Cerebral palsy research news

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Professor Nadia Badawi AM
CP Alliance Chair of Cerebral Palsy Research

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Interventions and Management

1. Research on the Cognitive Orientation to daily Occupational Performance Approach: A Bibliometric Review

Desirée Valera-Gran, Laura Delgado-Lobete, Rebeca Montes-Montes, Eva María Navarrete-Muñoz

Review Am J Occup Ther. 2024 Nov 1;78(6):7806205100. doi: 10.5014/ajot.2024.050802.

Importance: The Cognitive Orientation to daily Occupational Performance (CO-OP) is an evidence-based intervention approach that has significantly increased in popularity over the past two decades. However, how the research literature on this topic is patterned is still unknown, so it is difficult to identify potential areas for research and clinical interest. Aims: To analyze the literature published on the CO-OP approach to provide a detailed and structured analysis of the publication patterns. Data sources: All literature related to CO-OP included in the Web of Science database through June 15, 2024. Study selection and data collection: All published studies related to CO-OP were included in the bibliometric analysis, which was conducted on the raw data retrieved from the Web of Science database using the Bibliometrix R package. Findings: The annual growth rate in CO-OP research has been 0.8%, significantly increasing from 2015 onward. Most of the research has been published in occupational therapy and rehabilitation journals by English-speaking research teams, and its scope has expanded from developmental coordination disorder to a wide range of health conditions. In addition, two main lines of research have emerged: one focusing on understanding the underlying cognitive processes involved in CO-OP and the other focusing on its clinical effectiveness. Conclusions and relevance: Research on CO-OP has significantly increased over the past decade, and it currently encompasses a wide range of areas. This analysis may facilitate the advancement of research on and the clinical practical application of CO-OP. Plain-Language Summary: The Cognitive Orientation to daily Occupational Performance (CO-OP) is an evidence-based intervention approach that has significantly increased in popularity over the past two decades. Occupational therapists use it to improve the occupational performance of both children and adults with movement difficulties. However, it is unknown how the research literature on this topic is patterned, so it is difficult to identify potential areas for research and clinical interest. This study found that scientific literature on CO-OP has significantly increased in the past decade and that its scope has expanded from developmental coordination disorder to a wider range of health conditions, such as cerebral palsy. Moreover, research is now focused on two main questions: What are the underlying cognitive processes involved during intervention, and how effective is the CO-OP approach? These findings can be used to further improve occupational performance and participation among occupational therapy clients who struggle with motor performance and planning.

PMID: 39453692

2. Effects of motor and cognitive dual tasks on walking and balance in children with diparetic cerebral palsy

Suad Mohammed Omar Abuzaid

Appl Neuropsychol Child. 2024 Oct 21:1-8. doi: 10.1080/21622965.2024.2418446. Online ahead of print.

This study investigates the effects of motor and cognitive dual tasks on walking and balance in Children with diparetic cerebral palsy. The subjects of this study were 12 children (experimental group n = 6, control group n = 6) who were medical diagnosed with diparetic cerebral palsy. They aged 8-12 years. Experimental group was administered treatment for 30 min, 2

times a week for 8 weeks, with the experimental group performing motor and cognitive dual task, while the control group did not have such a training. Wilcoxon signed-rank test was performed to analyze changes in balance, gross motor function in the group, and the Mann-Whitney test was conducted to compare the differences between the two groups before and after intervention. In This study, the mean time for completing the Timed Up and Go Test in single and dual tasks and mean cognitive responses, there was a significant difference between the two groups ($P < 0.05$). Conclusion: Considering that many activities in daily life are dual tasks, these difficulties they experience in performing dual tasks show that children's daily lives are also affected. Therefore, dual task evaluations are very important for individuals to be independent in daily life.

PMID: 39429052

3. Human foot cutaneous receptors function: clinical findings and prospects of using medical devices to stimulate mechanoreceptors in neurorehabilitation

Alexandra Riabova, Maria Bekreneva, Alina Saveko

Review Rev Neurosci. 2024 Oct 21. doi: 10.1515/revneuro-2024-0082. Online ahead of print.

