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Interventions and Management

1. Quality of patient- and proxy-reported outcomes for children with impairment of the upper extremity: a systematic review using the COSMIN methodology

J P Ruben Kalle, Tim F F Saris, Inger N Sierevelt, Denise Eygendaal, Christiaan J A van Bergen

Review J Patient Rep Outcomes. 2022 Jun 2;6(1):58. doi: 10.1186/s41687-022-00469-4.

Background: As patient-reported outcome measures (PROMs) have become of significant importance in patient evaluation, adequately selecting the appropriate instrument is an integral part of pediatric orthopedic research and clinical practice. This systematic review provides a comprehensive overview of PROMs targeted at children with impairment of the upper limb, and critically appraises and summarizes the quality of their measurement properties by applying the COnsensus-based Standards for selection of health Measurement INstruments (COSMIN) methodology. **Methods:** A systematic search of the MEDLINE and EMBASE databases was performed to identify relevant publications reporting on the development and/or validation of PROMs used for evaluating children with impairment of the upper extremity. Data extraction and quality assessment (including a risk of bias evaluation) of the included studies was undertaken by two reviewers independently and in accordance with COSMIN guidelines. **Results:** Out of 6423 screened publications, 32 original articles were eligible for inclusion in this review, reporting evidence on the measurement properties of 22 self- and/or proxy-reported questionnaires (including seven cultural adaptations) for various pediatric orthopedic conditions, including cerebral palsy (CP) and obstetric brachial plexus palsy (OBPP). The measurement property most frequently evaluated was construct validity. No studies evaluating content validity and only four PROM development studies were included. The methodological quality of these development studies was either 'doubtful' or 'inadequate'. The quantity and quality of the evidence on the other measurement properties of the included questionnaires varied substantially with insufficient sample sizes and/or poor methodological quality resulting in significant downgrading of evidence quality. **Conclusion:** This review provides a comprehensive overview of currently available PROMs for evaluation of the pediatric upper limb. Based on our findings, none of the PROMs demonstrated sufficient evidence on their measurement properties to justify recommending the use of these instruments. These findings provide room for validation studies on existing pediatric orthopedic upper limb PROMs (especially on content validity), and/or the development of new instruments.

PMID: [35652989](https://pubmed.ncbi.nlm.nih.gov/35652989/)

2. Guided Growth of the Proximal Femur for the Management of the 'Hip at Risk' in Children with Cerebral Palsy-A Systematic Review

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Review Children (Basel). 2022 Apr 25;9(5):609. doi: 10.3390/children9050609.

Background: Guided growth is frequently used to modify lower-limb alignment in children, and recently temporary medial hemiepiphyodesis of the proximal femur (TMH-PF) has been used for the management of hips at risk of subluxation in cerebral palsy (CP) patients. The aim of our study was to evaluate the efficacy of TMH-PF in the management of neuromuscular hip dysplasia in children with cerebral palsy. **Methods:** A systematic search of the literature was performed by using PubMed, EMBASE, CINAHL, MEDLINE, Scopus and Cochrane databases. Pre- and postoperative radiographic changes of the migration percentage (MP), head-shaft angle (HSA) and acetabular index (AI) were included in a meta-

analysis. Secondary outcomes were treatment complication rates, technical considerations and the limitations of this novel technique. Results: Four studies (93 patients; 178 hips) met the eligibility criteria for inclusion in the meta-analysis. All three radiographic measurements showed significant changes at a minimum of 2 years of follow-up. Mean changes for MP were 8.48% (95% CI 3.81-13.14), HSA 12.28° (95% CI 11.17-13.39) and AI 3.41° (95% CI 0.72-6.10), with 12 of 75.74%, 0% and 87.68%, respectively. The serious complication rate was overall low; however, physcal 'growing off' of the screw was reported in up to 43% of hips treated. Conclusion: TMH-PF is an effective and predictable method to treat CP patients with 'hips at risk', and the overall complication rate is low; however, further work is required to identify the best candidates and surgical timing, as well as choice of technique and implant.

PMID: [35626786](#)

3. Prevalence and Risk Factors Associated With Pelvic Rod/Screw Radiographic Lucency Following Scoliosis Surgery in Spastic Cerebral Palsy: A Longitudinal Study

Armagan C Ulusaloglu, Ali Asma, James Richard Bowen, Petya Yorgova, Jason J Howard, Michael Wade Shrader, Suken A Shah

J Pediatr Orthop. 2022 Jun 1. doi: 10.1097/BPO.0000000000002173. Online ahead of print.

Background: Radiographic lucency around a smooth pelvic rod (Galveston/unit rod technique) or sacroiliac/iliac screw following spinal fusion in children with nonambulatory spastic cerebral palsy (CP) has been described as a "windshield wiper" phenomenon. We evaluated demographics, radiographs, and complications in 101 cases from a single center to determine prevalence, risk factors, and complications associated with persistent radiographic lucency from 1 to 5 years following spinal fusion. Methods: Inclusion criteria were diagnosis of nonambulatory spastic quadriplegic CP [Gross Motor Function Classification System (GMFCS) IV-V], under 18 years of age, scoliosis treated by posterior fusion from upper thoracic to sacrum with pelvic fixation (Galveston rod, iliac screw, or sacroiliac screw), adequate radiographs (preoperative, immediate postoperative, first-year, and second-year), and minimum 5-year follow-up. We evaluated demographics, radiographic parameters, comorbidities, scoliosis curve type, type of pelvic screw/rod, use of off-set connector, screw width, associated with posterior column osteotomy and/or additional anterior spinal release concurrent with posterior spine fusion, and infection over the follow-up period. Specific attention was given to the area and shape of the radiographic lucency. The logistic regression analysis was performed for continuous and categorical variables to define risk factors ($P=0.05$). Results: In 101 patients, data were collected at mean intervals of 1-year, 2-year, and >5-year follow-up and were 12.9±1.5, 25.8±2.5, and 81.5±23.0 months, respectively. Prevalence of pelvic rod/screw radiographic lucency was unchanged at 33%, 35%, and 24% at 1-year, 2-year, and >5-year follow-up, respectively, and radiographic parameters did not change ($P>0.05$). Furthermore, no risk factors or complications were associated with radiographic lucency around pelvic rods/screws ($P>0.05$). Conclusion: In patients with spastic nonambulatory CP who had scoliosis treated with posterior spinal fusion from upper thorax to pelvis, the prevalence of pelvic rod/screw lucency is high. Persistent lucency >2 mm around pelvic implants is not clinically significant, does not warrant advanced imaging, or indicate a complication if stable over time and wider distally than proximally.

PMID: [35650685](#)

4. Corrigendum to "Neonatal hypoxic-ischaemic encephalopathy: Motor impairment beyond cerebral palsy" [Eur J Paediatr Neurol. 35 (2021) 74-81]

Gergo Erdi-Krausz, Ruben Rocha, Alice Brown, Archana Myneni, Finn Lennartsson, Andrea Romsauerova, Rina Cianfaglione, Caroline J Edmonds, Brigitte Vollmer

Published Erratum Eur J Paediatr Neurol. 2022 May 17;S1090-3798(22)00079-4. doi: 10.1016/j.ejpn.2022.05.004. Online ahead of print.

