strength was decreased in the non-preferred compared to the preferred hand in children with uCP for both devices ($p < 0.001$). In children without uCP, grip strength was lower in the non-preferred compared to the preferred hand only for the MyoGrip ($p = 0.02$). The relation between both devices for both hands was good to very high ($r = 0.62$-0.92, $p < 0.007$).
Conclusion: Both devices can be implemented in clinical practice to assess grip strength in preschool-aged children with uCP. Only the MyoGrip detected differences between both hands in children without uCP and might be more sensitive.
Plain language summary
The Vigorimeter and MyoGrip reliably and validly assess grip strength in preschoolers with and without unilateral cerebral palsy Both tools allow accurate grip strength assessment supporting diagnosis and intervention planning For unilateral cerebral palsy, the Myogrip seems more sensitive in detecting differences than the Vigorimeter.
PMID: 40464572

4.Factors related to motor outcomes in adolescents and adults with cerebral palsy: A systematic review

Rayane Félix Lôbo Monteiro, Camila Araújo Santos Santana, Paula Silva de Carvalho Chagas, Ana Carolina de Campos

Review Braz J Phys Ther . 2025 May 31;29(5):101225. doi: 10.1016/j.bjpt.2025.101225. Online ahead of print.PMID: 40451121 DOI: 10.1016/j.bjpt.2025.101225

Background: Although the brain injury caused by cerebral palsy (CP) is not progressive, there is often a worsening of physical conditions during the transition to adolescence and adulthood. The aim of this systematic review was to summarize factors related to decline in motor function in adolescents and adults with CP.
Methods: This review was registered in PROSPERO (CRD42022311783). Studies met the following criteria: participants diagnosed with CP, ages 10 to 59 years; scientific studies with any methodological design and emphasis on motor function, reporting quantitative analysis of the effect of age on motor function or factors relevant that declined or improved motor capacity; published in English; any publication year, in electronic databases: Pubmed/Medline, Scopus, Cinahl. Data selection and extraction used the Covidence software. Factors related to motor outcomes that were statistically significant in at least one study and present in more than one study were reported. The outcomes were grouped within major categories (gross motor function, neuromusculoskeletal functions, and gait) for summary.
Results: 23 studies met the inclusion criteria. Relevant factors for changes in gross motor function (n = 16 studies) were: pain, neuromusculoskeletal aspects, altered gait parameters, Gross Motor Function Classification System (GMFCS) level, age, and history of surgery; for gait (n = 11): mobility performance, altered gait parameters, age, GMFCS level, pain and neuromusculoskeletal aspects; and for neuromusculoskeletal functions (n = 4): altered gait parameters, neuromusculoskeletal aspects, age, pain, and GMFCS level.
Conclusion: Age, GMFCS level, and presence of pain stood out as significant for motor decline across categories. Monitoring these factors is relevant for planning interventions and transition programs.
PMID: 40451121

5.Classification of spinopelvic balance in ambulatory adolescents and adults with cerebral palsy: a cross-sectional study

Emmanuelle Chaléat-Valayer, Carole Vernez, Stéphane Verdun, Soline Bellaiche, Laure Mathevon, Rachel Bard Pondarré, Hovannes Agopyan, Marianne Bagnol, Kariman Abelin

Sci Rep. 2025 Jun 6;15(1):19903. doi: 10.1038/s41598-025-03762-6.

Abstract
We aimed to determine the spinopelvic profile types of ambulatory adolescents and adults with diplegic CP, and their relationship with functional ability (Gross Motor Function Classification System [GMFCS]), pain, and previous orthopaedic treatments. We measured anatomical variables on radiographs from 77 individuals with CP (mean age, 28.4, SD, 11.9 years), GMFCS levels I-III. We applied a non-supervised hierarchical ascendant classification followed by k-medoids analysis to 5 key anatomical variables. We compared radiological and clinical variable values between the spinopelvic profiles identified. Three spinopelvic profiles emerged, according to whether the pelvis was anteverted (sacral slope ≥ 38°) or retroverted (< 38°) and whether this was concordant with the pelvic incidence (≥ 54° for anteversion and < 54° for retroversion). Most (61/77, 79%) participants had anteversion, concordant for only 28/61 (46%); 16/77 (21%) had retroversion, concordant for 14/16 (88%). More participants with concordant anteversion experienced pain than participants with discordant anteversion (P = 0.03). Rates of previous treatments did not differ between concordant and discordant anteversion. More participants with GMFCS level III had discordant anteversion than those with levels I-II (P = 0.02). Categorising the spinopelvic profile is the first step to understanding pain causes and proposing targeted interventions and/or rehabilitation programs.
PMID: 40481057

6.Corrigendum to "Comparison of the Hara, Harrington, and Davis hip joint center regression equations for gait analysis in children with cerebral palsy" [Clinical Biomechanics volume 126 (2025) 106565]

Reiko Hara, Tishya A L Wren

Published Erratum Clin Biomech (Bristol) . 2025 Jun 4:106572. doi: 10.1016/j.clinbiomech.2025.106572. Online ahead of print.

