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Interventions and Management

1. *J Child Neurol*. 2015 Aug 3. pii: 0883073815596609. [Epub ahead of print]

Outcomes of Botulinum Toxin Type A Injection Followed by Rehabilitation in Cases of Cerebral Palsy With Upper Extremity Involvement.

Karaca B, Ünlü E, Köse G, Gönen E, Çakıcı A.

We evaluated the efficiency of botulinum toxin type A injection followed by a rehabilitation program including individual therapy, group therapy, and occupational therapy in cases of cerebral palsy with upper extremity involvement. A total of 29 injections were performed on 25 patients, and the patients were placed on rehabilitation program. At 3-month and 6-month assessments, there was a significant improvement in lateral grip strength, 9 Hole Peg test, Upper Limb Physician's Rating Scale and pediatric functional independence measure total scores. There were significant decreases in active range of motion in elbow extension, supination, and wrist extension, and Modified Ashworth Scale in elbow flexion, elbow pronation, and wrist flexion at 6-week, 3-month, and 6-month assessments. Combination of group therapy with traditional therapy methods after injection is effective in cases of cerebral palsy with upper extremity involvement.

[PMID: 26239492](#)

2. *Neuroscience*. 2015 Jul 30. pii: S0306-4522(15)00699-5. doi: 10.1016/j.neuroscience.2015.07.072. [Epub ahead of print]

Children with cerebral palsy have uncharacteristic somatosensory cortical oscillations after stimulation of the hand mechanoreceptors.

Kurz MJ, Becker KM, Heinrichs-Graham E, Wilson TW.

Numerous clinical investigations have reported that children with cerebral palsy (CP) have tactile discrimination deficits that likely limit their ability to plan and manipulate objects. Despite this clinical awareness, we still have a substantial knowledge gap in our understanding of the neurological basis for these tactile discrimination deficits. Previously, we have shown that children with CP have aberrant alpha-theta (4-14Hz) oscillations in the somatosensory cortices following tactile stimulation of the foot. In this investigation, we evaluated if these aberrant alpha-theta oscillations also extend to the hand. Magnetoencephalography was used to evaluate event-related changes in the alpha-theta and beta (18-34Hz) somatosensory cortical oscillations in groups of children with CP and typically developing (TD) children following tactile stimulation of their hands. Our results showed that the

somatosensory alpha-theta oscillations were relatively intact in children with CP, which is in contrast to our previous results for foot tactile stimulations. We suspect that these inter-study differences may be related to the higher probability that the neural tracts serving the lower extremities are damaged in children with CP, compared to those serving the upper extremities. This inference is plausible since the participating children with CP had Manual Ability Classification System (MACS) levels between I and II. In contrast to the alpha-theta results, children with CP did exhibit a sharp increase in beta activity during the same time period, which was not observed in TD children. This suggests that children with CP still have deficits in the computational aspect of somatosensory processing.

[PMID: 26235434](#)

3. *J Pediatr Orthop.* 2015 Sep;35(6):571-5. doi: 10.1097/BPO.0000000000000329.

Epidural Baclofen for the Management of Postoperative Pain in Children With Cerebral Palsy.

Nemeth BA, Montero RJ, Halanski MA, Noonan KJ.

INTRODUCTION: Children with cerebral palsy undergoing soft tissue and bony procedures often experience pain and spasticity postoperatively. Differentiation of pain from spasticity complicates management, so controlling spasticity with a continuous infusion of baclofen, an antispasmodic, through an already present indwelling epidural catheter holds interest. **METHODS:** A retrospective chart review was performed of patients with cerebral palsy undergoing single event, multilevel lower extremity surgery at a single institution who received epidural analgesia with or without continuous baclofen infusion. Primary outcomes included need for supplemental narcotic analgesics and benzodiazepines postoperatively. Duration of hospitalization, pain scores, and complications were also evaluated.

