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Interventions and Management

Interventions and Management

1.Effectiveness of Intensive and Distributed Bilateral Intensive Training for Children With Unilateral Cerebral Palsy

Kai-Jie Liang, Zhi-Chi Weng, Hao-Ling Chen, Tien-Ni Wang

Am J Occup Ther . 2025 Jul 1;79(4):7904205150. doi: 10.5014/ajot.2025.051039.

Importance: Bilateral intensive training (BIT) has promising effects for children with unilateral cerebral palsy (UCP), but the effectiveness of different dosing schedules remains unclear.
Objective: To compare the efficacy of two dosing schedules of BIT (intensive and distributed) in children with UCP.
Design: Secondary analysis.
Setting: Community.
Participants: Thirty-five children with UCP ages 6 to 12 yr.
Intervention: Each group received 36 training hours: intensive BIT within 1 wk and distributed BIT twice weekly over 8 wk.
Outcomes and measures: Motor outcomes were assessed using the Box and Block Test, Melbourne Assessment 2, Pediatric Motor Activity Log-Revised, Bruininks-Oseretsky Test of Motor Proficiency 2, ABILHAND-Kids, and Parenting Stress Index-Short Form. The intensive group was evaluated at Weeks 0, 1, and 8; the distributed group was evaluated at Weeks 0 and 8.
Results: Both dosing schedules yielded similar improvements immediately posttreatment and at Week 8. The intensive BIT group exhibited significantly greater enhancements in the quality and frequency of the more affected hand's use in daily activities compared with the distributed BIT group at Week 8. No significant differences were observed in bilateral hand use between groups. Parental stress levels remained stable across both intervention schedules.
Conclusions and relevance: Both intensive and distributed BIT schedules yielded similar improvements, with intensive BIT providing additional benefits in daily use of the more affected hand. Both schedules are feasible and well tolerated and do not increase parental stress, supporting their potential for broader application in different clinical settings. Plain-Language Summary: This study compared the efficacy of two intervention schedules of bilateral intensive training (intensive and distributed) in children with unilateral cerebral palsy. Both intensive and distributed bilateral intensive training schedules demonstrated similar outcomes immediately after a 36-hour intervention. However, the intensive bilateral intensive training schedule led to greater improvement in the daily use of the more affected hand at an 8-week follow-up. This suggests that strengthening both the ability and habit of using the more affected hand can result in sustained improvements over time. Notably, we observed the transfer of these enhanced motor skills to daily activities in unilateral hand use but not in bilateral hand use. This discrepancy may be attributed to the complexity of bilateral coordination, highlighting the need for occupational therapist guidance. In summary, the similar improvements in motor outcomes between the two intervention schedules suggest that the total amount of training hours is the critical factor for bilateral motor improvement rather than the distribution of those hours.
PMID: 40493861

2.Developing a Bimanual Task-Oriented Training Program for Young Children With Unilateral Cerebral Palsy: A Delphi Consensus Study

Youngsub Hwang, Jiyeon Tak, Jeong-Yi Kwon

Am J Occup Ther . 2025 Jul 1;79(4):7904205100. doi: 10.5014/ajot.2025.050998.

Importance: Children with unilateral cerebral palsy (UCP) experience motor impairments that affect daily functioning. Despite clinical improvements with current therapies, evidence-based practices for home settings are lacking.
Objective: To develop a tailored, task-specific, home-based upper limb training program for children with UCP using the Delphi method to bridge the gap between therapy and daily life improvements.
Design: Three-phase design that involved identifying key tasks based on Canadian Occupational Performance Measure (COPM) data, developing pilot activities, and achieving expert consensus through Delphi rounds.
Setting: Electronic survey.
Participants: Sixty-five experts (30 occupational therapists, 30 physical therapists, and 5 pediatric physiatrists), with 55 participants continuing through the Delphi rounds.
Outcomes and measures: Participants rated their level of agreement with the proposed activities on a 10-point scale (1 = strongly disagree, 10 = strongly agree). Agreement was defined as ≥6 or higher, and disagreement as ≤5. A consensus was determined to have been reached if there was ≥70% agreement among panelists and a mean importance of ≥7.
Results: The initial COPM results for 22 children with UCP identified self-care tasks as critical, with dressing, feeding, and hygiene as the highest priorities; thus, 110 preliminary therapeutic activities were developed and refined in a pilot study. The Delphi process yielded a consensus on 106 of the 122 proposed activities, resulting in a comprehensive set of task-specific activities.
Conclusions and relevance: This consensus-driven approach provides expert-supported therapeutic activities with the potential to be applied in real-world settings. Further research should incorporate stakeholder perspectives to validate these activities and assess their impact on outcomes for children with UCP. Plain-Language Summary: There are ongoing questions regarding whether task-specific training can effectively enhance daily performance in children with unilateral cerebral palsy (UCP). To address this issue, we developed a task-oriented training program with input from pediatric therapy experts. This program emphasizes essential self-care tasks, such as dressing, feeding, and hygiene. Through a consensus reached using Delphi rounds, 106 activities were created to help children practice and enhance their skills at home. These activities are intended to make daily tasks easier and improve children's independence. This program provides occupational therapists with a structured framework for implementing task-oriented interventions in real-world settings. Further research is necessary to assess the impact of these activities on improving the outcomes of children with UCP.
PMID: 40498789

3.Combined Dorsal and Ventral Rhizotomy for Spasticity and Dystonia in a Pediatric Patient With Nonambulatory Cerebral Palsy: 2-Dimensional Operative Video

Benjamin R Johnston, Carolina Lopes, Weston T Northam

Oper Neurosurg (Hagerstown) . 2025 Jun 10. doi: 10.1227/ons.0000000000001671. Online ahead of print.

No abstract available
PMID: 40498503

4.Increased co-activation during clinical tests of spasticity is associated with increased co-activation during reactive balance control in cerebral palsy

Jente Willaert, Lena H Ting, Anja Van Campenhout, Kaat Desloovere, Friedl De Groote

J Neurophysiol . 2025 Jun 11. doi: 10.1152/jn.00568.2024. Online ahead of print.

Abstract
Joint hyper-resistance is a common symptom in cerebral palsy (CP). It is assessed by rotating the joint of a relaxed patient. Joint rotations also occur when perturbing functional movements. Therefore, joint hyper-resistance might contribute to reactive balance impairments in CP. Our aim was to investigate relationships between altered muscle responses to isolated joint rotations and perturbations of standing balance in children with CP. Twenty children with CP and twenty typically developing children participated in the study. During an instrumented spasticity assessment, the ankle was rotated as fast as possible from maximal plantarflexion towards maximal dorsiflexion. Standing balance was perturbed by backward support-surface translations and toe-up support-surface rotations. Gastrocnemius, soleus, and tibialis anterior electromyography was measured. We evaluated alterations in reciprocal pathways by plantarflexor-dorsiflexor co-activation and the neural response to stretch by average muscle activity. We evaluated the relation between muscle responses to ankle rotation and balance perturbations using linear mixed models. Co-activation during isolated joint rotations and perturbations of standing balance was correlated in CP but not in typically developing children. The neural response to stretch during isolated joint rotations and balance perturbations was not correlated. Our results suggest that increased co-activation, possibly due to reduced reciprocal inhibition, during isolated joint rotations might be a predictor of altered reactive balance control strategies in CP.
PMID: 40499562

5.Electromyographic analysis of trunk and lower limb activation in children with cerebral palsy during gait and hippotherapy sessions

Janaine Brandão Lage, Gabriel Antonio Nogueira Nascentes, Lorena Fuchs Silva, Marília Carvalho Borges, Isabella Cecílio Resende Ferreira, Leonardo Augusto Lombardi, Fernado Seiji Silva, Ana Paula Espindula

J Bodyw Mov Ther . 2025 Sep:43:273-278. doi: 10.1016/j.jbmt.2025.04.031. Epub 2025 May 8.