No abstract available
PMID: 40473570

7.The effectiveness of European Hip Surveillance Programmes in the identification and management of hip displacement and hip dislocation in children with cerebral palsy: a systematic review

Elaine McConkey, Claire Kerr, Sean Paul Carroll

Review Disabil Rehabil . 2025 May 31:1-10. doi: 10.1080/09638288.2025.2512407. Online ahead of print.

Purpose: To evaluate the effectiveness of European Hip Surveillance Programmes (HSPs) in the identification and surgical management of hip displacement/dislocation in children with Cerebral Palsy (CP), by systematically synthesising peer-reviewed evidence.
Methods: Five databases (MEDLINE, CINAHL, Cochrane Library, Science Direct and PEDro) were systematically searched in July 2023, alongside manual searching of reference lists and key journals to identify relevant studies conducted in Europe and written in English. Data were extracted and quality appraised using Joanna Briggs Institute Checklist for Analytical Cross-Sectional Studies (JBI-CACCS) appraisal tool.
Results: Six observational cross-sectional studies totalling 5069 participants met the inclusion criteria. Critical appraisal revealed good overall methodological quality. Results indicated HSPs were effective in identifying progressive hip displacement/dislocation. Five studies reported a significant decrease in prevalence of hip dislocation in children undergoing surveillance compared to controls. The need for salvage surgeries was abolished within surveillance groups across all included studies.
Conclusion: This review provides evidence that European HSPs can identify children at risk of developing hip displacement/dislocation and significantly reduce prevalence of dislocation. Future research including patient-reported outcomes such as pain, quality of life and burden of care for families may be useful to further evaluate effectiveness of HSPs.
Plain language summary
Hip Surveillance Programmes are effective in identifying children at risk of developing hip displacement/dislocation and in preventing subsequent dislocation. Hip Surveillance Programmes can eliminate the need for salvage hip surgery in this population, thus are key to the ongoing management of these children. The use of Hip Surveillance Programmes should be considered for children with cerebral palsy in countries with no formal surveillance programmes currently in place. Cerebral palsy registries and clinical databases can support longitudinal population-based health research for this population.
PMID: 40450389

8.Effects of Ankle Exoskeleton Motor Location on Gait Biomechanics and User Perceptions: The Bowden Cable Dilemma

Shanpu Fang, Riley J Shepard, Collin D Bowersock, Zachary F Lerner

IEEE Trans Med Robot Bionics . 2025 May;7(2):699-710. doi: 10.1109/tmrb.2025.3550661. Epub 2025 Mar 19.

Abstract
Motor-powered ankle exoskeletons have been shown to improve walking and rehabilitation outcomes in individuals with and without gait impairments (e.g., cerebral palsy (CP)). To date, ankle exoskeleton designs have either placed the motors on the shanks (direct or quasi-direct drive) or around the waist with Bowden cable transmissions. The former offers better transmission efficiency, while the latter reduces added mass biomechanical penalty. The biomechanical effects of motor placement may be magnified for individuals with CP due to weakened lower limb strength. To date, no study has compared how motor placement alters the biomechanical responses and user perceptions of individuals with or without gait impairment (e.g., CP). In this study involving 7 individuals with CP and 9 unimpaired individuals, we compared their metabolic cost of transport, lower limb muscle activities, and user perceptions when using ankle exoskeletons with either waist-mounted motors (and Bowden cables) or shank-mounted motors that were otherwise identical. Despite changes in lower leg muscle recruitment, results showed no statistical differences in the metabolic cost of transport. Shank-mounted motors were preferred by more participants in both cohorts (e.g., 6/7 in CP). These results help inform the ergonomics and mechanical designs of ankle exoskeletons and how they may be perceived.
PMID: 40454086

9.Effects of a Teleexercise Movement-to-Music Intervention on Health Outcomes in People with Mobility Disabilities: A Randomized Controlled Trial

Hui-Ju Young, Byron Lai, Jereme Wilroy, Avery Vitemb, Shiori Tanaka, Tapan S Mehta, Mohanraj Thirumalai, James H Rimmer

Arch Phys Med Rehabil . 2025 May 29:S0003-9993(25)00724-5. doi: 10.1016/j.apmr.2025.05.017. Online ahead of print.