The effectiveness of the support stimulation of the mechanoreceptors of the feet has been first shown in space medicine. In space flight during support withdrawal with non-use of postural muscle, this method is a countermeasure against sensorimotor disorders. Later, it was applied in clinical practice as treatment of motor disorders after stroke, in Parkinson's disease, infantile cerebral palsy, neuropathies, and many others. The impact of such stimulation on motor control is due to spinal and supraspinal mechanisms, which are activated by creating an additional support afferent input through the plantar surface. Many studies confirmed the positive effect of support stimulation on motor control, but the protocols of such stimulation remain the subject of active discussion. This review includes (1) the features of sensitivity of the foot sole cutaneous afferents to the support mechanical stimuli, (2) data on spinal and supraspinal responses of the nervous system to support stimulation, and (3) the results of applying this approach in neurological practice via various techniques. Summarizing this information, the authors highlight the most promising ways and types of medical devices for foot support stimulation in neurology.

PMID: 39425663

4. Serum metabolomics after exercise in ambulatory individuals with cerebral palsy

Chad Hanaoka, Rajeswari Pichika, Sudarshan Dayanidhi, Prakash Jayabalan

Dev Med Child Neurol. 2024 Oct 21. doi: 10.1111/dmcn.16105. Online ahead of print.

Aim: To evaluate whether serum metabolomics differ between ambulatory individuals with cerebral palsy (CP) compared with individuals with typical development and whether functional capacity is associated with metabolite abundance. Method: Thirty-eight adolescents and young adults were enrolled (CP: n = 19; typical development: n = 19). After functional capacity testing (10-meter walk, sit-to-stand, and peak knee flexion/extension torques), blood was drawn. Targeted serum metabolomics on hydrophilic metabolites were performed by high-performance liquid chromatography coupled with high-resolution and tandem mass spectrometry. Metabolite dimensionality reduction, pathway analysis, fold change, and t-tests evaluated changes in metabolite abundance. Associations were tested between functional measures and metabolite abundance. Results: Individuals with CP had a significant increase in the abundance of essential amino acids, catabolic products of protein metabolism, and tricarboxylic acid cycle substrates, such as valine, tryptophan, kynurenic acid, and pyruvate ($p < 0.05$). Importantly, the abundance of numerous metabolites was only highly associated with functional capacity in individuals with CP such that greater abundance was associated with greater capacity, but not in those with typical development. Interpretation: Our findings show clear increases in serum metabolites in individuals with CP, which are associated with functional capacity for movement. The altered metabolite profile measured after exercise might reflect increased energy production needed for movement. Appropriate nutritional intake during exercise might be needed given increased energy requirements.

PMID: 39431769

5. Effects of multicomponent exercise intervention on cardiometabolic risk factors in children and young adults with cerebral palsy: a multiple-baseline trial

Tiina Savikangas, Pedro Valadão, Eero A Haapala, Taija Finni

BMC Sports Sci Med Rehabil. 2024 Oct 21;16(1):219. doi: 10.1186/s13102-024-01006-0.

Background: Adults with cerebral palsy (CP) have a high risk of cardiometabolic diseases. It is unknown whether this risk is elevated in young people with CP and whether exercise can reduce this risk. Therefore, we investigated the effects of the EXErcise for Cerebral Palsy (EXECP) intervention on cardiometabolic risk in children and young adults with CP and compared this risk to typically developing children and young adults (TDs). Methods: Ambulatory male and female participants with spastic CP, aged 9-24 years, and age- and sex-matched TDs without musculoskeletal disorders were recruited.

