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## Interventions and Management

### 1. Association of corpus callosum and corticospinal tract microstructure with bimanual coordination in children with unilateral cerebral palsy

Hubert D Gascon, Ophélie Martinie, Philippe Karan, Maxime Descoteaux, Catherine Mercier, Maxime T Robert

Exp Brain Res 2026 Mar 11;244(4):68

#### Abstract

Bimanual actions involve the coordinated use of both hands and are supported in part by the corticospinal tract (CST) for motor execution and the corpus callosum (CC) for bimanual coordination. In children with unilateral cerebral palsy (CP), disruptions in the microstructural properties of the CST and CC have been associated with reduced bimanual motor functions. However, their specific contributions to bimanual motor control remain to be fully understood. Seventeen children with unilateral CP (mean age  $10.7 \pm 2.1$  years, 7 females) with mild to moderate motor impairments were recruited. Several types of diffusion magnetic resonance imaging metrics were collected in the CC and in the CST. Two behavioral tasks (cooperative and asymmetric independent goals) using the Kinarm exoskeleton were used, and spatiotemporal and bimanual coupling parameters were extracted. Nonparametric correlations were used to quantify the associations between neuroimaging metrics and behavioral parameters. The CC metrics showed multiple correlations with spatiotemporal parameters in both tasks with corrected p-values. In contrast, most CST metrics were only correlated with spatiotemporal parameters during the asymmetric independent goals task. No correlation was found between diffusion metrics and bimanual coupling parameters in either task. These findings highlight the significant role of CST and CC microstructure in spatiotemporal characterization of bimanual movement. Although not definitive, the findings suggest that corpus callosum microstructure broadly supports bimanual motor function in children with unilateral CP and highlight the need to examine its interaction with the corticospinal tract. PMID: [41811495](#)

### 2. Relationship between participation across daily environments and bimanual performance in children with unilateral cerebral palsy: an ICF-based cross-sectional study

María Coello-Villalón, Purificación López-Muñoz, Giuseppina Sgandurra, Alexandra Kalkantzi, Julián A Basco-López, Helena Romay-Barrero, Elena Beani, Rocío Palomo-Carrión

BMC Pediatr 2026 Mar 9

#### Abstract

No abstract available.  
PMID: [41803796](#)

### 3. Association Between BMI Z-Score and Postoperative Complications in Pediatric Neuromuscular Scoliosis Surgery

Alexander K Mihas, Dion Birhiray, Chun Wai Hung, Lorenzo R Deveza, Dallas Vanorny, Frank Gerow, Darrell Hanson, Benny Dahl

Global Spine J 2026 Mar 8. Online ahead of print.

Study design: Single-center retrospective review.

Objective: To investigate the association between BMI Z-scores and postoperative complications in pediatric patients with neuromuscular scoliosis undergoing spinal instrumentation.

Methods: Pediatric patients who underwent spinal instrumentation between July 2012 and June 2016 with  $\geq 2$ -year follow-up were included. BMI and BMI Z-scores were calculated and stratified into CDC BMI-for-age percentiles (underweight, normal, overweight, obese). Logistic regression assessed associations between BMI variables and complications.

Results: Among 147 patients (mean follow-up  $3.2 \pm 1.4$  years), cerebral palsy was the most common diagnosis (39.5%).

Complications occurred in 65 patients (44.2%): 21.8% had surgical site infection (SSI), 6.8% developed pneumonia, and 16.3% required return to surgery within 90 days. Higher BMI Z-score was associated with increased odds of deep SSI (OR 1.50), 30-day readmission (OR 1.45), and reoperation within 90 days (OR 1.52). Higher BMI Z-scores were associated with lower odds of pneumonia (OR 0.77), though this may reflect baseline pulmonary comorbidities in lower-BMI groups.

Conclusion: Higher BMI Z-scores increased the risk of deep SSI, readmission, and 90-day reoperation in pediatric neuromuscular scoliosis patients. Lower BMI Z-scores were associated with higher pneumonia risk. BMI Z-scores may aid in perioperative risk stratification.

PMID: [41796316](#)

### 4. Investigating rehabilitation by activities involving the trunk to improve balance and gait control in young children with cerebral palsy: A randomized open-label crossover trial protocol

Stella Zografou, Jonathan Pierret, Rajul Vasa, Jean Paysant, Christian Beyaert

PLoS One 2026 Mar 13;21(3):e0334195

Introduction: Children with cerebral palsy (CP) have gross motor and balance disorders altering standing, walking and activities. Since trunk control is central for balance, rehabilitation targeting the trunk is developing. In children with CP aged 5–12 years, rehabilitation by activities involving the trunk (RAIT) based on activities in intermediate postures for 3 months has been demonstrated to significantly improve trunk control while standing and early trunk deceleration and coupled negative ankle power due to plantar flexors while walking autonomously. As motor disorders develop early, the effects of RAIT are investigated in younger children and for longer time: the adapted design of this study is presented. Initial motor disorders in children with CP aged 18 months to 5 years and 6 months are expected to show at least a 30% reduction after RAIT compared to UR (based on prior findings in older children), with progressive improvements of 40% and 50% at 6 and 12 months, respectively, reflecting cumulative training effects.

Methods: The studied motor disorders include: (1) during gait, excessive early anterior deceleration of the sternum (primary outcome) measured by inertial measurement unit, excessive anterior location of center of pressure on affected leg(s), Enhanced Gait Variability Index and step width measured by a walkway with pressure sensors; (2) altered gross motor, balance and trunk function measured by the item set version of the Gross Motor Function Measurement 66 and by the Early Clinical Assessment of Balance.

Expected results: All these variables would be influenced by trunk balance and control, and therefore reduced after RAIT.

Trial registration: ClinicalTrials.gov: NCT06438432.

PMID: [41824540](#)

## 5.[Neurogenic hip dysplasia and hip dislocation: Pathophysiology, clinical presentation, and management in the context of cerebral palsy]

Ella Segatz, Erich Rutz

Orthopadie (Heidelb) 2026 Mar 9. Online ahead of print.

**Background:** Neurogenic hip dysplasia (NHD) is a significant musculoskeletal complication in children with neurological disorders, especially cerebral palsy (CP). It contributes to pain, functional limitations, and reduced quality of life. Muscle imbalance and impaired dynamic hip stability lead to progressive deformity of the femoral head and acetabulum, increasing subluxation and dislocation risk. Risk correlates strongly with GMFCS level and is highest in non-ambulant children (levels IV–V).

