Cerebral Palsy ALLIANCE

NEWS
Cerebral Palsy Research

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Interventions and Management

1. J Phys Ther Sci. 2015 Feb;27(2):411-3. doi: 10.1589/jpts.27.411. Epub 2015 Feb 17.

Effects of visual perceptual intervention on visual-motor integration and activities of daily living performance of children with cerebral palsy.

Cho M1, Kim D2, Yang Y3.

Purpose: The purpose of this study was to find the effects of a visual perceptual intervention on visual-motor integration and activities of daily living performance of children with cerebral palsy as subjects. Methods: This study was conducted with 56 children who were diagnosed as having cerebral palsy. The visual perceptual intervention was implemented for 8 weeks, 3 times a week, for 30 minutes per session, for a total of 24 sessions. All children were assessed using the VMI and WeeFIM to evaluate visual motor integration and activities of daily living skills, immediately before and after the 8-week intervention. Results: The VMI and WeeFIM scores of all of the 56 children with CP who participated in the study improved, and the improvements were statistically significant. Conclusion: Visual perceptual intervention had a positive influence on the visual-motor integration and activities of daily living performance of children with cerebral palsy.

PMID: 25729180 [PubMed] PMCID: PMC4339150 Free PMC Article

2. J Pediatr Orthop B. 2015 Mar 3. [Epub ahead of print]

Unusual entrapment of deep peroneal nerve after femoral distal extension osteotomy.

Yldrm E1, Sarkaya IA, Inan M.

The lateral exposure of the supracondylar femur includes the risk of damaging the neurovascular structures or tightening of the neurological structures within the popliteal fossa may occur as a complication of the osteotomy. Although different pathways of common peroneal nerve (CPN) have been reported throughout the literature, division of deep and superficial branches above the supracondylar femur level has not been reported. A 15-year-old boy with bilateral knee flexion contracture and spastic diplegic cerebral palsy underwent bilateral femoral distal extension osteotomy. The authors found an unusual higher division of CPN above the supracondylar femur level. This report is aimed at warning surgeons about the division of the CPN at a higher level and highlighting a need for a high-powered cadaveric research.

PMID: 25734569 [PubMed - as supplied by publisher]

3. Clin Orthop Surg. 2015 Mar;7(1):140-1. doi: 10.4055/ cios.2015.7.1.140. Epub 2015 Feb 10.

Anterior knee pain in patients with cerebral palsy.

Koca K1, Akyildiz F2, Akpancar S1, Ekinci S3.

PMID: 25729531 [PubMed - in process] PMCID: PMC4329527 Free PMC

4. Clin Orthop Surg. 2015 Mar;7(1):39-45. doi: 0.4055/ cios.2015.7.1.39. Epub 2015 Feb 10.

Contemporary ceramic total hip arthroplasty in patients with cerebral palsy: does it work?

Yoon BH1, Lee YK2, Ha YC3, Koo KH2.

BACKGROUND: Adult patients with cerebral palsy (CP), who have advanced degenerative arthritis of the hip, have been treated with resection arthroplasty and arthrodesis. Although total hip arthroplasty (THA) has also been used as one of the alternative options, there are few studies on contemporary bearings used in THA. Therefore, we evaluated the results of the contemporary ceramic-on-ceramic THA in adult patients with CP. METHODS: From January 2005 to December 2007, five adult CP patients (5 hips) underwent THA using contemporary ceramic-on-ceramic bearings. All patients were able to stand or ambulate with intermittent use of assistive devices at home. We retrospectively reviewed the series to determine the results of THA in terms of pain relief, improved function, and durability of prosthesis. RESULTS: There were 3 men and 2 women with a mean age of 35.9 years. All patients had pain relief without decline in mobility postoperatively. One hip was dislocated, which was treated successfully with closed reduction and an abduction brace for 2 months. There was no ceramic fracture, loosening, or osteolysis during the mean follow-up of 6.8 years (range, 5.8 to 8.3 years). CONCLUSIONS: Cementless THA using contemporary ceramic-on-ceramic bearings is a useful option for the treatment of advanced degenerative arthritis of the hip in ambulatory adults with CP.

