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Interventions and Management

1. HABIT+tDCS: a study protocol of a randomised controlled trial (RCT) investigating the synergistic efficacy of hand-arm bimanual intensive therapy (HABIT) plus targeted non-invasive brain stimulation to improve upper extremity function in school-age children with unilateral cerebral palsy

Andrew M Gordon, Claudio L Ferre, Maxime T Robert, Karen Chin, Marina Brandao, Kathleen M Friel

BMJ Open. 2022 Feb 21;12(2):e052409. doi: 10.1136/bmjopen-2021-052409.

Introduction: Unilateral spastic cerebral palsy (USCP) is characterised by movement deficits primarily on one body side. The best available upper extremity (UE) therapies are costly and intensive. Thus, there is an urgent need for better, more efficient and thus more accessible therapies. Transcranial direct current stimulation (tDCS) is non-invasive and may enhance physical rehabilitation approaches. The aim of this study is to determine whether tDCS targeted to the hemisphere with corticospinal tract (CST) connectivity enhances the efficacy of UE training in children with USCP. Our central hypothesis is that hand-arm bimanual intensive therapy (HABIT) combined with a tDCS montage targeting the hemisphere with CST connectivity to the impaired UE muscles will improve UE function more than HABIT plus sham stimulation. We will test this by conducting a randomised clinical trial with clinical and motor cortex physiology outcomes. **Methods and analyses:** 81 children, aged 6-17 years, will be randomised to receive 2 mA anodal tDCS targeted to the affected UE motor map, 2 mA cathodal tDCS to the contralesional motor cortex or sham tDCS during the first 20 min of each HABIT session (10 hours: 2 hours/day for 5 days). **Primary outcomes** will be Box and Blocks Test, Assisting Hand Assessment and motor cortex excitability, determined with single-pulse transcranial magnetic stimulation. **Secondary outcomes** include ABILHAND-Kids, Canadian Occupational Performance Measure, Cooper Stereognosis, Dimension of Mastery Questionnaire and Participation and Environment Measure-Children and Youth. All measures will be collected before, immediately and 6 months after treatment. A group \times test session Analysis of Variance will test differences among groups on all measures. **Ethics and dissemination:** The study has been approved by the BRANY Institutional Review Board (#18-10-285-512). We will leverage our subject and family relationships to maximise dissemination and share results with the academic and patient/family advocacy groups. Trial registration number: NCT03402854.

PMID: [35190424](https://pubmed.ncbi.nlm.nih.gov/35190424/)

2. Reliability and agreement of the Nine Hole Peg Test in patients with unilateral spastic cerebral palsy

Sandra Mendoza-Sánchez, Francisco Molina-Rueda, Lidiane Lima Florencio, Maria Carratalá-Tejada, Alicia Cuesta-Gómez

Eur J Pediatr. 2022 Feb 25;1-8. doi: 10.1007/s00431-022-04423-w. Online ahead of print.

Upper extremity involvement is one of the most common motor impairments in children with unilateral spastic cerebral palsy (CP). One tool for the assessment of manual function in CP is the Nine Hole Peg Test (NHPT). However, the reliability of the NHPT in patients with unilateral CP is unknown. This study aimed to analyze the intra-rater inter-session reliability of the NHPT in unilateral spastic CP, for its use in clinical practice and research. A total of 27 participants with spastic unilateral CP

were included. Reliability was verified by the intraclass correlation coefficient (ICC), standard error of measurement, and minimum detectable change. The agreement was analyzed by the Bland-Altman method. An excellent intra-rater reliability was observed for the non-affected side (ICC = 0.94) and the affected side (ICC = 0.96). The minimal detectable change was 4 and 12 s for the non-affected and affected side, respectively. There were no significant biases between repetitions. Conclusions: The NHPT showed excellent intra-rater inter-session reliability in patients with spastic unilateral CP. In addition, the test shows adequate agreement and proportionally small errors to assess manual dexterity. What is Known: • The Nine Hole Peg Test (NHPT) is widely used to assess dexterity in patients with neurological conditions. • The NHPT has demonstrated appropriate measurement properties in healthy children and adults with neurological conditions. What is New: • The NHPT presents excellent reliability, small measurement errors, and adequate agreement for the assessment of patients with cerebral palsy. • The measurement error of the NHPT in unilateral cerebral palsy may be up to 13% of the total time to perform it.

PMID: [35212827](#)

3. Long-Term Evolution of the Hip and Proximal Femur after Hip Reconstruction in Non-Ambulatory Children with Cerebral Palsy: A Retrospective Radiographic Review

Norine Ma, Peter Tischhauser, Carlo Camathias, Reinald Brunner, Erich Rutz

Children (Basel). 2022 Jan 28;9(2):164. doi: 10.3390/children9020164.

Background: Hip displacement in children with cerebral palsy (CP) has a higher prevalence in non-ambulatory children. Progression can lead to pain, pelvic obliquity and difficulty with sitting. This can be addressed with hip reconstruction. Our study aims to report the long-term radiological outcomes after hip reconstruction, in particular the evolution of femoral head deformity. Methods: A total of 58 hips of non-ambulatory children with CP were evaluated retrospectively using pre-operative, early (median 120 days) and late post-operative (median 8.6 years) anteroposterior standardised radiographs. All the hips were treated with femoral shortening varus derotation osteotomy (VDRO), pelvic osteotomy and an open reduction, if indicated. The radiographical indices measured included the migration percentage (MP), sharp angle, acetabular index, centre-edge angle, neck shaft angle, head shaft angle, pelvic obliquity, femoral head sphericity, femoral head deformity (FHD) and growth plate orientation. Results: Improvements in hip congruency and morphology were evident after reconstructive hip surgery. These were maintained at the late post-operative time point. Median MP improved from 56% (IQR 46-85%) to 0% (IQR 0-15%) at early follow-up. This increased to 12% (IQR 0-20%) at late follow-up. Pre-operatively, FHDs of 14 hips (24%) were classified as grade A (spherical femoral head). This increased to 22 hips (38%) at early follow-up and increased further to 44 hips (76%) at late follow-up. Conclusions: Our study shows that hip reconstruction reduces hip displacement in the long term, indicated by decreased post-operative MP maintained at long-term follow-up. Although non-ambulatory children lack weight-bearing forces promoting bone remodelling, improved femoral head morphology after surgery alters the forces between the acetabulum and the femoral head. Mild femoral head deformity (grades A and B) remained stable and even improved after surgery, postulated to be due to severe osteoporosis allowing remodelling.

PMID: [35204886](#)

4. Cerebral palsy diagnosis and the impact on hip surveillance enrollment

Jaimy Coates, Kishore Mulpuri, Jennifer Farr, Stacey D Miller

Dev Med Child Neurol. 2022 Feb 25. doi: 10.1111/dmcn.15188. Online ahead of print.