No abstract available

PMID: [35644842](#)

5. Gait Adaptation Is Different between the Affected and Unaffected Legs in Children with Spastic Hemiplegic Cerebral Palsy While Walking on a Changing Slope

Tae Young Choi, Dongho Park, Dain Shim, Joong-On Choi, Juntaek Hong, Yongjin Ahn, Eun Sook Park, Dong-Wook Rha

Children (Basel). 2022 Apr 22;9(5):593. doi: 10.3390/children9050593.

Walking on sloped surfaces requires additional effort; how individuals with spastic hemiplegic cerebral palsy (CP) manage their gait on slopes remains unknown. Herein, we analyzed the difference in gait adaptation between the affected and unaffected legs according to changes in the incline by measuring spatiotemporal and kinematic data in children with spastic hemiplegic CP. Seventeen children underwent instrumented three-dimensional gait analysis on a dynamic pitch treadmill at an incline of +10° to -10° (intervals of 5°). While the step length of the affected legs increased during uphill gait and decreased during downhill gait, the unaffected legs showed no significance. During uphill gait, the hip, knee, and ankle joints of the affected and unaffected legs showed increased flexion, while the unaffected leg showed increased knee flexion throughout most of the stance phase compared with the affected leg. During downhill gait, hip and knee flexion increased in the affected

leg, and knee flexion increased in the unaffected leg during the early swing phase. However, the ankle plantar flexion increased during the stance phase only in the unaffected leg. Although alterations in temporospatial variables and joint kinematics occurred in both legs as the slope angle changed, they showed different adaptation mechanisms.

PMID: [35626773](#)

6. Reduced plantar-flexors extensibility but improved selective motor control associated with age in young children with unilateral cerebral palsy and equinovagis gait

Christophe Boulay, Morgan Sangeux, Guillaume Authier, Michel Jacquemier, Andrea Merlo, Brigitte Chabrol, Jean-Luc Jouve, Jean-Michel Gracies, Sébastien Pesenti

J Electromyogr Kinesiol. 2022 May 19;65:102665. doi: 10.1016/j.jelekin.2022.102665. Online ahead of print.

Background: Children with spastic cerebral palsy gradually lose muscle extensibility but the interplay between the muscular and neurological components of the condition is unclear especially in the pathophysiology of equinovagis gait. **Aim:** This study aimed to quantify the muscular and neurological disorders in young children with unilateral cerebral palsy, and to investigate the role of the peroneus longus (PL) in equinovagis gait. **Design, setting and population:** This was an observational study with prospective assessments of 31 children (median age: 2.9 years, range: 2-6) from outpatient clinic in a tertiary teaching hospital. **Methods:** Clinical measures of plantar flexor extensibility (XV1), stretch response (XV3), and active ankle dorsiflexion angle (XA) were obtained as well as walking velocity and electromyography of tibialis anterior (TA), gastrocnemius medialis (GM) and PL during walking. **Results:** We found reduced extensibility of the triceps surae on the paretic side (effect size $r = 0.73$, $p < 0.001$ for soleus and $r = 0.68$, $p < 0.001$ for gastrocnemius) and a correlation between reduced triceps surae extensibility and earlier stretch response ($\rho = 0.5$, $p = 0.004$). During the swing phase, there was major co-contraction between TA and GM/PL, and significantly larger activation of PL compared to GM ($r = 0.46$, $p = 0.011$). Both GM and PL activation decreased with age. **Conclusions:** Our results suggest gradual deterioration of the muscular disorder and a link between the muscular and neurological disorders, although plantar flexor co-contraction improved with age. The PL was more activated than the GM and may be considered an intervention target to treat equinovagis gait.

PMID: [35653866](#)

7. Assessment of Functional Performance in Children with Cerebral Palsy Receiving Treatment in a Day Care Facility: An Observational Study

Andżelina Wolan-Nieroda, Aleksandra Łukasiewicz, Justyna Leszczak, Mariusz Druźbicki, Agnieszka Guzik

Observational Study Med Sci Monit. 2022 Jun 1;28:e936207. doi: 10.12659/MSM.936207.

BACKGROUND The study assessed changes in functional performance of children with cerebral palsy (CP), immediately following treatment and 2 months later, in addition to investigating the relationship between therapy effect and sex, age, or comorbidities. **MATERIAL AND METHODS** Functional performance of 32 children with spastic diplegia CP, aged 9-16 years, was assessed for: 1) manual function (Box and Block test), motor capacities (Gross Motor Function Measure), sensory capacities (Finger Identification [FI] and Localisation of Tactile Stimuli test [LTC]), and 2) activity and participation, ie, independence in essential and more complex daily activities (Barthel Index; Paediatric Evaluation of Disability Inventory). Measurements were conducted before the start (Month 0), immediately after 6-month rehabilitation program (Month 6), and following a 2-month period with no therapy, ie, 8 months after baseline measurement (Month 8). **RESULTS** Comparison of Month 0 and Month 6 scores showed significant differences ($P < 0.001$) in all measures. However, Month 8 scores were significantly worse in all the measures, except for sensory capacities assessed using FI and LTC ($P < 0.001$). **CONCLUSIONS** Functional performance of children with CP was positively affected by 6-month therapy, but 2 months later these effects significantly deteriorated, except for the sensory capacities. This suggests that therapy focusing on functional performance should be included as a permanent component of rehabilitation programs. These findings may be important for clinical practice as they show that therapy of children with CP should be continuous and systematic, and this should be taken into account by those designing therapeutic programs.

PMID: [35642128](#)

8. Multicentre, randomised controlled feasibility study to compare a 10-week physiotherapy programme using an interactive exercise training device to improve walking and balance, to usual care of children with cerebral palsy aged 4-18 years: the ACCEPT study protocol

Rachel Rapson, Jonathan Marsden, Jos Latour, Wendy Ingram, Kara Nicola Stevens, Laura Cocking, Bernie Carter

BMJ Open. 2022 May 30;12(5):e058916. doi: 10.1136/bmjopen-2021-058916.

Introduction: Children with cerebral palsy (CP) frequently undertake physiotherapy programmes to improve walking and balance. They often require adult support to exercise in a functional position. A novel interactive exercise trainer has been devised to enable children to exercise with against resistance in a functional position, but its efficacy has yet to be proved. A novel protocol has been developed to determine whether a randomised controlled trial (RCT) is feasible. **Aim:** To establish

whether it is feasible to conduct an RCT to assess the effectiveness of a 10-week physiotherapy intervention using an interactive trainer in children with CP. **Methods and analysis:** This study is multicentre randomised controlled feasibility trial with an embedded qualitative study. Forty children with CP, Gross Motor Function Classification System (GMFCS) I-III will be recruited from community paediatric physiotherapy caseloads. Participants will be randomised to 10 weeks of training with the interactive training device or to usual physiotherapy care. The mediolateral motion of the centre of mass estimate and Paediatric Balance Scale will be explored as potential primary outcomes measures, tested at baseline, 10 weeks and follow-up at 20 weeks. The views of child participants, their parents and physiotherapists will be gained through e-diaries and qualitative interviews. Feasibility will be determined by examining recruitment and retention rates, completeness of, adherence to the intervention, appropriateness of outcome measures and effectiveness of blinding. Results will be reported in accordance to Consolidated Standards of Reporting Trials (CONSORT) guidelines. **Ethics and dissemination:** Physiotherapists, children and parents have informed trial design and information leaflets. Results will be disseminated via publications, conferences and to families. This study has approval from North of Scotland Research Ethics Committee (20/NS/0018). Trial registration number: ISRCTN80878394.