RESULTS: Forty-four patients were identified, ranging in age from 3 to 17 years, 19 of whom received epidural baclofen. No differences were found in use of supplemental narcotic analgesia, benzodiazepines, or duration of hospitalization. Differences in pain scores were not statistically significant (0.82 ± 0.95 for baclofen vs. 1.48 ± 0.99 for controls) ($P=0.391$). Mean arterial pressure was lower in patients receiving baclofen ($P=0.004$). No potential side effects attributable to baclofen were noted. **CONCLUSIONS:** Continuous epidural baclofen infusion seems unlikely to alter the pain-spasm cycle experienced by patients with cerebral palsy following orthopaedic surgery to a clinically significant degree. More effective, and cost-effective, measures at assessing and controlling pain and muscle spasm should be explored to benefit cerebral palsy patients postoperatively. **LEVEL OF EVIDENCE:** Level III-therapeutic study.

[PMID: 26251959](#)

4. *Ortop Traumatol Rehabil.* 2015 Apr 14;17(2):155-61. doi: 10.5604/15093492.1157092.

Long Term Follow-up of Subcutaneous Achilles Tendon Lengthening in the Treatment of Spastic Equinus Foot in Patients with Cerebral Palsy.

Krupiński M, Borowski A, Synder M.

BACKGROUND: Spastic equinus foot is among the most common deformities in patients with cerebral palsy. The optimal therapy of this condition is yet to be determined. Despite a considerable volume of literature concerned with the subject of cerebral palsy, there is still a need for studies focusing on long-term follow-up after corrective procedures. The study aimed to evaluate the long-term effects of subcutaneous Achilles tendon lengthening in the treatment of spastic equinus foot. **MATERIAL AND METHODS:** A total of 100 patients after Hooke's or White's isolated subcutaneous lengthening of the Achilles tendon were invited to participate in the retrospective assessment. Of the above number, 53 patients reported for an examination (76 feet). The average follow-up time was 10.09 years. To enable a more accurate determination of the risk of recurrence, the patients were divided into two groups according to whether they had been operated before or after reaching the age of 8 years. All patients were able to walk and suffered from the spastic type of cerebral palsy. **RESULTS:** The average age of patients at the time of the Achilles tendon lengthening procedure was 7 years. The follow-up time ranged from 3 to 17 years (an average of 10.09 years). The degree of equinus foot contracture before the surgery was from -5 to -60 degrees (an average of -17.53 degrees). Recurrence of the deformity was reported in 43.42% of the patients. Recurrences

were more common in those with hemiplegic cerebral palsy. CONCLUSIONS: 1. Subcutaneous Achilles tendon lengthening is not associated with a risk of serious complications, while providing good long-term therapeutic outcomes as well as very good cosmetic and functional effects. 2. Subcutaneous Achilles tendon lengthening minimises the costs and time of patients' hospitalisation and uses a relatively simple operative technique.

[PMID: 26248760](#)

5. Clin Biomech (Bristol, Avon). 2015 Jul 29. pii: S0268-0033(15)00207-7. doi: 10.1016/j.clinbiomech.2015.07.010. [Epub ahead of print]

Multiple gait patterns within the same Winters class in children with hemiplegic cerebral palsy.

Agostini V, Nascimbeni A, Gaffuri A, Knaflitz M.

BACKGROUND: Previous literature hypothesized that Winters type I are mainly characterized by a hypo-activation of dorsiflexors and type II by hyperactivation of plantarflexors around initial contact. However, it is currently not known if hemiplegic children belonging to the same Winters class really share the same muscle activation patterns, although this information might have relevant clinical implications in the patient management. **METHODS:** Gait data of 38 hemiplegic cerebral palsy children (16 Winters type I, 22 Winters type II) were analyzed, focusing on the foot and shank. A 2.5-minute walk test was considered, corresponding to more than 100 gait cycles for each child, analyzing the muscle activation patterns of tibialis anterior and gastrocnemius lateralis. The large stride-to-stride variability of gait data was handled in an innovative way, processing separately: 1) distinct foot-floor contact patterns, and for each specific foot-floor contact pattern 2) distinct muscle "activation modalities", averaging only across gait cycles with the same number of activations, and obtaining, in both cases, the pattern frequency-of-occurrence. **FINDINGS:** At least 2 representative foot-floor contact patterns within each Winters group, and up to 4-5 distinct muscle activation patterns were documented. **INTERPRETATION:** It cannot be defined a predominant muscle activation pattern specific for a Winters group. For a correct clinical assessment of a hemiplegic child, it is advisable to record and properly analyze gait signals during a longer period of time (2-3min), rather than (subjectively) selecting a few "clean" gait cycles, since these cycles may not be representative of the patient's gait.