Aim: To investigate the diagnosis at enrollment in the Child Health British Columbia Hip Surveillance Program for Children with Cerebral Palsy (CP) and review the etiologies of children enrolled without a CP diagnosis. Method: Data from 959 children (543 males, 416 females; mean [SD] age at enrollment 6 years 8 months [4 years 2 months]) enrolled in the program between September 2015 and December 2019 were retrospectively reviewed. Enrollment diagnosis, Gross Motor Function Classification System level, migration percentage, and age at enrollment were included. Chart reviews were completed to confirm diagnoses for all children. Etiologies were compared to a list of conditions that are included and excluded from CP registries. Results: Diagnosis at enrollment was CP for 612 (64%), possible CP for 120 (13%), and 'other' for 220 (23%). No diagnosis was provided for seven (<1%). CP was confirmed for 700 (73%), including 106 (11.1%) enrolled as 'possible CP' or 'other'; 56 (5.8%) did not have CP due to progressive conditions. Migration percentage was similar across all groups at enrollment. Interpretation: One in four children were enrolled in hip surveillance without a diagnosis of CP or possible CP. Encouraging participation in hip surveillance when children meet the clinical criteria for CP but do not have a confirmed CP diagnosis can improve access to care.

PMID: [35213730](#)

5. Management of abnormal muscle tone: neurosurgical procedures to reduce spasticity: Cerebral palsy in adults
National Guideline Alliance (UK)

London: National Institute for Health and Care Excellence (NICE); 2019 Jan. NICE Evidence Reviews Collection.

When aggravating factors are removed and enteral or intramuscular pharmacological agents have been tried to their maximum tolerated dosage, neurosurgical interventions, such as intrathecal baclofen therapy and selective dorsal rhizotomy, are available for spasticity management. Both procedures require anaesthetic, and have surgical and recovery risks. However, they also have the potential to reduce spasticity and pain and improve quality of life. The aim of this review question is to examine the effectiveness of these interventions, taking into account the burden of having surgery, follow up and potential adverse events, as well as patient and carer experience.

PMID: [35192280](#)

6. Management of abnormal muscle tone: pharmacological treatments for spasticity: Cerebral palsy in adults
National Guideline Alliance (UK)

London: National Institute for Health and Care Excellence (NICE); 2019 Jan. NICE Evidence Reviews Collection.

Spasticity is a dynamic increase in the tone of muscles, causing muscles to spasm, or to be tight, and is experienced by some adults with cerebral palsy. Spasticity can limit a person's movement, function and quality of life. When factors that aggravate spasticity have been removed, enteral or intramuscular agents are available to treat the remaining spasticity. The aim of this review is to evaluate the effectiveness of pharmacological treatments for spasticity.

PMID: [35192276](#)

7. Management of abnormal muscle tone: treatments to reduce dystonia: Cerebral palsy in adults
National Guideline Alliance (UK)

London: National Institute for Health and Care Excellence (NICE); 2019 Jan. NICE Evidence Reviews Collection.

Dystonia is a pattern of sustained disturbed muscle contraction causing abnormal posture and frequent involuntary movements in some adults with cerebral palsy. There can be environmental, physical or psychological factors that aggravate dystonia and once they have been removed there are enteral and intramuscular pharmacological agents that can be used to manage dystonia. Neurosurgical procedures, such as intrathecal baclofen therapy, and in severe intractable cases Deep Brain Stimulation (DBS) are currently available options. Both procedures require anaesthetic, and have surgical, recovery and long-term risks. This review question examines the effectiveness of these interventions, including patient experience and quality of life and in the case of DBS the potential complications of brain surgery as well as on-going maintenance costs.

PMID: [35192275](#)

8. Enhanced recovery after surgery in pediatric cerebral palsy patients undergoing bilateral lower extremity orthopedic surgery: A pilot study

Nichole M Doyle, Kathryn Keeler, Todd A Glenski, Ezra Goodrich, Marisha Madhira

Paediatr Anaesth. 2022 Feb 24. doi: 10.1111/pan.14348. Online ahead of print.

No abstract available

PMID: [35212080](#)

9. Atypical triceps surae force and work patterns underlying gait in children with cerebral palsy

Anahid Ebrahimi, Michael H Schwartz, Jack A Martin, Tom F Novacheck, Darryl G Thelen

J Orthop Res. 2022 Feb 25. doi: 10.1002/jor.25307. Online ahead of print.

The purpose of this study was to quantitatively assess Achilles tendon mechanical behavior during gait in children with cerebral palsy (CP). We used a newly designed non-invasive sensor to measure Achilles tendon force in 11 children with CP (4F, 8-16 years old) and 15 typically developing children (controls) (9F, 8-17 years old) during overground walking. Mechanical work-loop plots (force-displacement plots) were generated by combining muscle-tendon kinetics, kinematics, and EMG activity to evaluate the Achilles tendon work generated about the ankle. Work loops patterns in children with CP were substantially different than those seen in controls. Notably, children with CP showed significantly diminished work production at their preferred speed compared to controls at their preferred speed and slower speeds. Despite testing a heterogeneous population of children with CP, we observed a homogenous spring-like muscle-tendon behavior in these participants. This is in contrast with control participants who used their plantar flexors like a motor during gait. Statement of Clinical Significance: These data demonstrate the potential for using skin-mounted sensors to objectively evaluate muscle contributions to work production in pathological gait. This article is protected by copyright. All rights reserved.

PMID: [35212418](#)

10. Instrumented Gait Analysis (IGA) for Management of Children With Cerebral Palsy: A Needs Assessment Survey

Ellen M Godwin, Yasser Salem, Rebecca A States, Joseph J Krzak, Mark McMulkin, Amy Bodkin-Winter

Pediatr Phys Ther. 2022 Feb 18. doi: 10.1097/PEP.0000000000000876. Online ahead of print.

Purpose: This needs assessment survey identifies the priorities of the clinical and research communities involved with the use of instrumented gait analysis (IGA) for a clinical practice guideline on IGA use with children with cerebral palsy (CP). Methods: Thirteen Likert scale questions asked about the importance of topics related to IGA. Other questions addressed respondents' demographics, experience with IGA, patient populations, and gait laboratory characteristics. Several open-ended questions were included and analyzed. Results: The survey was completed by 43 physical therapists and 53 non-physical therapists involved with IGA. More than 90% rated the following as critically or highly important: reliability and validity of IGA to identify gait pathology (94%); ability to longitudinally track gait pathology (93%); use in planning interventions (93%); use in evaluating outcomes (93%); and definition of IGA (90%). Conclusions and recommendations for clinical practice: This needs assessment survey identified the topic priorities of clinicians and practitioners who use IGA for the management of children with CP. These results will guide the development of a clinical practice guideline on the use of IGA for the management of CP.

PMID: [35184074](#)

11. Inter- and intra-rater reliability of the modified modified ashworth scale in the assessment of muscle spasticity in cerebral palsy: A preliminary study

Noureddin Nakhostin Ansari, Maryam Rahimi, Soofia Naghdi, Zahra Barzegar-Ganji, Scott Hasson, Ehsan Moghimi

J Pediatr Rehabil Med. 2022 Feb 21. doi: 10.3233/PRM-190648. Online ahead of print.

Purpose: The aim of the study was to investigate the inter- and intra-rater reliability of the Modified Modified Ashworth Scale (MMAS) in the assessment of lower extremity spasticity in children with spastic cerebral palsy (CP). Methods: Fifteen children (10 boys) with a mean age of 8.7 ± 3.4 years participated. Two physiotherapists rated the spasticity of the hip adductors, knee extensors, and ankle plantar flexors for inter-rater reliability. Each child was examined again by one of the physiotherapists (same physiotherapist for all of the children) for intra-rater reliability (mean interval = 7 days). A random sequence of raters and muscles tested was applied. Results: The reliability of the intraclass correlation coefficients (ICC) for individual muscle groups ranged between good to excellent (ICC agreement of 0.60-0.83). The ICC values for overall inter-rater (ICC agreement = 0.82) and intra-rater reliability (ICC agreement = 0.85) were excellent. Conclusion: The MMAS showed excellent reliability for the assessment of lower extremity muscle spasticity in children with cerebral palsy. However, an interpretation should be made with caution due to the small sample size and wide range of confidence interval values.