PMID: [35636794](#)

9. Effects of a core stability exercise program on balance and coordination in children with cerebellar ataxic cerebral palsy

Mohamed Ali Elshafey, Mohamed Samy Abdrabo, Ragab Kamal Elnaggar

Randomized Controlled Trial *J Musculoskelet Neuronal Interact.* 2022 Mar 1;22(2):172-178.

Objective: To evaluate the effects of a core stability exercise program on balance, coordination, and severity of ataxia in children with cerebellar ataxic cerebral palsy (CP). **Methods:** Forty children with cerebellar ataxic CP (mean age: 6.75±1.35 years) were randomly assigned to a control group and an intervention group for 2 months of follow-up. The control group received a standard physical therapy program three times weekly (1 h per session), while the intervention group received a core stability program for 30 min, in addition to the selected physical therapy program. Both groups were evaluated pre-treatment and post-treatment using the Scale for the Assessment and Rating of Ataxia, the Balance Error Scoring Systems scale, Bruininks-Oseretsky tests of motor proficiency, and HUMAC balance system scores. **Results:** We found statistically significant reductions in the severity of ataxia, as well as improved balance and coordination in both groups, with stronger effects observed in the intervention group ($P < 0.05$). **Conclusion:** The core stability program can improve balance and coordination in children with cerebellar ataxic CP when incorporated with a standard physical therapy program.

PMID: [35642697](#)

10. INFLAMMATORY RESPONSE STATUS IN INFANTS WITH INTRAUTERINE INFECTION FROM MOTHERS WITH IDENTIFIED TORCH INFECTION

Olesya M Horlenko, Yuriy Yu Chuhuran, Lyubomyra B Prylypko, Gabriella B Kossey, Olena V Debraetseni, Marianna I Peresta, Iryna Yu Pikina

Wiad Lek. 2022;75(4 pt 2):974-981. doi: 10.36740/WLek202204210.

Objective: The aim: To investigate the status and possibilities of markers of the inflammatory response of organism in infants with identified IUI born to mothers diagnosed with TORCH infection. **Patients and methods:** Materials and methods: The study group included: infants diagnosed with IUI ($n = 40$), born to mothers (age 31.31 ± 2.08 years) with the diagnosis of TORCH infection and a control group ($n = 25$ infants). Childbirth in all newborns was physiological. The average weight of newborns was 1877.69 ± 981.78 g (min - 600 g; max - 4000 g). Gestational age: 32.25 ± 5.15 weeks. Observation and treatment of newborns lasted up to 7 days (included stay in the emergency department of the Uzhhorod maternity hospital in the Zakarpattia region). Cytokine profile, γ -IFN, TNF- α , Pg E2, serum neopterin and procalcitonin levels were studied. **Results:** Results: The values of the parameters of the cytokine profile (IL-1, IL-6, IL-8, IL-10) varied within the reference values, but with significant differences with the values of the control group, which was 1,2; 4; 10; 6 times, respectively. The levels of inflammatory mediators (γ -IFN Procalcitonin Neopterin TNF- α Pg E2) differed significantly from the data of the control group of infants and exceeded the upper limit of the reference values by 1,3; 3; 25; 4 times, respectively. According to the correlation analysis, there are positive correlations of medium level: IL 1 and procalcitonin ($r = 0.33$); IL 6 and IL10 ($r = 0.44$); IL 10 and prostaglandin E2 ($r = 0.44$); neopterin and prostaglandin E2 ($r = 0.39$), which indicates synergism in the performance of biologically active processes. Negative correlations of moderate degree were observed between the following parameters: IL 1 and gestational age of infants ($r = -0.36$); IL 6 and IL 8 ($r = -0.34$); γ -IFN and TNF- α ($r = -0.43$), which indicates the diversity of interactions between participants in the inflammatory response of the organism. **Conclusion:** Conclusions: Various infectious agents can act as «primary affect» of sepsis as a complex pathological process involving the organism, and each of the infections has its own characteristics of the pathological process, therefore current changes in infectious circumstances make new demands on research. It has been proven that intrauterine infection has a negative effect on the homeostatic parameters of infants, in particular, on the indicators of the inflammatory response of the child's organism. Symptomatic inflammatory biomarkers can be used to identify the pathological condition of the infant, in addition to routine laboratory tests, for early correction of VUI. This delay in identifying affected infants can lead to long and unnecessary therapy, the emergence of resistant strains of microorganisms, increased treatment costs and, in particular, a higher risk of complications such as cerebral palsy or intraventricular hemorrhage.

PMID: [35633328](#)

11. Motor Performance in Association with Perceived Loneliness and Social Competence in 11-Year-Old Children Born Very Preterm

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Children (Basel). 2022 May 4;9(5):660. doi: 10.3390/children9050660.

Background: Very preterm birth may affect motor performance and social competence up to adulthood. Our objective was to describe perceived loneliness and social competence in children born very preterm in relation to motor impairment. **Methods:** 165 children born very preterm (birth weight \leq 1500 g and/or gestational age \leq 32 weeks) were assessed at 11 years of age. Cerebral palsy (CP) was diagnosed by 2 years of age. At 11 years of age, motor outcome was assessed using the Movement Assessment Battery for Children-Second edition (Movement ABC-2). Loneliness was evaluated by using the Peer Network and Dyadic Loneliness scale and social competence by using the Multisource Assessment of Children's Social Competence Scale. **Results:** In total, 6 (4%) children had CP, 18 (11%) had Developmental Coordination Disorder (DCD) (Movement ABC-2 \leq 5th percentiles), and 141 (85%) had typical motor development. There was no correlation between percentiles for total scores of the Movement ABC-2 and perceived loneliness or social competence when the children with motor impairment (CP or DCD) were excluded. Children with DCD reported less perceived loneliness, but more problems with social competence compared to children with CP. **Conclusions:** It is important to recognize children born very preterm with DCD to provide interventions and support services to prevent social exclusion.

PMID: [35626837](#)

12. Neuromuscular Fatigue in Cerebral Palsy Football Players after a Competitive Match According to Sport Classification and Playing Position

Matías Henríquez, Luis Felipe Castelli de Campos, Fernando Muñoz-Hinrichsen, María Isabel Cornejo, Javier Yanci, Raul Reina

Int J Environ Res Public Health. 2022 May 17;19(10):6070. doi: 10.3390/ijerph19106070.