Introduction: Cerebral Palsy (CP), the most common childhood physical disability, results from brain damage from various causes and affects movement, posture, and balance.
Objective: Analyze the impact of hippotherapy on the electrical activity of the trunk and lower limbs in children with CP, both during hippotherapy and independent gait, before and after 15 sessions.
Methods: Nine children aged 8-15 years (10.75 ± 2.49) participated in the study. Muscle activity in the trunk and lower limbs was assessed using surface electromyography. Data were collected during independent gait and hippotherapy before the first and after the 15th session.
Results: During human gait, electrical activity was higher in both pre- and post-treatment stages. Pre-treatment results were significant for the lower limbs: right ($p = 0.008$) and left ($p = 0.006$) lower limbs, as well as the right ($p = 0.017$) and left ($p = 0.001$) tibialis anterior. Post-treatment significance was seen in the multifidus (bilaterally), left rectus femoris, and right tibialis anterior ($p = 0.012$), and also in the right rectus femoris, left tibialis anterior ($p = 0.001$), and left abdominal ($p = 0.036$). After treatment, there was a reduction in electrical activity in the lower limbs and bilateral multifidus, with a significant decrease in the right tibialis anterior ($p = 0.042$). Additionally, abdominal muscles showed increased activation post-treatment (bilaterally). During human gait, most muscles, including the bilateral abdominals, showed increased activity post-treatment, though the differences were not statistically significant.
Conclusion: There was a reduction in electromyographic activity of the lower limbs and multifidus during hippotherapy, but increased muscle electrical activity in the trunk and lower limbs during independent gait compared to hippotherapy.
PMID: 40483135

6.Effects of Core Stability Training on Balance, Standing, and Gait in Children with Mild Cerebral Palsy: A Randomized Controlled Trial

Nancy Mohamed, Mohamed B Ibrahim, Osama A El-Agamy, Monira I Aldhahi, Sara Y Elsebahy

Healthcare (Basel) . 2025 May 29;13(11):1296. doi: 10.3390/healthcare13111296.

Abstract
Background/Objectives: Children with diplegic spastic cerebral palsy (CP) often present with impaired postural control, poor balance, and gait abnormalities that negatively affect their functional mobility and independence. Core stability, which is the ability to control the position and movement of the trunk, is considered a critical component in maintaining postural alignment and improving gross motor function. This study aimed to investigate the impact of a structured core stability exercise program on the standing ability, functional balance, and gait parameters of children diagnosed with diplegic spastic CP. Methods: Forty children (28 males, 12 females) aged 4-10 years with a clinical diagnosis of diplegic spastic cerebral palsy were randomly allocated into two groups (n = 20 each). The study group underwent a 12-week core stability exercise program in addition to a standardized physiotherapy regimen, which was conducted three times per week. The control group received the physiotherapy program alone. Functional outcomes were assessed pre- and post-intervention using the Gross Motor Function Classification System (GMFCS), Pediatric Balance Scale, and Kinovea software for gait analysis. Results: Both groups demonstrated statistically significant improvements in all measured variables after the intervention. However, the study group showed significantly greater improvements in standing ability (9%), balance (9%), and gait parameters ($p < 0.05$), particularly in knee flexion, ankle dorsiflexion, and plantar flexion, during gait cycles. Conclusions: Core stability training resulted in superior enhancements in balance, standing, and gait performance compared with physiotherapy alone in children with diplegic spastic cerebral palsy.
PMID: 40508909

7.The Impact of Verbal Status on Postoperative Outcomes Following Proximal Femur Varus Derotational Osteotomy in Children With Cerebral Palsy

Michaela Juels, Charlotte Wahle, Mathangi Sridharan, Aura Elias, Amith Umesh, Alexander Rueda, Nakul Talathi, Rachel Thompson

J Pediatr Orthop . 2025 Jun 12. doi: 10.1097/BPO.0000000000003031. Online ahead of print.

Background: In addition to physical disabilities, children with cerebral palsy (CP) often have concomitant nonphysical disabilities and associated medical comorbidities. Verbal disabilities are common and can affect both independence and communication, particularly in hospital settings, potentially impacting surgical outcomes. This study evaluates how verbal status affects postoperative outcomes of proximal femur varus derotational osteotomy (VDRO).
Methods: A retrospective review of pediatric patients with CP who underwent VDRO for hip subluxation/dislocation between 2017 and 2021 at a single tertiary care institution was completed. Demographic data, including age, weight, height, BMI, sex, race/ethnicity, insurance status, Gross Motor Function Classification System (GMFCS), and verbal status was recorded. Outcome variables included acute complications occurring within 90 days after surgery and delayed complications occurring >90 days postoperatively. Acute complications included emergency department (ED) visits, readmissions, reoperations, deep surgical-site infections, and medical complications such as pneumonia, atelectasis, and gastrointestinal bleeds. Delayed complications included delayed union, re-subluxation/dislocation, nonunion, painful hardware, and superficial surgical-site infection. Descriptive statistics, 2-sample t tests, and multiple regression analyses were performed.
Results: Seventy-two patients were included for analysis, 26 (35.1%) of whom were verbal and 46 (63.9%) nonverbal. In unadjusted analysis, nonverbal status was associated with higher rates of acute complications [OR=14.29, 95% CI (3.26, 64.83), P<0.0001] and increased ED visits [OR=7.86, 95% CI (1.17, 87.78), P=0.05] compared with verbal patients. However, after adjusting for GMFCS, these associations were no longer statistically significant. Conversely, after controlling for GMFCS, nonverbal patients were at significantly lower risk of experiencing delayed complications [OR=0.07, 95% CI (0.01, 0.36), P=0.0010] and painful hardware [OR=0.07, 95% CI (0.01, 0.33), P=0.0010] compared with verbal patients.
Conclusion: Verbal status plays a significant role in postoperative outcomes for children with CP undergoing VDRO. Nonverbal patients are at higher risk for acute complications, while verbal patients are more likely to present for delayed complications. These findings reinforce the need for enhanced communication strategies and vigilant postoperative monitoring in this particularly vulnerable population.
PMID: 40511971

8.Effects of extracorporeal shock wave therapy on motor function in patients with cerebral palsy: a systematic review and meta-analysis

Hui-Hui Peng, Ming-Jie Sung, Yu-Hao Lee, Shih-Wei Huang, Lien-Chieh Lin

Disabil Rehabil . 2025 Jun 7:1-10. doi: 10.1080/09638288.2025.2514261. Online ahead of print.

Abstract
Purpose: This study aims to evaluate extracorporeal shockwave therapy (ESWT) on spasticity, balance, gait patterns, and motor function in individuals with cerebral palsy (CP). Materials and methods: PubMed, EMBASE, Cochrane Library, Web of Science, and ClinicalTrials.gov were systematically searched up to 11 April 2025. Meta-analyses were conducted using Review Manager. The primary outcomes were Modified Ashworth Scale (MAS) and gait speed. Results: Ten randomized controlled trials (RCTs) involving 341 individuals with CP were included. Comparison between the ESWT and control groups revealed significant improvements in MAS (standardized mean difference [SMD]: -0.84, 95% confidence intervals [CIs]: -1.23 to -0.46, $p < 0.001$), gait speed (MD: 0.12, 95% CI: 0.02-0.23, $p = 0.02$), cadence (MD: -3.01, 95% CI: -6.03 to 0, $p = 0.05$), stride length (MD: 0.22, 95% CI: 0.16-0.28, $p < 0.001$), Pediatric Balance Scale (MD: 2.3, 95% CI: 0.4-4.19, $p = 0.02$), and Gross Motor Function Measure-88 (MD: 9.72, 95% CI: 7.36-12.08, $p < 0.001$). Conclusions: Combining ESWT with conventional physiotherapy, botulinum toxin type A (BTX-A) injection, or ankle-foot orthotics positively affects spasticity, gait, balance, and motor function. In addition, spasticity significantly decreases, particularly with focused ESWT or ESWT targeting the upper limbs.
Plain language summary
Spasticity significantly limits function and quality of life in individuals with cerebral palsy (CP).Extracorporeal shock wave therapy (ESWT) is a promising noninvasive intervention that may reduce spasticity and enhance motor function in individuals with CP.ESWT may improve clinical outcomes beyond spasticity, including gait speed, balance, and gross motor performance. Both focused and radial ESWT show therapeutic potential, but individualized treatment planning is needed due to differences in muscle volume, affected regions, and shockwave parameterises can complement conventional rehabilitation methods and may serve as an adjunct to botulinum toxin or orthotic interventions for optimizing patient outcomes.
PMID: 40481808

9.Optimization Simulations of Transcranial Direct Current Stimulation Montages in Children With Perinatal Stroke

Martin Bardhi, Ephrem Takele Zewdie, Adam Kirton, Helen L Carlson

Neuromodulation . 2025 Jun 9:S1094-7159(25)00187-4. doi: 10.1016/j.neurom.2025.05.002. Online ahead of print.

