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Interventions and Management

1. How much trunk control is affected in adults with moderate-to-severe cerebral palsy?

Barbado D, Reina R, Roldan A, McCulloch K, Campayo-Piernas M, Vera-Garcia FJ.

J Biomech. 2018 Nov 15. pii: S0021-9290(18)30844-3. doi: 10.1016/j.jbiomech.2018.11.009. [Epub ahead of print]

Trunk control (TC) impairment is a typical feature in individuals with cerebral palsy (CP), but there are lack of methods that allow to quantify the extent to which static and dynamic TC is impaired in adults with moderate-to-severe CP. Thus, the aims of this study were to analyze the reliability of a posturography protocol to assess TC in adults with CP, and quantify their degree of TC impairment compared to a control sample of adults without CP. Forty-seven adults with moderate-to-severe CP and nineteen control participants were assessed via a protocol of static and dynamic seated trunk tasks, performed on a stable and an unstable surface placed on a force-plate. The mean radial error was the primary variable measured. A large percentage of CP participants successfully completed the static and dynamic conditions on the stable surface (static: 93.6%; dynamic: 91.5-72.3%); however, this percentage decreased considerably on the unstable surface (51.1-34.0%). The posturography protocol displayed good reliability in adults with CP ($0.89 \leq ICC \leq 0.95$; $15.2\% \leq SEM \leq 20.7\%$). Adults with CP displayed significantly decreased TC in 4/5 tasks on the stable seat, particularly in dynamic conditions ($1.71 \leq dg \leq 1.91$). Our results confirmed that TC is significantly affected in CP adults compared with controls without CP of similar age, but they present more difficulties to perform dynamic tasks. Thus, it would be recommend including dynamic in addition to static conditions to obtain a comprehensive assessment of TC impairment in adults with moderate-to-severe CP. Additional, these results encourage practitioners to design dynamic activities that challenge trunk control for rehabilitations/training programs.

PMID: [30473138](#)

2. Effects of sensory manipulations on the dynamical structure of center-of-pressure trajectories of children with cerebral palsy during sitting.

da Costa CSN, Pavão SL, Visicato LP, de Campos AC, Rocha NACF.

Hum Mov Sci. 2018 Nov 22;63:1-9. doi: 10.1016/j.humov.2018.11.003. [Epub ahead of print]

AIM: To investigate the effects of manipulating visual information and the compliance of the support surface on the area of sway and dynamical trajectories of center-of-pressure (CoP) in children with CP and children with typical development during static sitting. METHODS: 32 typical children, 14 children with mild CP and 12 with moderate-to-severe CP were tested for CoP sway during static sitting under four sensory conditions: (1) eyes open on a rigid surface; (2) eyes closed on a rigid surface; (3) eyes open on foam; (4) eyes closed on foam. RESULTS: Children with moderate-to-severe CP showed greater regularity and local stability of dynamical CoP trajectories and lower complexity in their motor patterns than typical children and children with mild CP. Moreover, removing vision and sitting on a compliant surface reduced the regularity of CoP trajectories. CONCLUSION: Children with CP were able to adjust the structure and complexity of their postural control

responses to sensory challenges, although the structure of their postural responses was poorer than in typical children.

PMID: [30472351](#)

3. The increase of anterior pelvic tilt after semitendinosus transfer to distal femur in patients with spastic diplegic cerebral palsy.

de Moraes Filho MC, Fujino MH, Kawamura CM, Dos Santos CA, Lopes JAF, Blumetti FC, Mattar R Junior.