PMID: [35213334](#)

12. The Short-term Effects of Hippotherapy and Therapeutic Horseback Riding on Spasticity in Children With Cerebral Palsy: A Meta-analysis

Cheolhwan Hyun, Kyungmin Kim, Soolim Lee, Nayeon Ko, In-Sik Lee, Seong-Eun Koh

Pediatr Phys Ther. 2022 Feb 18. doi: 10.1097/PEP.0000000000000880. Online ahead of print.

Purpose: We systematically reviewed the short-term effects of hippotherapy and therapeutic horseback riding (THR) on lower-limb muscle spasticity in children with cerebral palsy (CP). **Methods:** PubMed, EMBASE, Cochrane Library, and Google Scholar databases were searched for relevant quantitative studies. Treatment effects were coded using the Ashworth scale (AS) or modified Ashworth scale (MAS) in pre- and posttreatment evaluations. Of the 73 studies identified initially, 7 met the inclusion criteria. **Results:** Treatment was associated with positive effects on lower-limb muscle spasticity, as supported by the AS or MAS scores. However, repeated trials did not show a statistically significant difference from a single trial ($Q = 2.95$, $P = .086$). **Conclusion:** Hippotherapy and THR can be used to treat lower-limb muscle spasticity in children with CP. However, repeated sessions did not show a better effect in reducing spasticity. **What this adds to the evidence:** This is the first meta-analysis to confirm that hippotherapy or THR can reduce lower-limb muscle spasticity in children with CP in the short term, but long-term effects on function still require further studies.

PMID: [35184078](#)

13. Estimation of Gross Motor Functions in Children with Cerebral Palsy Using Zebris FDM-T Treadmill

Mariusz Bedla, Paweł Pięta, Daniel Kaczmarski, Stanisław Deniziak

J Clin Med. 2022 Feb 12;11(4):954. doi: 10.3390/jcm11040954.

A standardized observational instrument designed to measure change in gross motor function over time in children with cerebral palsy is the Gross Motor Function Measure (GMFM). The process of evaluating a value for the GMFM index can be time consuming. It typically takes 45 to 60 min for the patient to complete all tasks, sometimes in two or more sessions. The diagnostic procedure requires trained and specialized therapists. The paper presents the estimation of the GMFM measure for patients with cerebral palsy based on the results of the Zebris FDM-T treadmill. For this purpose, the regression analysis was used. Estimations based on the Generalized Linear Regression were assessed using different error metrics. The results obtained showed that the GMFM score can be estimated with acceptable accuracy. Because the Zebris FDM-T is a widely used device in gait rehabilitation, our method has the potential to be widely adopted for objective diagnostics of children with cerebral palsy.

PMID: [35207227](#)

14. Interventions that improve function and participation: physical function: Cerebral palsy in adults

National Guideline Alliance (UK)

London: National Institute for Health and Care Excellence (NICE); 2019 Jan. NICE Evidence Reviews Collection.

Physical function and mobility can be reduced in adults with cerebral palsy due to a number of factors. These include musculo-skeletal weakness, disorders of tone, development of contracture and deformity as well as cognition and mood. Maintenance of strength and range of movement is therefore important. Current practice is based on physiotherapy such as stretching and occupational therapy, rehab engineering, and orthotics. This review question aims to look at the efficacy and cost of available interventions.

PMID: [35192279](#)

15. ASSOCIATION BETWEEN DAILY PHYSICAL ACTIVITY AND CLINICAL ANTHROPOMORPHIC MEASURES IN ADULTS WITH CEREBRAL PALSY

Stephen Leb, Christina Marciniak, Deborah Gaebler-Spira, Liqi Chen, Ariane Garrett

Arch Phys Med Rehabil. 2022 Feb 21;S0003-9993(22)00208-8. doi: 10.1016/j.apmr.2022.01.150. Online ahead of print.

Objective: To describe the relationship between activity level and cardiovascular risk measures as well as describe general activity patterns of adults with cerebral palsy **Design:** Cross-Sectional **Setting:** Academic Outpatient Rehabilitation Clinic. **Participants:** 47 adults with cerebral palsy (CP) **Interventions:** Not applicable **Main Outcome Measures:** Gross Motor Functional Classification System (GMFCS) level was determined by validated self-report questionnaire. Activity (daily step count, walk time, sitting time, standing time, and transitional movements) over 6 days recorded using an activPAL. **Weight,**

body mass index (BMI), and waist to hip ratio (WHR) were measured. Bivariate relationships between anthropomorphic and activity measures were assessed. Results: 38 participants completed all measurements. Nine were excluded due to incomplete activPAL data. The median age was 28.50 years [interquartile range 24.25,47.00], range 18-77 years. Participants' GMFCS levels were I:13%, II:16%, III:21%, IV:34%, and V:16%. Median steps/day for GMFCS I/II participants were 5258.3[3606.8, 6634.7], while median steps/day were 1681.3 [657.2, 2751.8] and 30.0 [6.8, 54.2] for GMFCS level III and IV/V participants, respectively. Significantly greater steps/day were found for GMFCS I/II or III participants compared to those GMFCS IV/V ($p<0.001$ and $p=0.0074$, respectively). 60.5% of the subjects had a BMI in the normal range, 10.5% were obese, 23.6% were overweight, and 5.3% were underweight. For subjects with GMFCS I/II, the Spearman's rank correlation coefficient for time standing and waist circumference was -0.73 (0.01). Subjects GMFCS III and GMFCS IV/V had respective correlations of -0.16 (0.71) and -0.01 (0.98). For subjects with GMFCS I/II, the Spearman's rank correlation coefficient for standing time and BMI was -0.55 ($p=0.08$). For the GMFCS III and GMFCS IV/V groups the respective correlation was -0.19 (0.67) and 0.00 (1.00). Conclusions: Subjects with GMFCS level I or II who engaged in more activity tended to have more favorable anthropometric profiles. Subjects GMFCS III, IV, or V did not have a similar trend. Our findings suggest factors beyond activity patterns affect anthropometrics to a greater degree in those with higher GMFCS levels.

PMID: [35202580](#)

16. Hammersmith Infant Neurological Examination in infants born at term: Predicting outcomes other than cerebral palsy

Domenico M Romeo, Frances M Cowan, Leena Haataja, Daniela Ricci, Elisa Pede, Francesca Gallini, Francesco Cota, Claudia Brogna, Mario G Romeo, Giovanni Vento, Eugenio Mercuri

Dev Med Child Neurol. 2022 Feb 24. doi: 10.1111/dmcn.15191. Online ahead of print.