Background: Perinatal stroke (PS) is a vascular brain injury that causes most hemiparetic cerebral palsy. Transcranial direct current stimulation (tDCS) applies a weak electric field (EF) to the scalp, and targeting motor cortex (M1) paired with therapy may improve motor function. However, owing to developmental differences and idiosyncratic anatomy after early injury, optimal electrode placements are not known. We optimized electrode placements on the basis of individual anatomy and explored the resulting EF propagation patterns.
Objective/hypothesis: We hypothesized that children with PS would have greater electrode displacement distances from standard montages and that optimizations could improve the strength and direction of EF at M1 targets.
Materials and methods: Magnetic resonance images of participants with PS and of controls were preprocessed, segmented, and converted to three-dimensional meshes. SimNIBS (Thielscher, Copenhagen, Denmark) modeled EF for various tDCS electrode placements. Optimal placements were modeled to maximize EF strength or direction at the targeted M1. Electrode displacement distances and directions in addition to EF metrics were compared in groups and optimization strategies.
Results: Optimal electrode displacement distance was greater in the arterial ischemic stroke group when EF strength in the lesioned M1 was optimized ($W = 4.31$, $p < 0.01$), located further posterior than controls. The opposite trend was observed when current direction was optimized ($W = 3.68$, $p = 0.025$). Displacement direction had higher variability in children with PS across all optimizations. Montage optimization improved EF metrics. Specifically, the anodal nondirectionally optimized protocol caused greater EF strength in simulations of participants with PS. Directionally optimized montages altered average current angle through the target M1, making it closer to perpendicular to the posterior bank of the precentral gyrus in all groups.
Conclusions: Individualized electrode placements may optimize tDCS current propagation in children with PS, with tradeoffs between current direction and EF strength. tDCS current optimization may improve noninvasive neuromodulation therapies in children with disabilities.
PMID: 40492999

10.The effects of hydrotherapy on athletic ability in children with cerebral palsy: A systematic review and meta-analysis

Ye Tao, Ziyi Cao, Min-Chul Shin, Meijia Chen, Shuaiju Han

Meta-Analysis PLoS One . 2025 Jun 10;20(6):e0325517. doi: 10.1371/journal.pone.0325517. eCollection 2025.

Abstract
Background: Cerebral palsy (CP) is a disability caused by brain malformations or injuries occurring from conception to infancy. Hydrotherapy is a popular treatment for children with cerebral palsy and other neuromotor disorders. Despite evidence supporting the efficacy of hydrotherapy for treating children with cerebral palsy, there remains controversy regarding its effectiveness over different follow-up periods and in comparison with other physical therapy methods.
Objective: To compare the effects of hydrotherapy on gross motor abilities, fine motor functions, balance, and muscle tone in children and adolescents with cerebral palsy, and to assess evaluate efficacy across different age stages and treatment durations.
Methods: This meta-analysis was registered with PROSPERO (registration number CRD42024535838). Literature searches were conducted in databases including CNKI, VIP, WanFang, Web of Science, PubMed, Embase, and the Cochrane Library starting from June 2024. Randomized controlled trials (RCTs) that assessed the effects of hydrotherapy on gross motor functions, fine motor functions, balance, and muscle tone in children and adolescents with cerebral palsy were included. RCTs were evaluated for quality using the Cochrane risk of bias tool. Outcomes were analyzed by calculating mean difference (MD) or standardized mean difference (SMD) along with their 95% confidence intervals (CIs).
Results: Sixteen studies were included, assessing the impact of hydrotherapy compared to conventional care on gross motor functions in children and adolescents with cerebral palsy. The findings indicated that hydrotherapy significantly improved gross motor functions [SMD = 0.41, 95% CI = 0.15-0.68, I2 = 59.5%, $p < 0.05$], with consistent effects observed in children aged ≤6 years [SMD = 0.42, 95% CI = 0.16-0.68, I2 = 38.2%, $p < 0.05$] and those aged >6 years [SMD = 0.43, 95% CI = 0.22-0.63, I2 = 59.5%, $p < 0.05$]. Subgroup analysis based on intervention duration revealed that programs lasting more than 10 weeks were associated with significant improvements [SMD = 0.48, 95% CI = 0.31-0.66, I2 = 65.1%, $p < 0.05$], whereas no significant effects were found in interventions lasting 10 weeks or less [SMD = 0.14, 95% CI = -0.26-0.53, I2 = 35.6%, $p > 0.05$]. Hydrotherapy demonstrated a certain positive effect on fine motor functions [SMD = 0.78, 95% CI = 0.46-1.10, I2 = 46.4%, $p > 0.05$].In contrast, no statistically significant improvements were observed in balance [SMD = 0.64, 95% CI = -0.05-1.34, I2 = 80.7%, $p > 0.05$] or muscle tone [SMD = -0.45, 95% CI = -0.98-0.07, I2 = 58.2%, $p > 0.05$].
Conclusion: The results indicate that hydrotherapy is more effective than conventional treatment in improving gross motor functions in children and adolescents with cerebral palsy, with consistent benefits observed across different age groups and in interventions of longer duration. Hydrotherapy also showed a positive trend in enhancing fine motor functions, although no significant improvements were observed in balance or muscle tone.
PMID: 40493654

11.Nonsurgical Therapies for Spastic Cerebral Palsy: A Network Meta-Analysis

Yike Xu, Dongmei Zhuang, Fenglan Chen, Lijun Ma, He Du, Anran Jin, Jingyi He, Wen Chen, Lingkun Jin, Yaqun Hu, Han Gu, Jiali Zhu, Xiaoming Li

Pediatrics . 2025 Jun 11:e2024070402. doi: 10.1542/peds.2024-070402. Online ahead of print.

Context: Spastic cerebral palsy (SCP) presents daily challenges because of spasms, impacting motor function. Although multiple nonsurgical therapies exist, their comparative efficacy remains uncertain.
Objective: To compare the effectiveness of various nonsurgical therapies for SCP.
Data sources: A systematic search of PubMed, Embase, Web of Science, CINAHL, and Cochrane Library up to February 10, 2025.
Study selection: Randomized controlled trials (RCTs) measuring the effectiveness of nonsurgical therapies in improving spasticity, gross motor function, walking, and living ability among patients with SCP.
Data extraction: Effect sizes for outcomes were extracted and calculated through a random effects model.
Results: Of 5765 studies retrieved, 81 were included. Biofeedback, transcranial direct current stimulation, extracorporeal shockwave therapy, botulinum toxin A with cast, transcutaneous electrical nerve stimulation, cast, whole-body vibration, acupuncture, and 1 pharmacotherapy (botulinum toxin A) significantly reduced spasticity (standardized mean difference [SMD], -3.29 to -0.73). Hippotherapy, gaming, acupuncture, and whole-body vibration improved gross motor function (SMD, 0.91-6.75). Acupuncture significantly enhanced daily living and walking (SMDs of 0.72 and 2.04, respectively).
Limitations: The limited number of RCTs supporting the top-ranked therapies, combined with small sample sizes that may overestimate treatment effects, methodological biases, and heterogeneity in key analyses, necessitates cautious interpretation of the findings in the real world.
Conclusions: Biofeedback, hippotherapy, and acupuncture were effective for spasticity, gross motor function, daily living, and walking abilities. Extracorporeal shockwave therapy worked across various spasticity levels. Acupuncture demonstrated consistent and significant efficacy across all outcome measures, highlighting its substantial therapeutic potential. This study provides comprehensive recommendations for optimizing treatment strategies for SCP.
PMID: 40494559

12.Comparison of CO-OP and goal-directed training on occupational performance and functional status in children with cerebral palsy: Three-armed randomised trial

Zeynep Kolit, Rüya Gül Temel, Gamze Ekici

Randomized Controlled Trial Aust Occup Ther J . 2025 Jun;72(3):e70033. doi: 10.1111/1440-1630.70033.