[PMID: 26239583](#)

6. Comput Methods Biomech Biomed Engin. 2015 Aug 5:1-2. [Epub ahead of print]

Gait synthesis for an anthropomorphic human model with articulated feet.

Santos AP, Ben Amar F, Bidaud P, Desailly E.

Introduction: Locomotion disorders are common in cerebral palsy children (Wren et al. 2005). Assessing these disorders and their causes is essential for treatment planning. Clinical gait analysis is the method of choice to measure 3D whole body kinematics and kinetics of the patients. Nevertheless, if measure is feasible, this locomotion cannot yet be synthesized using personalized patient's segmental and inertial parameters. The synthesis of pathological gait could lead to a better understanding of the underlying causes of certain movement disorders (Krogt et al. 2010). We propose here to develop an anthropomorphic human model with articulated feet, which will be used to generate different gait patterns. **Method:** A 3D full body gait simulator based on a human child was designed. **Gait generation:** To generate gait patterns, the Linear Quadratic Programming controller developed by Salini (2012) was used. Adaptations to the gait generator were made, in order to consider the articulated feet. Gait was synthesized in XDE-ISIR, using a linear inverted pendulum model and the zero moment point (ZMP) (Kajita et al. 2003; Wieber 2006). **Results:** Stable gait patterns for an anthropomorphic human model with articulated feet are generated. For types I and II, fully stable walking patterns are generated, including gait initiation, 10 m straight walking, and a stable stop. Concerning type III, improvements are still in need, as the generated walking patterns are not completely stable for every configuration. Different contact sequences generate different kinematics. For instance, the knee kinematics during a gait cycle is greatly influenced by the type of contact considered, see Figure 2. For the same initial conditions, in the Equinus Gait case, the knee is much more flexed than in the Flat Feet case. **Conclusion:** In this article, an anthropomorphic human model with articulated feet was developed, which allows different kinds of feet rockers in the design of gait patterns. Pathological and normal

patterns are generated, even though the normal patterns including heel rocker still need some improvement. This approach may lead to new applications of the simulation of human gait, in particular, the simulation of pathological gait. Future work includes stabilization of the generated patterns of normal gait, synthesis of different gait patterns, and a comparison with patients' kinematics.

[PMID: 26244578](#)

7. Comput Methods Biomech Biomed Engin. 2015 Aug 3:1-7. [Epub ahead of print]

Are clinical parameters sufficient to model gait patterns in patients with cerebral palsy using a multilinear approach?

Bonnefoy-Mazure A, Sagawa Y Jr, Pomero V, Lascombes P, De Coulon G, Armand S.

The aim of this study was to evaluate whether clinical parameters are sufficient using, a multilinear regression model, to reproduce the sagittal plane joint angles (hip, knee, and ankle) in cerebral palsy gait. A total of 154 patients were included. The two legs were considered (308 observations). Thirty-six clinical parameters were used as regressors (range of motion, muscle strength, and spasticity of the lower). From the clinical gait analysis, the joint angles of the sagittal plane were selected. Results showed that clinical parameter does not provide sufficient information to recover joint angles and/or that the multilinear regression model is not an appropriate solution.

[PMID: 26237712](#)

8. Comput Methods Biomech Biomed Engin. 2015 Aug 3:1-2. [Epub ahead of print]

Predicting postoperative knee flexion during gait of cerebral palsy children.

Galarraga C OA, Vigneron V, Dorizzi B, Khouri N, Desailly E.