**Diagnostics:** Diagnosis and monitoring rely on radiographic parameters such as the Reimers migration index and Rutz classification, though some measures have limitations in CP. Hip surveillance based on GMFCS level supports early detection and intervention.

**Therapy:** Treatment must be individualized. Options range from conservative management with limited long-term efficacy, to soft-tissue procedures, and to reconstructive surgery (e.g., VDRO ± pelvic osteotomy). Salvage procedures are reserved for severe cases.

**Conclusion:** NHD is a multifactorial condition requiring structured diagnostics, continuous monitoring, and early, patient-specific therapy with family involvement to improve function and quality of life.

PMID: [41801410](#)

## 6.Bilateral Neglected Neck of Femur Fracture in a Cerebral Palsy Child: Case Report

Abdullah A Nada, Ahmed Oun, Mostafa Elsebai Hammad

JBJS Case Connect 2026 Mar 12;16(1)

### Abstract

**Case presentation:** A 15-year-old spastic quadriplegic cerebral palsy girl, with a Gross Motor Function Classification Scale III, presented with bilateral neglected femoral neck fractures, 2 months after a seizure episode, due to inability to walk. Bilateral subtrochanteric valgus osteotomies and fixation using dynamic hip screws were done. Functional lengthening of soft tissue was achieved by femoral shortening. Postoperatively, partial weight bearing was allowed after 3 weeks and progressed gradually to full weight-bearing. The prefracture activity level was achieved, with satisfactory radiographic results at 1 year.

**Conclusion:** Simultaneous bilateral valgus osteotomy with dynamic hip screw fixation was an effective treatment option for this patient.

PMID: [41818387](#)

## 7.Intra- and inter-therapist reliability of lower-limb inter-joint coordination during gait in individuals with and without cerebral palsy

Cloé Dussault-Picard, Yosra Cherni, Mickael Fonseca, Lena Carcreff, Fabien Leboeuf, Stéphane Armand

Gait Posture 2026 Mar 7;127:110148

**Purpose:** Inter-joint coordination plays a key role in walking, particularly in people with cerebral palsy (CP), who experience altered movement patterns. The Continuous Relative Phase (CRP) method quantifies lower-limb coordination by assessing phase relationships between joints. However, reliability of CRP during walking in CP remains unclear, potentially influenced by marker placement errors, soft tissue artifacts, and movement variability. This study aimed to quantify intra- and inter-therapist reliability of CRP measurements in CP and non-impaired (NI) individuals.

**Methods:** CP (n = 19, age  $18.4 \pm 7.3$  years, GMFCS I–III) and NI (n = 19, age  $18.3 \pm 11.2$  years) individuals completed two gait sessions, ten days apart, with 3D motion capture over at least 10 trials. Two trained therapists independently placed markers and conducted gait analyses. Standard error of measurement (SEM) and minimal detectable change (MDC) were calculated.

**Results:** SEM and MDC were lower for knee-hip than ankle-knee coordination. For knee-hip coordination, MDC reached  $15.1 \pm 0.7^\circ$  (CP) and  $9.3 \pm 0.6^\circ$  (NI) inter-therapist, and  $23.8 \pm 3.0^\circ$  (CP) and  $9.1 \pm 1.6^\circ$  (NI) intra-therapist. Ankle-knee MDC reached  $29.0 \pm 2.6^\circ$  (CP) and  $25.0 \pm 3.5^\circ$  (NI) inter-therapist, peaking at  $47.3 \pm 10.9^\circ$  (CP) during mid-swing intra-therapist.

**Conclusions:** This study provides the first reference for reliability of CRP-based inter-joint coordination during gait in CP.

Results showed poor reliability, emphasizing the need for cautious clinical use.

PMID: [41812488](#)

## 8. The Interlimb Asymmetry-Locomotor Capacity Nexus: A Two-Year Longitudinal Investigation in Ambulatory Children With Unilateral Cerebral Palsy

Ragab K Elnaggar, Mahmoud S Elfakharany

Am J Phys Med Rehabil 2026 Mar 6. Online ahead of print.

**Objective:** To investigate the longitudinal relationship between spatial-temporal gait asymmetries and locomotor capacity in ambulatory children with unilateral cerebral palsy (UCP).

**Design:** Prospective longitudinal study with assessments at baseline, 6, 12, 18, and 24 months. Twenty-seven children with UCP (GMFCS I–II, aged 8–15 years) were evaluated for spatial (SAI) and temporal (TAI) gait asymmetry indices and locomotor capacity measures: community balance and mobility (CB&M), functional walking test (FWT), 10-meter Shuttle Run Test (10m-SRT), and 6-Minute Walk Test (6mWT).

**Results:** Mixed-effects models indicated higher SAI was significantly associated with lower CB&M scores ( $\beta = -124.73$ ), reduced FWT performance ( $\beta = -48.79$ ), increased 10m-SRT times ( $\beta = 32.14$ ), and shorter 6mWT distances ( $\beta = -774.86$ ) (all  $P < 0.001$ ). Similar associations were found with TAI. Trajectory analyses showed gradual improvements in asymmetry over 24 months. Children with lower baseline asymmetry had faster functional improvements.

**Conclusion:** Spatial-temporal gait asymmetries are significantly associated with locomotor capacity in UCP, supporting the use of gait asymmetry metrics as biomarkers to monitor functional mobility trajectories.

PMID: [41811828](#)

## 9. An effectiveness-implementation trial of home-based early hand therapy for young children with cerebral palsy

A Hilderley, K O'Grady, M Herrero, E Heptonstall, S Reist-Asencio, R Pynn, C Tao, S Tao, C Diot, J Andersen, A Kirton

Res Dev Disabil 2026 Mar 12;171:105267. Online ahead of print.

**Background:** Early hand therapy is an effective approach for improving hand function in young children with cerebral palsy (CP), yet clinical implementation is limited. This trial assessed implementation and effectiveness of a high dose early hand therapy.

**Methods:** A home-based, caregiver-delivered intervention of 18 weeks with daily 30-minute practice (60 h total) of constraint-induced movement therapy and bimanual therapy. A coaching approach was used to support caregivers, with weekly coaching sessions provided in-person or virtually. Implementation strategies included training, educational materials, and dedicated clinician time. The primary effectiveness outcome was achievement of individualized hand function goals, assessed via the Canadian Occupational Performance Measure (COPM) pre/post/8-weeks post-intervention. The primary implementation outcome was satisfaction assessed by caregivers and clinicians post-intervention. A repeated measures ANOVA assessed change in COPM scores, with Bonferroni correction of post hoc pairwise comparisons (paired t-tests). Mean values and standard deviations (SD) were calculated for satisfaction scores.