This study aimed to determine the rated perceived exertion (RPE) and match load (RPE-ML) to compare pre-post-match vertical jump (VJ) capacity according to cerebral palsy (CP) players' sport classes (i.e., FT1-FT3) and playing positions and to explore whether the neuromuscular performance variation is associated with the internal load of para-footballers with CP. Fifty-six male para-footballers performed two VJ tests before and immediately after a competitive CP football match, followed by measurements of the players' RPE and RPE-ML. There were no significant differences ($p > 0.05$) in the pairwise comparisons for RPE and RPE-ML according to sport classes and playing position. A significant reduction in the VJ performance was found for each player sport class and playing position in squat jump (SJ) ($p < 0.01$; 0.24 \pm 0.58) and countermovement jump (CMJ) ($p < 0.05$; 0.22 \pm 0.45). Regarding the pairwise comparisons, players with the minimal impairment criteria (FT3) obtained higher deficit scores during SJ than those belonging to the FT1 and FT2 ($p = 0.003$; 1.00 \pm 1.56). Defenders experienced the lowest performance compared to midfielders and attackers in SJ performance ($p = 0.027$; 0.94 \pm 1.28). Significant correlations were obtained between Δ SJ or Δ CMJ and RPE or RPE-ML ($r = -0.58$ to -0.75 ; $p < 0.001$). These findings provide novel information supporting the notion that fatigue induced after a competitive match causes notable impairments in VJ performance differentiated according to sport class and playing position in para-footballers with CP.

PMID: [35627606](#)

13. Convergent validity of functional communication tools and spoken language comprehension assessment in children with cerebral palsy

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Int J Lang Commun Disord. 2022 May 30. doi: 10.1111/1460-6984.12732. Online ahead of print.

Background: The majority of children with cerebral palsy (CP) experience challenges in functional communication from a young age. A pivotal aspect of functional communication is language comprehension. A variety of classification systems and questionnaires are available to classify and describe functional communication skills in children with CP. A better understanding of the convergent validity of (subsections of) these tools, as well as their relationship with spoken language comprehension, will be valuable in both clinical practice and research. **Aims:** To investigate the convergent validity of (subsections of) functional communication tools and the relationship with spoken language comprehension in children with CP. **Methods & procedures:** Cross-sectional data on 138 children were subdivided into three developmental stages based on (Dutch) educational phases: ages 18 months-3;11 y ($n = 59$), 4;0-5;11 years ($n = 37$) and 6;0-8;11 years ($n = 42$). The following functional communication tools were used to classify and describe functional communication: Communication Function Classification System (CFCFS), subscales of the Caregivers Priorities and Child Health Index of Life with Disabilities-Dutch

Version (CPCHILD-DV) and the Focus on Communication Under Six-34 (FOCUS-34) questionnaire. Spoken language comprehension was assessed with the Computer-Based instrument for Low motor Language Testing (C-BiLLT). Correlations between the functional communication tools, and with the C-BiLLT, were calculated using Pearson's and Spearman's correlation coefficients. It was hypothesized a priori that correlations of at least 0.60 suggest good convergent validity. Outcomes & results: At all developmental stages, a significant ordered decreasing tendency of communication outcomes was found across CFCS levels; lower CFCS levels were associated with lower scores on the CPCHILD-DV and FOCUS-34, and with a lower level of spoken language comprehension (C-BiLLT). Correlation coefficients of the functional communication tools varied between 0.351 and 0.591 at developmental stage 18 months-3;11 years, between 0.781 and 0.897 at developmental stage 4;0-5;11 years, and between 0.635 and 0.659 at developmental stage 6;0-8;11 years. Conclusions & implications: The functional communication tools assessed in this study showed convergent validity at all developmental stages. The CFCS, currently most widely used in paediatric rehabilitation, is adequate in the classification of functional communication. However, for more detailed clinical goal setting and evaluation of change in functional communication, the additional use of FOCUS-34 or CPCHILD-DV is recommended. What this paper adds: What is already known on the subject A range of functional communication tools are available that help describe and classify functional communication in children with CP. These include the CFCS, subsections of CPCHILD-DV and FOCUS-34. The CFCS classifies functional communication in daily life with familiar and unfamiliar partners. Specific subsections of the CPCHILD-DV and FOCUS-34 include items that pertain to communicative participation. The innovative C-BiLLT provides a standardized method to assess spoken language comprehension in children with CP and significant motor impairments. What this paper adds to existing knowledge In the present study, convergent validity was confirmed between CFCS and specific subsections of the CPCHILD-DV and FOCUS-34. Correlations between these functional communication tools and the C-BiLLT were moderate to strong. What are the potential or actual clinical implications of this work? For clinical and research purposes (for instance, accurate prescription of augmentative and alternative communication-AAC), healthcare and educational professionals together with parents need to know how functional communication tools converge and how functional communication levels relate to the comprehension of spoken language. The CFCS provides a valid classification of functional communication abilities in children with CP. However, to measure change in functional communication and to evaluate treatment outcomes, use of additional functional communication tools such as the CPCHILD-DV and FOCUS-34 is recommended. When discrepancies are found between communicative abilities and spoken language comprehension, it is strongly recommended that valid tools are used in a more detailed examination of the child's spoken language comprehension skills and functional communication.

PMID: [35637603](https://pubmed.ncbi.nlm.nih.gov/35637603/)

14. Acute histologic chorioamnionitis independently and directly increases the risk for brain abnormalities seen on MRI in very preterm infants

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Am J Obstet Gynecol. 2022 May 26;S0002-9378(22)00393-3. doi: 10.1016/j.ajog.2022.05.042. Online ahead of print.

Background: The independent risk for neurodevelopmental impairments attributed to chorioamnionitis in premature infants remains controversial. Delayed brain maturation or injury identified on magnetic resonance imaging (MRI) at term-equivalent age can be used as a surrogate measure of neurodevelopmental impairments that is less confounded by post neonatal intensive care unit (NICU) environmental factors to more clearly investigate this relationship. Objective: To determine whether preterm infants born with moderate to severe acute histological chorioamnionitis would have a higher MRI-determined global brain abnormality score, independent of early premature birth, as compared to preterm infants with no/mild chorioamnionitis. Study design: Prospective multicenter cohort study involving infants born very preterm at or before 32 weeks gestational age with acute moderate to severe histological chorioamnionitis, graded using standard histologic criteria. Brain abnormalities were diagnosed and scored using a well-characterized, standardized scoring system captured using a high-resolution 3 Tesla MRI research magnet. In secondary analyses, total brain volume and four MRI metrics of cortical maturation (cortical surface area, sulcal depth, gyral index, and inner cortical curvature) were calculated using an automated algorithm and associated with chorioamnionitis. The association of funisitis (any grade) with brain abnormalities was also explored. We investigated if premature birth mediated the relationship between histological chorioamnionitis and brain abnormality score using mediation analysis. Results: Of 353 very preterm infants, 297 infants had mild or no chorioamnionitis (controls), and 56 were diagnosed with moderate to severe acute histological chorioamnionitis. The primary outcome brain abnormality score was significantly higher in histological chorioamnionitis exposed infants than in controls (median, 4 vs 7, $p < 0.001$). Infants with acute histological chorioamnionitis had significantly lower brain tissue volume ($p = 0.03$) and sulcal depth ($p = 0.04$), while other morphometric indices did not differ statistically. On multiple regression analysis, we observed persistent significant relationships between moderate to severe acute histological chorioamnionitis and brain abnormality score ($\beta = 2.84$ [1.51, 4.16], $p < 0.001$), total brain volume, and sulcal depth. Funisitis was also significantly associated with brain abnormality score after adjustment for clinical confounders. Mediation analyses demonstrated that 50% of brain abnormalities resulted indirectly from premature birth and the remaining 50% from a direct effect of moderate to severe acute histological chorioamnionitis as compared to preterm infants with no/mild chorioamnionitis. Examining gestational age as a mediator, funisitis did not exert a significant direct effect on brain abnormalities, after the significant indirect effects of preterm birth were accounted for. Conclusion: Acute histological chorioamnionitis increases the risk of brain injury and/or delayed maturation, both directly and indirectly by inducing premature birth.