Participants with CP were measured at baseline, after a three-month control period manifesting normal development, and after the three-month strength, gait, and flexibility training intervention. TDs were measured at baseline and after the control period. They did not attend the intervention. Cardiometabolic risk factors included body weight, body fat percentage, and skeletal muscle mass index assessed with bioimpedance; resting systolic and diastolic blood pressure and aortic pulse wave velocity assessed with a non-invasive oscillometric device; fasting plasma high-density and low-density lipoprotein cholesterol, triglyceride, and glucose levels. Data were analyzed with independent samples t-tests and linear mixed-effects models adjusted for sex and age. Results: The study involved 18 participants with CP (13 males, 9-22 year, mean 14.2 ± 4.4) and 17 TDs (12 males, 9-22 year, mean 14.6 ± 4.3). At baseline, participants with CP had a 1.0 (95% confidence interval (CI) [-2.0, -0.0]) kg/m2 lower skeletal muscle mass index than TDs. During the control period, no statistically significant between-group differences were observed in the change of any outcome. In the CP group, body weight (β = 1.87, 95% CI [1.04, 2.70]), fat percentage (β = 1.22 [0.07, 2.37], and blood glucose (β = 0.19, 95% CI [0.01, 0.37]) increased, while diastolic blood pressure (β=-2.31, 95% CI [-4.55, -0.06]) and pulse wave velocity (β=-0.44, 95% CI [-0.73, -0.16]) decreased. In the TD group, only body weight increased (β = 0.85, 95% CI [0.01, 1.68]) statistically significantly. In the CP group, no changes were observed during the intervention. Conclusions: Young people with and without CP do not exhibit significant differences in most cardiometabolic risk factors. EXECP intervention may attenuate some adverse development trajectories occurring without the intervention but greater volume and intensity of aerobic exercise may be needed to reduce cardiometabolic risk.

PMID: 39434176

6. Parental acceptance of dental treatment with SDF in children with CP

R Mona Pattu, Mridula Goswami, Monica Juneja, Gyanendra Kumar, Smriti Johar, Vashi Narula, Riya Marie Johnson

Spec Care Dentist. 2024 Oct 24. doi: 10.1111/scd.13058. Online ahead of print.

Introduction: This study aims to evaluate parental acceptance of dental treatment with silver diamine fluoride (SDF) in children with cerebral palsy (CP). Methods: The present study is a case-control study with 80 children in the age range of 6-11 years. Group I consisted of children diagnosed with CP and Group II consisted of children without any Special Health Care Needs and systemic conditions. Preoperative and postoperative behavior assessment was done using Frankl's behavior Rating Scale. 38 % SDF application was done in any one primary molar with occlusal dentinal caries. A well-designed validated structured questionnaire with 10 questions was developed to assess the parental acceptance of dental treatment with SDF. The questionnaire comprised 10 close-ended questions with subdivisions on socio-demographic details, the reason for the previous and current dental visit, and acceptance of dental treatment with SDF. The data were analyzed using SPSS (version 26, IBM, Chicago, USA). Continuous variables were expressed as mean ± standard deviation (M ± SD). Categorical variables were expressed as frequency (n) and percentage (%). The chi-square test was used for qualitative analysis. The level of significance was set at 5%. Results: The number of children showing positive behavior on Frankl's behavior Rating Scale increased from 55% to 70% after dental treatment with SDF and this difference was statistically significant in Group I (p-value < 0.001). 87.5% of parents in Group I had accepted the discoloration caused after dental treatment with SDF compared to 80% in Group II. In Group I, 95% of parents agreed strongly, while in Group II, 82.5% agreed strongly that SDF can be done on un-cooperative and special health care needs children. This difference in agreement seen between parents of Group I and Group II was found to be statistically significant (p-value = 0.02). Also, the acceptance of SDF was found to be higher in parents who were educationally more qualified in Group I. This difference in the acceptance level of SDF seen based on the educational status of parents was statistically significant (p-value < 0.001). Conclusion: Parental acceptance of SDF for dental treatment was higher in Group I (children with CP) as a greater number of parents accepted dental treatment despite discoloration with the modality being noninvasive and less time-consuming. Improved behavior rating was observed among children in both groups after dental treatment with SDF.