**Results:** Eighteen participants completed the protocol, aged 4–22 months (mean 13, SD 6 months). COPM scores significantly improved from pre- to post-intervention ( $p < 0.001$ ) and pre- to 8-weeks post-intervention ( $p < 0.001$ ). Mean satisfaction scores indicated a large to very large extent of satisfaction for caregivers (4.9/5.0, SD 0.3) and for clinicians (4.5/5.0, SD 0.6).

**Conclusions:** Implementation of a caregiver-delivered home-based early hand therapy was highly satisfactory and effective for achievement of individualized hand function goals. Resources are available to support implementation spread.

PMID: [41825274](#)

## 10. Deep brain stimulation in children with acquired dystonia

Lea Hagelschuer, Anne Koy

Front Neurol 2026 Feb 25;17:1735832

### Abstract

The aim of this review is to present the current state of knowledge on deep brain stimulation (DBS) in pediatric patients with acquired dystonia. We summarize the short- and long-term effects of DBS on motor and non-motor domains and discuss potential factors influencing treatment response and patient selection. Furthermore, in view of the limitations of the existing data future perspectives are discussed, which could contribute to an improved understanding of disease mechanisms and outcome predictors in order to optimize the treatment by invasive neuromodulation in these often complex disabled patients.

PMID: [41821636](#)

### **11.Homehabilitation – development of a new pathway for management of slow to recover children in an inpatient rehabilitation ward**

Davina Lo, Rose Gilmore, Sasaka Bandaranayake, Naomi Blakely, Emily Burley, Yvette Callaghan, Theresa Carroll, Nicole Cooper, Lisa Copeland, Matthew Dawes, Sarah Donaghey, Anna Doyle, Priya Edwards, Jane Fong, Grainne Lee, Shailendra Maharaj, Elizabeth Maiden, Melanie Mildenhall, Heather Miles, Scarlett Murray Salter, Jacqueline Nightingale, William Padman, Erin Ransley, Suzanne Simpson, Lucy Sullivan, Mandy Tanner, Louise Tyack, Penny Ireland  
Disabil Rehabil 2026 Mar 11:1–10

**Purpose:** Paediatric rehabilitation patients who are slow to recover present a unique challenge to support in an intensive rehabilitation setting. Traditional intensive, goal-directed rehabilitation models do not cater for the complex presentations and poorer functional outcomes associated with catastrophic injuries in a paediatric population.

**Materials and methods:** A group of 24 experts from a paediatric rehabilitation setting developed consensus statements through a modified Delphi process to create a new service delivery model (Homehabilitation) supporting children needing a slower approach to rehabilitation.

**Results:** Two pathways were defined: (i) an intensive goal-directed model, or (ii) a slower approach focused on comfort, participation, caregiving ease, and safe, sustainable discharge home.

**Conclusions:** A well-defined slow-stream model supports children who are slow to progress by optimizing comfort, maximizing remaining skills, and providing family education for smoother discharge planning.

**Plain language summary:** Paediatric rehabilitation patients who have suffered catastrophic illness or injury frequently do not respond to a traditional goal-directed rehabilitation model of care. A slower ‘Homehabilitation’ model that prioritises goals of comfort, participation, ease of caregiving and family adjustment was developed to support children who are slow to progress. Having two distinct but similar models of care for paediatric rehabilitation may support children suffering catastrophic injuries or life limiting conditions to commence home-based contextual therapy earlier.

PMID: [41810987](#)

### **12.Efficacy of botulinum toxin type A for spasticity management and motor function in children with cerebral palsy: a systematic review and meta-analysis of randomized controlled trials**

Mshari Alghadier, Aseel Alsawayegh

Front Neurol 2026 Feb 23;17:1751493

**Background:** Spasticity is a major motor impairment in children with cerebral palsy (CP). Botulinum toxin type A (BoNT-A) is widely used, but questions remain regarding effect magnitude and durability.

**Objective:** To quantify short-term effects of BoNT-A on spasticity and motor function across randomized controlled trials.

**Methods:** Systematic search of RCTs from 2015–2025. Spasticity (Modified Ashworth Scale) was the primary outcome; GMFM outcomes were synthesized qualitatively.

**Results:** Eighteen RCTs (892 participants) met inclusion criteria. Meta-analysis of five lower-limb trials showed significant reduction of ankle spasticity (mean difference  $-0.31$ , 95% CI  $-0.43$  to  $-0.19$ ). Functional improvements were small and inconsistent but more evident when BoNT-A was combined with structured rehabilitation. Effects attenuated by  $\sim 12$  weeks.

**Conclusion:** BoNT-A provides significant short-term spasticity reduction, with limited and variable functional benefits.

Combined multimodal rehabilitation yields the most promising outcomes.

PMID: [41809197](#)

### **13.Comparative effects of high- vs. low-intensity Bobath therapy on spasticity in young children with spastic cerebral palsy**

Faith M Muma, Geoffrey Moyo, Loveness A Nkhata

BMC Pediatr 2026 Mar 10

#### **Abstract**

No abstract available.

PMID: [41808128](#)

#### 14. Association Between ASA Physical Status Classification and Postoperative Intensive Care Requirement in Pediatric Patients Undergoing Dental Treatment Under General Anesthesia: A Retrospective Study