Introduction: Cerebral palsy (CP) refers to a group of neurological disorders, caused by brain damaged during development, that affect human movement, balance and posture. CP entails muscle and bone deformities and frequently manifests by gait troubles. In order to lessen gait deviations, orthopedic surgery is usually performed on CP patients. Multiple bone and soft tissue are modified during a single-event multilevel surgery (SEMLS), which combines several surgical gestures in the same operation. There are some methods for predicting good and bad outcomes for some surgical gestures, such as psoas lengthening (Schwartz et al. 2011) and hamstring lengthening (Sebsadji et al. 2012), but they are binary and do not give any biomechanical parameter prediction. Niiler et al. (2007) predict knee range of motion for rectus femoris transfer along with some concurrent surgeries. The objective of this work is to predict postoperative knee flexion during gait of CP children, knowing preoperative gait, physical examination and surgery type. The purpose of the system is to be used as a decision-making tool for SEMLS.

Methods: Data is composed of clinical gait analyses and physical examinations of 230 lower limbs corresponding to 115 CP children that have undergone surgery. Gait cycles were normalized to 51 points (2% of gait cycle) (Schwartz & Rozumalski 2008) and then mean gait cycles were computed for each limb. Missing data belonging to physical examination were replaced using the iterative robust model-based imputation algorithm (IRMI) (Templ et al. 2011). The gathered preoperative kinematic and physical examination data were projected into a lower dimension space using principal component analysis (PCA) (Duda et al. 2012). Different PCA dimensions were tested, from 1 to 50 principal components. Then a multiple linear regression (Bishop 2006) is performed between 51-point postoperative knee flexion during gait and the dimensionality-reduced preoperative vector plus a surgery code. The surgery code is a binary vector whose elements are '1' if a surgery category was conducted and '0' if not. Nine surgery categories are considered: hip bone surgery (BS), hip soft tissue surgery (STS), rectus femoris transfer, hamstring lengthening, patella lowering, distal femoral osteotomy, shank BS, ankle-foot STS and foot BS. When a patient j is tested, both limbs data belonging to j are removed from the training set. Then a regression is done with data of the other patients and subsequently the data of patient j is tested on the trained model.

Results and Discussion: Best results were obtained with a PCA dimension of 9, which contains 82% of the information. Figure 1 shows an example of the output of the system. On test, the mean root-mean-square error is 8.75° ($\sigma = 3.9^\circ$). The prediction intervals vary from 10 to 15° depending on the patient and the point of the knee flexion curve. The mean confidence interval is 12° . 19.73% of test limbs are outside the prediction intervals.

Conclusions: The

proposed system predicts postoperative knee flexion during gait knowing preoperative state (kinematics and physical exam) and surgery type. The prediction confidence intervals are given with 80% reliability, which is respected when testing new data. The sizes of these intervals vary depending on preoperative state and surgery type. Prediction error is independent of the preoperative gait profile of the patients, which means that good predictions can be given for any preoperative gait state. The proposed method considers nine different categories of surgeries and their combinations and predicts surgery outcomes with biomechanical (kinematic) parameters. The system can help clinicians to validate or modify surgical plans and also to show the probable outcomes to the patients.

[PMID: 26237083](#)

9. *Disabil Rehabil.* 2015 Aug 3:1-4. [Epub ahead of print]

Balance improvement after physical therapy training using specially developed serious games for cerebral palsy children: preliminary results.

Bonnechère B, Omelina L, Jansen B, Van Sint Jan S.

PURPOSE: Cerebral palsy (CP) leads to various clinical signs mainly induced by muscle spasticity and muscle weakness. Among these ones impaired balance and posture are very common. Traditional physical therapy exercise programs are focusing on this aspect, but it is difficult to motivate patients to regularly perform these exercises, especially at home without therapist supervision. Specially developed serious games (SG) could therefore be an interesting option to motivate children to perform specific exercise for balance improvement. **METHOD:** Ten CP children participated in this study. Patients received four sessions of SG included into conventional therapy (1 session of 30 min a week during 4 weeks). Trunk control and balance were assessed using Trunk Control Motor Scale (TCMS) before and after interventions. **RESULTS:** Children presented a significant improvement in TCMS global score after interventions [37.6 (8.7) and 39.6 (9.5) before and after interventions, respectively, $p = 0.04$]. **CONCLUSION:** SG could therefore be an interesting option to integrate in the conventional treatment of CP children. Implication for Rehabilitation Cerebral palsy (CP) leads to balance issues. Rehabilitation exercises are not performed (enough) at home. Serious games (SG) could increase patients' motivation. SG increase balance control of CP children.