PMID: 39446039

7. Negative effects on oral motor function after submandibular and parotid botulinum neurotoxin A injections for drooling in children with developmental disabilities

Reva M van Eck, Lynn B Orriëns, Corinne P A Delsing, Frank J A van den Hoogen, Corrie E Erasmus, Karen van Hulst

Dev Med Child Neurol. 2024 Oct 24. doi: 10.1111/dmcn.16131. Online ahead of print.

Aim: To evaluate negative effects on oral motor function after concurrent submandibular and parotid (four-gland) botulinum neurotoxin A (BoNT-A) injections as a treatment for paediatric drooling. Method: This was a retrospective cohort study of 125 children (median age 7 years 7 months [interquartile range 4 years 5 months]) with developmental disabilities, including cerebral palsy, treated with four-gland injections. Most children (90.4%) were previously exposed to submandibular injections. Frequency, severity, and duration of negative effects on oral motor function (i.e. saliva swallowing, eating, drinking, articulation) were evaluated and compared to a reference cohort treated with submandibular injections. Results: Negative effects on oral motor function were reported in 45 children (36.0%), predominantly manifesting as eating-related problems (64.4%). Most negative effects (62.2%) were classified as mild and resolved within 4-weeks post-injunction (53.3%). Compared to the reference cohort, frequency (36.0% vs 33.0%) and duration (53.3% vs 53.6% resolving within 4 weeks) of

negative effects were comparable, although problems were more often moderately severe (33.3% vs 10.1%). Interpretation: While negative effects on oral motor function were relatively common after four-gland BoNT-A injections, most problems were mild and resolved promptly. No substantial differences to a reference cohort treated with submandibular injections were observed, although further research should establish the generalizability of these findings in a treatment-naive population. Nevertheless, when submandibular injections prove ineffective, clinicians can confidently consider four-gland injections.

PMID: 39446975

8. Measuring instability in chronic human intracortical neural recordings towards stable, long-term brain-computer interfaces

Tsam Kiu Pun, Mona Khoshnevis, Tommy Hosman, Guy H Wilson, Anastasia Kapitonava, Foram Kamdar, Jaimie M Henderson, John D Simeral, Carlos E Vargas-Irwin, Matthew T Harrison, Leigh R Hochberg

Commun Biol. 2024 Oct 21;7(1):1363. doi: 10.1038/s42003-024-06784-4.

Intracortical brain-computer interfaces (iBCIs) enable people with tetraplegia to gain intuitive cursor control from movement intentions. To translate to practical use, iBCIs should provide reliable performance for extended periods of time. However, performance begins to degrade as the relationship between kinematic intention and recorded neural activity shifts compared to when the decoder was initially trained. In addition to developing decoders to better handle long-term instability, identifying when to recalibrate will also optimize performance. We propose a method, "MINDFUL", to measure instabilities in neural data for useful long-term iBCI, without needing labels of user intentions. Longitudinal data were analyzed from two BrainGate2 participants with tetraplegia as they used fixed decoders to control a computer cursor spanning 142 days and 28 days, respectively. We demonstrate a measure of instability that correlates with changes in closed-loop cursor performance solely based on the recorded neural activity (Pearson r = 0.93 and 0.72, respectively). This result suggests a strategy to infer online iBCI performance from neural data alone and to determine when recalibration should take place for practical long-term use.

PMID: 39433844

9. A click-based electrocorticographic brain-computer interface enables long-term high-performance switch scan spelling

Daniel N Candrea, Samyak Shah, Shiyu Luo, Miguel Angrick, Qinwan Rabbani, Christopher Coogan, Griffin W Milsap, Kevin C Nathan, Brock A Wester, William S Anderson, Kathryn R Rosenblatt, Alpa Uchil, Lora Clawson, Nicholas J Maragakis, Mariska J Vansteensel, Francesco V Tenore, Nicolas F Ramsey, Matthew S Fifer, Nathan E Crone

Commun Med (Lond). 2024 Oct 22;4(1):207. doi: 10.1038/s43856-024-00635-3.