Aim: We explored the ability of the Hammersmith Infant Neurological Examination (HINE) to identify cognitive performance delay at 2 years in a large cohort of infants born at term. **Method:** We conducted a retrospective study of infants born at term at risk of neurodevelopmental impairments assessed using the HINE between 3 and 12 months post-term age and compared them with a cohort of typically developing infants born at term. All infants performed a neurodevelopmental assessment at 2 years of age using the Mental Development Index (MDI) of the Bayley Scales of Infant Development, Second Edition; the presence of cerebral palsy (CP) was also reported. The infants were classified as being cognitively normal/mildly delayed or significantly delayed ($MDI < 70$). The predictive validity of HINE scores for significantly delayed cognitive performance, in infants with and without CP, was calculated using specific cut-off scores according to age at assessment. **Results:** A total of 446 at-risk and 235 typically developing infants (345 males, 336 females; mean [SD] gestational age 38.7 weeks [1.4], range 25-36 weeks) were included. Of the at-risk infants, 408 did not have CP at 2 years; 243 had a normal/mild delayed MDI and 165 had an MDI less than 70. Of the at-risk infants, 38 developed CP. HINE scores showed a good sensitivity and specificity, mainly after 3 months, for identifying significantly delayed cognitive performance in infants without CP. In those with CP, the score was associated with their cognitive performance. The comparison group had the highest HINE scores. **Interpretation:** The HINE provides evidence about the risk of delayed cognitive performance at age 2 years in infants born at term with and without CP.

PMID: [35201619](#)

17. Cost-effectiveness of cervical length screening and progesterone treatment to prevent spontaneous preterm delivery in Sweden

T Wikström, P Kuusela, B Jacobsson, H Hagberg, P Lindgren, M Svensson, U Britt Wennerholm, L Valentin

Ultrasound Obstet Gynecol. 2022 Feb 23. doi: 10.1002/uog.24884. Online ahead of print.

Objective: The aim is to estimate the cost-effectiveness of strategies to prevent spontaneous preterm delivery (PTD) in asymptomatic singleton pregnancies, using prevalence and health care cost data from a Swedish health care context. **Methods:** We designed a decision analytic model based on the Swedish CERVIX-study to estimate the cost-effectiveness of strategies to prevent spontaneous preterm delivery in asymptomatic women with a singleton pregnancy. The model was constructed as a combined decision-tree and a Markov model with the time horizon of 100 years. Four strategies (universal screening, low-risk based screening, risk based screening and nullipara screening) include second trimester cervical length screening with transvaginal ultrasound followed by vaginal progesterone treatment in case of short cervix. A fifth preventive strategy means vaginal progesterone treatment of women with previous spontaneous PTD but no cervical length screening (Treat high-risk no screening). For comparison, we use a sixth strategy implying no specific intervention to prevent spontaneous PTD, reflecting the current situation in Sweden (No screening). Probabilities for short cervix (≤ 25 mm, base-case) and for spontaneous PTD at $<33+0$ weeks and at $33+0$ to $36+6$ weeks were derived from the CERVIX-study, and probabilities for stillbirth, neonatal mortality and long-term morbidity (cerebral palsy) from Swedish health data registers. Costs are based on Swedish data, except costs for cerebral palsy, which are based on Danish data. We assumed vaginal progesterone to reduce spontaneous PTD at <33

weeks with 30% and spontaneous PTD at 33 to 36 weeks by 10% (information from the literature). All analyses are from a societal perspective. We express the effectiveness of each strategy as gained quality adjusted life years (QALYs) and present cost-effectiveness as average and incremental cost-effectiveness ratios (ACER; average cost per gained QALY compared to No screening, ICER; the difference in costs divided by the difference in QALYs for each of two strategies being compared). We performed deterministic and probabilistic sensitivity analyses. The results of the latter are shown as cost-effectiveness acceptability curves. Willingness-to-pay was set at maximum 500 000 Swedish krona (56 000 US Dollars) as suggested by the Swedish National Board of Health and Welfare. Results: All interventions gave better health outcomes than No screening. The best strategy in terms of improved health outcomes was Low-risk based screening (i.e. treat women with previous spontaneous PTD, screen remaining women), irrespective of whether screening was performed at 18+0 to 20+6 weeks (Cx1) or at 21+0 to 23+6 weeks (Cx2). Low-risk based screening at Cx1 was cost-effective, while Low-risk based screening at Cx2 entailed high costs compared to other alternatives. The ACERs were 2200 USD for Low-risk based screening at Cx1 and 36 800 USD for Low-risk based screening at Cx2. Cost-effectiveness was particularly sensitive to progesterone effectiveness and to productivity-loss due to sick-leave during pregnancy. The probability that Low-risk based screening is cost-effective at Cx1 compared to No screening is 72%. Conclusion: Interventions to prevent spontaneous PTD, including cervical length screening with progesterone treatment, may be cost-effective in Sweden. This article is protected by copyright. All rights reserved.

PMID: [35195310](#)

18. Identifying pain, such as musculoskeletal and gastrointestinal pain: Cerebral palsy in adults

National Guideline Alliance (UK)

London: National Institute for Health and Care Excellence (NICE); 2019 Jan. NICE Evidence Reviews Collection.

Adults with cerebral palsy may experience pain due to a number of common co-morbidities such as musculo-skeletal and gastro-intestinal problems. In addition adults with cerebral palsy may not be able to communicate their pain and may instead demonstrate pain through changes in behaviours. This review question looks at the available evidence on how to identify the presence, site and severity of pain in adults with cerebral palsy.

PMID: [35192268](#)

19. Assessing and monitoring complications and comorbidities: mental health problems: Cerebral palsy in adults

National Guideline Alliance (UK)

London: National Institute for Health and Care Excellence (NICE); 2019 Jan. NICE Evidence Reviews Collection.

Adults with cerebral palsy may experience mental health issues, such as anxiety and depression more frequently than the wider population. Learning and communication difficulties can also lead to specific emotions and behaviours that require specialist understanding and input. As part of this they may also experience barriers to accessing support for their problems. This question reviews the evidence for the assessment and monitoring of these mental health problems.

PMID: [35192267](#)

20. Identifying and managing respiratory disorders associated with cerebral palsy: assisted ventilation: Cerebral palsy in adults

National Guideline Alliance (UK)

London: National Institute for Health and Care Excellence (NICE); 2019 Jan. NICE Evidence Reviews Collection.

Conservative treatment for chronic respiratory disorders aims to ensure adequate supply of oxygenation. This is commonly achieved through treatment with bronchodilators, corticosteroids, and controlled oxygen. People who do not respond to such interventions receive ventilation. If ventilation involves any instrument that is inserted in the trachea through the mouth, such as an endotracheal tube, it is referred to as invasive assisted ventilation. This may be associated with adverse events such as tissue damage and infections. In non-invasive ventilation the patient receives air or a mixture of air and oxygen from a flow generator through a full facial or nasal mask which is a less invasive method of supplying sufficient oxygen to the body with potentially fewer adverse events. This evidence review sets out to investigate the effectiveness of assisted ventilation for adults with cerebral palsy who have a chronic respiratory disorder.

PMID: [35192269](#)

21. Identifying and managing respiratory disorders associated with cerebral palsy: protocols for monitoring respiratory health: Cerebral palsy in adults

National Guideline Alliance (UK)

London: National Institute for Health and Care Excellence (NICE); 2019 Jan. NICE Evidence Reviews Collection.