Objective: To examine the effects of a 12-week online movement-to-music (eM2M) intervention on health outcomes in people with mobility disabilities.
Design: Two-arm randomized controlled trial.
Setting: Synchronous, online delivery over Zoom.
Participants: Participants (N=97) aged 18 to 70 and had diagnoses of traumatic brain injury, stroke, multiple sclerosis, spinal cord injury, spina bifida, Parkinson's, or cerebral palsy were randomized to eM2M (n=48) or control (n=49).
Intervention: eM2M participants completed three 60-minute sessions weekly for 12 weeks, while controls maintained usual activities.
Main outcome measures: Primary measures included resting heart rate, heart rate recovery, and grip strength. Secondary measures included Short Physical Performance Battery (SPPB), Timed Up and Go, PROMIS 10 Global Health Items, Ability to Participate in Social Roles and Activities Short Form 8a, and Godin Leisure Time Exercise Questionnaire. Participants were assessed at baseline and post-intervention, with intent-to-treat mixed-model ANCOVA as primary analyses.
Results: After adjusting for baseline and mobility groups, there was no significant between-group difference in resting heart rate post-intervention, though eM2M had a greater reduction in heart rate at minute-1 recovery (LSM=33.7%, p=0.04). No difference was observed in dominant hand grip strength, while controls showed a significantly greater increase in non-dominant grip strength compared to eM2M (LSM=-1.76kg, p=0.03). In contrast, eM2M demonstrated significant improvements in overall SPPB (LSM=0.52, p=0.048), gait speed (LSM=0.32, p=0.02), and both physical (LSM difference=2.08, p=0.04) and mental (LSM=2.22, p=0.02) health compared to controls. No group differences were observed in social participation. After removing outliers, eM2M showed a significant increase in physical activity compared to controls (LSM=11.55, p=0.02).
Conclusion: Movement-to-music delivered online may improve cardiorespiratory fitness, mobility, quality of life, and physical activity in people with mobility disabilities.
PMID: 40449571

10.Use of Botulinum Toxin Type A in the Open Reduction of a Mandibular Fracture in a Patient With Cerebral Palsy

Rah Yoon Kim, Chang Jun Lee, Gyeol Yoo

Case Reports J Craniofac Surg . 2025 Jun 1;36(4):e382-e384. doi: 10.1097/SCS.0000000000010871. Epub 2024 Nov 22.

Abstract
Patient compliance is essential for stabilizing mandibular fractures and ensuring successful outcomes. However, uncontrollable movement disorders can greatly complicate the overall management. This case discusses the management of a mandibular body fracture in a 46-year-old male with dyskinetic cerebral palsy, without using maxillomandibular fixation. The patient fell from a wheelchair, resulting in a mandibular body fracture. He received open reduction and internal fixation, but maxillomandibular fixation was not feasible due to his condition. Severe bruxism led to excessive contractions of the masseter muscle, which complicated recovery. The patient underwent 2 revision surgeries, along with botulinum toxin injections and muscle relaxants. Three months after the final surgery, the patient recovered without complications, and radiographic follow-up confirmed proper fixation. This case demonstrates that for patients with dyskinetic cerebral palsy, combining open reduction and internal fixation with botulinum toxin injections can effectively manage mandibular body fractures and lead to successful healing.
PMID: 40459984

11.Impact of an Adaptive Dance Program on Physical Abilities and Psychosocial Well-Being of Youth With Cerebral Palsy: A Case Series

Michelle R Christie, Heather Roberts, Hannah Maxey, Nancy J Clegg, Taylor Haut, Rachael De Leon, Dana Dempsey, Daniel Gonzalez, Angela Shierk

Pediatr Neurol . 2025 May 11:169:74-80. doi: 10.1016/j.pediatrneurol.2025.05.007. Online ahead of print.

Background: Dance provides therapeutic benefits to children and adolescents with cerebral palsy (CP), but the benefits of dance on both the physical abilities and psychosocial well-being of youth with CP have not been fully explored.
Methods: A prospective explanatory mixed-methods case series was conducted to explore the impact of "Dance!," a manualized adaptive dance program based on action-observation principles, on the physical abilities and psychosocial well-being of youth with CP.
Results: Three adolescent females (aged 13-16 years) diagnosed with CP (Gross Motor Functional Classification System I to II and Manual Ability Classification System I to III) participated in "Dance!" including preintervention and postintervention assessments and semistructured interviews following the program. Participants demonstrated improvements in their endurance, balance, and motor skills. Caregivers also reported improved psychosocial well-being following the program. During semistructured interviews, caregivers and participants reported improved balance, motor coordination, participation, and confidence.
Conclusions: "Dance!" provided an opportunity for a movement-based leisure activity and an opportunity to socialize with peers that led to meaningful change in both the physical abilities and psychosocial well-being of youth with CP.
PMID: 40466517

12.Hearing and neurodevelopmental outcomes among children with congenital cytomegalovirus

Jordan C Stout, Jessica Leung, Peter Kfoury, John A Germiller, Albert H Park, Tatiana M Lanzieri

Int J Pediatr Otorhinolaryngol . 2025 May 26:195:112408. doi: 10.1016/j.ijporl.2025.112408. Online ahead of print.