J Pediatr Orthop B. 2018 Nov 29. doi: 10.1097/BPB.0000000000000577. [Epub ahead of print]

The aim of this study was to compare semitendinosus transfer to distal femur (STTX) to semitendinosus surgical lengthening (STL) regarding the increase of anterior pelvic tilt after flexed knee gait treatment. Thirty-nine patients were evaluated, and they were divided according surgical procedures at knees: STL group (22 patients/44 knees), which included patients who received medial hamstrings surgical lengthening as part of multilevel approach, and STTX group (17 patients/34 knees), which was represented by patients who underwent orthopedic surgery including a STTX instead of STL. In the present study, the mean anterior pelvic tilt increased in all groups after treatment and STTX was not effective to prevent it in a medium-term follow-up.

PMID: [30499862](#)

4. Hamstring lengthening in cerebral palsy and the use of musculoskeletal modelling.

Stewart C.

Dev Med Child Neurol. 2018 Nov 25. doi: 10.1111/dmcn.14116. [Epub ahead of print]

PMID: [30474208](#)

5. Long-term muscle changes after hamstring lengthening in children with bilateral cerebral palsy.

Salami F, Brosa J, Van Drongelen S, Klotz MCM, Dreher T, Wolf SI, Thielen M.

Dev Med Child Neurol. 2018 Nov 25. doi: 10.1111/dmcn.14097. [Epub ahead of print]

AIM: To evaluate short-term (1y postoperatively; E1) and long-term (at least 4y postoperatively; E2) changes in hamstring muscle-tendon length (MTL) and lengthening velocity after hamstring lengthening in children with bilateral cerebral palsy (CP). METHOD: Three-dimensional gait analysis was performed in 19 children (16 males, 3 females; 36 limbs; mean age at surgery 9y [SD 3y]; range 6-10y) with flexed knee gait, preoperative ankle dorsiflexion lower than 20 degrees, and CP before bilateral hamstring lengthening (E0), at E1 and E2. Hamstring MTL (normalized by leg length) and velocity were assessed via OpenSim software. RESULTS: MTL increased from E0 to E1 ($p=0.004$) and decreased from E1 to E2 ($p<0.020$). Hamstring lengthening velocity did not change. In the subgroup with short, not slow hamstrings, the increase in MTL was maintained at E2. INTERPRETATION: Hamstring lengthening is an efficient procedure to lengthen short and/or slow hamstrings short-term. The desired outcome with maintenance of the postoperative changes in hamstring MTL is only achieved for preoperatively short, not slow hamstrings. WHAT THIS PAPER ADDS: Surgical hamstring lengthening can be confirmed via musculoskeletal modelling in OpenSim software. Surgical hamstring lengthening in cerebral palsy does not change hamstring lengthening velocity. Short, not slow hamstrings present a long-lasting muscle-tendon length (MTL) increase after hamstring lengthening. Changes in MTL after hamstring lengthening cannot be maintained for slow hamstrings. MTL does not change after hamstring lengthening for neither short nor slow hamstrings.

PMID: [30474110](#)

6. Gait parameters in children with bilateral spastic cerebral palsy: a systematic review of randomized controlled trials.

Gómez-Pérez C, Font-Llagunes JM, Martori JC, Vidal Samsó J.

Dev Med Child Neurol. 2018 Nov 28. doi: 10.1111/dmcn.14108. [Epub ahead of print]

AIM: To identify the gait parameters used to assess gait disorders in children with bilateral spastic cerebral palsy (CP) and evaluate their responsiveness to treatments. **METHOD:** A systematic search within PubMed, Web of Science, and Scopus (in English, 2000-2016) for randomized controlled trials of children with bilateral spastic CP who were assessed by instrumented gait analysis (IGA) was performed. Data related to participants and study characteristics, risk of bias, and outcome measures were collected. A list of gait parameters responsive to clinical interventions was obtained. **RESULTS:** Twenty-one articles met the inclusion criteria. Eighty-nine gait parameters were identified, 56 of which showed responsiveness to treatments. Spatiotemporal and kinematic parameters were widely used compared to kinetic and surface electromyography data. The majority of responsive gait parameters were joint angles at the sagittal plane (flexion-extension). **INTERPRETATION:** The IGA yields responsive outcome measures for the gait assessment of children with bilateral spastic CP. Spatiotemporal and kinematic (at sagittal plane) parameters are the gait parameters used most frequently. Further research is needed to establish the relevant gait parameters for each clinical problem. **WHAT THIS PAPER ADDS:** Fifty-six responsive gait parameters for children with bilateral spastic cerebral palsy were identified. Most responsive gait parameters belong to joint angles time-series at sagittal plane. Spatiotemporal and kinematic parameters are widely used compared to kinetic and surface electromyography parameters.