Adults with cerebral palsy are at increased risk of respiratory health problems. This may be due to a variety of co-morbidities, including gastro-oesophageal reflux, aspiration of feed or secretions, reduced functional lung volume, muscle tone in the form of respiratory muscle weakness and some side effects of regularly used medication. Identifying adults with these risks and re-appraising risk may help prevent infection, and delay respiratory failure. This review question looks at the evidence of clinical and cost effectiveness for methods of identification and monitoring respiratory disorders.

PMID: [35192270](#)

22. Identifying and managing respiratory disorders associated with cerebral palsy: prophylactic treatments: Cerebral palsy in adults

National Guideline Alliance (UK)

London: National Institute for Health and Care Excellence (NICE); 2019 Jan. NICE Evidence Reviews Collection.

Prophylactic or preventative treatments such as posture management, respiratory physiotherapy, cough assist devices, non-invasive ventilation; as well as background medications for gastro-oesophageal reflux, mucolytics and antibiotics can be used to prevent respiratory infections. This question looks at the evidence and cost-effectiveness of these interventions in adults with cerebral palsy.

PMID: [35192278](#)

23. Assessing and monitoring complications and comorbidities: Disorders of bones and joints: Cerebral palsy in adults

National Guideline Alliance (UK)

London: National Institute for Health and Care Excellence (NICE); 2019 Jan. NICE Evidence Reviews Collection.

Adults with cerebral palsy can experience more bone and joint problems due to the effects of the movement disorder (weakness, spasticity and dystonia) and some of the treatments they receive, for example those who are less mobile, or on anticonvulsants, may also have loss of bone mineral density. This review question aims to look at how these problems with joints and bone should be assessed and monitored in adults with cerebral palsy.

PMID: [35192277](#)

24. Assessing and monitoring complications and comorbidities: feeding and nutritional problems: Cerebral palsy in adults

National Guideline Alliance (UK)

London: National Institute for Health and Care Excellence (NICE); 2019 Jan. NICE Evidence Reviews Collection.

Adults with cerebral palsy may experience problems with eating or feeding due to a number of co-morbidities. Difficulties with weakness, hand-eye co-ordination, muscle tone, gastro-oesophageal reflux, medications, positioning, carer training and behaviour can all lead to nutritional concerns and there may even be a need for enteral feeding tubes. This review question looks at the evidence available on effective ways of assessment and monitoring of feeding and nutrition.

PMID: [35192274](#)

25. Effects of Stochastic Resonance Stimulation on Manual Function in Children with Hemiplegic Cerebral Palsy: A Pilot Clinical Trial

Jessica Lynn, Allison Wolf, Travis Bridges, Zachary Pottanat, Suzanne Spivey, Olivier Rolin

PM R. 2022 Feb 20. doi: 10.1002/pmrj.12788. Online ahead of print.

Objective: To investigate the effect of stochastic resonance stimulation (SRS) on manual abilities in children with Hemiplegic Cerebral Palsy **DESIGN:** This pilot study is a randomized, sham-controlled, one-period, crossover trial. **Setting:** A neuroscience clinic with specialty therapy programs at an urban, university-based Children's Hospital. **Participants:** Sixteen children aged 3-16 years who were diagnosed with hemiplegic cerebral palsy and had hand Manual Abilities Classification scale score of I - III with sufficient cognitive abilities to follow instructions. **Interventions:** Children donned wrist and arm bands that delivered SRS via embedded piezoelectric actuators in two randomly assigned conditions: sham (devices powered off) and subthreshold stimulation (SBT-SRS). Following the randomized protocol, a subset of participants also completed an open-label, above-threshold stimulation (AT-SRS) condition. Children carried out the same unimanual and bimanual tasks during the randomized and open-label protocols; all data were collected in a single session. **Main outcome measure(s):** Box and Blocks (B&B) test, a unimanual function test, and the Shriners Upper Extremity Evaluation (SHUEE). The SHUEE was video recorded and scored by two raters blinded to experimental condition. **Results:** Thirteen children completed the B&B task and fourteen children completed the SHUEE. Children in the SBT-SRS condition relative to sham condition moved an average of 1.77 more blocks in one minute ($p = 0.08$); scored an average of 3 points higher on SHUEE spontaneous functional analysis ($p < 0.002$); and scored an average of 2.7 points higher on SHUEE dynamic positional analysis ($p = 0.20$). In the open label protocol, children in the AT-SRS condition relative to sham moved 3.9 more blocks than in the sham condition ($n=8$, $p < 0.001$); scored an average of 4.5 points higher on SHUEE spontaneous functional analysis ($n=6$, $p = 0.08$); and scored an average of 10.5 points higher on SHUEE dynamic positional analysis ($n=6$, $p = 0.01$). **Conclusion(s):** In this pilot study, we found preliminary evidence that children with hemiplegic CP demonstrated improved unimanual abilities and increased function of the impaired hand on bimanual tasks when receiving a single session of sub-threshold SRS. Preliminary evidence also suggests that some children with hemiplegic CP may improve more when receiving a single session of above-threshold SRS. Future research using larger, controlled studies should evaluate the optimal intensity, duration, and long-term effect of SRS for improving impaired manual abilities. This article is protected by copyright. All rights reserved.

PMID: [35187840](#)

26. Interventions that improve function and participation: vocational and independent living skills: Cerebral palsy in adults

National Guideline Alliance (UK)

London: National Institute for Health and Care Excellence (NICE); 2019 Jan. NICE Evidence Reviews Collection.

Recreational, educational and vocational participation in society can be reduced in adults with cerebral palsy due to physical, cognitive and emotional disabilities that require interventions to optimise function. Barriers to participation can be environmental, financial, cultural, systemic and institutional. This review question seeks to look at what therapeutic interventions for the individual, based on their abilities and aspirations, improve participation.

PMID: [35192272](#)

27. Interventions that improve function and participation: communication: Cerebral palsy in adults

National Guideline Alliance (UK)

London: National Institute for Health and Care Excellence (NICE); 2019 Jan. NICE Evidence Reviews Collection.

Adults with cerebral palsy can have communication difficulties due to their underlying motor disorder, learning difficulties and problems with medication and equipment. In current practice speech and language therapy assessment is used to identify interventions including alternative augmentative communication systems that can be used to assist communication. The effectiveness of these interventions is analysed in this review question.

PMID: [35192273](#)

28. Interventions that improve function and participation: electronic assistive technology: Cerebral palsy in adults
National Guideline Alliance (UK)

London: National Institute for Health and Care Excellence (NICE); 2019 Jan. NICE Evidence Reviews Collection.

Electronic assistive technology can be used by adults with cerebral palsy to improve choice and independence. This is achieved through a wide variety of different methods and devices to facilitate environmental control (for example eye gaze technology, switches and computer access). In this review question the effectiveness and cost of the available technology in promoting independence is assessed.

PMID: [35192281](#)

29. Prognosis of 22- and 23-gestational-week-old infants at our facility: A retrospective cohort study
Toshimitsu Yanagisawa, Tomohiko Nakamura, Masayo Kokubo

Am J Perinatol. 2022 Feb 22. doi: 10.1055/a-1779-4032. Online ahead of print.