Enes Bardakci, Mehmet Sinan Dogan, Peris Celikel

Healthcare (Basel) 2026 Feb 28;14(5):615

**Background and aim:** Accurate perioperative risk stratification is essential for patient safety in pediatric dental treatment under general anesthesia. We aim to evaluate the association between ASA (American Society of Anesthesiologists) Physical Status Classification and postoperative intensive care requirement in pediatric patients undergoing dental treatment under general anesthesia. **Methods:** In this retrospective study, the clinical records of 1003 children who underwent dental treatment under general anesthesia between June 2022 and June 2025 were evaluated. The patients' age, gender, ASA classification, concomitant systemic diseases, and postoperative intensive care requirements were analyzed. The chi-square test and logistic regression analysis were used for statistical evaluation, and results are expressed as odds ratios (ORs) with 95% confidence intervals (CIs). **Results:** The mean age of the patients was  $5.78 \pm 2.87$  years, and 58.3% were male. All patients requiring postoperative intensive care were in the ASA II (34.7%) and ASA III (65.3%) groups, while no intensive care need was observed in the ASA I group ( $p < 0.001$ ). The need for intensive care significantly increased, particularly in the presence of cerebral palsy, epilepsy, autism, congenital heart disease, and intellectual disability ( $p < 0.001$ ). In addition, the mean age of children requiring intensive care was significantly higher ( $p < 0.001$ ). In multivariable logistic regression analysis, ASA classification was significantly associated with postoperative intensive care requirement (OR = 180.73, 95% CI: 9.40–1922.49,  $p < 0.001$ ), whereas age and gender were not independently associated. Furthermore, the interaction term between ASA and age (ASA  $\times$  Age) was not statistically significant ( $p = 0.59$ ). **Conclusions:** ASA classification was significantly associated with postoperative intensive care unit admission in pediatric patients undergoing dental treatment under general anesthesia and may contribute to perioperative risk assessment. The findings emphasize the need for early identification of high-risk children and support the integration of ASA classification into multidisciplinary preoperative planning to enhance patient safety and optimize postoperative resource utilization.

PMID: [41827568](#)

#### 15. Ventriculoperitoneal (VP) Shunt-Associated Calcified Chronic Subdural Hematoma: Armored Brain Management With Shunt Revision

Hajar Hamadi, Oumaima Monadi, Yassine Ait M'Barek, Lamia Benantar, Khalid Aniba

Cureus 2026 Feb 9;18(2):e103255

##### **Abstract**

Calcified chronic subdural hematoma (CCSDH) or “armored brain” is a rare, late-stage complication that has been reported more often in children and young adults and may arise after ventriculoperitoneal (VP) shunting. We present a case of a 14-year-old male patient with cerebral palsy and a VP shunt presenting with intermittent headache. A non-contrast CT scan was consistent with bilateral CCSDH. The patient underwent shunt revision and remained asymptomatic during a follow-up period of two years. Through this case, we illustrate the importance of individualized management guided by clinical and imaging findings.

PMID: [41822670](#)

## 16. Prophylactic antibiotics to prevent chest infections in children with neurological impairment: the PARROT RCT

Paul S McNamara, Ashley Paul Jones, Anne Chang, Kieran Crabtree, Kylie Crompton, Sepideh Dehghani, Helen Eccleson, Jo Fothergill, Jonathan Grigg, Paul Gringras, Adrienne Harvey, Michelle Heys, Dyfrig Arwyn Hughes, Gabrielle McCallum, Kim McLennan, Christopher Morris, Amy Nuttall, Jeremy Parr, Yankier Pijeira Perez, Dinah Reddihough, Malcolm Gracie Semple, Hayley Smallman, Mandy Wan, Katrina Williams

Health Technol Assess 2026 Mar 4:1–19

**Background:** Improved neonatal and paediatric care has increased survival of children with non-progressive neurological impairment, but respiratory disease—particularly lower respiratory tract infection—is common and difficult to manage. Prophylactic antibiotics are increasingly used, yet evidence for effectiveness is limited. The PARROT trial compared 52 weeks of azithromycin with placebo in children with neurological impairment at risk of lower respiratory tract infection. **Results:** Ninety children (aged 3–17 years) were randomized (1:1). Sixty-five (72%) completed the 52-week treatment period. Cerebral palsy affected 64%; 67% were non-ambulant and 54% were tube-fed. Eleven children (36.7%) receiving azithromycin and nine (25.7%) receiving placebo were hospitalized with lower respiratory tract infection (absolute risk reduction 0.11; 95% CI –0.12 to 0.33). Secondary outcomes were limited by missing data, but quality of life, sleep, and respiratory symptoms were similar between groups.

**Conclusions:** Early termination due to COVID-19 resulted in an underpowered trial, preventing firm conclusions about azithromycin effectiveness. However, the study supports hospitalisation as an appropriate primary outcome and highlights the need to reduce trial burden for families in future research.

**Plain language summary:** Many more children and young people are now living with neurological conditions, such as cerebral palsy, because of improvements in neonatal and paediatric care. Respiratory disease and, particularly, chest infections are common causes of hospitalisation in this group and can be very difficult to manage. Therapy with long-term antibiotic treatments is sometimes used to prevent chest infections, but we do not know whether this approach is effective. We undertook a clinical trial in the United Kingdom and Australia to find out whether this preventative therapy works. We wanted to compare a year's treatment with an antibiotic called azithromycin to a placebo (an inactive treatment) to see whether azithromycin reduced the number of children admitted to hospital with chest infections. This was our primary outcome. We also collected lots of other secondary outcome data. We had planned to include 500 children and young people aged 3–17 years in our trial, but regrettably, we had to end the trial early because of difficulties associated with the COVID-19 pandemic. By the end of the prophylactic antibiotics to prevent chest infections in children with neurological impairment trial, we had recruited 90 participants (most with severe cerebral palsy), with 65 completing a year's treatment with either azithromycin or placebo. Regarding our primary outcome, similar numbers in the azithromycin (11) and placebo (9) groups were admitted to hospital with a chest infection. Analysis of secondary outcome information was limited by the amount of missing data, but family quality of life and sleep amount/quality and respiratory symptoms were similar between the two groups and countries. Importantly, azithromycin was as safe as placebo and was not associated with any particular side effects. Unfortunately, while this is one of the biggest trials in this group of children and young people with neurological impairment, it was not large enough to answer the question as to whether azithromycin reduces hospital admissions with chest infections. However, we can draw some conclusions from this trial. Prophylactic antibiotics to prevent chest infections in children with neurological impairment confirmed that hospitalisation continues to be an appropriate key outcome measure for future trials in this high-risk and vulnerable group of children and young people. Furthermore, the high attrition rate and large amounts of missing data, specifically for questionnaire-based outcomes at later follow-up points, should encourage researchers to be mindful of minimising trial burden to families for any future trials wherever possible.

PMID: [41800780](https://pubmed.ncbi.nlm.nih.gov/41800780/)

### 17. Robot-Assisted Gait Training Combined with Conventional Physiotherapy in Postoperative Patients with Diplegic Cerebral Palsy: A Pilot Single Cohort Observational Study

Anna Falivene, Emilia Biffi, Luca Emanuele Molteni, Cristina Maghini, Rossella Cima, Roberta Morganti, Eleonora Diella

Sensors (Basel) 2026 Feb 25;26(5):1438

**Background:** Cerebral palsy (CP) is the most common cause of disability in developmental age, affecting motor and postural skills. With growth, lower-limb orthopedic surgery often becomes necessary. Post-surgical walking rehabilitation programs generally involve conventional therapy with only limited evidence on the use of robot-assisted gait training (RAGT). The aim of the present pilot study is to assess the feasibility and the preliminary functional outcomes of an intensive 3-week rehabilitation of 15 sessions with Lokomat combined with 15 sessions of conventional physiotherapy.