PMID: [35644247](#)

15. Implications of providing wrist-hand orthoses for children with cerebral palsy: evidence from a randomised controlled trial

Christine Imms, Margaret Wallen, Catherine Elliott, Brian Hoare, Susan Greaves, Melinda Randall, Francesca Orsini

Disabil Rehabil. 2022 Jun 1;1-11. doi: 10.1080/09638288.2022.2079734. Online ahead of print.

Purpose: To investigate the effects of providing rigid wrist-hand orthoses plus usual multidisciplinary care, on reducing hand impairments in children with cerebral palsy. **Methods:** A pragmatic, multicentre, assessor-blinded randomised controlled trial aimed to enrol 194 children aged 5-15 years, with wrist flexor Modified Ashworth Scale score ≥ 1 . Randomisation with concealed allocation was stratified by study site and passive wrist range. The treatment group received a rigid wrist-hand orthosis, to wear ≥ 6 h per night for 3 years. Analysis included repeated measures mixed-effects linear regression models, using intention-to-treat principles. **Results:** The trial stopped early due to insufficient recruitment: 74 children, across all Manual Ability Classification System levels, were randomised ($n = 38$ orthosis group; $n = 36$ control). Mean age was 10.2 (SD 3.1) years (orthosis group) and 9.1 (SD 2.8) years (control). Data showed some evidence that rigid wrist-hand orthosis impacted passive wrist extension with fingers extended in the first year [mean difference between-groups at 6 months: 13.15° (95%CI: 0.81 - 25.48° , $p = 0.04$); 12 months: 20.94° (95%CI: 8.20 - 33.69° , $p = 0.001$)]. Beyond 18 months, participant numbers were insufficient for conclusive findings. **Conclusion:** The study provided detailed data about short- and long-term effects of the wrist-hand orthosis and highlighted challenges in conducting large randomised controlled trials with this population. **Trial Registration:** Australia and New Zealand Clinical Trials Registry: U1111-1164-0572 **IMPLICATIONS FOR REHABILITATION.** There may be incremental benefit, for children with cerebral palsy, at 6 and 12 months on passive wrist range from wearing a rigid wrist-hand orthosis designed according to this protocol. The rigid-wrist-hand orthosis evaluated in this study, which allowed for some tailoring for individual children's presentations, differed in design from past recommendations for "resting hand" positioning. Longitudinal follow up of children with cerebral palsy prescribed a rigid wrist-hand orthosis is essential to monitor any benefit. Minor adverse events were commonly experienced when wearing the orthosis and should be discussed prior to prescription of a rigid wrist-hand orthosis.

PMID: [35649128](#)

16. Feasibility of Overground Gait Training Using a Joint-Torque-Assisting Wearable Exoskeletal Robot in Children with Static Brain Injury

Juntaek Hong, Jongweon Lee, Taeyoung Choi, Woon Choi, Taeyong Kim, Kyuwan Kwak, Seongjun Kim, Kyeongyeol Kim, Daehyun Kim

Sensors (Basel). 2022 May 19;22(10):3870. doi: 10.3390/s22103870.

Pediatric gait disorders are often chronic and accompanied by various complications, which challenge rehabilitation efforts. Here, we retrospectively analyzed the feasibility of overground robot-assisted gait training (RAGT) using a joint-torque-assisting wearable exoskeletal robot. In this study, 17 children with spastic cerebral palsy, cerebellar ataxia, and chronic traumatic brain injury received RAGT sessions. The Gross Motor Function Measure (GMFM), 6-min walk test (6 MWT), and 10-m walk test (10 MWT) were performed before and after intervention. The oxygen rate difference between resting and training was performed to evaluate the intensity of training in randomly selected sessions, while the Quebec User Evaluation of Satisfaction with assistive Technology 2.0 assessment was performed to evaluate its acceptability. A total of four of five items in the GMFM, gait speed on the 10 MWT, and total distance on the 6 MWT showed statistically significant improvement ($p < 0.05$). The oxygen rate was significantly higher during the training versus resting state. Altogether, six out of eight domains showed satisfaction scores more than four out of five points. In conclusion, overground training using a joint-torque-assisting wearable exoskeletal robot showed improvement in gross motor and gait functions after the intervention, induced intensive gait training, and achieved high satisfaction scores in children with static brain injury.

PMID: [35632279](#)

17. Early Diagnosis of Cerebral Palsy in Low- and Middle-Income Countries

Arrabella R King, Mahmudul Hassan Al Imam, Sarah McIntyre, Catherine Morgan, Gulam Khandaker, Nadia Badawi, Atul Malhotra

Review Brain Sci. 2022 Apr 23;12(5):539. doi: 10.3390/brainsci12050539.

Cerebral palsy describes a group of permanent disorders of movement, motor function and posture that occur due to non-progressive insults to the developing brain. Most of the information concerning the early diagnosis of cerebral palsy originates from studies conducted in high-income countries. In this scoping review, we aimed to explore the tools used in low- and middle-income countries for the early diagnosis of cerebral palsy. A systematic search was conducted using OVID Medline and PubMed databases. "Early diagnosis" was defined as diagnosis prior to 12 months of age, and low- and middle-income countries were classified according to the World Bank classification system. We identified nine studies on the early diagnosis

of cerebral palsy from low- and middle-income countries. The tools featured (n = number of studies) were: General Movement Assessment (6), neonatal magnetic resonance imaging (3), Hammersmith Neonatal Neurological Examination (2), Hammersmith Infant Neurological Examination (1) and cranial ultrasound (1). We found a paucity of published literature on the early diagnosis of cerebral palsy from low- and middle-income countries. Further research is needed to determine the tools that are accurate and feasible for use in low-resource settings, particularly since cerebral palsy is more prevalent in these areas.

PMID: [35624926](#)

18. Adolescent pregnancy in Sao Tome and Principe: are there different obstetric and perinatal outcomes?

Alexandra Vasconcelos, Nelson Bandeira, Swasilanne Sousa, Maria Céu Machado, Filomena Pereira

BMC Pregnancy Childbirth. 2022 May 31;22(1):453. doi: 10.1186/s12884-022-04779-9.