Background: Brain-computer interfaces (BCIs) can restore communication for movement- and/or speech-impaired individuals by enabling neural control of computer typing applications. Single command click detectors provide a basic yet highly functional capability. Methods: We sought to test the performance and long-term stability of click decoding using a chronically implanted high density electrocorticographic (ECoG) BCI with coverage of the sensorimotor cortex in a human clinical trial participant (ClinicalTrials.gov, NCT03567213) with amyotrophic lateral sclerosis. We trained the participant's click detector using a small amount of training data (<44 min across 4 days) collected up to 21 days prior to BCI use, and then tested it over a period of 90 days without any retraining or updating. Results: Using a click detector to navigate a switch scanning speller interface, the study participant can maintain a median spelling rate of 10.2 characters per min. Though a transient reduction in signal power modulation can interrupt usage of a fixed model, a new click detector can achieve comparable performance despite being trained with even less data (<15 min, within 1 day). Conclusions: These results demonstrate that a click detector can be trained with a small ECoG dataset while retaining robust performance for extended periods, providing functional text-based communication to BCI users.

PMID: 39433597

10. Efficacy of virtual reality on balance impairment in ataxic cerebral palsy children: randomized controlled trial

Hanady A Mouhamed, Nehad A Abo-Zaid, Heba A Khalifa, Mohammed E Ali, Noha S Elserty, Mohamed A Behiry, Walaa E Heneidy

Eur J Phys Rehabil Med. 2024 Oct 23. doi: 10.23736/S1973-9087.24.08617-9. Online ahead of print.

Background: Children with ataxic cerebral palsy have unsteady movements and poor balance. Many therapeutic interventions are used to improve their upper and lower functioning. Aim: To assess the effectiveness of virtual reality (VR) on balance impairment in ataxic cerebral palsy children. Design: RCT. Population: Sixty-four children with ataxic cerebral palsy. Methods: Children were randomly assigned into two equal groups with 32 patients in each group. The control group received a

specially developed physical therapy program and the VR group received VR training on a Wii balance board in addition to the control group's program. For three successive months the intervention program was implemented three times a week for both groups. Stability indices (overall, anteroposterior, and mediolateral) were measured using the Biodex balance system and Pediatric Balance Scale (PBS) at baseline and after three months of intervention for both groups. Results: At the beginning of the intervention, there were no statistically significant differences between the two groups (P>0.05). However, following three months of the intervention, there was a statistically significant decline in the stability index scores., as well as a statistically significant improvement in the score of the PBS in both groups with a notable advancement in favor of the VR group (P≤0.05). Conclusions: Adding VR training on a Wii balance board to a designed physical therapy program has a significant impact on improving balance deficits in ataxic cerebral palsy children. Clinical rehabilitation impact: VR has a therapeutic effect on improving balance that may result in better and more efficient rehabilitation program of children with ataxic cerebral palsy.

PMID: 39441113

11. Implanted cortical neuroprosthetics for speech and movement restoration

William R Muirhead, Hugo Layard Horsfall, Christine Aicardi, Jacques Carolan, Harith Akram, Anne Vanhoestenberghe, Andreas T Schaefer, Hani J Marcus

Review J Neurol. 2024 Oct 24. doi: 10.1007/s00415-024-12604-w. Online ahead of print.

Implanted cortical neuroprosthetics (ICNs) are medical devices developed to replace dysfunctional neural pathways by creating information exchange between the brain and a digital system which can facilitate interaction with the external world. Over the last decade, researchers have explored the application of ICNs for diverse conditions including blindness, aphasia, and paralysis. Both transcranial and endovascular approaches have been used to record neural activity in humans, and in a laboratory setting, high-performance decoding of the signals associated with speech intention has been demonstrated. Particular progress towards a device which can move into clinical practice has been made with ICNs focussed on the restoration of speech and movement. This article provides an overview of contemporary ICNs for speech and movement restoration, their mechanisms of action and the unique ethical challenges raised by the field.