Abstract
Introduction: Cerebral palsy (CP) is a neurological disorder that impacts motor skills and daily functioning in children. While conventional occupational therapy aims to improve these areas, newer approaches like 'Cognitive Orientation to Daily Occupational Performance' (CO-OP) and 'Goal-Directed Training' (GDT) show promise. However, their comparative effectiveness in enhancing occupational performance and functional status in children with CP remains underexplored. This study aimed to investigate and compare the effects of the CO-OP and GDT on the occupational performance and functional status of children with CP.
Methods: Sixty children were randomly assigned to three intervention groups: CO-OP approach in addition to conventional occupational therapy (COT) (Group A; n = 20), GDT in addition to COT (Group B, n = 20), and only COT (Group C; n = 20). The outcomes regarding occupational performance via the Canadian Occupational Performance Measure and functional status via the Paediatric Evaluation of Disability Inventory were evaluated by the blind evaluators before and after the interventions. All participants received two sessions per week over a 12-week period.
Consumer and community involvement: No consumer and community involvement in these studies.
Results: All groups demonstrated statistically significant improvements in occupational performance and functional status ($p < 0.001$). Between-group comparisons revealed that Group A achieved greater improvements in occupational performance and functional status, which particularly in the areas of self-care, mobility, and total Paediatric Assessment of Disability Inventory (PEDI) scores ($p < 0.05$), compared to the other groups.
Conclusions: Although significant gains were achieved on occupational performance and functional status levels of both the CO-OP approach and GDT, it was revealed that the group receiving the CO-OP approach had superior effects.
Plain language summary: Cerebral palsy (CP) is a condition that affects how children move and use their muscles. It can make everyday tasks like getting dressed or playing more difficult. Occupational therapy helps children with CP build their skills and become more independent in daily life. This study looked at two types of therapy: cognitive orientation to daily occupational performance (CO-OP) and goal-directed training (GDT). The aim was to find out which approach worked better for improving everyday activities and skills in children with CP. The results showed that the children who took part in the CO-OP program made the most progress. They improved more in both daily tasks and skills compared to the children who received GDT. Both groups showed some improvement, but CO-OP had stronger results. These findings suggest that CO-OP could be a helpful part of therapy programs for children with CP. It may support them in doing more things on their own. More research with larger groups of children is needed to learn more about how these therapies work in the long term.
PMID: 40495364

13.Comment on "The effects of extracorporeal shock wave therapy in children with cerebral palsy: a systematic review"

Xiaoqian Lv, Hongqing Su, Wanhui Li, Zhanru Yin

Int J Surg . 2025 Jun 10. doi: 10.1097/JS9.0000000000002609. Online ahead of print.

No abstract available
PMID: 40497778

14.Deep brain stimulation lead fracture with normal impedances: case report and review of literature

Lucia Darie, Gina Lumsdon, Jonathan Ellenbogen

Br J Neurosurg . 2025 Jun 12:1-5. doi: 10.1080/02688697.2025.2516813. Online ahead of print.
Abstract
Introduction: Lead fracture is a well-acknowledged form of hardware failure in deep brain stimulation (DBS) implants, with an incidence ranging from 1.46 to 5%. It has been noted to occur more frequently in patients with dystonia, and in terms of location in the cervical region. Impedance measurements serve as an objective means to assess the integrity of a DBS system, with increased impedance values typically indicative of lead fracture. We report a case of normal measured impedances in the presence of complete lead fracture.
Case report: A 12-year-old patient with a history of secondary dystonia due to cerebral palsy treated with GPi DBS (Boston Scientific®) presented in dystonic crisis. Upon initial review the DBS system was considered intact based on measured impedances within normal range. Following further exploration, a chest X-ray was performed that showed fracture and dislocation of both extension leads.
Discussions: Normal impedance values in a system cannot be relied upon to ensure system integrity. If the impedance values are out of range then the system integrity is compromised, but if the impedance values are within range the system integrity might still be compromised. It is crucial for clinicians to include this possibility in any patient presenting with subtherapeutic therapy or undergoing MRI scanning.
Conclusion: Impedance measurements only may not provide a sufficient robust indication of system integrity in DBS implants, and in suspicion of a reduction in clinical effectiveness X-rays should also be performed to help establish system integrity.
PMID: 40503617

15.Effects of Equine-Assisted Therapy: A Systematic Review and Meta-Analysis

Alexandra N Stergiou, Avraam Ploumis, Spyridon Kamtsios, Georgios Markozannes, Pineio Christodoulou, Dimitrios N Varvarousis

Review J Clin Med . 2025 May 26;14(11):3731. doi: 10.3390/jcm14113731.

Abstract
Objectives: Different types of exercises that aim in the development of balance, motor function, and gait are necessary for patients with motor disorders. Equine-assisted therapy could play an important role in the rehabilitation of these participants.
Methods: The purpose of this study was to examine the effects that equine-assisted therapy can exert on balance, motor function, spasticity, posture and gait, as well as quality of life on individuals with motor disorders. Clinical trials, published up to 20 April 2022, comparing equine-assisted therapy with conventional rehabilitation were systematically searched. Two independent reviewers performed data extraction and assessed the quality of studies using the Downs and Black quality assessment tool. Results: Out of 27 studies that satisfied the inclusion criteria for systematic review, 15 included appropriate data for further comparative meta-analysis. Statistically significant differences were found in Dimension E (walking, running, jumping) of Gross Motor Function Measure in children with CP (0.009) and in Time Up and Go in Elderly and post-stroke participants ($p = 0.006$). Specifically, children with CP improved in walking, running, and jumping, as well as improved mobility in the elderly. The systematic review showed that the intervention had positive results, as well as in other domains, even though these were not statistically significant. Conclusions: Equine-assisted therapy is beneficial for individuals with impairments in balance, gross motor function, gait, spasticity, and coordination.
PMID: 40507494

16.Effects of sport and physical recreation on health-related outcomes among children and young people with physical disability: systematic review with meta-analysis

Kerry West, Leanne Hassett, Juliana S Oliveira, Wing S S Kwok, Minke Geerts, Heidi Gilchrist, Stephen Gilbert, Rae Anderson, Amabile B Dario, Gavin John Robertson, Jennifer N Baldwin, Catherine Sherrington

BMJ Open Sport Exerc Med . 2025 Jun 8;11(2):e002350. doi: 10.1136/bmjsem-2024-002350. eCollection 2025.

Objectives: To describe quantitative studies of sport or physical recreation for children and young people with physical disability and evaluate effects on health-related outcomes.
Design: Systematic review with meta-analysis of randomised controlled trials.
Data sources: Six databases searched from inception to December 2023.
Eligibility criteria: Quantitative studies evaluating sports or physical recreation among children and young people≤18 years with physical disability.
Results: 77 studies (n=2584) were included in the review, with 11 randomised controlled trials included in meta-analyses. Pre-post measurement design, health condition cerebral palsy and intervention of dance were most common. Meta-analysis could not be performed for participation outcomes because there were only two eligible trials. Sport and physical recreation had a small positive impact on activity limitations (nine trials, n=271, standardised mean difference (SMD) 0.30, 95% CI 0.02 to 0.57, p=0.018, low certainty evidence) and a medium positive impact on physical impairment (seven trials, n=216, SMD 0.63, 95% CI 0.08 to 1.18, p=0.025, very low certainty evidence) compared with control. No effect was found on quality of life (three trials, n=133, SMD -0.02, 95% CI -0.42 to 0.38, p=0.917, moderate certainty evidence) or cognitive or behavioural impairment (four trials, n=124, SMD 0.54, 95% CI -0.29 to 1.36, p=0.202, very low certainty evidence). A small number of mild adverse events were reported.
Conclusion: Sport and physical recreation likely improve activity and physical impairment outcomes for children and young people with physical disability. More research assessing participation outcomes and evaluation of existing sport and recreation programmes in the community is indicated. PROSPERO Registration Number CRD42020159283.
PMID: 40510456

17.New Perspectives on the Efficacy of Catgut Embedment in Acupoint Combined with Rehabilitation Training for Pediatric-Cerebral-Palsy Motor Function Disorders: A Systematic Review and Meta-Analysis of Randomized Controlled Trials

Zhe-Hao Hu, Xin-Yue Zhang, Hong-Zhan Jiang, Xue-Jing Li, Yu-Fang Hao

Review Healthcare (Basel) . 2025 May 30;13(11):1301. doi: 10.3390/healthcare13111301.