Objective: Congenital cytomegalovirus (cCMV) infection is the most common congenital infection and the leading non-genetic cause of sensorineural hearing loss. We assessed demographics, clinical characteristics, hearing and neurodevelopmental outcomes by 6 years of age among U.S. children with possible cCMV.
Study design: Retrospective cohort design.
Setting: The Audiological and Genetic Database (AudGenDB) includes 175,216 pediatric patients who underwent audiology, otology or genetic visits during 2006-2019 in Children's Hospital of Philadelphia, Vanderbilt Children's Hospital, or Boston Children's Hospital.
Methods: Children with possible cCMV were identified by diagnostic codes for cCMV infection and CMV disease up to 6 years of age. We examined clinical signs of cCMV during 0-45 days of birth and neurodevelopmental conditions (including hearing loss) up to 6 years of age. Hearing loss was defined as pure tone average or any frequency threshold ≥25 dB.
Results: A total of 180 (0.1 %) children with possible cCMV were identified; 70 % had diagnosis codes after 45 days of life. The proportions of Black and Hispanic/Latino children comprised a higher proportion in the possible cCMV group compared to the non-cCMV group. Overall, 129 (72 %) children with possible cCMV had diagnoses codes for neurodevelopmental conditions, including hearing loss (56), communication delays (45) and cerebral palsy (22). Hearing loss was diagnosed at a median age of 2 (1-4) years.
Conclusion: Neurodevelopmental delays were common among children with possible cCMV included in this study. AudGenDB provides access to longitudinal outcomes for a large and diverse cohort that remains helpful in lieu of state-mandated screenings.
PMID: 40451107

13.Investigation of Sleep Patterns and Electroencephalographic Characteristics in Children With Microcephaly Associated With Congenital Zika Syndrome and Severe Cerebral Palsy

Valéria Brandão Marquis, Adriana de Oliveira Melo, Márcia Pradella-Hallinan, Gustavo de Vasconcelos Ataíde, Maria Durce Costa Gomes Carvalho, Demócrito de Barros Miranda-Filho, Ricardo Arraes de Alencar Ximenes

Review Pediatr Neurol . 2025 May 12:169:69-73. doi: 10.1016/j.pediatrneurol.2025.04.014. Online ahead of print.

Abstract
This study investigates the sleep characteristics and electroencephalographic (EEG) activity in 65 children with microcephaly associated with congenital Zika syndrome (CZS) and severe cerebral palsy. The children, born between 2015 and 2017, tested positive for Zika and exhibited neuroimaging findings consistent with CZS. Extended neurological polysomnography was conducted following American Academy of Sleep Medicine guidelines. Sleep was classified into quiet (N), active (R), and indeterminate (I) phases, with frequent epileptiform activity observed. Epileptiform activity was prevalent during wakefulness, N sleep, and R sleep. Seizures occurred in 29.2% of the children during polysomnography. Key sleep waves like sleep spindles, k-complexes, and delta waves were rarely identified. During wakefulness, a continuous EEG trace was seen in 49.2% of the children, whereas burst-suppression (BS) was noted in 47.7%. The absence of posterior dominant rhythm and the presence of sharp slow wave activity were common. In N sleep, most children exhibited BS activity (63.1%) and sharp slow wave activity (95.3%), with 98.5% showing epileptiform activity. There was little difference in EEG traces between wakefulness and N sleep in over half of the children. In R sleep, continuous EEG trace and rapid eye movement were noted in 53.8% and 69.2% of the children, respectively, with 93.8% showing epileptiform activity. The study suggests that brainstem and cortical lesions may explain these findings, highlighting the complex neurological and sleep patterns in children with CZS and the need for further research.
PMID: 40466516

14.Chronic lower back pain in adults with cerebral palsy: Stigma, anxiety, and physical decline

Dev Med Child Neurol . 2025 Jun 5. doi: 10.1111/dmcn.16375. Online ahead of print.