PMID: [30484877](#)

7. Gradual increase of perturbation load induces a longer retention of locomotor adaptation in children with cerebral palsy.

Tang R, Kim J, Gaebler-Spira DJ, Wu M.

Hum Mov Sci. 2018 Nov 24;63:20-33. doi: 10.1016/j.humov.2018.11.006. [Epub ahead of print]

The goal of this study is to determine whether the size and the variability of error have an impact on the retention of locomotor adaptation in children with cerebral palsy (CP). Eleven children with CP, aged 7-16 years old, were recruited to participate in this study. Three types of force perturbations (i.e., abrupt, gradual and noisy loads) were applied to the right leg above the ankle starting from late stance to mid-swing in three test sessions while the subject walked on a treadmill. Spatial-temporal gait parameters were recorded using a custom designed 3D position sensor during treadmill walking. We observed that children with CP adapted to the resistance force perturbation and showed an aftereffect consisting of increased step length after load release. Further, we observed a longer retention of the aftereffect for the condition with a gradual load than that with an abrupt load. Results from this study suggested that the size of error might have an impact on the retention of motor adaptation in children with CP with a longer retention of motor adaptation for the condition with a small size of error than that with a large error. In addition, enhanced variability of error seems facilitate motor learning during treadmill training. Results from this study may be used for the development of force perturbation based training paradigms for improving walking function in children with CP.

PMID: [30481722](#)

8. Does Home-Based Progressive Resistance or High-Intensity Circuit Training Improve Strength, Function, Activity or Participation in Children With Cerebral Palsy?

Schranz C, Kruse A, Belohlavek T, Steinwender G, Tilp M, Pieber T, Svehlik M.

Arch Phys Med Rehabil. 2018 Dec;99(12):2457-2464.e4. doi: 10.1016/j.apmr.2018.06.010. Epub 2018 Jul 4.

OBJECTIVE: Does home-based progressive resistance or high-intensity circuit training improve strength, function, activity, or participation in children with cerebral palsy (CP)? **DESIGN:** This was the first study on high-intensity circuit training for children with CP. This study was conducted as a randomized prospective controlled pilot study. **SETTING:** Evaluation took place at the gait laboratory of the university hospital, training sessions were performed at home. **PARTICIPANTS:** Children (N=22) with CP (average age: 12y, 10mo, 19 Gross Motor Function Classification System level I, 3 level II) were randomly assigned either to progressive resistance training (PRT) or high-intensity circuit training (HICT). **INTERVENTIONS:** The PRT group trained with progressive overload, while the HICT group performed as many repetitions as possible within 30-second intervals (8wk, 3 times weekly in both groups). **MAIN OUTCOME MEASURES:** Outcome measures stretched over all domains of the International Classification of Functioning, Disability and Health and included muscle strength, muscle power sprint test (MPST), timed stairs test (TST), 6-minute walking test, Gait Profile Score (GPS), timed Up and Go test (TUGT) and participation questionnaires. **RESULTS:** Only the HICT group was able to improve strength. Furthermore, the HICT group scored better in the MPST, while PRT participants improved in the TST and TUGT. The HICT-group was able to show improvement in the subscores of the parent-reported participation questionnaire. Other measures of mobility or participation did not change. **CONCLUSIONS:** Both programs improved function specific to intervention. However, only the HICT group showed significant strength and participation improvements. Compliance was decent in both groups, but the average training

unit was shorter in the HICT group. Both exercise programs showed functional benefits, but HICT might be the preferable option for strengthening in highly functional children with CP.