**Methods:** In total, 27 patients with diplegic cerebral palsy who underwent orthopedic surgery were recruited. Outcomes collected: the 6 min walking test (primary outcome), the Gross Motor Function Measure-88, the Gillette Functional Assessment Questionnaire, 3D gait analysis, and spasticity and force metrics of the lower limbs. Paired statistical tests were used to assess pre-post changes.

**Results:** A pre-post statistically significant improvement was observed in gait endurance in the 6MWT ( $\Delta = 28.56 \pm 34.28$  m;  $p < 0.001$ ) and in gross motor functional skills. Gait parameters showed some functional and structural improvements, and joint stiffness was reduced in some measures.

**Conclusions:** This combined rehabilitative approach seems to be promising in postoperative patients with CP. Future studies, involving a control group and larger sample size, are needed to generalize our results.

PMID: [41829400](#)

### 18. Repetitive Transcranial Magnetic Stimulation for Spasticity in Stroke and Other Neuromotor Disorders: A Systematic Review of Randomized Clinical Trials

Michele Iacona, Rosario Ferlito, Rita Bella, Mariagiovanna Cantone, Raffaele Ferri, Francesco Fisicaro, Salvatore Giunta, Pietro Marano, Maria P Mogavero, Vito Pavone, Manuela Pennisi, Gianluca Testa, Davide N Tringali, Giuseppe Lanza

J Clin Med 2026 Mar 4;15(5):1932

**Background:** Spasticity is a common and disabling feature of several neuromotor disorders. Repetitive transcranial magnetic stimulation (rTMS) has been proposed as a non-invasive approach to modulate corticospinal excitability and reduce spasticity, although its clinical effectiveness remains debated. This systematic review evaluated the efficacy and safety of rTMS in reducing spasticity in stroke and other neuromotor conditions. **Methods:** A systematic search of PubMed, Scopus, and Cochrane Library was conducted up to June 2025 in accordance with PRISMA 2020 guidelines. Eligible studies were randomized controlled trials (RCTs) comparing rTMS with sham stimulation or conventional therapy and assessing spasticity using validated scales, primarily the Modified Ashworth Scale. Included populations comprised patients with stroke, spinal cord injury, multiple sclerosis, cerebral palsy, and hereditary spastic paraplegia. Risk of bias was assessed using the RoB 2.0 tool, and certainty of evidence was evaluated with GRADE. **Results:** Twenty-six RCTs were included, mainly involving stroke patients. Most studies reported a significant reduction in spasticity with rTMS compared with control interventions. Low-frequency stimulation was commonly used after stroke, while excitatory protocols predominated in other conditions. Benefits generally persisted for up to 12 weeks. Evidence quality was moderate, and no serious adverse events were reported.

**Conclusions:** rTMS appears to be a safe and promising adjunctive treatment for spasticity across neuromotor disorders.

However, protocol heterogeneity and small sample sizes limit definitive clinical recommendations, highlighting the need for standardized, larger-scale studies.

PMID: [41827349](#)

### 19. Cerebellar DBS during fMRI: initial findings and simulation-informed thermal assessment

Benson Yang, Ian O Bledsoe, Skyler Deutsch, David Mikhael, Sydney Riemer, Allisun Wiltshire, Sarah Wang, Lee Reid, Philip A Starr, Simon J Graham, Marta San Luciano, Melanie A Morrison

AJNR Am J Neuroradiol 2026 Mar 12. Online ahead of print.

#### Abstract

The cerebellum has garnered increasing interest as a promising deep brain stimulation (DBS) target for dyskinetic cerebral palsy and other conditions such as cerebellar ataxia and stroke. Functional MRI of cerebellar stimulation can facilitate more comprehensive understanding of the mechanisms underlying symptom response; however, evidence regarding its safety and feasibility is lacking. In this report, we first assessed the risk of radiofrequency-induced heating through simulations informed by postoperative CT images from three patients with distinct cerebellar DBS hardware orientations. Following heating estimates, and as part of an ongoing trial (NCT06122675), we then collected three functional MRI runs in one anesthetized patient with DBS turned ON, turned OFF, and cycled ON/OFF in 30s intervals. Simulations suggested acceptable heating under our scanner and sequence conditions, with peak temperature increases ranging from 0.6–1.5°C. Preliminary stimulation-induced brain activations and functional connectivity changes appeared consistent with the underlying structural anatomy. PMID: [41819793](#)

### 20. The evolution of speech communication devices for anarthria: a review

Catherine T Jones, Erik R Hill

Review J Neurol 2026 Mar 13;273(3):206

#### Abstract

Anarthria is a lack of verbal communication caused by physiological disturbances in the motor pathway. While affected individuals retain the ability to comprehend and produce speech, orofacial paralysis renders them unable to execute speech. Anarthria can be caused by amyotrophic lateral sclerosis, stroke, traumatic brain injury, and other etiologies that affect the descending motor pathway. A wide range of technologies has been developed and tested to improve communication efficiency for patients with anarthria and accompanying paralysis. This review evaluates three key eras of communication device development. First, before implantation devices gained traction, many communication devices revolved around blinks, head and eye tracking, and non-invasive brain recording. Second, implanted cortical neuroprosthetics were designed to improve accuracy and speed of communication. Finally, the review analyzes the future era, where accessibility, patient comfort, and broader applications of neural analysis elevate communication for patients with anarthria to match fluid communication. Restoring speech communication in patients with anarthria is vital to improve their quality of life. Therefore, understanding communication device efficiency and its future trajectory is of utmost clinical importance. PMID: [41826709](#)

## 21. Non-immersive virtual reality telerehabilitation for motor accuracy and precision in individuals with Cerebral Palsy: A non-randomized clinical trial

Paula Lumy da Silva, Elisa de Jesus Valenzuela, Mariana Giovanelli de Carvalho, Anne Michelli Gomes Gonçalves Fontes, Juliana Perez Weingartner, Talita Dias da Silva-Magalhães, Íbis Ariana Peña de Moraes, Helen Dawes, Eduardo Dati Dias, Carlos Bandeira de Mello Monteiro

PLoS One 2026 Mar 13;21(3):e0343934

This study aimed to describe motor performance, accuracy and precision, in individuals with Cerebral Palsy (CP) compared to typically developing individuals (controls), and to examine longitudinal changes during a non-immersive virtual reality (VR) telerehabilitation protocol.