No abstract available
PMID: 40474545

15.Providing culturally sensitive sexual medicine for persons with disabilities: a scoping review

Rebecca Howland, Benjamin Tooke, Hugh Deery, JoAnne Deery, Jodi Kreschmer, Michelle Arthur, Daniela Wittmann, Courtney Streur

Sex Med Rev . 2025 Jun 6:qeaf026. doi: 10.1093/sxmrev/qeaf026. Online ahead of print

Introduction: Persons with physical disabilities (PWD) are a health care disparity group who face both difficulties accessing and inequalities in care. Although their sexual health is impacted by their disability and important to them, they often receive no or inadequate sexual health care. To address this gap, we sought to summarize evidence-based recommendations for culturally sensitive sexual health care for PWD.
Objectives: The aim of this scoping review was to identify patient-reported preferences for culturally sensitive sexual health care for people with Parkinson's Disease, Multiple Sclerosis, Spinal Cord Injury, Spina Bifida, and Cerebral Palsy.
Methods: Utilizing PubMed and Embase, we identified all primary research studies published from 1/1/2005-1/6/2024 that included PWD-reported preferences for delivery of sexual health care. After determining eligibility, two authors extracted and subsequently summarized the data utilizing standard scoping review methods.
Results: 6575 articles were identified, of which 32 met eligibility criteria, which included 13 reviews, nine cross- sectional studies, nine cohort studies, and one quasi-experimental studies. Sexual health generally goes unaddressed in the care of PWD despite its importance to the individuals. While there is a paucity of research, existing evidence suggests that preferences are highly individual and may vary by sociocultural, health, disability, relationship, and personal factors. Health care providers should ask each person about their preferences for the timing and context of sexual health conversations, such as who is present and how to make the person comfortable during the clinic visit. Validated questionnaires and educational tools may help facilitate conversations. Sexual health conversations should be ongoing.
Conclusions: Providing culturally sensitive sexual health care for PWD and their partners is both critical and feasible. Additional research is needed to further explore preferences for care and how preferences are impacted by the intersectionality of sociocultural, disability, and other factors.
PMID: 40479564

16.Eye-tracking as a measure of receptive vocabulary in non-verbal children with cerebral palsy

Susheel Joginder Singh, Suvalaxmi Raman, XinTong Lim, Vinitaa Rajakumar, Rogayah A Razak, Shin Ying Chu

PLoS One . 2025 Jun 3;20(6):e0325183. doi: 10.1371/journal.pone.0325183. eCollection 2025.

Abstract
Children with cerebral palsy (CP) often struggle to participate in traditional language assessments due to their limited mobility, making it challenging for speech-language therapists (SLTs) to accurately assess their language abilities. In recent years, there has been evidence that eye-tracking is an effective way of measuring the receptive language abilities of children who demonstrate difficulties with traditional language assessments. This study aimed to (i) develop eye-tracking assessment materials based on a receptive vocabulary subtest of a Malay language assessment and (ii) evaluate the performance of children with CP on the receptive vocabulary assessment conducted via eye-tracking, compared to their performance on a traditional receptive vocabulary assessment. The first phase of the study focused on developing eye-tracking receptive vocabulary assessment materials from the Malay Preschool Language Assessment Tool and trialling the materials and assessment protocol. This phase involved 15 typically developing children aged 4-6 years. The finalized materials and protocol were administered to 15 children with CP in the second phase. Each child attended two assessment sessions: the first was a traditional receptive vocabulary assessment, and the second utilized eye-tracking technology. Children practiced eye-tracking through online games. Results showed that eight children with CP performed better in the eye-tracking assessment, two scored similarly across both methods, and five scored lower during eye-tracking. The Wilcoxon Signed Rank Test conducted revealed no significant difference in scores across both assessment methods ($p > .05$). Furthermore, most children exhibited poor consistency in their scores across the two methods. These findings suggest that while some children with CP may benefit from receptive vocabulary assessments conducted via eye-tracking, no single assessment method is optimal for all children with CP. Instead, children with CP may benefit from a combination of assessment methods, including eye-tracking, to increase the accuracy of assessment results.
PMID: 40460148

17.The health-seeking experiences of caregivers of children with cerebral palsy in Thembisa, South Africa: shifting from the voice of medicine to the voice of the caregiver

Cynthia Sawasawa, Jennifer Watermeyer, Khetsiwe Masuku

Disabil Rehabil . 2025 Jun 6:1-12. doi: 10.1080/09638288.2025.2513043. Online ahead of print.