PMID: [30473019](#)

9. The carry-over effect of an aquatic-based intervention in children with cerebral palsy.

Ballington SJ, Naidoo R.

Afr J Disabil. 2018 Oct 29;7(0):361. doi: 10.4102/ajod.v7i0.361. eCollection 2018.

BACKGROUND: Cerebral palsy (CP) is the most common motor disability in childhood. Children with CP are more likely to have lower levels of physical activity than their peers, which has negative implications for their health. However, aquatic exercise can be used to improve levels of fitness among children with CP. **OBJECTIVE:** To determine the carry-over effect of an aquatic-based programme (postural control and balance) on land (walking, running and jumping) in children with CP, post aquatic intervention. **METHOD:** The study used a pretest-post-test, randomised group, cross-over design. Children aged 8-12 years (n = 10) were divided into intervention (n = 5) and control (n = 5) groups. The intervention group participated in two 30-min sessions a week, while the control group continued with normal activities. Pre- and post-intervention testing was conducted using gross motor function measurement. The 10-point programme of the Halliwick Concept was used. **RESULTS:** Results demonstrated that the aquatic therapy had a significant effect on gross motor function scores. The aquatic programme-based group showed increased motor function following the intervention, compared to the control group (z = -2.803, p = 0.005). Furthermore, the aquatic-based therapy improved the average score for gross motor function measurement, post-intervention. **CONCLUSION:** Together with conventional modes of therapy, aquatic-based programmes should be integrated and considered as an essential, ongoing mode of treatment for children with CP, in order to ensure long-term gross motor function improvements.

PMID: [30473998](#)

10. Preoperative anemia increases the risk of red blood cell transfusion and prolonged hospital length of stay in children undergoing spine arthrodesis surgery.

Fontanals M, O'Leary JD, Zaarour C, Skelton T, Faraoni D

Transfusion. 2018 Nov 30. doi: 10.1111/trf.15055. [Epub ahead of print]

BACKGROUND: Preoperative anemia is an important modifiable risk factor for red blood cell (RBC) transfusion in a variety of surgical populations. The primary objective of this study was to examine the association between preoperative anemia and i) transfusion of RBCs within 72 hours of surgery and ii) postoperative clinical outcomes in children undergoing spine arthrodesis surgery. **STUDY DESIGN AND METHODS:** We assembled a retrospective cohort of children included in the American College of Surgeons National Quality Improvement Program Pediatric database who underwent spine arthrodesis surgery from 2012 to 2016. Anemia was defined using age- and sex-specific hematocrit thresholds. Data collected included demographic and surgical characteristics, RBC transfusion within 72 hours, and 30-day postoperative outcomes (postoperative mechanical ventilation, infection, readmission, hospital length of stay, mortality). Multivariable logistic regression analyses were used to identify independent predictors of RBC transfusion and postoperative outcomes. **RESULTS:** We included 9,095 patients in the analysis. Preoperative anemia was present in 14% (n = 1,233) of the population and 67% (n = 6,135) of patients were transfused. Our multivariable logistic regression showed anemia, surgical time > 350 minutes, > 7 vertebral levels fused, neuromuscular disease, and cerebral palsy were all independent predictors of RBC transfusion. Preoperative anemia was also associated with prolonged hospital LOS (adjusted OR: 1.31, 95%CI: 1.11-1.54, p = 0.002). **CONCLUSIONS:** In this study of 9,095 children undergoing spine surgery, preoperative anemia was associated with an increased risk of RBC transfusion and prolonged LOS. Further studies are needed to determine if treatment of preoperative anemia can effectively reduce intraoperative RBC transfusion.

PMID: [30499592](#)

11. Data-Driven Classification of Dysarthria Profiles in Children With Cerebral Palsy.

Allison KM, Hustad KC.