PMID: 39446156

12. Eye movements and stress during eye-tracking gaming performance in children with dyskinetic cerebral palsy

No authors listed

Dev Med Child Neurol. 2024 Oct 24. doi: 10.1111/dmcn.16138. Online ahead of print.

No abstract available

PMID: 39447015

13. Short-Term Powered Mobility Intervention is Associated With Improvements in Development and Participation for Young Children with Cerebral Palsy: A Randomized Clinical Trial

Heather A Feldner, Samuel W Logan, Sango Otieno, Anna Fragomeni, Carissa Kono, Katie Riordan, Bethany Sloane, Lisa K Kenyon

Phys Ther. 2024 Oct 25:pzae152. doi: 10.1093/ptj/pzae152. Online ahead of print.

Objective: The objective of this study was to evaluate the effects of 2 short-term powered mobility interventions across developmental domains, participation, and perceptions of intervention implementation for young children with cerebral palsy and their families. Methods: This randomized, crossover clinical trial compared 2 powered mobility interventions: the Explorer Mini (Permobil AB, Timra, Sweden) and an adapted ride-on toy car. Analyses included 24 children aged 12 to 36 months, recruited from 3 sites. Each device was trialed in the home for an 8-week period for a total of 16 weeks. Three in-person study visits took place at baseline, crossover, and study completion, and 2 additional virtual check-ins were conducted for each device trial period. Outcome measures included all domains of the Bayley Scales of Infant and Toddler Development, Fourth Edition (Bayley-4); Child Engagement in Daily Life (CEDL) participation questionnaire; and t3 perceptual implementation measures: Acceptability of Intervention Measure, Intervention Appropriateness Measure, and Feasibility of Intervention Measure. Analyses included descriptive statistics, 2 by 3 group × time analysis of variance, and post hoc t tests as warranted. Results: Statistically significant mean improvements were observed in all domains of the Bayley-4 and in the self-care subscale of the CEDL regardless of device order. Caregivers ranked both devices as acceptable and feasible to implement, although the Explorer Mini was ranked slightly more favorably than the adapted ride-on toy car, with a device order effect being observed. Conclusion: Short-term powered mobility intervention may advance multiple domains of development and participation for young children with cerebral palsy. Caregivers rated 2 different powered mobility devices favorably as part of their child's

early intervention strategies. Impact: This study enhances the quality of evidence available to clinicians and families to support decision-making about powered mobility intervention for young children with motor disabilities, especially those who may be reluctant to begin powered mobility due to stigma or concern for motor skill development.

PMID: 39450982

14. Natural history of cerebral visual impairment in children with cerebral palsy

No authors listed

Dev Med Child Neurol. 2024 Oct 24. doi: 10.1111/dmcn.16143. Online ahead of print.

No abstract available

PMID: 39447010

15. Increasing prevalence of cerebral palsy in children born very preterm in Denmark

No authors listed

Dev Med Child Neurol. 2024 Oct 24. doi: 10.1111/dmcn.16141. Online ahead of print.

No abstract available

PMID: 39447009

16. The Gait Outcomes Assessment List (GOAL) questionnaire: Test-retest reliability and validity in children with cerebral palsy in Türkiye

Umut Apaydın, Unni Narayanan, Rabia Zorlular, Hatice Adıgüzel, Ramazan Yıldız, Ayşe Yıldız, Erkan Erol, Yasemin Apaydın, Bülent Elbasan

Gait Posture. 2024 Oct 23:114:290-296. doi: 10.1016/j.gaitpost.2024.10.009. Online ahead of print.