Purpose: Caregivers of children diagnosed with cerebral palsy (CP) frequently engage with healthcare professionals (HCPs) when seeking help on behalf of their children. However, little is known about their health-seeking experiences, particularly in low-resourced townships.
Materials and methods: A qualitative descriptive case study research design, underpinned by a phenomenological approach. A series of semi-structured interviews were conducted with fifteen caregivers who live in a township in South Africa and were selected using purposive and snowball sampling. Data were analysed using interpretative phenomenological analysis.
Results: The results revealed three main themes which include: (i) A primary focus in healthcare systems on child-centred care which neglects the needs of caregivers, (ii) Brief disease-focused consultations with HCPs that have a negative impact on caregiver health-seeking experiences, and (iii) Dismissal of caregivers' expert knowledge.
Conclusion: The findings indicate that caregivers have needs that are separate from those of their children. To ensure that caregivers receive helpful help during their health-seeking attempts, there must be a shift from the traditional paternalistic roles of healthcare providers. Instead, HCPs should view themselves as collaborators with caregivers to ensure that they provide family-centred services. Additionally, the voice of the lifeworld needs to become a central feature of the care provided to caregivers and their children.
Plain language summary
Caregivers in South Africa with children diagnosed with cerebral palsy (CP) report experiences of care that reflect biomedical and child-focused healthcare practices. The fragmented use of the biopsychosocial model not only limits the understanding of the impact of CP on the caregiver but may actively undermine caregiver engagement. Counselling and therapy should be provided to caregivers of children with CP who often have psychosocial needs that they are unaware of, particularly in the early stages of the CP diagnosis.
PMID: 40476627

18.Utility of equations that consider gross motor function to estimate height in a Mexican population of children and adolescents with cerebral palsy

Andrea Anais García-Contreras, Jorge Abraham García-Íñiguez, Dennis Camacho-Buenrostro, Edgar Manuel Vásquez-Garibay, Luisa Fernanda Martínez Romero, Jimena Mújica-Páez, Andrea María Murrieta-Verduzco, Ana Paula Rojas-Chávez

Nutr Hosp . 2025 May 13. doi: 10.20960/nh.05651. Online ahead of print.

Introduction: height estimation is essential for the assessment of nutritional status. In children with cerebral palsy (CP), it is difficult to obtain this information reliably. The equations that consider gross motor function to estimate height have not been tested in the Mexican population.
Objective: to evaluate the usefulness of equations that consider gross motor function to estimate height in a Mexican population of children and adolescents with CP.
Methods: this was an analytical cross-sectional study of children and adolescents from two to 18 years of age with CP. Height, height-for-age index and BMI were estimated via the Stevenson and Ruiz-Brunner equations. The Mann-Whitney U-test, Spearman correlation and Bland-Altman concordance analysis were performed.
Results: the equations that consider gross motor function showed excellent correlations (height $r = 0.987$, $p < 0.001$; height-for-age index $r = 0.959$, $p < 0.001$; and BMI $r = 0.986$, $p < 0.001$). The mean difference for height was -2.92 ± 3.14 cm; for the height-for-age index, it was -2.67 ± 2.66 %; and for BMI, it was 0.75 ± 0.71 kg/m2. The groups with levels 1-3 gross motor function showed wider limits of agreement than groups with levels 4-5 for the three anthropometric indicators.
Conclusion: the equations that consider the levels of gross motor function to estimate height are useful in a Mexican population with CP.
PMID: 40462609

19.The risk of complications in elective orthopedic surgeries in children and young adults with cerebral palsy: a population-based register study

Anna Telléus, Johan Von Heideken, Fredrik Granath, Eva Broström, Gunnar Hägglund, Per Åstrand

Acta Orthop. 2025 May 27:96:387-393. doi: 10.2340/17453674.2025.43705.

Background and purpose: Musculoskeletal deformities in cerebral palsy (CP) may be surgically treated, but population-based studies of postoperative complications after these surgeries are rare. The aim of our study was to assess the risk of complications following elective orthopedic surgery in children and young adults with CP.
Methods: We performed a register-based cohort study of 1,514 individuals born between 1990 and 2019 who underwent 2,983 orthopedic surgical events between January 1, 1997, and December 31, 2019. Data was obtained from the CP surveillance program CPUP, the Swedish National Patient Register, and the National Cause of Death Register. We used logistic regression to calculate odds ratios (OR) with 95% confidence intervals (CI) for postoperative complications within 90 days, in relation to the Gross Motor Function Classification System (GMFCS) level, anatomic level, and type of surgery (i.e., skeletal vs. soft tissue).
Results: 13% of all surgical events had at least 1 postoperative complication (6% in soft tissue surgeries, 17% in skeletal surgeries), and 51% of these were related to infection. The complication rate was higher in individuals with GMFCS levels IV and V than in the pooled GMFCS levels I-III. The highest ORs were found in GMFCS level V (7.0, CI 3.7-13.5) vs. GMFCS I and spinal surgery (7.9, CI 3.7-13.5) vs. foot/ankle surgery. The OR for skeletal surgery was 1.6 (CI 1.2-2.1) compared with soft tissue surgery.
Conclusion: 13% of all surgical events had at least 1 postoperative complication. The risk of complications after elective orthopedic surgery was higher in children with higher GMFCS levels and in skeletal surgery compared with soft tissue surgery.
PMID: 40460267