[PMID: 26234748](#)

10. *PLoS One.* 2015 Aug 6;10(8):e0128959. doi: 10.1371/journal.pone.0128959. eCollection 2015.

Effects of Neuromuscular Electrical Stimulation on the Masticatory Muscles and Physiologic Sleep Variables in Adults with Cerebral Palsy: A Novel Therapeutic Approach.

Giannasi LC, Matsui MY, Freitas SR, Caldas BF, Grossmann E, Amorim JB, Santos Idos R, Oliveira LV, Oliveira CS, Gomes MF.

Cerebral palsy (CP) is a term employed to define a group of non-progressive neuromotor disorders caused by damage to the immature or developing brain, with consequent limitations regarding movement and posture. CP may impair oropharyngeal muscle tone, leading to a compromised chewing function and to sleep disorders (such as obstructive sleep apnea). Thirteen adults with CP underwent bilateral masseter and temporalis neuromuscular electrical stimulation (NMES) therapy. The effects on the masticatory muscles and sleep variables were evaluated using electromyography (EMG) and polysomnography (PSG), respectively, prior and after 2 months of NMES. EMG consisted of 3 tests in different positions: rest, mouth opening and maximum clenching effort (MCE). EMG values in the rest position were 100% higher than values recorded prior to therapy for all muscles analyzed ($p < 0.05$); mean mouth opening increased from 38.0 ± 8.0 to 44.0 ± 10.0 cm ($p = 0.03$). A significant difference in MCE was found only for the right masseter. PSG revealed an improved in the AHI from $7.2 \pm 7.0/h$ to $2.3 \pm 1.5/h$ ($p < 0.05$); total sleep time improved from 185 min to 250 min ($p = 0.04$) and minimum SaO₂ improved from 83.6 ± 3.0 to 86.4 ± 4.0 ($p = 0.04$). NMES performed over a two-month period led to improvements in the electrical activity of the masticatory muscles at rest, mouth opening, isometric contraction and sleep variables, including the elimination of obstructive sleep apnea events in patients with CP

[PMID: 26247208](#)

11. *J Child Neurol.* 2015 Aug 3. pii: 0883073815596610. [Epub ahead of print]

Age at Referral of Children for Initial Diagnosis of Cerebral Palsy and Rehabilitation: Current Practices.

Hubermann L, Boychuck Z, Shevell M, Majnemer A.

OBJECTIVES: This study describes current practices in the age at referral for diagnosis of cerebral palsy and factors that influence earlier referral. **STUDY DESIGN:** Retrospective chart review (2002-2012). **RESULTS:** Of 103 children referred for diagnosis, 81 were referred to a neurologist by other medical specialists at a mean of 13.6 ± 15.7 months, whereas primary care providers referred much later (mean = 28.8 ± 27.1 months). Children admitted to the neonatal intensive care unit were referred earlier (mean = 9.3 ± 10.2 months) than those not (28.1 ± 24.9 months). Referral to rehabilitation was similarly delayed. **CONCLUSIONS:** Primary care providers generated a minority of referrals, of concern given their role in developmental surveillance. Remarkably high variability suggests knowledge of cerebral palsy attributes varies widely among service providers. Half of children with cerebral palsy do not have a complicated birth history; subsequently, referrals for diagnosis and management are often delayed. New strategies are needed to optimize prompt referral by primary care providers.

[PMID: 26239493](#)

Prevention and Cure

12. *Nat Commun.* 2015 Aug 3;6:7949. doi: 10.1038/ncomms8949.

Clinically relevant copy number variations detected in cerebral palsy.

Oskoui M, Gazzellone MJ, Thiruvahindrapuram B, Zarrei M, Andersen J, Wei J, Wang Z, Wintle RF, Marshall CR, Cohn RD, Weksberg R, Stavropoulos DJ, Fehlings D, Shevell MI, Scherer SW.