Background: Most questionnaires provide little information about children's or parents' views on functioning and do not attempt to understand their priorities or expectations. The Gait Outcomes Assessment List (GOAL) questionnaire was developed to fill this gap by identifying the most important goals of the patient and family for a gait intervention. Research question: To investigate the test-retest reliability and concurrent and discriminant validity of the GOAL questionnaire in children with cerebral palsy (CP) in Türkiye. Methods: In this study, we included 81 children with CP aged 5-18 years and their families. The parent and child version 5.0 of the GOAL was used. Standardized item, domain and total (across all domains) GOAL scores were calculated for each participant. Test-retest reliability was assessed with the intraclass correlation coefficient (ICC). The Gillette Functional Assessment Questionnaire (FAQ) was used for validation. Results: The mean age of the children was 10.4 ± 3.3 years (range 5-18), and 64.2 % were boys. The test-retest reliability was excellent for the GOAL-Child and GOAL-Parent total GOAL scores (ICC: 0.97 for the child and ICC: 0.96 for the parent). All standard errors of measurement (SEMs) for domain scores and total scores were fewer than 20 points. The children's total scores on the GOAL questionnaire showed a significant difference between the GMFCS levels ($p < 0.001$). The parents' total scores on the GOAL questionnaires also showed a significant difference between the GMFCS levels ($p < 0.001$). There were moderate positive correlations between the GOAL child and parent questionnaire total scores and the FAQ walking level according to Spearman's rho (GOAL child and FAQ walking rho: 0.66, $p<0.001$; GOAL parent and FAQ walking rho: 0.58, $p<0.001$). Significance: The results demonstrate that the child and parent versions of the GOAL 5.0 are valid and reliable for the comprehensive assessment of Turkish children with CP.

PMID: 39447428

17. Major structural congenital anomalies and causal pathways in people with cerebral palsy

No authors listed

Dev Med Child Neurol. 2024 Oct 24. doi: 10.1111/dmcn.16148. Online ahead of print.

No abstract available

PMID: 39447074

18. Experiences of health services for adults with cerebral palsy, their support people, and service providers

No authors listed

Dev Med Child Neurol. 2024 Oct 24. doi: 10.1111/dmcn.16145. Online ahead of print.

No abstract available

PMID: 39447065

19. The Living Lab at Home: Feasibility and Acceptability of Multimodal In-Home Data Collection Among Youth Across the Developmental Spectrum

Katelynn E Boerner, Veronica Dudarev, Leora Pearl-Dowler, Marie-Noelle Wharton, Harold Siden, Liisa Holsti, Tim F Oberlander

J Dev Behav Pediatr. 2024 Oct 23. doi: 10.1097/DBP.0000000000001319. Online ahead of print.

Objective: Dynamic, real-time, in-home methods of data collection are increasingly common in child health research. However, these methods are rarely cocreated or used with families of youth with developmental disabilities. We aimed to determine the feasibility of codesigned methods for in-home data collection for youth across the developmental spectrum. Methods: Sixteen youth (14-18 years) with autism spectrum disorder, cerebral palsy, and/or chronic pain completed 14 days of data collection, wearing an accelerometer, answering Ecological Momentary Assessment (EMA) questionnaires, and collecting salivary cortisol samples. Participants completed a poststudy interview regarding their experiences. Data were analyzed for feasibility, quantity, and quality. Results: At least 1 EMA response was provided on 73% of days, with 54% of the total number of administered prompts answered before the next prompt arrived. In total, 77% of participants wore the accelerometer ≥10 hours for at least 7 days. Adherence to 8-day saliva sampling after accounting for protocol violations and dry samples was 28%. No significant adverse events were reported aside from mild emotional distress (25%). Families reported generally high satisfaction, willingness to participate again, and acceptability, with moderate burden and interference. Qualitative interviews described: (1) the research question's value to the family as a motivator of engagement; (2) in-home data collection is not a passive or neutral experience; (3) personalized approaches and context are important to families; and (4) a clear need for continued iteration and engagement. Conclusion: In-home multimodal data collection is potentially feasible for families across the developmental spectrum but requires iteration based on family feedback to increase adherence.

PMID: 39446061

20. The Role of Tissue Expansion Before Baclofen Pump Insertion in the Pediatric Population

Connor Atkinson, Barry Rawicki, Nelson Low

Case Reports Ann Plast Surg. 2024 Nov 1;93(5):611-616. doi: 10.1097/SAP.0000000000004135.