**Methods:** The final sample included 38 with CP and 21 controls. Controls completed a single practice session, while 29 participants with CP completed the 10-day home-based protocol, and 20 returned for a follow-up session to assess retention. Analyses followed the intention-to-treat principle, including all 38 CP participants. The intervention used the MoveHero game, performed two to three times per week, with sessions lasting at least 9 minutes under remote therapist supervision. Motor performance was assessed in a coincident timing task using absolute error (AE, accuracy), variable error (VE, precision), and percentage of hits. The study was registered in the Brazilian Clinical Trials Registry (ReBec: RBR-4kf52bv).

**Results:** The CP group had higher mean AE and VE values than controls but showed progressive improvements across practice days. Mean accuracy improved across most target positions ( $p < 0.05$ ), with mean AE decreasing from 1350 ms on Day 1 to 895 ms on the best practice day. Controls had a mean AE of 584 ms, and participants with CP achieved similar performance in two of the four target positions. Mean VE improved notably for Target 3 (1124 ms on Day 1 to 811 ms on Day 9,  $p = 0.007$ ), and the mean percentage of correct responses increased from 45.8% to 58.5% ( $p = 0.019$ ), while controls reached 69.1%. No significant differences were found among GMFCS subgroups. Gains were maintained at follow-up ( $p > 0.05$ ).

**Conclusion:** Home-based non-immersive VR telerehabilitation using MoveHero effectively enhanced upper-limb motor performance in individuals with CP, regardless of functional level. These findings support VR as an accessible, motivating, and adaptable tool for promoting motor learning and continuity of care in home-based rehabilitation.

PMID: [41824404](#)

## 22. Exoskeleton-assisted physiotherapy in school and outpatient contexts for minimally ambulant children with cerebral palsy

Stefanie S Bradley, Tom Chau, Anne Kawamura, F Virginia Wright

Dev Med Child Neurol 2026 Mar 9. Online ahead of print.

**Aim:** To assess the clinical feasibility of lower-limb pediatric exoskeleton-assisted (Trexo Plus) physiotherapy for minimally ambulant children at an outpatient center and a primary school. Secondary aims were to evaluate functional and goal-based outcomes before and after Trexo-based physiotherapy.

**Method:** Ten children with cerebral palsy participated (five males; mean age 5 years 9 months; GMFCS level IV). Trexo intervention occurred twice weekly for 6 weeks in school (gym class/individual physiotherapy) and outpatient settings, delivered by a physiotherapist two-person team. Motor and functional assessments were conducted pre-intervention, 1-week post-intervention, and 5-weeks post-intervention.

**Results:** Fifteen of sixteen feasibility indicators were achieved. All participants completed the intervention, and use of the Trexo exoskeleton was safe (two minor adverse skin events in one child). Children reported high enjoyment and comfort, with some fatigue. Goal attainment was demonstrated through Canadian Occupational Performance Measure and Goal Attainment Scale outcomes. No meaningful gains were seen in GMFCS-88 scores (mean change +1.0). Gait assessments showed no increase in 1-minute walk distance but did demonstrate improved gait maneuverability and reduced physiotherapist assistance when using a supported-stepping walker.

**Interpretation:** Exoskeleton-based physiotherapy was safe, feasible, and supported achievement of Trexo-focused functional goals in both school and outpatient environments.

PMID: [41797658](#)

### 23. Experiences, outcomes and unmet needs of caregivers of children with Cerebral Palsy in Spain: Protocol for a mixed-methods study

Clàudia Arumí-Trujillo, Francisco José Verdejo-Amengual, Oriol Martínez-Navarro, Jord J T Vink, Fran Valenzuela-Pascual

PLoS One 2026 Mar 13;21(3):e0342763

#### Abstract

Cerebral Palsy is one of the most prevalent motor disabilities in childhood, significantly impacting both children and their caregivers. This mixed-methods study explores the experiences, psychological well-being, and unmet needs of caregivers of children with Cerebral Palsy. Using an explanatory sequential design (QUAN → QUAL), first it will be assessed burden, stress levels, and quality of life of caregivers through standardized questionnaires (PedsQL-FIM, ZBI, PSS-14). In the second phase, semi-structured interviews will be conducted to provide a deeper understanding of these variables. Other studies indicate that caregivers experience heightened stress and decreased quality of life, influenced by their child's functional limitations and the lack of adequate social and healthcare support. Moreover, many caregivers struggle with navigating medical systems, balancing personal and professional responsibilities, and managing emotional distress. This study will highlight the urgent need for family-centered interventions, psychosocial support, and healthcare policies that address not only the medical needs of children with Cerebral Palsy but also the well-being of their caregivers. By integrating quantitative and qualitative data, this research will provide comprehensive insights into the caregiving burden and will offer recommendations for improving caregiver support strategies. The Clinical Trial is registered at ClinicalTrials.org with the registration number NCT06912373.

PMID: [41824430](https://pubmed.ncbi.nlm.nih.gov/41824430/)

### 24. Epidemiology of cerebral palsy in Brazil through the lens of the International Classification of Functioning, Disability and Health framework

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Dev Med Child Neurol 2026 Mar 12. Online ahead of print.

**Aim:** To establish an overall description of people with cerebral palsy (CP) in Brazil, including the epidemiology, clinical features, functioning, and access to rehabilitation and equipment, through the lens of the International Classification of Functioning, Disability and Health (ICF) framework, using preliminary data from the Brazilian Cerebral Palsy Register (BrCPR).

**Method:** Data were extracted from the ongoing BrCPR for individuals with CP aged 0 to 100 years. The information collected included aetiological risk factors and, from the ICF, personal and health-related factors, environmental factors, body functions and structures, activity, and participation.

**Results:** A total of 1098 participants were included (median age 9 years [interquartile range 5–15 years]; 57.6% male). Most brain injuries occurred pre- or perinatally (68.1%), with preterm birth (44.8%) and perinatal asphyxia (51.1%) as common risk factors. Postneonatal CP (>28 days) was often infection-related (23.0%). One-third of all children were diagnosed before 6 months of age. Bilateral spastic CP predominated (59.4%), and 54.9% were classified in Gross Motor Function Classification System levels IV or V. Co-occurring conditions included epilepsy (57.5%), hip dislocation (31.0%), and cognitive impairment (55.3%). Severe activity limitations were reported, for example dressing (58.9%). Considering participation, 10.0% never attended school. Environmental barriers included lack of home adaptations (67.7%), no rehabilitation (14.0%), and lack of necessary assistive devices (44.7%).