PMID: 25729517 [PubMed - in process] PMCID: PMC4329531 Free PMC Article

5. J Phys Ther Sci. 2015 Feb;27(2):499-500. doi: 0.1589/ jpts.27.499. Epub 2015 Feb 17.

Abnormal sitting pressures of hemiplegic cerebral palsy children on a school chair.

Lee IH1, Park SY2.

Purpose: The purpose of this study was to investigate the differences in symmetry of sitting posture between typical developmental (TD) children and hemi-cerebral palsy (CP) children. Subjects and Methods: A school chair mounted on a force platform was used to assess the quiet-sitting pressure distribution of 10 TD and 10 CP children. Results: The symmetry index of the TD children was significantly closer to zero than that of the CP children irrespective of the latter group's hemiparetic side. Conclusions: Sitting posture on school chairs of CP children was more asymmetrical than that of TD children.

PMID: 25729201 [PubMed] PMCID: PMC4339171 Free PMC Article

6. J Orthop Res. 2015 Mar 2. doi: 10.1002/jor.22860. [Epub ahead of print]

Reduced satellite cell number in situ in muscular contractures from children with cerebral palsy.

Dayanidhi S1, Dykstra PB, Lyubasyuk V, McKay BR, Chambers HG, Lieber RL.

Satellite cells (SC) are quiescent adult muscle stem cells critical for postnatal development. Children with cerebral palsy have impaired muscular growth and develop contractures. While flow cytometry previously demonstrated a reduced SC population, extracellular matrix abnormalities may influence the cell isolation methods used systematically isolating fewer cells from CP muscle and creating a biased result. Consequently, the purpose of this study was to use immunohistochemistry on serial muscle sections to quantify SCs in situ. Serial cross sections from human gracilis muscle biopsies (n=11) were labeled with fluorescent antibodies for Pax7 (SC transcriptional

marker), laminin (basal lamina), and 4', 6-diamidino-2-phenylindole (nuclei). Fluorescence microscopy under high magnification was used to identify SC based on labeling and location. Mean SC/100 myofibers was reduced by ~70% ($p<0.0001$) in children with CP (2.89 ± 0.39) compared to TD children (8.77 ± 0.79). Furthermore, SC distribution across fields was different ($p<0.05$) with increased percentage of SC in fields being solitary cells ($p<0.01$) in children with CP. Quantification of SC number in situ, without any other tissue manipulation confirms children with spastic CP have a reduced number. This stem cell loss may, in part, explain impaired muscle growth and apparent decreased responsiveness of CP muscle to exercise. This article is protected by copyright.

PMID: 25732238 [PubMed - as supplied by publisher]

7. Prog Brain Res. 2015;217:253-66. doi: 10.1016/bs.pbr.2014.11.030. Epub 2015 Feb 2.

The discovery of human auditory-motor entrainment and its role in the development of neurologic music therapy.

Thaut MH1.

The discovery of rhythmic auditory-motor entrainment in clinical populations was a historical breakthrough in demonstrating for the first time a neurological mechanism linking music to retraining brain and behavioral functions. Early pilot studies from this research center were followed up by a systematic line of research studying rhythmic auditory stimulation on motor therapies for stroke, Parkinson's disease, traumatic brain injury, cerebral palsy, and other movement disorders. The comprehensive effects on improving multiple aspects of motor control established the first neuroscience-based clinical method in music, which became the bedrock for the later development of neurologic music therapy. The discovery of entrainment fundamentally shifted and extended the view of the therapeutic properties of music from a psychosocially dominated view to a view using the structural elements of music to retrain motor control, speech and language function, and cognitive functions such as attention and memory.

PMID: 25725919 [PubMed - in process]

8. J Pediatr Rehabil Med. 2015 Jan 1;8(1):3-12. doi: 10.3233/PRM-150313.

Implementation of an academic adult primary care clinic for adolescents and young adults with complex, chronic childhood conditions.

Berens JC1, Peacock C2.