Background: Adolescent childbirth is a major public health problem in Sao Tome and Principe (STP). Adolescent pregnancy and childbirth can carry a risk of morbidity associated with the physiological and sociological characteristics of teenage girls. This study aims to identify the main adverse obstetric and perinatal outcomes for adolescent pregnancies in the Hospital Dr. Ayres de Menezes (HAM), the only hospital in STP. **Methods:** An institution-based cross-sectional study. Pregnant women \leq 19 years of age (n = 104) were compared to non-adolescent women (n = 414). The obstetric and perinatal outcomes were compared between groups using the t test. Odds ratio (OR) were calculated through Cochran's and Mantel-Haenszel statistics test for odds ratio equal to 1, 95% confidence intervals (CI) and p values ($p < 0.05$) were considered significant. **Results:** The adverse perinatal outcomes imputable to adolescent births were foetal distress with low first minute Apgar score < 7 (OR 1.94, 95% CI 1.18-3.18, $p = 0.009$) and performance of neonatal resuscitation manoeuvres (OR 2.4, 95% CI 1.07-5.38, $p = 0.032$). Compared to older mothers, teenage girls were likely to have a non-statistically significant threefold higher risk of having an obstructed labour (OR 3.40, 95% CI 0.89-12.94, $p = 0.07$). Other perinatal outcomes as neonatal asphyxia, risk for cerebral palsy, premature birth, early neonatal infection, and neonatal death were identical between groups as well as maternal anaemia, mode of delivery or other obstetrical outcomes. **Conclusion:** Adolescent pregnancies were associated with worse perinatal outcomes as foetal distress and higher need for neonatal resuscitation manoeuvres. This study may support STP health authorities in their efforts to make Sustainable Development Goals 3 (good health and wellbeing), 4 (quality education) and 5 (gender equality) a reality by 2030, since it identifies specific problems that need to be addressed to improve maternal adolescent health.

PMID: [35642050](#)

19. Infantile neurodevelopmental outcome after fetoscopic laser photocoagulation for twin-to-twin transfusion syndrome: the first prospective experience from Iran

Nazila Mesbah, Vajihah Marsousi, Laleh Eslamian, Hadi Montazerlotfelahi, Alireza A Shamshirsaz, Kamran Hessami, Ashraf Jamal, Maryam Noorzadeh, Mahsa Naemi, Marjan Ghaemi

BMC Pregnancy Childbirth. 2022 Jun 1;22(1):458. doi: 10.1186/s12884-022-04793-x.

Objective: We sought to evaluate the neurodevelopmental outcomes at 12 months of age among infants with twin-to-twin transfusion syndrome (TTTS) undergoing fetoscopic laser photocoagulation (FLP). **Materials and methods:** In this prospective longitudinal study, neurodevelopmental assessment was performed among the infants at the corrected age of 12 months, who were diagnosed with TTTS and treated by FLP. The Ages and Stages Questionnaire (ASQ) was filled out by parents. In the next step in infants with abnormal ASQ, motor and cognitive developments were evaluated by Bayley's infant and toddler development scoring system (Bayley 3-Third edition). **Results:** In 39 FLP procedures the rate of live birth of at least one twin was 73.8%. Four neonatal deaths were recorded, three of which were due to prematurity and one was due to heart anomaly. The ASQ was normal in 89.7% (35/39) of the infants (group I), 5.1% (2/39) had minor neurodevelopmental impairment (NDI) (group II), and 5.1% (2/39) had major NDI (group III). The 4 infants with abnormal ASQ had Bayley examination which showed two with mild to moderate cerebral palsy and two had delayed verbal skills and autistic spectrum disorder. No significant difference was noted between survivors with and without NDI with respect to donor or recipient status, birth weight, gestational age at birth, Quintero stage of TTTS. In addition, the relationship between gestational age at the time of undergoing FLC and NDI was not significant. **Conclusion:** In our population, minor and major neurodevelopmental impairment were seen in 10.2% of the infants. This information is useful for counseling our couples in this population prior the procedure.

PMID: [35650560](#)

20. Movement Difficulties at Age Five Among Extremely Preterm Infants

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Pediatrics. 2022 May 26;e2021054920. doi: 10.1542/peds.2021-054920. Online ahead of print.

Background and objectives: Children born extremely preterm (EPT), < 28 weeks' gestational age, face higher risks of movement difficulties than their term-born peers. Studies report varying prevalence estimates and prognostic factors identifying children

who could benefit from early intervention are inconsistent. This study investigated the prevalence of movement difficulties in children born EPT and associated risk factors. Methods: Data come from a population-based EPT birth cohort in 2011 and 2012 in 11 European countries. Children without cerebral palsy were assessed at 5 years of age ($N = 772$) with the Movement Assessment Battery for Children-Second Edition, which classifies movement difficulties as none (>15 th percentile), at risk (6th -15th percentile) and significant (≤ 5 th percentile). Associations with sociodemographic, perinatal, and neonatal characteristics collected from obstetric and neonatal medical records and parental questionnaires were estimated using multinomial logistic regression. Results: We found 23.2% ($n = 179$) of children were at risk for movement difficulties and 31.7% ($n = 244$) had significant movement difficulties. Lower gestational age, severe brain lesions, and receipt of postnatal corticosteroids were associated with significant movement difficulties, whereas male sex and bronchopulmonary dysplasia were associated with being at risk and having significant movement difficulties. Children with younger, primiparous, less educated, and non-European-born mothers were more likely to have significant movement difficulties. Differences in prevalence between countries remained after population case-mix adjustments. Conclusions: This study confirms a high prevalence of movement difficulties among EPT children without cerebral palsy, which are associated with perinatal and neonatal risk factors as well as sociodemographic characteristics and country.

PMID: [35615946](#)

21. Factors associated with dental caries experience of Thai preschool children with cerebral palsy

Kullanant Pansrimangkorn, Pornpun Asvanit, Busayarat Santiwong

Spec Care Dentist. 2022 May 30. doi: 10.1111/scd.12732. Online ahead of print.

Aim: To investigate the factors association with dental caries experience in the primary dentition of Thai preschool children with cerebral palsy. Methods and results: A cross-sectional study was conducted among sixty Thai preschool children with cerebral palsy, aged 3-6 years old. Caries experience was determined by identifying decayed non-cavitated and cavitated lesion, missing, and filled surfaces of deciduous teeth(dmfs). Sociodemographic data, CP motor types, dietary habits, oral health behaviors and dental plaque index were collected. Multiple linear regression analysis was carried out to identify the strength of the association between factors and dental caries experience. The prevalence of dental caries was 91.66%. The average dmfs was 20.30 ± 21.63 surfaces/individual. The multiple linear regression indicated that dmfs was significantly associated with snacking carbohydrate between meals more than two times/day $\beta \pm SE = 0.372 \pm 0.125$; $p = 0.004$, spastic type of cerebral palsy $\beta \pm SE = 0.309 \pm 0.124$; $p = 0.015$ and one-time daily tooth brushing $\beta \pm SE = 0.306 \pm 0.124$; $p = 0.017$. Conclusions: Nine out of 10 preschool children with CP experienced dental caries. Spastic type of CP had more risk to develop dental decay. Caries prevention for preschool children with CP should emphasis on controlling the frequency of carbohydrate snack no more than two times/day and reinforcing tooth brushing at least twice daily.