Abstract
Background: Motor Function Disorders (MFDs) are common conditions in children with cerebral palsy and closely related to muscle spasticity. Catgut Embedment in Acupoint (CEA) has shown promise as an important adjunctive therapy but current evidence remains insufficient. The aim of this study was to evaluate the efficacy and safety of CEA in Pediatric-Cerebral-Palsy Motor Function Disorders (PCPMFDs). Methods: PubMed, Cochrane Library, Embase, Web of Science, four Chinese databases and two clinical trial registries were searched to include randomized controlled trials of patients with PCPMFDs treated with CEA combined with conventional rehabilitation. Meta-analysis was performed using Review Manager 5.4, Stata 18 and R Studio software 2025, and risk of bias was assessed for the included studies using the Cochrane Collaboration Network tool. Results: A total of 17 papers were included, including 1106 PCPMFDs patients with a wide range of conditions, age ≤ 9 years, and rehabilitation training mostly using Bobath/Vojta therapy. Meta-analysis showed that CEA was effective in improving MFDs with the Gross Motor Function Measure Scale (SMD, 0.90 [95% CI, 0.57 to 1.23], $p < 0.0001$) and the modified Ashworth Scale (MD, -0.40 [95% CI, -0.58 to -0.23], $p < 0.0001$). Preliminary results suggested that a treatment regimen, which consisted of three monthly sessions and lasted for one to two months, was most effective. Conclusions: CEA is an effective complementary treatment for patients with PCPMFDs with mild adverse effects. However, due to the relatively new perspective of this study, only a small number of researchers have focused on this area and conducted studies, resulting in fewer included studies meeting requirements, which is a direct result of the fact that this study, although informative, still requires a significant amount of research before clear evidence-based recommendations can be developed.
PMID: 40508914

18.A core outcome set to assess chronic pain interference and impact on emotional functioning for children and young people with cerebral palsy

No authors listed

Dev Med Child Neurol . 2025 Jun 8. doi: 10.1111/dmcn.16377. Online ahead of print.

No abstract available
PMID: 40485086

19.Mobility device use in children with cerebral palsy

No authors listed

Dev Med Child Neurol . 2025 Jun 9. doi: 10.1111/dmcn.16376. Online ahead of print.

No abstract available
PMID: 40490900

20.Effects of Virtual Reality Intervention on Motor Function and Activities of Daily Living of Children and Adolescents with Cerebral Palsy: A Systematic Review and Meta-analysis of Randomized Controlled Trials: VR AND MOTOR FUNCTION & ADL

Fang-Bo Li, Wei-Feng Pan, Jia-Fu Huang, Liang-Hao Zhu, Xue-Cheng Li

Review Arch Phys Med Rehabil . 2025 Jun 11:S0003-9993(25)00748-8. doi: 10.1016/j.apmr.2025.06.001. Online ahead of print.

Objective: To explore the impact of virtual reality (VR) intervention on motor function (MF) and activities of daily living (ADL) in children and adolescents with cerebral palsy (CP), and to identify effective VR intervention strategies.
Data sources: Searches were conducted in PubMed, Wiley online Library, Embase, Cochrane Library, and Web of Science (all collections).
Study selection: All randomized controlled trials of VR intervention on motor function and ADL of children and adolescents with cerebral palsy.
Data extraction: We conducted dual data abstraction, quality assessment, and strength of evidence. Outcomes include gait, balance, gross motor function, ADL, and hand function.
Data synthesis: This review encompassed 41 randomized controlled trials (RCTs) focusing on the use of VR intervention in children and adolescents with CP. The effect of VR intervention on gait (SMD=0.52; 95% CI: 0.18, 0.85) and gross motor function (SMD=0.76; 95% CI: 0.17, 1.34) has a moderate effect, while the balance (SMD=1.1; 95% CI: 0.61, 1.59), ADL (SMD=1.46; 95% CI: 0.71, 2.2) and hand function (SMD=1.08; 95% CI: 0.17, 2) has great effect. Subgroup analysis reveals the influence of different intervention parameters on different functions. For example, balance is related to the intervention duration of more than 10 weeks, the frequency of 1-2 times per week, Nintendo Wii platform and non-immersive VR.
Conclusion: Although the results show that VR intervention has a positive impact on MF and ADL, the high heterogeneity limits the stability of the conclusion. Future research needs to further explore the mechanism of VR intervention and try to set a reliable personalized intervention model.
PMID: 40513764

21.Effectiveness of Active Video Games Used to Augment Physical Therapy for Improving Gross Motor Outcomes of Children with Cerebral Palsy: A Systematic Review and Meta-Analysis

Shivangi Bajpai, Pegah Firouzeh, Lesley Pritchard

Games Health J . 2025 Jun 12. doi: 10.1089/g4h.2024.0137. Online ahead of print.

Abstract
Background: Active video games may be beneficial for improving gross motor outcomes when used to augment traditional physical therapy for children and youth with cerebral palsy (CP). However, their effectiveness for improving gross motor outcomes is unclear. The purpose of this systematic review and meta-analysis was to determine the effectiveness of active video game interventions combined with physical therapy compared to physical therapy alone for improving gross motor outcomes for children with CP. Materials and Methods: MEDLINE, CINAHL, Scopus, EMBASE (Ovid), PsycINFO, and SPORTDiscus databases were searched for relevant literature published prior to January 27, 2023. Eligible studies (a) were published in English, (b) used a randomized study design comparing active video games plus physical therapy to physical therapy alone, (c) included children and/or adolescents with CP (aged 5-18 years), and (d) measured gross motor outcomes. Included articles were assessed for bias (Cochrane risk-of-bias tool-version 2) (RoB-2), outcomes across studies were evaluated for evidence certainty using Grading of Recommendations Assessment, Development, and Evaluation (GRADE), and meta-analyses were conducted on outcomes when at least two studies used the same outcome measure. Results: Twelve articles met the inclusion criteria. Very low certainty evidence supported the use of active video games as an augmentative intervention for improving gross motor function ($Z = 3.33$; $P < 0.001$). Meta-analyses focused on other gross motor outcomes (i.e., balance and walking speed/distance) were not statistically significant. Conclusion: Active video games may be beneficial in combination with regular physical therapy for improving gross motor function. However, current evidence is weak, and high-quality research is required.
PMID: 40504750

22.Predictors of community participation from preschool to school age in children with cerebral palsy

No authors listed

Dev Med Child Neurol . 2025 Jun 8. doi: 10.1111/dmcn.16379. Online ahead of print.

No abstract available
PMID: 40485072

23.A social media-delivered intervention for motor delays: stage-Ib randomized clinical trial and implementation exploration

Nathalie L Maitre, Larken Marra, William Kjeldsen, Lisa J H Pinson, Rachel Byrne, Zhulin He, Melissa M Murphy

Pediatr Res . 2025 Jun 12. doi: 10.1038/s41390-025-04151-5. Online ahead of print.