J Speech Lang Hear Res. 2018 Nov 27:1-17. doi: 10.1044/2018_JSLHR-S-17-0356. [Epub ahead of print]

PURPOSE: The objectives of this study were to examine different speech profiles among children with dysarthria secondary to cerebral palsy (CP) and to characterize the effect of different speech profiles on intelligibility. **METHOD:** Twenty 5-year-old children with dysarthria secondary to CP and 20 typically developing children were included in this study. Six acoustic and perceptual speech measures were selected to quantify a range of segmental and suprasegmental speech characteristics and were measured from children's sentence productions. Hierarchical cluster analysis was used to identify naturally occurring subgroups of children who had similar profiles of speech features. **RESULTS:** Results revealed 4 naturally occurring speech clusters among children: 1 cluster of children with typical development and 3 clusters of children with dysarthria secondary to CP. Two of the 3 dysarthria clusters had statistically equivalent intelligibility levels but significantly differed in articulation rate and degree of hypernasality. **CONCLUSION:** This study provides initial evidence that different speech profiles exist among 5-year-old children with dysarthria secondary to CP, even among children with similar intelligibility levels, suggesting the potential for developing a pediatric dysarthria classification system that could be used to stratify children with dysarthria into meaningful subgroups for studying speech motor development and efficacy of interventions.

PMID: [30481827](#)

12. Multimorbidity and lifestyle factors among adults with intellectual disabilities: a cross-sectional analysis of a UK cohort.

Tyrer F, Dunkley AJ, Singh J, Kristunas C, Khunti K, Bhaumik S, Davies MJ, Yates TE, Gray LJ.

J Intellect Disabil Res. 2018 Nov 28. doi: 10.1111/jir.12571. [Epub ahead of print]

BACKGROUND: Multimorbidity [two or more conditions in addition to intellectual disability (ID)] is known to be more common among people with ID. However, the relationship between multimorbidity and lifestyle factors is currently unknown. The aim of this study was to determine the prevalence of multimorbidity in a population of adults with ID. We also aimed to identify risk factors, including lifestyle factors, for multimorbidity in this population. **METHODS:** This was a cross-sectional analysis using data from a diabetes screening study of 920 adults aged 18-74 years with ID living in Leicestershire, UK. We described comorbidities and the prevalence of multimorbidity in this population. We explored the relationship between multimorbidity and age, gender, ethnicity, severity of ID, socio-economic status, physical activity, sedentary behaviour, fruit and vegetable consumption and smoking status using multiple logistic regression. **RESULTS:** The prevalence of multimorbidity was 61.2% (95% CI 57.7-64.7). Multimorbidity was independently associated with being female ($P < 0.001$) and severe/profound ID ($P = 0.004$). Increasing age was of borderline significance ($P = 0.06$). Individuals who were physically inactive or sedentary were more likely to be multimorbid, independent of ability to walk, age, gender, severity of ID, ethnicity and socio-economic status (adjusted OR = 1.91; 95% CI 1.23-2.97; $P = 0.004$ and OR = 1.98; 95% CI 1.42-2.77; $P < 0.001$). After excluding probable life-long conditions (autism spectrum conditions, attention deficit hyperactivity disorders, epilepsy, cerebral palsy and other paralytic syndromes) as contributing comorbidities, the effect of sedentary behaviour, but not physical activity, remained ($P = 0.004$). We did not observe a relationship between multimorbidity, fruit and vegetable consumption and smoking status. **CONCLUSIONS:** Multimorbidity presents a significant burden to people with ID. Individuals who were physically inactive or sedentary were more likely to be multimorbid, but further work is recommended to explore the relationship between multimorbidity and lifestyle factors using standardised objective measures.

PMID: [30485584](#)

13. MR Imaging of hypoxic ischemic encephalopathy - Distribution Patterns and ADC value correlations.

Rana L, Sood D, Chauhan R, Shukla R, Gurnal P, Nautiyal H, Tomar M.