20.Shifting outlooks after neonatal encephalopathy in the era of therapeutic hypothermia

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Review Pediatr Res . 2025 Jun 4. doi: 10.1038/s41390-025-04156-0. Online ahead of print.

Abstract
In the era of therapeutic hypothermia (TH), more infants are surviving moderate to severe hypoxic-ischemic encephalopathy (HIE) with no or less apparent injury on neonatal brain magnetic resonance imaging (MRI). Despite a reduction in death and severe neurodisability for infants with neonatal encephalopathy from HIE, children remain at risk for challenges in learning, language, coordination, behavior, and socioemotional development. Neither neonatal MRI nor early developmental testing is completely predictive of outcomes at school age. This review summarizes current data on long-term outcomes of infants who have received TH for HIE, most in the absence of cerebral palsy or significant neonatal brain injury. Many children with a history of neonatal HIE face challenges in their motor skills, emotion regulation and behavior, language and communication, cognition and learning, and academic achievement. All children with a history of neonatal HIE can benefit from close neurodevelopmental surveillance into adolescence. It is important for providers to counsel families about the spectrum of long-term outcomes and potential effects on later stages of neurodevelopment even when brain MRI is reassuring. Understanding the broader spectrum of neurodevelopmental impairment at school-age in children with neonatal HIE can inform new therapies, early intervention strategies, and pre-school readiness to optimize outcomes. IMPACT STATEMENT: Children with a history of moderate to severe hypoxic ischemic encephalopathy (HIE) without evidence of significant brain injury on post-cooling neonatal MRI are still at risk for a range of neurodevelopmental challenges at school-age and beyond. Neonatal neuroimaging and early neurodevelopmental evaluations do not reliably indicate outcomes at school-age, making early prognostication and counseling families in the NICU period and during neonatal follow-up clinics challenging. All children with perinatal HIE, regardless of MRI findings, should have long-term follow up and support through school age.
PMID: 40467976

21.Educating antenatal patients about cytomegalovirus infection: An e-learning package improves general practitioners' knowledge and intention to implement clinical guidelines

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Aust J Gen Pract . 2025 Jun;54(6):407-412.PMID: 40466734

Background and objectives: The Australian Government's Living Evidence for Australian Pregnancy and Postnatal Care guideline recommend all pregnant women be informed about cytomegalovirus (CMV) infection risk-reduction strategies. The aim of this paper was to determine the effectiveness of the 'Infections in Pregnancy' e-learning module in improving general practitioner (GP) knowledge, confidence in counselling and intended practice regarding CMV patient education.
Method: This study used a pre-post quasi-experimental design. GPs undertaking the module in March to December 2023 completed questionnaires before and after completing the module. An adjusted linear mixed effects model was used to evaluate change in scores.
Results: Of 164 study participants, 94% had not previously received CMV prevention education. Total adjusted mean CMV knowledge scores and confidence in CMV counselling were significantly higher after completing the module ($P<0.001$). The proportion of GPs intending to counsel pregnant patients about CMV increased from 24% to 97% after completing the module.
Discussion: Targeted e-learning can improve GP knowledge and confidence, and can support the implementation of the national congenital CMV risk-reduction guidelines.
PMID: 40466734

22.Attitudes and behaviors surrounding physical activity of caretakers and children with cerebral palsy

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J Pediatr Nurs . 2025 Jun 3:84:172-178. doi: 10.1016/j.pedn.2025.05.023. Online ahead of print.