Background: Early motor delays are common and can have lasting consequences. Gaps between delay identification and caregiver support often cause stress. We hypothesized that a social-media-delivered intervention supporting caregivers of children with motor delays could improve understanding of development/parenting, and self-efficacy; we explored effects on caregiver stress, implementation fit/feasibility.
Methods: This single-blind Phase 1b randomized controlled trial with wait-list control and implementation exploration included caregivers of children 3-36 months corrected age (CA) with motor delays. Interactions occurred via Facebook private groups and REDCap. Knowledge questionnaires, parental-self efficacy scale, Parenting Stress Index and Developmental Assessment of Young Children physical domain (DAYC-2 Phys) were administered pre/post-intervention.
Results: Within the cohort, caregivers (n = 31 intervention, n = 31 waitlist) reported that 13% of children had only motor delays, 63% also had diagnosed cerebral palsy, and 24% also had other types of complex medical conditions (e.g., chronic lung disease, feeding disorder). The intervention group had greater knowledge gains and fewer instances of parental distress scores in the clinical range ($p < 0.01$) with no effects on self-efficacy. Feasibility and acceptability were high for delivery format and content; positive perceptions, sense of connection and empowerment predominated. Negative feedback concerned technical issues and study design.
Conclusion: This social-media-delivered intervention showed social connection was valued and may reduce parent distress. Implementation and future research are well supported.
Trial registration number and name: NCT05542251, Education Program for Caregivers of Children with Gross Motor Delays.
Impact: Social connection is valued by families of young children with motor delays and impairments. Interventions leveraging social media can decrease stress and increase knowledge for these families. Social media delivered interventions are feasible and acceptable to families as they wait for specialized early intervention services. Further studies are needed to research whether social-medial delivered interventions can also improve the motor outcomes of children with motor delays.
PMID: 40506582

24.High-risk infant follow-up: current practice and factors determining eligibility

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Pediatr Res . 2025 Jun 10. doi: 10.1038/s41390-025-04154-2. Online ahead of print.

Background: High-risk infant follow-up (HRIF) lacks universal definition. The aim of this study was to report current practice and factors used to identify eligibility for HRIF, yielding information which may provide a basis for future consensus.
Methods: A survey was prepared for a workshop at the 15th International Newborn Brain Conference on prediction of outcome, which was subsequently distributed to all attendees (n = 426).
Results: Follow-up was offered by 97% of respondents (n = 113/116). HRIF was offered to infants born <28 weeks by 47%, to those <32 weeks by two-thirds (66%) and to preterms based on neuroimaging by 54%. For infants born full-term, HRIF was offered by 88% in neonatal encephalopathy (NE) and 86% in neonatal stroke. HRIF continued most frequently until 24 months corrected (33.6%). For guiding prognosis in preterm infants, 22% (n = 25) selected neuroimaging as the most important factor. For NE, 54% (n = 63) selected neuroimaging findings as the most important factor in guiding prognosis and 14% (n = 16) selected EEG/aEEG. Social factors are not considered by 46% in determining HRIF eligibility.
Conclusion: Significant variability in HRIF exists, without consensus. Awareness of factors predicting prognosis and the importance of social risk-factors must improve to allow accurate identification of those at highest risk. This information may act as a basis for future consensus on HRIF.
Impact: There is no clear consensus on eligibility or duration of high-risk infant follow-up. We report current practice in, and factors used to identify eligibility for same, amongst attendees of the International Newborn Brain Conference. This information on international practice may provide a basis for future consensus. Given the importance of accurate prognostication in risk-stratification, we report participants' awareness of the most important factors guiding prognosis. A disconnect between the impact of social factors on outcome and their consideration for eligibility of high-risk infant follow-up is noted. We propose the need for guidelines on follow-up of socially disadvantaged, medically high-risk infants.
PMID: 40494865

25.Consensus Guidelines of the Indian Academy of Pediatrics (IAP)-Neurodevelopmental Pediatrics Chapter on Developmentally Supportive Follow-Up for High-Risk Infants

Zafar Mahmood Meenai, M K C Nair, Samir Dalwai, Lal D V Nair, Sheffali Gulati, Sharmila B Mukherjee, Naveen Jain, Deepak Dwivedi, Kawaljit S Multani, Shambhavi Seth, Vivek V Singh, Atanu Bhadra, Vasant Khalatkar, Santhosh K Kraleti, Monica Juneja, Leena Deshpande, Anjan Bhattacharya, Lallan Kumar Bharti, Yogesh Parikh, Leena Srivastava, Sitaraman Sadasivan, Jeeson C Unni, Manmeet K Sodhi, Shyamal Kumar, Deepa Bhaskaran, Adarsh Eregowda, Indu Surana, Abraham K Paul, Ashok Rai, Sanjay Shivanna, Khurshid Wani, Lata Bhat, Shabina Ahmed, Nimmy K Joseph

Review Indian Pediatr . 2025 Jun 10. doi: 10.1007/s13312-025-00110-9. Online ahead of print.

Justification: With increasing neonatal survival, there is a need for trained staff for timely identification and intervention for high-risk infants. Since the foundation of neurodevelopment is laid in the first three years of life, addressing the lacunae of a robust guidelines for extended follow-up of high-risk infants needs to be formulated to avoid remediation or rehabilitation later on.
Objectives: To develop comprehensive evidence-based consensus guidelines for developmentally supportive care and follow-up of high-risk infants in the Indian context with the aim of reducing the need for future rehabilitative services.
Process: Scientific literature over the last 10 years was searched using database-specific controlled vocabularies like Emtree for Embase, MeSH terms for PubMed, Scopus, CINAHL headings for CINAHL databases, and the Cochrane Library. The available studies were analyzed based on their scientific credibility and strength of evidence. Data from meta-analysis, systematic reviews, and randomized controlled trials was extracted, and relevant statements were prepared. These were deliberated in two onsite Delphi rounds of discussion (February 19, 2023 and January 11, 2025) and one hybrid (online and onsite) Delphi round (February 6, 2025). The final draft was made under different headings and was circulated, followed by recommendations made with Grading of Recommendations Assessment, Development and Evaluation (GRADE) analysis. The final draft after incorporating all suggestions was circulated and accepted online on March 2, 2025.
Statement: The recommendations propose using a color-coded system to monitor high-risk infants, risk stratification, promoting early stimulation, structured interventions, and parental involvement. Routine care should align with the infant's behavioral state and use validated screening tools and growth charts. Comprehensive follow-ups, including screening for retinopathy of prematurity, thyroid disorders, developmental dysplasia of hip, and hearing impairments, are essential, with specialized therapies provided as needed. Structured follow-up guidelines are likely to improve the selection of high-risk infants, plan follow-up, and guide pediatricians on screening, evaluation, early stimulation, intervention, and plan-specific definitive therapies with rehabilitation therapists which would ultimately decrease the childhood disability.
PMID: 40493113

26.Effect of bovine milk-derived peptide on SNAP-25 of the neurotransmitter system in treating the sialorrhoea in chronic neurological diseases

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Food Sci Biotechnol . 2025 Mar 29;34(11):2601-2610. doi: 10.1007/s10068-025-01872-5. eCollection 2025 Jul.

Abstract
Sialorrhea is a prominent symptom of chronic neurological disorders like amyotrophic lateral sclerosis, Parkinson's disease, motor neuron disease, cerebral palsy, and stroke. Synaptosome-Associated Protein-25 (SNAP-25) plays a key role in triggering involuntary saliva secretion. This study aimed to identify SNAP-25-targeting bovine milk-derived peptides to mitigate sialorrhea, using computational and quantum atomistic simulation approach. Among 8559 bovine milk-derived peptides, 8499 were non-toxic, 7749 non-allergenic, 911 with blood-brain barrier crossing potential, and 175 with cell-penetrating capabilities. Using HAPPENN program, 20 non-hemolytic peptides were screened, while PeptideRanker predicted two physiologically active peptides. Protein-peptide docking followed by de novo structural modeling showed that CMPTFQFFK has a stronger inhibitory affinity (- 7.45 kcal/mol) for SNAP-25 than botulinum toxin. Additionally, dynamic simulations, free energy and quantum chemical studies confirmed the stability of CMPTFQFFK's with SNAP-25. Our study recommends CMPTFQFFK as a potential inhibitor of SNAP-25 for sialorrhea treatment, with further in vitro testing needed to confirm efficacy.
PMID: 40492044

27.Parental presence in the pediatric intensive care unit reduces postoperative sedative requirements: A retrospective study

Vitaliy Sazonov, Alpamys Issanov, Sayazhan Turar, Zaure Tobylbayeva, Olga Mironova, Askhat Saparov, Dmitriy Viderman

World J Clin Pediatr . 2025 Jun 9;14(2):102049. doi: 10.5409/wjcp.v14.i2.102049.