Eur J Radiol Open. 2018 Nov 16;5:215-220. doi: 10.1016/j.ejro.2018.08.001. eCollection 2018.

BACKGROUND AND PURPOSE: Neonatal hypoxic-ischemic encephalopathy causes hypoxic brain injury. Due to differences in brain maturity at time of insult, severity of hypotension and duration of insult, there are four distinct patterns of brain injury. Magnetic resonance imaging is the most sensitive modality for evaluating these patterns of brain injury. Additional role of Diffusion weighted imaging and ADC values can be useful in the evaluation of such cases. We conducted this study to analyse the usefulness of ADC values in the brain tissue affected by hypoxic-ischemic injury. **MATERIALS AND METHODS:** We conducted a prospective study of all the patients referred to our department for magnetic resonance scanning of brain with history of hypoxic ischemic encephalopathy and clinical features cerebral palsy. 23 Cases with imaging manifestations of hypoxic ischemic encephalopathy were included in the study. We studied distribution patterns of HIE in our cases and calculated the ADC values of involved as well as normal grey and white matter. Further, sensitivity, specificity, predictive values, and likelihood ratios for each dichotomized diffusion and ADC values were obtained Wilson Score method. **RESULTS:** The most common distribution pattern in our study was involvement of peri-rolandic area (15 cases, 65%). ADC values were significantly ($p < 0.005$) increased in abnormal white matter. No significant changes ($p = 0.8$) were seen in ADC

values of normal and abnormal grey matter. **CONCLUSIONS:** Due to significant increase in ADC values of affected white matter, ADC value can be used as a marker to detect chronic sequel of hypoxic ischaemic brain injury. Another observation was the perirolandic brain tissue being most common area of involvement in the cases with cerebral palsy.

PMID: [30480058](#)

14. A comparison of 3D ultrasound to MRI for the measurement and estimation of gastrocnemius muscle volume in adults and young people with and without cerebral palsy.

Noorkoiv M, Theis N, Lavelle G.

Clin Anat. 2018 Nov 27. doi: 10.1002/ca.23314. [Epub ahead of print]

INTRODUCTION: Muscle volume (MV) is an important parameter for understanding muscle morphology and adaptations to training, growth and pathology. In this study, we assessed the validity of freehand 3D ultrasound (3DUS) for measuring medial gastrocnemius MV in adults, typically developing children (TD) and children with cerebral palsy (CP). We also assessed the validity between our direct measures of MV and estimates derived from anatomical cross sectional area (ACSA) and muscle length (ML), using previously outlined methods. **MATERIALS AND METHODS:** The medial gastrocnemius of all groups was scanned with 3DUS and MRI. Images from both methods were digitised to derive MV, ACSA and ML. Measured MV was compared between methods and compared to estimated MV derived from recently published algorithms. **RESULTS:** MV had a mean difference of -0.13% (standard error of estimate (SEE)=2.23%, R2 =0.99) between MRI and 3DUS and 19.82% (SEE=4.73% and R2 =0.99) and -3.11% (SEE=6.55%, R2 =0.99) mean differences between the measured and estimated MV from two methods of estimation. **CONCLUSIONS:** The 3DUS is a valid method for the measurement of MV in adults, TD children and those with CP. Estimation methods of MV may be useful in clinical practise, but require further replication on various populations and careful methodological consideration. This article is protected by copyright. All rights reserved.

PMID: [30479004](#)

15. EMG breakthrough during cortical silent period in congenital hemiparesis: a descriptive case series.

Lixandrão MC, Stinear JW, Rich T, Chen CY, Feyma T, Meekins GD, Gillick BT.