**Interpretation:** The BrCPR highlights substantial unmet needs among individuals with CP in Brazil.

PMID: [41817275](https://pubmed.ncbi.nlm.nih.gov/41817275/)

## 25. Caregiver Experiences of Providing Care to a Child With Cerebral Palsy in Zambia: A Photovoice Project

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Child Care Health Dev 2026 Mar;52(2):e70252

**Background:** Caregivers of children living with cerebral palsy often experience challenges when living in low-resource communities, such as those found in low- and middle-income countries. Kusamala is a home-visiting programme that supports families of children with disabilities in Makululu in Kabwe, Zambia.

**Methods:** Following the nine steps of photovoice, this project aimed to consider the experiences of ten caregivers of children living with cerebral palsy who participated in a 12-month home-visiting programme. Potential recruits attended an informational meeting, received training in photovoice methods, gave consent, and were provided cameras. Participants took photos and later joined a focus group session where they shared experiences, identified themes, and selected images for a community exhibition.

**Results:** Participants identified three themes: Equality, Business/Having a Source of Income, and Special Care. The first theme described how caregivers understand and support the inclusion of their children; the second emphasized the need for sustainable income; the third related to learning new caregiving skills to support child development.

**Conclusions:** The study expands understanding of community-based programming and its impact on families of children with cerebral palsy in low-resource settings.

PMID: [41814581](#)

## 26. Developmental profiles of infants with hypoxic ischaemic encephalopathy at a tertiary hospital in South Africa

Ayanda Myaka-Gama, Sibongile Mbatha, Sarah Lowick, Kebashni Thandrayen, Firdose L Nakwa

Afr J Disabil 2026 Feb 23;15:1729

**Background:** Hypoxic ischaemic encephalopathy (HIE) is a common cause of neonatal death and severe neurological impairment.

**Objectives:** To describe neurodevelopmental outcomes in infants with moderate and severe HIE and assess the effects of HIE severity and therapeutic hypothermia (TH).

**Method:** Retrospective descriptive study of 239 infants with HIE, assessed at 1 year using the Griffiths Mental Developmental Scales. General Quotient (GQ) scores defined neurodevelopmental impairment (NDI); clinical criteria identified neurological complications.

**Results:** Of 239 infants, 211 had moderate and 28 had severe HIE. Cerebral palsy occurred in 9.2%; NDI in 17.1%. Severe HIE infants had significantly higher rates of NDI (50%) and CP (21.4%) compared with moderate HIE (12.7% and 7.6%). TH was associated with reduced NDI, CP, epilepsy, and visual impairment.

**Conclusion:** Developmental scores at 1 year were within average ranges overall, but severe HIE predicted worse outcomes. TH was associated with improved neurodevelopmental outcomes.

PMID: [41809399](#)

## 27. The proportional magnitude of rickets and diagnostic utility of radiography in children with cerebral palsy attending neurology clinic at tertiary hospital in a low resource setting: a cross-sectional study

Edward J Feksi, Mwajabu A Saleh, Mechris C Mango, Karim P Manji, Mboka Jacob

BMC Pediatr 2026 Mar 10

### Abstract

No abstract available.

PMID: [41803748](#)

## 28. Adult Perspectives on the Long-term Impact of Neonatal Encephalopathy Due to Hypoxia-Ischemia

Corline E J Parmentier, Brigitha T P van den Broek, Robbert Welles, Evie J G Bel, Wouter G Busstra, Maarten H Lequin, Niek E van der Aa, Linda S de Vries

Neuropediatrics 2026 Mar 13. Online ahead of print.

### Abstract

Neonatal encephalopathy (NE) following perinatal hypoxia-ischemia (HI) can lead to a wide range of neurodevelopmental consequences, ranging from mild motor problems to severe cerebral palsy, epilepsy, cognitive impairments, and behavioral issues. There is growing recognition of the long-term effects of NE during childhood, but little is known about the outcomes in adulthood, particularly from the perspective of the individuals affected and their families. Existing research primarily relies on outcome measures from neurodevelopmental assessments, which often fail to capture the lived experiences of those affected, limiting our understanding of the meaning and impact of the consequences of NE on their everyday lives. This paper tells the stories of four adults with varying outcomes following NE due to HI, ranging from largely typical development to cerebral palsy to subtle but significant cognitive challenges. Their narratives demonstrate that the long-term consequences of NE are highly variable and influenced by a complex interaction of medical, social, and environmental factors. They shared experiences of challenges, e.g., memory issues, which significantly affect their lives but are not routinely assessed in neurodevelopmental follow-up. Moreover, their narratives underscore that difficulties may emerge or evolve over time, emphasizing the need for ongoing, individualized care. Importantly, the stories of these adults also show that despite the challenges that they have faced and continue to face, they live fulfilling lives that go beyond what results from developmental assessments may indicate. These insights from lived experience experts emphasize the need for a holistic, patient-centered approach in both research and long-term follow-up care.

PMID: [41825451](#)

## 29. Does Time Tick Faster in Cerebral Palsy? Accelerated Aging as a Framework for Skeletal Muscle Dysfunction

Oscar Horwath, Sebastian Edman, Sudarshan Dayanidhi, Davis Englund, Mark D Peterson, Ferdinand von Walden

FASEB J 2026 Mar 31;40(6):e71653

### Abstract

Cerebral palsy (CP) is the most common cause of childhood-onset physical disability. Individuals experience motor impairments, muscle weakness, fatigue, and early functional decline. These features resemble sarcopenia and age-related muscle degeneration. This article hypothesizes that skeletal muscle in individuals with CP undergoes accelerated aging, driven by pathways similar to those implicated in sarcopenia. Emerging evidence highlights shared characteristics, including neuromuscular changes, impaired satellite-cell function, chronic inflammation, extracellular matrix alterations, reduced capillarization, and mitochondrial dysfunction. To test this hypothesis, cross-sectional and longitudinal studies targeting aging biomarkers—such as mitochondrial integrity, epigenetic aging markers, and cellular senescence—are proposed. Confirmation could transform understanding of muscle pathology in CP and support repurposing geriatric therapies for children and young adults with CP.