Background: Although critically ill pediatric patients can benefit from the use of sedation, it can cause side effects and even iatrogenic complications. Since pediatric patients cannot adequately express the intensity or location of the pain, discriminating the cause of their irritability and agitation can be more complicated than in adults. Thus, sedation therapy for children requires more careful attention.
Aim: To evaluate the association of the internal parental care protocol and the reduction in pediatric intensive care unit (PICU) postoperatively.
Methods: This retrospective cohort study was carried out in the PICU of the tertiary medical center in Kazakhstan. The internal parental care protocol was developed and implemented by critical care team. During the pandemic, restrictions were also placed on parental presence in the PICU. We compare two groups: During restriction and after return to normal. The level of agitation was evaluated using the Richmond Agitation-Sedation Scale. Univariate and multivariate logistic regression analyses were performed to examine associations of parental care with sedation therapy.
Results: A total of 289 patients were included in the study. Of them, 167 patients were hospitalized during and 122 after the restrictions of parental care. In multivariate analysis, parental care was associated with lower odds of prescribing diazepam (odds ratio = 0.11, 95% confidence interval: 0.05-0.25), controlling for age, sex, cerebral palsy, and type of surgery.
Conclusion: The results of this study show that parental care was associated only with decreased odds of prescribing sedative drugs, while no differences were observed for analgesics.
PMID: 40491737

28.Reliability and Construct Validity of the Self-Report Version of Strengths and Difficulties Questionnaire in Children and Adolescents With Cerebral Palsy

Hasan Bingöl, Dilan Demirtaş Karaoba

Observational Study Child Care Health Dev . 2025 Jul;51(4):e70114. doi: 10.1111/cch.70114.

Background: Children and adolescents with childhood-onset physical disabilities, including cerebral palsy (CP), face a significantly higher risk of developing mental health disorders due to factors such as reduced physical activity, participation limitations, sleep disturbances, pain, social isolation, rejection, bullying and victimization. Therefore, identifying mental health problems in this population is crucial for promoting their mental health and psychosocial well-being. This study aimed to investigate the reliability and construct validity of the self-report Strengths and Difficulties Questionnaire (SDQ) in children and adolescents with CP.
Methods: The study included 120 children and adolescents with CP (mean age = 14.13 ± 2.2 years), representing the full spectrum of CP subtypes. Internal consistency was assessed using McDonald's omega (ω). Test-retest reliability was assessed using intraclass correlation coefficients (ICC) to estimate the level of consistency in scores for 50 children and adolescents who completed the SDQ again after 14 days. Three types of construct validity were assessed: factorial, convergent and known-group validity. Factorial validity was assessed based on the model fit of structural equation model-based confirmatory factor analysis (CFA). For CFA, the following fit indices were considered acceptable: a Root Mean Square Error of Approximation (RMSEA) < 0.08, a Goodness of Fit Index (GFI) ≥ 0.95 and a Standardized Root Mean Square Residual (SRMR) ≤ 0.08. Convergent validity was assessed by estimating correlations between the SDQ and Cerebral Palsy Quality of Life (CP QOL) scores using Pearson correlation coefficient (r).
Results: Internal consistency and test-retest reliability of both SDQ Total Difficulties Scale and SDQ Prosocial subscale were found to be acceptable (ω: 0.73-0.85; ICCs: 0.77-0.96). The SDQ's factor structure showed good fit (Total Difficulties Scale: RMSEA = 0.03, GFI = 0.95 and SRMR = 0.037; SDQ Prosocial: RMSEA = 0.025, GFI = 0.97 and SRMR = 0.066). Acceptable correlations between SDQ and CP-QOL scores (r = 0.53-0.93) supported convergent validity. Known-groups validity was confirmed, with children with CP showing significantly different SDQ scores compared to their TD peers ($p < 0.05$).
Conclusion: Our findings provide evidence of adequate internal consistency reliability, test-retest reliability and construct validity for scores on the SDQ for children and adolescents with CP.
Trial registration: ClinicalTrials.gov identifier: NCT06527508.
Key messages: This is the first study investigating the measurement properties of the self-report SDQ in children and adolescents with CP This study yielded satisfactory evidence for the factorial validity, convergent validity and known-group validity of the self-report SDQ, supporting its suitability as a tool for assessing the mental health status of children and adolescents CP aged 11-17 years. All items in the self-report SDQ were found to effectively measure the intended construct-mental health-demonstrating item homogeneity and supporting internal consistency The satisfactory agreement between SDQ scores obtained over a two-week interval demonstrated the instrument's temporal stability, indicating strong test-retest reliability.
PMID: 40490683

29.Punctate White Matter Abnormality in Moderate-to-Late Preterm Infants

Eleanor Kennedy, Ting Guo, Sian Williams, Thiviya Selvanathan, Jane M Alsweiler, Frank H Bloomfield, Malcolm Battin, David Dubowitz, Steven P Miller, Catherine Morgan, David Perry, Ngaire Susan Stott, Jane E Harding; MR DIAMOND and MoPED Study Groups

Ann Neurol . 2025 Jun 9. doi: 10.1002/ana.27261. Online ahead of print.

Objective: Moderate-to-late preterm (MLP) infants contribute to the greatest proportion of preterm children with neurodevelopmental impairments. White matter injury (WMI) is common and predicts adverse outcomes in very preterm (VP) infants. However, little is known about white matter abnormality (WMA) in MLP infants. We investigated the burden and distribution of WMA in MLP infants.
Methods: MLP infants were recruited from a randomized trial on neonatal nutrition and a prospective observational cohort in New Zealand, and underwent brain magnetic resonance imaging (MRI) soon after birth and at term-equivalent age (TEA). WMA was manually segmented using an established method. Total and regional WMA volumes and percentage of WMA to total cerebral volume were calculated. Probabilistic WMA maps were generated and compared with WMI in VP infants and term infants with congenital heart disease.
Results: Of 101 infants (32 females), 40 (39.6%) had WMA on at least 1 scan. In 37 infants with WMA who had both scans, WMA was less visible in 22 (59.5%) or undetectable in 7 (18.9%) infants with a mean reduction of 72.7 ± 207.5 mm3 in WMA volume from early-life to term. Infants with and without WMA had mostly comparable pregnancy and neonatal characteristics. Probabilistic maps demonstrated a characteristic WMA topology, with most lesions in posterior followed by central and anterior regions. Trigonal areas were vulnerable across neonatal populations.
Interpretation: WMA is much more common in MLP infants than previously reported and occurs in a characteristic topology. WMA may be missed on TEA MRI, and its relationship with outcomes in MLP infants warrants attention. ANN NEUROL 2025.
PMID: 40488346

30.Moyamoya Disease in a Patient With Cerebral Palsy Presenting With Intraventricular Hemorrhage and Hydrocephalus Requiring Ventriculoperitoneal Shunt Placement: A Case Report

Christian P Howard, Kevin Szafran, Jake Lester, Brandt Gruizinga

Case Reports Cureus . 2025 May 9;17(5):e83804. doi: 10.7759/cureus.83804. eCollection 2025 May.

Abstract
Moyamoya disease (MMD) is a chronic cerebrovascular disorder characterized by progressive stenosis of the internal carotid arteries (ICA) and the development of fragile collateral vessels. These abnormal vessels can lead to ischemic or hemorrhagic strokes, with intracranial hemorrhage being a notable complication. Although rare, hydrocephalus may also occur in MMD, particularly in the setting of intraventricular hemorrhage (IVH). We present the case of a 42-year-old male with a history of cerebral palsy (CP) and MMD, diagnosed at the age of seven, who developed IVH and hydrocephalus. Despite prior bilateral craniotomy and encephaloduroarteriosynangiosis (EDAS), the patient presented with seizure activity and was found to have a hemorrhagic stroke with IVH and hydrocephalus on imaging. He initially underwent external ventricular drain (EVD) placement, which was ineffective, necessitating ventriculoperitoneal (VP) shunt insertion. His hospital course was complicated by aspiration pneumonia and chronic respiratory failure, requiring tracheostomy. Although the IVH and hydrocephalus ultimately resolved, the patient remained in a vegetative state. This report highlights the complexities of managing MMD in patients with comorbid CP, underscoring the need for early diagnosis, timely revascularization, and coordinated multidisciplinary care.
PMID: 40486296

31.A contemporary global approach is required to understand consanguinity and disability

Nadia Badawi, Ahmed Moustafa, Gulam Khandaker, Sarah McIntyre

Editorial Dev Med Child Neurol . 2025 Jun 7. doi: 10.1111/dmcn.16383. Online ahead of print.