Braz J Phys Ther. 2018 Nov 21. pii: S1413-3555(17)30677-9. doi: 10.1016/j.bjpt.2018.11.002. [Epub ahead of print]

BACKGROUND: The cortical silent period is a transient suppression of electromyographic activity after a transcranial magnetic stimulation pulse, attributed to spinal and supraspinal inhibitory mechanisms. Electromyographic breakthrough activity has been observed in healthy adults as a result of a spinal reflex response within the cortical silent period. **OBJECTIVES:** The objective of this case series is to report the ipsilesional and contralesional cortical silent period and the electromyographic breakthrough activity of 7 children with congenital hemiparesis. **METHODS:** TMS was delivered over the ipsilesional and contralesional primary motor cortices with resting motor threshold and cortical silent period measures recorded from first dorsal interosseous muscle. **RESULTS:** Seven children (13±2 years) were included. Ipsilesional and contralesional resting motor thresholds ranged from 49 to 80% and from 38 to 63% of maximum stimulator output, respectively. Ipsilesional (n=4) and contralesional (n=7) cortical silent period duration ranged from 49 to 206ms and 81 to 150ms, respectively. Electromyographic breakthrough activity was observed ipsilesionally in 3/4 (75%) and contralesionally in 3/7 (42.8%) participants. In the 3 children with ipsilesional breakthrough activity during the cortical silent period, all testing trials showed breakthrough. Contralesional breakthrough activity was observed in only one of the analyzable trials in each of those 3 participants. The mean peak amplitude of breakthrough activity ranged from 45 to 214µV (ipsilesional) and from 23 to 93µV (contralesional). **CONCLUSION:** Further research is warranted to understand the mechanisms and significance of electromyographic breakthrough activity within the cortical silent period in congenital hemiparesis. Understanding these mechanisms may lead to the design of tailored neuromodulation interventions for physical rehabilitation. **TRIAL REGISTRATION:** NCT02250092 (<https://clinicaltrials.gov/ct2/show/NCT02250092>).

PMID: [30471965](#)

16. Cerebral palsy.

Morgan P, McGinley JL.

Handb Clin Neurol. 2018;159:323-336. doi: 10.1016/B978-0-444-63916-5.00020-3.

Cerebral palsy (CP) is a lifespan motor disorder arising from damage to the developing brain before or shortly after birth. People with CP may experience problems with muscle coordination and difficulties with the organization and processing of sensory information. Functional mobility is impaired and commonly influenced by spasticity and musculoskeletal system problems such as contractures or bony torsion. Around 60% of individuals with CP are able to walk independently or with aids when entering adulthood. However, many adults with CP experience increasing balance and mobility dysfunction associated with premature aging. Falls and reduced falls efficacy are commonly experienced, with associated physical and psychosocial consequences. There is evidence that ambulant adults with CP may be able to enhance their functional balance and mobility as a result of an individualized exercise program of sufficient duration and intensity. However, whether such programs result in a reduction in falls is unknown. Given the high number of falls with injury experienced by this population, attention to fall risk factors and provision of basic fall prevention strategies are warranted.

PMID: [30482324](#)

17. What We Need to Know?

Shevell M.

Pediatr Neurol. 2018 Aug 6. pii: S0887-8994(18)30830-0. doi: 10.1016/j.pediatrneurol.2018.07.017. [Epub ahead of print]

PMID: [30477742](#)

18. Administrative databases to monitor the prevalence of cerebral palsy.

Sellier E.

Dev Med Child Neurol. 2018 Nov 27. doi: 10.1111/dmcn.14118. [Epub ahead of print]

PMID: [30480314](#)

19. National Registry Data from Korean Neonatal Network: Two-Year Outcomes of Korean Very Low Birth Weight Infants Born in 2013-2014.

Youn Y, Lee SM, Hwang JH, Cho SJ, Kim EK, Kim EA; Korean Neonatal Network.

J Korean Med Sci. 2018 Nov 9;33(48):e309. doi: 10.3346/jkms.2018.33.e309. eCollection 2018 Nov 26.