PMID: [41806256](#)

### 30.A German translation and cross-cultural comparison of a mobility questionnaire (MobQues47) for ambulant children and adolescents with cerebral palsy

Jacqueline Romkes, Annika Kruse, Martin Svehlik, Elke Viehweger, Alsalloum Fahd, Sean Nader, Annemieke I Buizer, Helga Haberfehlner, Matthias Hösl

Neuropediatrics 2026 Mar 9. Online ahead of print.

#### Abstract

Cerebral palsy (CP) is a non-progressive neurodevelopmental disorder caused by brain damage occurring before or around birth. Individuals demonstrate a heterogeneous range of mobility limitations requiring monitoring to evaluate treatment effectiveness. The validated Mobility Questionnaire (MobQues47), originally available in Dutch, assesses mobility difficulties across 47 indoor and outdoor activities in ambulant children and adolescents with CP, based on parent or caregiver reporting. This study aimed to translate the MobQues47 into German and to compare results from German-speaking participants with the original Dutch cohort. Parents and caregivers of 193 ambulant children and adolescents with CP (aged 4–18 years; GMFCS I–III) completed the MobQues47 during visits to gait laboratories in Germany, Austria, or Switzerland. These results were compared with Dutch data (N = 351). MobQues47 scores were significantly higher in the German-speaking group than in the Dutch group for GMFCS levels I and II but equal for GMFCS level III. In both groups, indoor-environment scores were significantly higher than outdoor-environment scores. Scores decreased (indicating more mobility difficulties) with increasing GMFCS level in both populations, supporting discriminant validity of the German version. However, higher German scores for GMFCS I and II suggest that region-specific reference values are necessary for clinical application of the MobQues47.

PMID: [41802756](#)

### 31.Independent living transitions for young people with cerebral palsy in Australia: aligning policy and practice with family realities

L Hickey, H T D Nguyen, L Harms, E Culnane, V Saunders, C Imms, M Ball, D Reddihough

Front Public Health 2026 Feb 19;14:1755553

#### Abstract

The transition to independent living is a major milestone for adolescents and young adults (AYAs) with disability. This study explored family adaptation during independent living transitions for AYAs with cerebral palsy. Semi-structured interviews were conducted with 13 parents of AYAs with CP. Data were analysed using the Resiliency Model of Family Stress, Adjustment, and Adaptation. Vulnerability factors included overlapping major transitions (school exit, adult health system entry, and independent living), creating a “pile-up” of demands. Resiliency factors included family appraisal, available resources, coping strategies, and problem-solving patterns. Participants identified systemic challenges such as rigid policies, complex bureaucratic processes, market-driven services, and workforce shortages. Findings emphasize that policy and practice must adopt a family systems perspective, addressing the needs of both AYAs and their ageing parents, and recognising dynamic family demands over time.

PMID: [41799452](#)

## Prevention and Cure

### 32. Neurodevelopmental Outcomes of Isolated Cerebellar Pathologies in Extremely Preterm Infants

Julia Buchmayer, Sophie Stummer, Renate Fuiko, Gregor Kasprian, Katrin Klebermaß-Schrehof, Angelika Berger, Katharina Goeral

Pediatrics 2026 Mar 11;e2025074603

**Background and objectives:** Cerebellar pathologies, especially cerebellar hemorrhage (CBH), in extremely preterm infants have been increasingly detected through cerebral magnetic resonance imaging (cMRI). We evaluated prevalence, associated risk factors, and neurodevelopmental outcomes of isolated CBH in a contemporary cohort of high-risk infants without major supratentorial brain injuries.

**Methods:** This observational cohort study included infants born <28 weeks' gestation during 2017–2022 who underwent cMRI at term-equivalent age. Cerebellar pathologies—including low-grade ( $\leq 3$  mm) and high-grade ( $> 3$  mm) hemorrhages, cerebellar atrophy, and vermis hemorrhage—and their impact on outcomes at 2 years' corrected age were analyzed using multivariable regression. Risk factors for CBH were also assessed.

**Results:** CBH was identified in 69 of 252 infants without major supratentorial injuries (27.4%; 74% low-grade, 26% high-grade). At 2 years' corrected age, motor composite scores were significantly lower in the CBH group, including low-grade hemorrhages. Larger hemorrhages and cerebellar atrophy were associated with poorer cognitive and motor performance. Vermian hemorrhages were linked to impaired motor development and higher rates of cerebral palsy. Infants with isolated CBH had lower gestational ages, lower birth weights, lower 1-minute Apgar scores, and higher rates of sepsis, patent ductus arteriosus requiring intervention, and high-grade retinopathy of prematurity.

**Conclusions:** Extremely preterm infants without supratentorial injury but with isolated CBH demonstrated significantly impaired motor outcomes and higher rates of cerebral palsy at 2 years' corrected age. Isolated CBH is an independent risk factor for neurodevelopmental impairment.

PMID: [41806870](#)

### 33. Impact of Thyroxine Treatment on Myelination in Premature Neonates With Intraventricular Hemorrhage: An Magnetic Resonance Imaging-Based Approach

Praveen Ballabh, Vincent Lee, Edmund F LaGamma, Ashok Panigrahy

Pediatr Neurol 2026 Feb 18;178:92–100

**Background:** Intraventricular hemorrhage (IVH) remains a major complication of prematurity. Survivors often develop cerebral palsy, cognitive deficits, and neurobehavioral disorders. Thyroxine (T4) treatment improves oligodendrocyte maturation and myelination in preterm rabbit models. We hypothesized that T4 treatment in neonates with grade III IVH or periventricular echo density would promote white matter recovery.

**Methods:** Preterm neonates (23 0/7–27 6/7 weeks' gestation) with grade III IVH or periventricular echo density were randomized to T4 treatment or no treatment ( $n = 7$  per group). The T4 group received thyroxine 8  $\mu\text{g}/\text{kg}/\text{day}$  in two doses for 42 days. MRI with diffusion tensor imaging (DTI) was performed at 36 weeks postmenstrual age. DTI analysis was validated using data from 130 neonates with IVH.

**Results:** Recruitment and retention were feasible. Seed-based tractography showed reduced mean, radial, and axial diffusivity in the splenium of T4-treated neonates, suggesting enhanced myelination compared with controls.

**Conclusions:** T4 treatment appears to enhance white matter recovery in neonates with moderate-to-severe IVH. This pilot study supports larger multicenter trials in preterm infants with IVH.

PMID: [41806496](#)