No abstract available
PMID: 40482061

Prevention and Cure

32.Comparison of Seven-Day Versus Continuous Prophylactic Antibiotic Therapy Until Delivery in Preterm Premature Rupture of Membranes

Guddad Shabana Hameed, Shobha Shirgur, Mallanagouda Patil, Rajasri G Yaliwal, Neelamma Patil

Cureus . 2025 May 12;17(5):e83991. doi: 10.7759/cureus.83991. eCollection 2025 May.

Abstract
Background and aim Preterm prelabour rupture of membranes (PPROM) refers to the spontaneous rupture of fetal membranes before the onset of labor and prior to 37 completed weeks of gestation. PPROM is associated with significant maternal and neonatal complications. Maternal risks include chorioamnionitis, abruptio placentae, and postpartum infections. Neonatal complications commonly observed are respiratory distress syndrome (RDS), neonatal sepsis, cerebral palsy, and necrotizing enterocolitis (NEC). This study aimed to evaluate and compare maternal and neonatal outcomes in women with PPROM treated with prophylactic antibiotics for seven days versus antibiotics administered until delivery. Materials and methods This comparative study included 110 pregnant women between 26 weeks 0 days and 36 weeks six days of gestation. Participants were divided into the following two groups: group 1 received prophylactic antibiotics for seven days, and group 2 received antibiotics until delivery. Data collected included the duration of membrane rupture, types of antibiotics used, and various maternal and neonatal outcomes. Results A significantly lower incidence of persistent amniotic fluid leakage was observed in group 1 (31; 56.4%) compared to group 2 (45; 81.8%) ($p<0.002$). Continuous positive airway pressure (CPAP) support was not required in 41 (74.5%) of neonates in group 1 and 40 (72.7%) in group 2. However, a significantly higher proportion of neonates in group 2 required high-flow nasal cannula (HFNC) support compared to group 1 ($p=0.015$). Additionally, a shorter neonatal hospital stay (one to three days) was more frequent in group 1 (29; 52.7%) than in group 2 (17; 30.9%) ($p=0.048$). Conclusion A seven-day course of prophylactic antibiotics in PPROM is as effective as continuous antibiotic therapy until delivery, with added benefits of reduced neonatal hospital stay and potentially fewer antibiotic-associated risks.
PMID: 40510101

33.Risk of Neurodevelopmental Disorders in the Offspring of Young Female Cancer Survivors

Kyujin Choi, Jihye Heo, Soo-Young Oh, Jonghan Yu, Juyoung Sung, Insung Kim, Su-Min Jeong, Danbee Kang

J Autism Dev Disord . 2025 Jun 11. doi: 10.1007/s10803-025-06926-5. Online ahead of print.

Abstract
This study aimed to examine the risk of neurodevelopmental disorders (NDDs) in cJihye Heohildren born to female cancer survivors under 40 years old. Using nationwide retrospective data from the Korean National Health Insurance Service between January 1, 2005, and December 31, 2019, we included 19,474 children born to female cancer survivors under 40 years old. Propensity-score matching (1:3) with 58,422 controls born to women without cancer was conducted. NDDs were identified using ICD-10 codes. Hazard ratios (HRs) were calculated to assess the relative risk. Children born to cancer survivors had a higher overall risk of NDDs (HR = 1.10; 95% CI 1.05-1.15), with specific elevated risks for cerebral palsy (HR = 1.38; 95% CI 1.05-1.81), developmental delay (HR = 1.16; 95% CI 1.06-1.26), and epileptic and febrile seizures (HR = 1.06; 95% CI 1.01-1.12). The risk was particularly elevated in children whose mothers were diagnosed with cancer during pregnancy (HR = 1.26; 95% CI 1.08-1.47). However, for births occurring more than 5 years after the cancer diagnosis, the difference in NDDs risk was not statistically significant (HR = 1.07; 95% CI 0.98-1.16). The offspring of young female cancer survivors had an increased risk of NDDs compared with the control group. When young female cancer survivors desire pregnancy, healthcare providers should offer appropriate counseling and surveillance for potential adverse NDDs in their offspring.
PMID: 40498258

34.Intrapartum Sildenafil to Improve Perinatal Outcomes: A Randomized Clinical Trial

Sailesh Kumar, William Tarnow-Mordi, Ben W Mol, Vicki Flenady, Helen G Liley, Nadia Badawi, Susan Walker, Jonathan Hyett, Anna Lene Seidler, Emily Callander, John Simes, Rachel L O'Connell; iSEARCH Investigators

JAMA . 2025 Jun 9:e257710. doi: 10.1001/jama.2025.7710. Online ahead of print.

Importance: Sildenafil citrate may increase uteroplacental blood flow. Its ability to reduce perinatal complications related to fetal hypoxia during labor is uncertain.
Objective: To compare the effectiveness of intrapartum maternal oral sildenafil citrate vs placebo in improving perinatal outcomes potentially related to intrapartum hypoxia in term pregnancies.
Design, setting, and participants: This pragmatic, multicenter, investigator-initiated, placebo-controlled randomized clinical trial including 3257 women was conducted in 13 Australian hospitals from September 6, 2021, to June 28, 2024. The last date of follow-up (28-day neonatal mortality) was July 26, 2024. Women aged 18 years or older with singleton or dichorionic twin pregnancies, planning vaginal birth at term by either spontaneous labor or induction of labor, were recruited.
Interventions: Women were assigned to 50 mg oral sildenafil citrate every 8 hours up to 150 mg or equivalent placebo.
Main outcome and measures: The primary composite outcome was intrapartum stillbirth, neonatal death, Apgar score less than 4 at 5 minutes (a score of <4 at 5 minutes is indicative of severe neonatal depression at birth, with scores ranging from 0 to 10), acidosis at birth (umbilical cord artery pH <7.0), hypoxic ischemic encephalopathy, neonatal seizures, neonatal respiratory support for greater than 4 hours, neonatal unit admission for greater than 48 hours, persistent pulmonary hypertension of the newborn, or meconium aspiration syndrome. Secondary outcomes were the individual components of the primary composite and emergency cesarean delivery or instrumental birth for intrapartum fetal distress.
Results: A total of 3257 women were randomized to sildenafil citrate (n = 1626 women and 1634 infants) or placebo (n = 1631 women and 1641 infants). Mean (SD) maternal age and gestation at randomization were similar in both groups (31.7 [5.1] vs 31.5 [5.0] years and 39.5 [1.2] vs 39.5 [1.1] weeks, respectively). A total of 868 participants (53.4%) vs 874 participants (53.6%) were of Australia/New Zealand ethnicity and 315 participants (19.4%) vs 311 participants (19.1%) were of European ethnicity. Most participants were nulliparous (944 of 1624 [58.1%; 2 missing values] vs 966 of 1630 [59.3%; 1 missing value]). Induction of labor occurred in 1353 of 1621 women (83.5%) in the sildenafil citrate group and 1348 of 1627 women (82.9%) in the placebo group. The primary outcome occurred in 83 of 1625 women (5.1%) in the sildenafil citrate group and 84 of 1625 (5.2%) in the placebo group (relative risk, 1.02; 95% CI, 0.75-1.37). Sildenafil citrate had no significant effect on emergency cesarean delivery or instrumental vaginal birth for fetal distress (relative risk, 1.12; 95% CI, 0.98-1.29) or on any of the individual components of the primary outcome. Subgroup analyses showed no evidence of heterogeneity of treatment effect.
Conclusions and relevance: Sildenafil citrate did not result in a lower incidence of adverse perinatal outcomes potentially related to intrapartum hypoxia.
Trial registration: anzctr.org.au Identifier: ACTRN12621000231842.
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