PMID: [35635839](#)

22. Outcome at age 7 of epilepsy presenting in the first 2 years of life. A population-based study

Tommy Stödberg, Torbjörn Tomson, Britt-Marie Anderlid, Tomas Andersson, Olivia Henry, Per Åmark, Anna Wedell

Epilepsia. 2022 Jun 2. doi: 10.1111/epi.17314. Online ahead of print.

Objective: Existing data suggest that outcome of epilepsy presenting in the first few years of life carries a worse prognosis than later onset. However, studies are few and methods differ making interpretations of data uncertain. This study analyses outcome at age 7 and potential prognostic factors in a well characterized population-based cohort with epilepsy onset during the first 2 years of life. Methods: An incidence cohort of 116 prospectively identified cases of epilepsy with seizure onset before age 2 years was described in a previous publication. Cases were originally retrieved from the Stockholm Incidence Registry of Epilepsy (SIRE), that registered all cases with a first unprovoked epileptic seizure from September 1, 2001 in Northern Stockholm. Data on treatment and outcome at age 7 years were collected from electronic medical records and through interviews with parents. Outcome and potential prognostic factors were analyzed with descriptive statistics and multivariable log binomial regression analysis. Results: Eleven children (9.5%) died before age 7. Polytherapy was common. Epilepsy surgery was performed in two children. At age 7 years 61/116 (53%) children had been seizure free for the last 2 years or longer. Intellectual disability was diagnosed in 57/116 (49%) children, autism spectrum disorder in 13 (11%) and 38 (33%) children had cerebral palsy. West syndrome had a similar seizure remission rate but a worse cognitive outcome. There was no difference in outcome between first and second year onset. Six predictors, including etiology, remained associated to two or more outcome variables after regression analysis. Significance: About half of children with infantile-onset epilepsy will become seizure free and half of them will have intellectual disability. Etiology was confirmed as a major independent predictor of outcome. Our study contributes to a more firm knowledge-base when counselling parents of infants diagnosed with epilepsy.

PMID: [35652437](#)

23. Selective dorsal rhizotomy: short-term results and early experiences with a newly established surgical treatment in Slovenia

Peter Spazzapan, Roman Bosnjak, Zoran Rodi, Natasa Kos, Katja Groleger, Tomaz Velnar

J Integr Neurosci. 2022 May 11;21(3):90. doi: 10.31083/j.jin2103090.

Background: Spasticity is characterised by an atypical increase of muscle tone, affecting normal movements and interfering with the patient quality of life. The medicines may limit the effects of the disease and selective dorsal rhizotomy (SDR) can be used for selected cases or cases refractory to medicine. We present the surgical technique and the short-term results of this newly established surgical treatment in Slovenia. **Methods:** A retrospective analysis was performed of all patients that underwent the SDR from 2017 to 2019. The median follow-up was of 10 months. The following data have been collected: aetiology of spasticity, age at SDR, number of sectioned lumbar rootlets L1-S2, intraoperative disappearance of the H-reflex and intraoperative preservation of the bulbocavernosus reflex. The motor functions of all children have been classified by the Gross Motor Function Classification System (GMFCS) and Gross Motor Function Measure (GMFM-88). Twelve children underwent SDR, the median age at surgery was 9.6 years (min 3.9-max 16 years). **Results:** A mean of 57.8% of dorsal rootlets L2-S1 have been cut, while at level L1 50% of the dorsal roots have been routinely sectioned. The median amount of S2 rootlets cut was 14.3%. Postoperatively, we observed a sudden decrease in muscle tone. In all patients, there was an improvement of the muscle tone and of the gait pattern. The GMFM improved from 187.8 to 208.3 after a follow-up of 6 months. **Conclusions:** There was no complication in terms of wound healing, cerebrospinal fluid fistula of neurological dysfunctions. Despite the relatively short follow-up, our early results confirm the efficacy of the SDR.

PMID: [35633171](#)

24. Fetal reduction for everyone?

Mark I Evans, Jenifer Curtis, Shara M Evans, David W Britt

Review Best Pract Res Clin Obstet Gynaecol. 2022 Apr 29;S1521-6934(22)00067-0. doi: 10.1016/j.bpobgyn.2022.04.003. Online ahead of print.

Infertility treatments have benefited millions of couples to have their own children; however, the complication of multiple pregnancies with their increased morbidity and mortality has created significant problems. Fetal reduction (FR) was developed to ameliorate these issues. Over 30 years of publications show that FR has been highly successful in substantially reducing both mortality and morbidity. As with most radically new techniques, initial cases were in the "nothing to lose" category. With experience, indications liberalize, and quality of life issues increase as a proportion of cases. Overall risks for twins are not twice as those for singletons, but they are approximately 4- to 5-fold higher. In experienced hands, the combination of genetic testing by CVS followed by FR has made most multiples behave statistically as if they were originally the lower number. The use of microarray analysis to better determine fetal genetic health before deciding on which fetus(es) to keep or reduce further improves pediatric outcomes. With increasing experience and lower average starting numbers, the proportion of FRs to a singleton has increased considerably. Twins to a singleton FR now constitute an increasing proportion of cases performed. Data on such cases show improved outcomes, and we believe FR should be at least discussed and offered to all patients with a dichorionic twin pregnancy or higher. eSET is not a panacea because of the resultant monochorionic twins.

PMID: [35643756](#)

25. An Ethical Analysis of Newborn Congenital Cytomegalovirus Screening

Megan H Pesch, Phoebe Danziger, Lainie Friedman Ross, Armand H Matheny Antommara

Case Reports Pediatrics. 2022 Jun 1;149(6):e2021055368. doi: 10.1542/peds.2021-055368.

Congenital cytomegalovirus (cCMV) affects approximately 1 in every 200 US infants and can be associated with long-term neurodevelopmental sequelae, including sensorineural hearing loss, cerebral palsy, and intellectual disability. As cCMV is infrequently diagnosed based on clinical suspicion alone, newborn cCMV screening programs have been gaining traction, especially hearing-targeted programs which only test infants who fail their newborn hearing screen. cCMV screening programs raise unique ethical dilemmas of both under- and over-diagnosis of cCMV. In this Ethics Rounds, we present a case in which the parents of a child with symptomatic cCMV that was not recognized until 4 years of age urge the birth hospital to implement a cCMV screening program. We then ask a parent-clinician, a medical ethicist and pediatrician, and a primary care pediatrician to comment on how they would advise the hospital administration and consider the ethical and clinical implications of a cCMV screening program. The commentaries herein arrive at differing conclusions about cCMV screening. The first highlights the developmental advantages of early cCMV detection, supporting a broad approach to treatment beyond antiviral medication alone. The second explores cCMV screening from the perspective of newborn screening as a public health program, noting shortcomings in available testing platforms, and raising concerns about overdiagnosis and overtreatment. The final commentary challenges the risks of undue parental anxiety and vulnerable child syndrome as a barrier to screening, instead considering cCMV screening as a controlled opportunity to understand and support the experiences of affected children and their families.