Objective This study aimed to compare inborn infants aged 22 and 23 gestational weeks at our hospital to assess for differences in survival and long-term prognosis. **Study Design** We retrospectively analyzed infants aged 22 and 23 gestational weeks born in our hospital between January 2011 and December 2018. The prognosis of inborn infants in Japan was also calculated using the Neonatal Research Network of Japan (NRNj) data during the same period. **Results** The survival rates at our institution's neonatal intensive care unit discharge, including stillbirth, were 72% and 89% at 22 and 23 gestational weeks, respectively. The mortality rate and neurodevelopmental impairment (NDI) rate at 3 years of age, including stillbirth, were 58% and 32% at 22 and 23 weeks, respectively. Cerebral palsy, mental developmental retardation, visual impairment, and hearing impairment defined NDI. The prognosis at our hospital was better than the average calculated using NRNj data. Survival rates varied among facilities, and some facilities had survival rates similar to that of our hospital. **Conclusion** The prognosis of inborn infants at 22 gestational weeks old was inferior to that of those at 23 gestational weeks old in our institution but was better than previously reported. If aggressive treatment is provided, survival without sequelae can be fully expected even for those at 22 gestational weeks old.

PMID: [35193151](#)

30. Children with severe disabilities: adaptation, virtual education, and prospects. Experiences of three Peruvian mothers, COVID-19 context

Pilar Maria Gamarra Choque, Edith Gissela Rivera Arellano, Enaidy Reynosa Navarro, Juan Méndez Vergaray, Yolanda Josefina Huayta-Franco, Melissa Fatima Muñante Toledo

J Med Life. 2022 Jan;15(1):43-51. doi: 10.25122/jml-2021-0330.

This study aimed to reveal and investigate mothers' experiences of students with severe disabilities regarding learning in distance education in Lima-Peru. This is a phenomenological study focused on understanding the world of mothers regarding the education of their children with severe disabilities. Their discourse focused on four categories: being the mother of a child with severe disability, pandemic category, virtual education, and family prospects. The participants were three mothers of children with Down Syndrome, Autism Spectrum Disorder, and Cerebral Palsy. An in-depth interview structured in 26 questions was used, applied face to face. With distance education, the mothers consider that their children's abilities and skills have assumed a leading role, developed creativity, and employed various strategies to comply with school activities. In addition, it also strengthened their family ties despite the pandemic.

PMID: [35186135](#)

31. Intra- and Interrater Reliability of the Spanish Version of the Gross Motor Function Measure (GMFM-SP-88)
Marina Ferre-Fernández, María Antonia Murcia-González, José Ríos-Díaz

Pediatr Phys Ther. 2022 Feb 18. doi: 10.1097/PEP.0000000000000874. Online ahead of print.

Purpose: To assess intra- and interrater reliability of the Spanish version of the 88-item Gross Motor Function Measure (GMFM-SP-88), and its correlation to age and severity of children with cerebral palsy. **Methods:** Six raters assessed 50 videotapes and 4 viewed 50 recordings to determine intra- and interrater reliability, respectively. Intraclass correlation coefficients (ICCs), standard error of measurement (SEM), smallest real difference (SRD), and limits of agreement (LoA) were calculated. **Results:** Intra- and interrater reliability were excellent for both total (ICC_{2,1} = 1.00, 95% confidence interval [CI] 0.99-1.00) and dimension scores (ICC_{2,1} = 0.99, 95% CI 0.99-1.00). The SEM and the SRD for the total score were acceptable (1.60 and 3.14, respectively). The average differences in dimension scores were below 1 and 0.1 points (95% LoA: -1.65 to 1.94, -1.06 to 0.86 for intra- and interrater reliability, respectively). **Conclusions:** The results support the potential use of the GMFM-SP-88 as a reliable tool, having correlation with age and severity. What this adds to the evidence: The GMFM-SP-88 is a reliable outcome measure to assess gross motor function in cerebral palsy. The GMFM-SP is the only tool available in Spanish to assess gross motor function in children and adolescents with cerebral palsy. The GMFM-SP-88 is a valuable resource for both Spanish physical therapists and researchers.

PMID: [35184079](#)

32. A Social Business Model of Early Intervention and Rehabilitation for People with Disability in Rural Bangladesh

Mahmudul Hassan Al Imam, Manik Chandra Das, Israt Jahan, Mohammad Muhit, Delwar Akbar, Nadia Badawi, Gulam Khandaker

Brain Sci. 2022 Feb 14;12(2):264. doi: 10.3390/brainsci12020264.

Background: Despite the high burden of childhood disability in low- and middle-income countries (LMICs), the opportunity for early intervention and rehabilitation is very limited. Studies have found that community-based rehabilitation service is effective for children with cerebral palsy (CP); however, such services are not readily available in LMICs, and services run by non-profit organisations on external funding are often not sustainable. In this study, we report the lesson learnt in establishing a social business model of early intervention and rehabilitation services for children with CP and adults with disabilities in a rural subdistrict of Bangladesh. **Methods:** Case study of a rural early intervention and rehabilitation centre (i.e., the model centre) implemented between May 2018 and September 2019. An economic evaluation incorporating gross margin analysis along with descriptive statistics was performed to assess the social business potentials of the model centre. **Results:** The establishment of this model centre cost ~5955 USD with an average monthly running cost of ~994 USD. During the 17 months study period, 7038 therapy sessions (average eight sessions per patient) were offered to 862 patients with musculoskeletal and neurological disorders. The most common clinical presentations were low back pain (35.6%; n = 307). Six percent (n = 52) of the attendees were children with CP (mean (SD) age 6.3 (4.0) years; 35.7% (n = 19) were female), who received 1392 sessions, on average 27 sessions per child. The centre reached the break-even point at the 13th month and remained profitable for the next 4 months of the study period. An average session fee of 2.2 USD resulted in a gross margin of -1458 USD and 1940 USD in 2018 and 2019, respectively. Revenue to cost ratios for the 2 years were 0.27:1 and 0.51:1 while average rates of return were -41.4% and 10.1%, respectively. Sensitivity analysis revealed that session numbers including 5000, 6000, 7000, 8000, 9000, and 10,000 were required to break even at the session fees of 3.0, 2.50, 2.0, 2.0, 1.5, and 1.5 USD, respectively. **Conclusion:** Our social business model of an early intervention and rehabilitation service provides evidence of enhancing access to services for children with CP as well as adults with disabilities while ensuring the sustainability of the services in rural Bangladesh.

PMID: [35204026](#)

33. Extreme prematurity: Risk and resiliency

Genevieve L Taylor, T Michael O'Shea

Curr Probl Pediatr Adolesc Health Care. 2022 Feb 15;101132. doi: 10.1016/j.cppeds.2022.101132. Online ahead of print.

Individuals born extremely preterm (before 28 weeks of gestation) comprise only about 0.7% of births in the United States and an even lower proportion in other high resource countries. However, these individuals account for a disproportionate number of children with cerebral palsy, intellectual deficit, autism spectrum disorder, attention deficit hyperactivity disorder, and epilepsy. This review describes two large multiple center cohorts comprised of individuals born extremely preterm: the EPICURE cohort, recruited 1995 in the United Kingdom and the Republic of Ireland, and the Extremely Low Gestational Age Newborn (ELGAN), recruited 2002-2004 in five states in the United States. The primary focus of these studies has been neurodevelopmental disorders, but also of interest are growth, respiratory illness, and parent- and self-reported global health and well-being. Both of these studies indicate that among individuals born extremely preterm the risks of most neurodevelopmental disorders are increased. Early life factors that contribute to this risk include perinatal brain damage, some of which can be identified using neonatal head ultrasound, bronchopulmonary dysplasia, and neonatal systemic inflammation. Prenatal factors, particularly the family's socioeconomic position, also appear to contribute to risk. For most adverse outcomes, the risk is higher in males. Young adults born extremely preterm who have neurodevelopmental impairment, as compared to

those without such impairment, rate their quality of life lower. However, young adults born extremely preterm who do not have neurodevelopmental impairments rate their quality of life as being similar to that of young adults born at term. Finally, we summarize the current state of interventions designed to improve the life course of extremely premature infants, with particular focus on efforts to prevent premature birth and on postnatal efforts to prevent adverse neurodevelopmental outcomes.