Background: Tissue expansion is a well-established technique for soft tissue reconstruction in the pediatric population. We present a case series of this technique to create a safe pocket for baclofen pump insertion to minimize risk of complications including pump migration, extrusion, wound dehiscence and infection. Methods: A case series of 3 pediatric patients undergoing tissue expansion prior to baclofen pump insertion at a single center in Melbourne. The expansion procedure was performed by senior surgeon N Low in all cases, and patients followed up 6 months after expander-pump exchange. The study was conducted over a 4-year period 2019 to 2023. Results: We suffered 2 minor complications with the tissue expansion process including cellulitis and pump deflation. Neither complication precluded further tissue expansion nor led to premature removal of the expander. All patients proceeded to safely complete expander-pump exchange. One patient suffered a small (6 mL) abdominal seroma associated with pump insertion, which required no intervention. All patients have had a successful outcome 6 months after pump insertion. Conclusions: We describe a reliable and reproducible approach in creating a safe abdominal wall pocket to better accommodate baclofen pump insertion. Our series has overcome the imbalance between device size and abdominal wall pocket, now offering an alternative approach to achieve the safe delivery of intrathecal baclofen in the pediatric population.

PMID: 39445880

21. A continuum of balance performance between children with developmental coordination disorder, spastic cerebral palsy, and typical development

Charlotte Johnson, Ann Hallemans, Pieter Meyns, Silke Velghe, Nina Jacobs, Evi Verbecque, Katrijn Klingels

Eur J Phys Rehabil Med. 2024 Oct 23. doi: 10.23736/S1973-9087.24.08472-7. Online ahead of print.

Background: Balance deficits are one of the most common impairments in developmental coordination disorder (DCD) and cerebral palsy (CP), with shared characteristics between both groups. However, balance deficits in DCD are very heterogeneous, but unlike in CP, they are poorly understood. Aim: To unravel the heterogeneity of balance performance in children with DCD by comparing them with CP and typical development (TD). Design: Cross-sectional case-control study. Setting: Different outpatient settings and the community. Population: Children aged 5-10.9 years with TD (N.=64, boys: 34, mean [SD] age: 8.1 [1.6]), DCD (N.=39, boys: 32, mean [SD] age: 8.1 [1.5], formal diagnosis [N.=27]), and CP (N.=24, boys: 14, mean [SD] age: 7.5 [1.4], GMFCS level I [N.=14]/II [N.=10], unilateral [N.=13]/bilateral [N.=11]). Methods: We evaluated balance performance with the extended version of the Kids-Balance Evaluation Systems Test (Kids-BESTest). Between-group differences in domain and total scores (%) were assessed via ANCOVA (covariate: age), with Tukey post-hoc analyses ($P \leq 0.01$). Results: Children with DCD and CP performed poorer than TD children on total and domain scores with large effects (domains: $\eta 2=0.25$-0.66 [$P<0.001$], total: $\eta 2=0.71$ [$P<0.001$]). Still, post hoc comparisons revealed that DCD children scored significantly better than CP on the total score and four domains ($P \leq 0.009$), while performing similarly on tasks related to stability limits ($P=0.999$) and gait stability ($P=0.012$). Conclusions: There is a continuum of balance performance between children with TD, DCD and CP, but with great inter- and intra-individual heterogeneity in DCD and CP. DCD and CP children have difficulties with tasks requiring anticipatory postural adjustments, fast reactive responses, and with tasks that require complex sensory integration, suggesting an internal modeling deficit in both groups. This implies that these children must rely on slow conscious feedback-based control rather than fast feedforward control and fast automatic feedback. The performance of both DCD and CP children on their stability limits/verticality is similarly poor which further emphasizes a potential deficit in their sensory input and/or integration. Future research must focus on unraveling the control mechanisms, to further understand the heterogeneity of these balance deficits. Clinical rehabilitation impact: The heterogeneous balance performances in both children with DCD and CP underscore the importance of comprehensively evaluating balance deficits in both groups. This comprehensive assessment contributes to a better understanding of individual balance deficits, thereby facilitating more tailored treatment programs.

PMID: 39441111