BACKGROUND: The aim of this study was to observe long-term outcomes of very low birth weight infants (VLBWIs) born between 2013 and 2014 in Korea, especially focusing on neurodevelopmental outcomes. **METHODS:** The data were collected from Korean Neonatal Network (KNN) registry from 43 and 54 participating units in 2013 and 2014, respectively. A standardized electronic case report form containing 30 items related to long-term follow up was used after data validation. **RESULTS:** Of 2,660 VLBWI, the mean gestational age and birth weight were 291/7 ± 26/7 weeks and 1,093 ± 268 g in 2013 and 292/7 ± 26/7 weeks and 1,125 ± 261 g in 2014, respectively. The post-discharge mortality rate was 1.2%-1.5%. Weight < 50th percentile was 46.5% in 2013 and 66.1% in 2014. The overall prevalence of cerebral palsy among the follow up infants was 6.2% in 2013 and 6.6% in 2014. The Bayley Scales of Infant Developmental Outcomes version II showed 14%-25% of infants had developmental delay and 3%-8% of infants in Bayley version III. For the Korean developmental screening test for infants and children, the area "Further evaluation needed" was 5%-12%. Blindness in both eyes was reported to be 0.2%-0.3%. For hearing impairment, 0.8%-1.9% showed bilateral hearing loss. Almost 50% were readmitted to hospital with respiratory illness as a leading cause. **CONCLUSION:** The overall prevalence of long-term outcomes was not largely different among the VLBWI born between 2013 and 2014. This study is the first large national data study of long-term outcomes.

PMID: [30473651](#)

20. Editor's Spotlight/Take 5: Socioeconomic Status Influences Functional Severity of Untreated Cerebral Palsy in Nepal: A Prospective Analysis and Systematic Review.

Leopold SS.

Clin Orthop Relat Res. 2018 Nov 16. doi: 10.1097/CORR.0000000000000574. [Epub ahead of print]

PMID: [30499782](#)

Prevention and Cure

21. Severe-combined immunodeficient rats can be used to generate a model of perinatal hypoxic-ischemic brain injury to facilitate studies of engrafted human neural stem cells.

Beldick SR, Hong J, Altamentova S, Khazaei M, Hundal A, Zavvarian MM, Rumajogee P, Chio J, Fehlings MG.

PLoS One. 2018 Nov 28;13(11):e0208105. doi: 10.1371/journal.pone.0208105. eCollection 2018.

Cerebral palsy (CP) encompasses a group of non-progressive brain disorders that are often acquired through perinatal hypoxic-ischemic (HI) brain injury. Injury leads to a cascade of cell death events, resulting in lifetime motor and cognitive deficits. There are currently no treatments that can repair the resulting brain damage and improve functional outcomes. To date, preclinical research using neural precursor cell (NPC) transplantation as a therapy for HI brain injury has shown promise. To translate this treatment to the clinic, it is essential that human-derived NPCs also be tested in animal models, however, a major limitation is the high risk of xenograft rejection. A solution is to transplant the cells into immune-deficient rodents, but there are currently no models of HI brain injury established in such a cohort of animals. Here, we demonstrate that a model of HI brain injury can be generated in immune-deficient *Prkdc* knockout (KO) rats. Long-term deficits in sensorimotor function were similar between KO and wildtype (WT) rats. Interestingly, some aspects of the injury were more severe in KO rats. Additionally, human induced pluripotent stem cell derived (hiPSC)-NPCs had higher survival at 10 weeks post-transplant in KO rats when compared to their WT counterparts. This work establishes a reliable model of neonatal HI brain injury in *Prkdc* KO rats that will allow for future transplantation, survival, and long-term evaluation of the safety and efficacy of hiPSC-NPCs for neonatal brain damage. This model will enable critical preclinical translational research using human NPCs.

PMID: [30485360](https://pubmed.ncbi.nlm.nih.gov/30485360/)