PMID: [35181232](#)

34. Cerebral palsy and the placenta: A review of the maternal-placental-fetal origins of cerebral palsy

Eric M Chin, Nicole Gorny, Maya Logan, Alexander H Hoon

Exp Neurol. 2022 Feb 20;114021. doi: 10.1016/j.expneurol.2022.114021. Online ahead of print.

Accumulating evidence from clinical and neuropathological study has identified a number of seemingly disparate associations carrying a predisposition for cerebral palsy (CP). We narratively reviewed clinical studies reporting associations between prenatal and perinatal environmental factors and the risk of developing CP. As expected, some processes with direct central nervous system involvement (e.g. perinatal hypoxic-ischemic encephalopathy or infectious encephalomalacia) carry >10% absolute risk of CP. Other acute perinatal processes including placental abruption, uterine rupture, and neonatal sepsis are also associated with increased risk of CP but carry <3% absolute risk of CP. Indirect markers of chronic placental insufficiency such as fetal and placental growth patterns are associated with increased risk of CP, and risk of CP in infants with growth abnormalities born extremely preterm exceeds 10%. We synthesize these findings within a framework of risk accumulating across several defined pre- and perinatal developmental windows. Causal links remain incompletely understood, but genetic background, the intrauterine environment, general fetal health, and fetal neurologic health all appear to contribute.

PMID: [35196502](#)

35. Best evidence for improving function in children with cerebral palsy: Success is within reach

Michelle Jackman, Leanne Sakzewski, Catherine Morgan, Roslyn N Boyd, Sue E Brennan, Katherine Langdon, Rachel A M Toovey, Susan Greaves, Megan Thorley, Iona Novak

Dev Med Child Neurol. 2022 Feb 23. doi: 10.1111/dmcn.15186. Online ahead of print.

No abstract available

PMID: [35199337](#)

36. Quality of Life and Its Association with Level of Functioning in Young Children with Cerebral Palsy

Indar Kumar Sharawat, Prateek Kumar Panda

Neuropediatrics. 2022 Feb 23. doi: 10.1055/s-0042-1743432. Online ahead of print.

Introduction: Quality of life (QOL) in older children, adolescents, and adults with cerebral palsy (CP) is significantly impaired. Level of functioning is one of the probable determinants of impairment in QOL. However, such studies in young children with CP are scarce in the literature. **Methods:** Parents of all consecutive children aged between 1 and 4 years with a confirmed diagnosis of CP completed the Infant Toddler Quality of Life (ITQOL) questionnaire. Total and individual subdomain scores of ITQOL were examined for association with the level of functioning measured by Gross Motor Function Classification System-Expanded & Revised (GMFCS E&R), Mini-Manual Ability Classification System (Mini-MACS), Communication Function Classification System (CFCS), and Eating and Drinking Ability Classification System (EDACS), with/without adjustment to probable confounding variables. **Results:** One hundred three children with CP (74 boys, mean age: 2.6 ± 0.9 years, 49% lower and 39% middle socioeconomic status) were enrolled. All four scales (GMFCS, Mini-MACS, CFCS, and EDACS) describing levels of functioning had significant association with ITQOL total score ($\beta = -0.19, -0.15, -0.11, -0.09$, respectively), which persisted even after adjusting for confounding variables ($p = 0.004, 0.01, 0.03, \text{ and } 0.046$, respectively). Among the confounding variables, uncontrolled seizures, significant vision impairment, lower socioeconomic status, type of CP, and institution of comprehensive rehabilitation measures for ≥ 6 months had a significant association with ITQOL score ($p = 0.03, 0.04, 0.02, 0.02, \text{ and } 0.01$, respectively). **Conclusion:** Level of functioning as measured by GMFCS, Mini-MACS, EDACS, and CFCS is independent predictors of impairment in QOL in young children with CP.

PMID: [35196712](#)

37. Reduced Cross-Sectional Muscle Growth Six Months after Botulinum Toxin Type-A Injection in Children with Spastic Cerebral Palsy

Nathalie De Beukelaer, Guido Weide, Ester Huyghe, Ines Vandekerckhove, Britta Hanssen, Nicky Peeters, Julie Uytterhoeven, Jorieke Deschrevel, Karen Maes, Marlies Corvelyn, Domiziana Costamagna, Ghislaine Gayan-Ramirez, Anja Van Campenhout, Kaat Desloovere

Toxins (Basel). 2022 Feb 14;14(2):139. doi: 10.3390/toxins14020139.

Botulinum Neurotoxin type-A (BoNT-A) injections are widely used as first-line spasticity treatment in spastic cerebral palsy (SCP). Despite improved clinical outcomes, concerns regarding harmful effects on muscle morphology have been raised. Yet, the risk of initiating BoNT-A to reduce muscle growth remains unclear. This study investigated medial gastrocnemius (MG) morphological muscle growth in children with SCP (n = 26, median age of 5.2 years (3.5)), assessed by 3D-freehand ultrasound prior to and six months post-BoNT-A injections. Post-BoNT-A MG muscle growth of BoNT-A naive children (n = 11) was compared to (a) muscle growth of children who remained BoNT-A naive after six months (n = 11) and (b) post-BoNT-A follow-up data of children with a history of BoNT-A treatment (n = 15). Six months after initiating BoNT-A injection, 17% decrease in mid-belly cross-sectional area normalized to skeletal growth and 5% increase in echo-intensity were illustrated. These muscle outcomes were only significantly altered when compared with children who remained BoNT-A naive (+4% and -3%, respectively, $p < 0.01$). Muscle length growth persevered over time. This study showed reduced cross-sectional growth post-BoNT-A treatment suggesting that re-injections should be postponed at least beyond six months. Future research should extend follow-up periods investigating muscle recovery in the long-term and should include microscopic analysis.

PMID: [35202166](#)

38. Validity and Reliability of Functional Independence Measure for Children (WeeFIM) for Children With Cerebral Palsy

Goen-Woo Kim, Hyub Kim, Ju-Yeong Jeon, Jong-Sik Jang

Inquiry. Jan-Dec 2022;59:469580211072454. doi: 10.1177/00469580211072454.