Cerebral palsy (CP) represents a group of non-progressive clinically heterogeneous disorders that are characterized by motor impairment and early age of onset, frequently accompanied by co-morbidities. The cause of CP has historically been attributed to environmental stressors resulting in brain damage. While genetic risk factors are also implicated, guidelines for diagnostic assessment of CP do not recommend for routine genetic testing. Given numerous reports of aetiologic copy number variations (CNVs) in other neurodevelopmental disorders, we used microarrays to genotype a population-based prospective cohort of children with CP and their parents. Here we identify de novo CNVs in 8/115 (7.0%) CP patients (~1% rate in controls). In four children, large chromosomal abnormalities deemed likely pathogenic were found, and they were significantly more likely to have severe neuromotor impairments than those CP subjects without such alterations. Overall, the CNV data would have impacted our diagnosis or classification of CP in 11/115 (9.6%) families.

[PMID: 26236009](#)

13. *Acta Paediatr.* 2015 Aug 3. doi: 10.1111/apa.13146. [Epub ahead of print]

Less severe cerebral palsy outcomes in infants treated with therapeutic hypothermia.

Jary S, Smit E, Liu X, Cowan FM, Thoresen M.

AIM: To describe the incidence, type and severity of cerebral palsy at 24 months in a regional cohort of infants treated with whole body therapeutic hypothermia for neonatal encephalopathy **METHODS:** Data were collected prospectively in a regional centre providing TH. Antenatal and perinatal clinical variables and severity of encephalopathy were collected. Infants were assessed at 18 months using the Bayley Scales of Infant and Toddler Development-III and the presence and severity of CP was investigated at 24 months. **RESULTS:** 125 of 132 infants fulfilled entry criteria for TH trials and completed 72h of TH. Sixteen (13%) of the 125 infants died and 8 (6%) were not available for follow-up. Eighteen infants (14%; 18% of those assessed) developed CP. Of these, 12 (67%) were

classified using the Gross Motor Function Classification System, at level 1, six (33%) at level 5 and none at levels 2, 3 or 4. CONCLUSION:

Our regional clinical cohort had lower mortality and comparable rates of CP compared with historical outcomes in TH trials. In contrast to historical cohorts, only one third of the 18 children with CP were severely affected and 12 were mildly affected, all of whom were independently ambulant by 24 months.

[PMID: 26237284](#)

14. Early Hum Dev. 2015 Jul 31;91(10):593-599. doi: 10.1016/j.earlhumdev.2015.07.008. [Epub ahead of print]

Neonatal neurobehavior after therapeutic hypothermia for hypoxic ischemic encephalopathy.

Massaro AN, Evangelou I, Brown J, Fatemi A, Vezina G, McCarter R, Glass P, Limperopoulos C.

BACKGROUND: Perinatal hypoxic ischemic encephalopathy (HIE) is a major cause of neurodevelopmental impairment including cerebral palsy and intellectual disability. Brain magnetic resonance imaging is the gold standard for acute assessment of cerebral injury in HIE. Limited data are available regarding the significance of clinically manifested neurobehavioral impairments in the neonatal period. **AIM:** To evaluate brain structure-function relationships in newborns with HIE using diffusion tensor imaging (DTI) and the NICU Network Neurobehavioral Scale (NNNS). **STUDY DESIGN:** Prospective observational study with secondary longitudinal component.

SUBJECTS:

Forty-five newborns (62% male) with HIE referred for therapeutic hypothermia who underwent MRI and neurobehavioral assessment prior to discharge. **OUTCOME MEASURES:** DTI was performed at median age of 8days (range 5-16) and NNNS at median 12days of life (range 5-20, postmenstrual age 40±2weeks). Developmental assessment with the Bayley Scales of Infant Development-II was performed at median age of 21.6months (range 20.8-30.6). **RESULTS:** Significant associations were observed between DTI corticospinal tract integrity and NNNS neuromotor performance in HIE newborns. Neonatal neuromotor performance was also related to later early childhood motor outcomes. **CONCLUSIONS:** NNNS performed after therapeutic hypothermia in newborns with HIE can identify neuromotor abnormalities that are related to microstructural brain injury in the corticospinal tract and later motor outcomes in early childhood. These data support the NNNS as a valid early functional assessment of perinatal brain injury.