Purpose: To investigate attitudes and behaviors surrounding physical activity (PA) in parents/caregivers and children with Cerebral Palsy (CP).
Design/methods: A prospective cross-sectional study was conducted at a tertiary level academic medical CP Clinic. Outcomes included responses to questions surrounding PA attitudes/behaviors using a modified CP-Play Lifestyle Activity & Youth (CP-PLAY) questionnaire. Fisher's Exact test was used for statistical analysis with a significance level of 0.05.
Results: Participants included 70 children and their parents/caregivers. Children ranged from 6 to 11 years (mean age = 8.5 years (SD +/- 1.8 years) and were mostly male (n = 43, 61.4 %). Parents/caregivers were mostly female (n = 54, 77.1 %) and mothers (n = 52, 74.3 %). Most parents/caregivers (84 %) who were active themselves had children who played outside ≥5 days/week vs. 36 % of parents/caregivers who were less active ($P < 0.001$). Parents/caregivers who were more active with their child were associated with children who reported playing outside ≥5 days per week vs. parent/caregivers less active with their child (82 % vs. 48 %, $P = 0.007$). Similarly, parents/caregivers who were more active themselves vs less were associated with children who reported of 60-min of MVPA/day (75 % vs. 38 %, $P = 0.004$). Associations were found between parents/caregivers who encouraged PA more vs. less frequently and children who played outside more (73 % vs 27 %, $P = 0.011$) and parents/caregivers who encouraged PA more vs. less frequently and children who reported 60-min MVPA/day (66 % vs 25 %, $P = 0.021$).
Conclusion: Our study found positive associations between parents/caregivers' attitudes and behaviors surrounding PA with reported PA patterns in children with CP.
PMID: 40466369

23.Comparative Analysis of App-based Oral Motor Therapy and Behavior Therapy for Reducing Stress and Enhancing Coping Skills in Caregivers of Children with Cerebral Palsy Using "SCATOCS"

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Ann Afr Med . 2025 Jun 2. doi: 10.4103/aam.aam_7_25. Online ahead of print.

Background: Parents and caregivers of children with cerebral palsy (CP) often experience the varied levels of stress while managing their child's oral health care. Limited research regarding this topic emphasizes the need for a study.
Aim: To compare the efficacy of effect of app-based oral motor therapy (OMT) and behavior therapy (BT) on stress and coping among parents/caregivers of children with CP; specifically with regard to the management of oral health care.
Settings and design: It is a randomized, double blinded, parallel group, multicenter trial.
Methods: The study comprised of 228 CP children aged 4-14 years who were randomly assigned into two groups - Group 1 (mobile app based OMT) and Group 2 (BT). The parents and caregivers of children with CP were asked to fill the Stress and Coping Assessment Tool associated with maintaining Oral health among Children with Special healthcare needs (SCATOCS) questionnaire. Baseline evaluations before interventions and follow-up scores postinterventions (6 months later) were done.
Statistical analysis: The paired samples t -test and independent samples t -test were utilized for the study. Analysis was done using the SPSS software version 25 and results were considered statistically significant whenever $P \leq 0.05$.
Results: Intragroup comparison of SCATOCS scores in each domain showed a statistically significant ($P < 0.05$) improvement postintervention in both the groups. Intergroup comparison showed a statistically significant difference between the groups with respect to A1 and A2 domains (stress factors), respectively ($P < 0.05$), while no significant differences were observed in B1 and B2 domains (coping factors) ($P > 0.05$).
Conclusion: "SCATOCS" can be used as important tool while specifically investigating stress and coping with regard to dental concerns.
PMID: 40452295

24.Could minor neurological dysfunction be a type of non-cerebral palsy motor impairment?

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Review Arq Neuropsiquiatr . 2025 May;83(5):1-11. doi: 10.1055/s-0045-1809359. Epub 2025 Jun 1.

Abstract
Non-cerebral palsy motor impairments have been increasing over time, especially in preterm-born children, with a variety of labels, including, but not limited to, developmental coordination disorder and minor neurological dysfunction. They may not only negatively affect the child in their daily life activities, but are also associated with cognitive, emotional, and behavioral disorders, as well as decreased academic performance. Since there is a paucity of literature on non-cerebral palsy motor impairment, the main objective of the present study is to assess minor neurological dysfunction in the context of neurodevelopment. We reviewed the medical literature using the following search terms: preterm infants; follow-up; non-cerebral palsy motor impairment or disability; minor neurological dysfunction; developmental coordination disorder; neurological soft signs; and Touwen Neurological Examination. We compiled evidence-based data on minor neurological dysfunction critical domains, diagnosis, etiological factors and the influence of age and puberty in minor neurological signs. We also listed the cohort studies that used the Touwen Neurological Examination for premature or term-born follow-up, including those that suggest an association between minor neurological dysfunction and developmental coordination disorder as a motor impairment beyond cerebral palsy. Moreover, we found significant evidence of a correlation involving minor neurological dysfunction and cognitive, behavioral, and learning abilities, which, all in all, means that these children particularly deserve special attention regarding social, educational and healthcare resources. Furthermore, since motor activity seems to play an important role in the physical, mental, and neurological health of typical children, different approaches to education could have a positive impact on neurological development.
PMID: 40451190