Purpose: This study was conducted to verify the validity and reliability of the Functional Independence Measure for Children (WeeFIM) for children with cerebral palsy by verifying the construct validity, difficulty, suitability, and cultural differences using Rasch analysis. Methods: From May 1, 2015, to February 27, 2020, 105 children with cerebral palsy aged 6 months-95 months (7 years and 11 months old) from Hospital Y located in Korea were included. In WeeFIM, 18 items were divided into 3 areas: Self-care 8 items, Motor 5 items, and Cognition 5 items. Analysis and separation reliability were analyzed. Results: In the Self-care area, the Grooming item and in the Motor area, the Transfer (Tub, Shower) item were judged as inappropriate items, and the order of difficulty was arranged without excluding the unsuitable items. In Self-care, the most difficult item was Bathing, the easiest items were Eating and Bladder management, and the separation reliability was .87, the most difficult item in Motor was Stair, and the easiest item was Locomotion, and the separation reliability was .99. In Cognition, the most difficult item was Problem Solving, the easiest item was Communication, and the separation reliability was .95. Conclusion: The reliability and validity of WeeFIM was verified for children with cerebral palsy by applying Rasch Analysis. In future research, it is thought that additional research should be conducted by dividing the children by age and type so that they can be generalized.

PMID: [35199570](#)

39. Utilizing a Team Kinesiology Model to Support Rehabilitative Care in Patients

Paulette M Yamada, Joe Priest

Int J Environ Res Public Health. 2022 Feb 13;19(4):2079. doi: 10.3390/ijerph19042079.

An approach that provides a standardized way of continuing rehabilitative care to help patients return to their lives and activities of daily living (ADL) in an economical and efficient manner is the Team Kinesiology Model (TKM). Many patients who are given a life-altering diagnosis (i.e., paralysis due to spinal cord injury, cerebral palsy, or cancer) are unable to return to employment, their family or a pre-diagnosis quality of life (QOL) given the current health care resources. This is a longstanding, and urgent problem as population aging and rising multi-morbidity is projected to negatively impact all regions of the world. Utilization of mid-level rehabilitation services is a proposed method to increase accessibility to all populations,

including those of lower socioeconomic status or minority populations. Capitalizing on this idea, we describe two different programs that use the TKM to provide rehabilitative services to patients who were diagnosed with nervous system dysfunction or cancer. This model benefits the patient by improving physical fitness, psychosocial function, and QOL. Furthermore, we provide specific examples that show how this approach could have further-reaching impacts on society, education and research. Integrating kinesiologists and TKM in health care could assist in workflow, long-term health surveillance, rehabilitation and improvement of QOL.

PMID: [35206268](#)

40. Advance care plan discussion among parents of children with cerebral palsy

Farah Khalid, Swee Im Ng Voon, Lai Choo Ong, Wei Kang Lim, Limin Li, Azirah Adnan, Vigneswari Ganesan, Chee Ming Teh, Choong Yi Fong

Dev Med Child Neurol. 2022 Feb 25. doi: 10.1111/dmcn.15184. Online ahead of print.

Aim: To evaluate parental perception of advance care plan (ACP) discussions in families of Malaysian children with bilateral cerebral palsy (CP) classified in Gross Motor Function Classification System levels IV or V for (1) acceptance of the ACP discussion, (2) feedback on the usefulness of ACP discussion, and (3) exploration of possible factors related to parental acceptance of ACP. **Method:** This was a prospective pre- and post-ACP discussion questionnaire study for parents of children with bilateral CP. **Results:** Sixty-nine patients were recruited to the study; 64 (93%) had at least one additional comorbidity. The median age was 8 years (interquartile range 5 years 1 month-11 years 6 months). Fifty-seven (82.6%) parents found the ACP discussion acceptable, and most reported positive feedback on various components of the discussion (88.4-97.1%). One-third of participants were not comfortable discussing end-of-life care plans. On multivariate analysis, parents who were comfortable discussing end-of-life care plans were more likely to find the ACP discussion acceptable (odds ratio 27.78, 95% confidence interval 2.9-265.1, $p = 0.004$). **Interpretation:** Most parents of Malaysian children with bilateral CP reported the ACP discussion as both acceptable and beneficial. Parents need to be comfortable about discussing end-of-life care plans for their child to enable the ACP discussion to be an acceptable experience.

PMID: [35213736](#)

41. Australasian Academy of Cerebral Palsy and Developmental Medicine and the International Alliance of Academies of Childhood Disability, Abstracts for the Conference, 1-5 March 2022, Melbourne, Australia

No authors listed

Dev Med Child Neurol. 2022 Mar;64 Suppl 2:5-107. doi: 10.1111/dmcn.15159.

No abstract available

PMID: [35211960](#)

42. Configuration of services: service design access to primary and secondary care: Cerebral palsy in adults

National Guideline Alliance (UK)

London: National Institute for Health and Care Excellence (NICE); 2019 Jan. NICE Evidence Reviews Collection.

Adults with cerebral palsy have the same health requirements as other adults in terms of screening, diagnosis, monitoring and management, but may have additional requirements and face additional difficulties accessing these services. Barriers may be environmental, organizational, social, or due to complications of Cerebral Palsy. This review question analyses the clinical and cost effectiveness of how services are structured and delivered.

PMID: [35192271](#)

43. Configuration of services: service design: Cerebral palsy in adults

National Guideline Alliance (UK)

London: National Institute for Health and Care Excellence (NICE); 2019 Jan. NICE Evidence Reviews Collection.

Children with cerebral palsy have access to services specifically related to cerebral palsy. When they become adults there is no such service available to them. To ensure that the adult's right for autonomy and independence are met they may need access to appropriate specialist services such as rehabilitation medicine, neurology, speech and language therapy services, physiotherapy and occupational health. Adults with learning disabilities (including adults with cerebral palsy who have learning disabilities) currently can have an annual review of their needs as outlined in the NICE guideline on challenging behaviour and learning disabilities. Adults with cerebral palsy, their family, or carers, may not be aware of their need for a specialist service, or know how to access that service. This review question looks at the evidence around the effectiveness of how these specialist services are accessed and delivered (including the effectiveness of the provision of an annual review to all adults with cerebral palsy).

PMID: [35192266](#)

44. Safety of sibling cord blood cell infusion for children with cerebral palsy

Kylie Crompton, Iona Novak, Michael Fahey, Nadia Badawi, Katherine J Lee, Françoise Mechinaud-Heloury, Priya Edwards, Paul Colditz, Trisha Soosay Raj, Janet Hough, Xiaofang Wang, Simon Paget, Kuang-Chih Hsiao, Peter Anderson, Dinah Reddihough

Cytotherapy. 2022 Feb 19;S1465-3249(22)00022-6. doi: 10.1016/j.jcyt.2022.01.003. Online ahead of print.

Cerebral palsy (CP) is a nonprogressive neurological disorder and the most common physical disability of childhood. There is no cure for CP, but stem cells have the potential to improve brain injury and hence function. This phase 1 clinical trial investigated the safety of the intravenous infusion of full-matched sibling cord blood cells for children with CP aged 1 to 16 years. Preliminary efficacy outcomes were also investigated. Twelve participants received 12/12 HLA-matched sibling cord blood cell infusions. One treatable serious adverse reaction to cryoprotectant was observed, and no adverse reactions occurred beyond 24 h after infusion. Gross motor function measure (GMFM-66) scores did not improve compared with baseline beyond what could be expected from developmental levels, and participants had varied changes in the Quality of Upper Extremity Skills Test (QUEST) and Vineland Adaptive Behavior Scales (VABS-II) scores. In conclusion, matched sibling cord blood cell infusion for children with CP is relatively safe when conducted in an appropriate facility. Australian and New Zealand Clinical Trials Registry (ACTRN12616000403437) and Clinicaltrials.gov (NCT03087110).

PMID: [35193825](#)