[PMID: 26246138](#)

15. Int J Mol Sci. 2015 Aug 5;16(8):18018-18032.

Stromal Cell-Derived Factor-1 α Plays a Crucial Role Based on Neuroprotective Role in Neonatal Brain Injury in Rats.

Mori M, Matsubara K, Matsubara Y, Uchikura Y, Hashimoto H, Fujioka T, Matsumoto T.

Owing to progress in perinatal medicine, the survival of preterm newborns has markedly increased. However, the incidence of cerebral palsy has risen in association with increased preterm birth. Cerebral palsy is largely caused by cerebral hypoxic ischemia (HI), for which there are no effective medical treatments. We evaluated the effects of stromal cell-derived factor-1 α (SDF-1 α) on neonatal brain damage in rats. Left common carotid (LCC) arteries of seven-day-old Wistar rat pups were ligated, and animals were exposed to hypoxic gas to cause cerebral HI. Behavioral tests revealed that the memory and spatial perception abilities were disturbed in HI animals, and that SDF-1 α treatment improved these cognitive functions. Motor coordination was also impaired after HI but was unimproved by SDF-1 α treatment. SDF-1 α reduced intracranial inflammation and induced cerebral remyelination, as indicated by the immunohistochemistry results. These data suggest that SDF-1 α specifically influences spatial perception abilities in neonatal HI encephalopathy.

[PMID: 26251894](#)

16. Stem Cell Rev. 2015 Aug 4. [Epub ahead of print]**A Need for Renewed and Cohesive US Policy on Cord Blood Banking.**

Matsumoto MM1, Matthews KR.

Stem cells obtained from umbilical cord blood (CB) are used to treat more than 80 different diseases and are a standard treatment for many types of leukemias, lymphomas, myelodysplasias, and inherited immune system disorders. CB transplants have been carried out in humans for over 25 years, and hundreds of clinical trials are currently underway investigating CB's therapeutic potential for a wide range of disorders, including autism, diabetes, cerebral palsy, and spinal cord injury. Extensive storage facilities have been established in the United States and around the world to collect, test, and freeze CB for later use in medical procedures. However, a divide between two different banking models-public versus private-has emerged, presenting several policy challenges. While the Food and Drug Administration currently regulates CB storage and use in the United States, other state and federal guidelines on CB education, awareness, and ethical considerations remain variable, and no mandatory international guidelines exist. In addition, federal funding for an important CB collection initiative that specifically targets minority populations is set to expire by the end of FY2015. To help organize and coordinate efforts across the United States and other nations, policymakers should implement regulations for: high quality standards for both private and public CB banks, a commitment to ethical practices, and an investment in educational campaigns and training programs for all steps of the CB banking process.

[PMID: 26239848](#)

17. Stem Cells Int. 2015;2015:325652. doi: 10.1155/2015/325652. Epub 2015 Jul 8.**Safety of Allogeneic Umbilical Cord Blood Stem Cells Therapy in Patients with Severe Cerebral Palsy: A Retrospective Study.**

Feng M, Lu A, Gao H, Qian C, Zhang J, Lin T, Zhao Y.

This retrospective study aimed to assess the safety of patients with severe cerebral palsy (CP), who received allogeneic umbilical cord blood stem cells (UCBSCs) treatment from August 2009 to December 2012 in Guangdong Provincial Hospital of Chinese Medicine. A total of 47 patients with average age of 5.85 ± 6.12 years were evaluated in this study. There was no significant association with allogeneic UCBSCs treatments found in the data of the laboratory index. No casualties occurred. Some adverse events during treatments were found in 26 (55.3%) patients, including fever (42.6%) and vomiting (21.2%). Intrathecal infusion and the ages at the initiation of treatment (≤ 10 years old) were risk factors for the occurrence of adverse events by logistic regression analysis. However, all adverse events disappeared after symptomatic treatment. No treatment related serious adverse events were found in follow-up visits within 6 months. In conclusion, allogeneic UCBSCs treatment was relatively safe for severe CP patients.

[PMID: 26236347](#)