PMID: [35641472](#)

26. Research Summit V: Optimizing Transitions From Infancy to Early Adulthood in Children With Neuromotor Conditions

Barbara Sargent, Regina Harbourne, Noelle G Moreau, Theresa Sukal-Moulton, Melissa Tovin, Judy L Cameron, Richard D

Stevenson, Iona Novak, Jill Heathcock, Participants From RSV

Pediatr Phys Ther. 2022 Jun 1. doi: 10.1097/PEP.0000000000000912. Online ahead of print.

Purpose: The purpose of this executive summary is to review the process and outcomes of the Academy of Pediatric Physical Therapy Research Summit V, "Optimizing transitions from infancy to young adulthood in children with neuromotor disabilities: biological and environmental factors to support functional independence." **Summary of key points:** An interdisciplinary group of researchers, representatives from funding agencies, and individuals with neuromotor disabilities and their parents participated in an intensive 2.5-day summit to determine research priorities to optimize life transitions for children with neuromotor disabilities. Recommended priorities for research included (1) promoting self-determination and self-efficacy of individuals with neuromotor disabilities and their families, (2) best care at the right time: evidence-based best practice care, led and navigated by families seamlessly across the lifespan, (3) strengthening connections between developmental domains to enhance function and participation, and (4) optimal dosing and timing to support adaptive bone, muscle, and brain plasticity across the lifespan.

PMID: [35653258](#)

27. Family and Individual Quality of Life in Parents of Children with Developmental Disorders and Diabetes Type 1

Marija Ljubičić, Sanja Delin, Ivana Kolčić

J Clin Med. 2022 May 19;11(10):2861. doi: 10.3390/jcm11102861.

Background: This cross-sectional study assessed both family and individual quality of life (QOL), and their association with self-esteem, optimism, chronic psychological stress, anxiety, and depression in parents of children with chronic conditions. **Methods:** Parents of children with Down syndrome (DS), autistic spectrum disorder (ASD), cerebral palsy (CP), diabetes mellitus type 1 (DMT1), and parents of children without chronic diseases with typical development (TD) were included. Multivariate linear regression analysis was used to assess parental characteristics associated with the domains of individual and family QOL. **Results:** Compared to the parents of TD children, parents of children with ASD and DS were more likely to report reduced family QOL in all domains, while parents of children with DMT1 had lower parental perception. Self-esteem was positively associated with all domains of individual QOL, while optimism was associated with the overall individual QOL perception and health. Higher stress perception was negatively associated with most of the domains of individual and family QOL. **Conclusions:** This study confirmed that parents of children with chronic conditions are more likely to have lower perception of both individual and family QOL, which were associated with self-esteem, chronic stress, anxiety, and depression. Interventions should focus not only on the child with a chronic condition but on parents too.

PMID: [35628987](#)

28. Deep nuclei injury distribution in isolated "basal ganglia-thalamus" (BGT) versus combined "BGT and watershed" patterns of hypoxic-ischaemic injury (HII) in children with cerebral palsy

M M Elsingerly, F Worede, S Venkatakrisna, S Andronikou

Clin Radiol. 2022 May 29;S0009-9260(22)00228-8. doi: 10.1016/j.crad.2022.04.019. Online ahead of print.

Aim: To compare frequency and distribution of deep nuclei involvement in isolated basal ganglia and ventrolateral thalamus (BGT) versus combined BGT and watershed (BGT-WS) hypoxic-ischaemic injury (HII). **Materials and methods:** A retrospective review was undertaken of the magnetic resonance imaging (MRI) reports of children (0-18 years) with isolated BGT or combined BGT-WS HII. The location and extent of deep nuclear injuries were compared between groups using Fisher's exact test. **Results:** Of 762 MRI reports, 435 (57%) had isolated BGT and 327 (43%) combined BGT-WS. Isolated BGT showed basal ganglia involvement in 85.1% (n=370) versus 49.8% (n=163) for combined BGT-WS (p<0.01). Sole putamen lesions were more common in isolated BGT (70.3%; 306) versus combined (19.3%; 63; p<0.01). Thalamic involvement was similar between isolated BGT (93.8%; 408) and combined BGT-WS (96.9%; 317; p>0.05). Sole ventrolateral nucleus involvement was more common in isolated BGT (66.6%; 291) while sole pulvinar lesions (25.1%; 82) and whole thalamus lesions (41.6%; 136) were more common in combined BGT-WS (p<0.01). Putamen and ventrolateral nucleus was the most frequent BGT lesion combination in isolated BGT (55.4%) but not in combined BGT-WS (8.6%; p<0.01). **Conclusion:** Variations in the frequency of deep nuclear lesions between groups may reflect different underlying pathogenetic mechanisms. Therefore, combined BGT-WS patterns may not necessarily indicate a superimposed profound on partial prolonged HII, as other causes such as neonatal hypoglycaemia may cause these.

PMID: [35649736](#)

29. Epigenetics and Neuroinflammation Associated With Neurodevelopmental Disorders: A Microglial Perspective

Munekazu Komada, Yuhei Nishimura

Review Front Cell Dev Biol. 2022 May 12;10:852752. doi: 10.3389/fcell.2022.852752. eCollection 2022.

Neuroinflammation is a cause of neurodevelopmental disorders such as autism spectrum disorders, fetal alcohol syndrome, and cerebral palsy. Converging lines of evidence from basic and clinical sciences suggest that dysregulation of the epigenetic landscape, including DNA methylation and miRNA expression, is associated with neuroinflammation. Genetic and environmental factors can affect the interaction between epigenetics and neuroinflammation, which may cause neurodevelopmental disorders. In this minireview, we focus on neuroinflammation that might be mediated by epigenetic dysregulation in microglia, and compare studies using mammals and zebrafish.

PMID: [35646933](#)

30. Brivaracetam for dyskinetic cerebral palsy

Vasileios Papaliagkas, Konstantinos Notas, Evangelia Chatzikyriakou, Maria Moschou, Sevasti Bostanjopoulou, Georgios Hadjigeorgiou, Vasilios K Kimiskidis

Epileptic Disord. 2022 Jun 1;24(3):1-3. doi: 10.1684/epd.2022.1431.

No abstract available

PMID: [35653104](#)

31. [The role of neuropsychiatry in the care of children and adults with cerebral palsy]

[Article in French]

Aaron J Hauptman, Elizabeth Barkoudah

BJPsych Open. 2022 Jun 1;8(4):e99. doi: 10.1192/bjo.2022.62.

Neuropsychiatric symptoms are commonly reported in cerebral palsy. These symptoms interact in complex ways with the core motoric features of cerebral palsy, and require specialised care. We argue for increased awareness of these symptoms by clinicians, and the need for greater integration of neuropsychiatric specialists into the core teams involved in multidisciplinary care for individuals with cerebral palsy and their families.

PMID: [35642355](#)