PURPOSE: For the growing population of adolescents and young adults with chronic childhood conditions (AYACCC), the transition from pediatric to adult health care contains many barriers and appropriate adult-based health care options are few. In 2005, the Transition Medicine Clinic (TMC), affiliated with Baylor College of Medicine, was established in Houston, Texas. It is one of the first clinics of its kind and serves AYACCC by providing a medical home in the adult health care system. This article describes the development and implementation of the TMC, its patient population and their resource needs, and lessons learned along the way. METHODS: We retrospectively examined the electronic health records of 332 patients that established care in the TMC prior to July, 2011. Data were collected describing multiple facets of the patient population and their resource utilization, both in aggregate and for several subgroups. RESULTS: The most common primary diagnoses were cerebral palsy, spina bifida, Down syndrome, genetic conditions, and autism. Patient characteristics demonstrated the unique challenges faced by the clinic: more than 80% received Medicaid, 65% had an intellectual disability, 41% used a wheelchair, and most had multiple secondary diagnoses. Compared to typical adult primary care practices, a larger amount of clinical resources, medical technology, and specialists were used, especially for those with the most medically fragile conditions. CONCLUSIONS: The results suggest that a clinic serving AYACCC requires physicians and support staff familiar with the aforementioned issues that are willing to spend a considerable amount of time and effort outside of routine office visits in health care coordination. Because many of these patients are covered by publicly funded health insurance, enhanced reimbursement must be considered to

keep clinics like the TMC self-sustaining. Future research is needed to demonstrate adult-based care delivery models, develop clinical care guidelines, and evaluate key clinical outcomes.

PMID: 25737343 [PubMed - in process]

9. Pediatrics. 2015 Mar 2. pii: peds.2014-1947. [Epub ahead of print]

Measles Imported to the United States by Children Adopted From China.

Su Q1, Zhang Y2, Ma Y2, Zheng X3, Han T4, Li F4, Hao L1, Ma C1, Wang H1, Li L1, Luo H5.

In July 2013, the National Immunization Program of China was notified by the US Centers for Disease Control and Prevention that measles was detected in 3 newly adopted, special needs children with cerebral palsy (CP) from China. We report an investigation of measles transmission in China that led to infection of these children. Interviews were conducted with welfare institute staff and panel physicians; health records of the potentially exposed population were reviewed; and immunization coverage was assessed among institute residents. Five residents with CP, all unvaccinated against measles, among who were the 3 adoptees, were linked epidemiologically into 3 generations of measles transmission antecedent to the US outbreak. In a random sample of residents, first dose of measles containing vaccine (MCV1) and MCV2 coverage was 16 of 17 (94%) and 7 of 11 (64%) among children with CP, and 100% (32 of 32) and 96% (21 of 22) among children without CP. Vaccinators reported reluctance to vaccinate children with CP because the China pharmacopeia lists encephalopathy as a contraindication to vaccination. Panel physicians reported to investigators no necessity of vaccination for adoptees to the United States if US parents sign an affidavit exempting the child from vaccination. We recommend that the China pharmacopeia vaccine contraindications be reviewed and updated, the United States should reconsider allowing vaccination exemptions for internationally adopted children unless there are true medical contraindications to vaccination, and US pediatricians should counsel adopting parents to ensure that their child is up-to-date on recommended vaccinations before coming to the United States.

PMID: 25733758 [PubMed - as supplied by publisher]

10. J Phys Ther Sci. 2015 Feb;27(2):401-3. doi: 10.1589/jpts.27.401. Epub 2015 Feb 17.

Differences in respiratory pressure and pulmonary function among children with spastic diplegic and hemiplegic cerebral palsy in comparison with normal controls.

Kwon YH1, Lee HY2.

Purpose: The purpose of this study was to determine differences in respiratory pressure and pulmonary function among children with spastic diplegic and hemiplegic cerebral palsy (CP) in comparison with children with normal development. Subjects and Methods: Fourteen children with spastic diplegic CP, 11 children with hemiplegic CP, and 14 children with normal development were recruited. Respiratory pressure was measured and the pulmonary function test (PFT) was performed to evaluate the strength of the respiratory muscles and lung volumetric capacity. Results: Regarding respiratory pressure, children with spastic diplegic and hemiplegic CP showed significantly lower functions in terms of MIP and MEP compared with children with normal development, although no significant differences were found between children with the two types of CP. In the pulmonary function test, children with spastic diplegic CP showed significantly higher pulmonary function than children with normal development in terms of only FVC and FEV1. Conclusion: Children with CP showed relatively lower function in terms of respiratory pressure and lung capacity, in comparison with children with normal development. Therefore, respiratory function in children with CP should be carefully evaluated and should receive more attention in a rehabilitation setting.

PMID: 25729178 [PubMed] PMCID: PMC4339148 Free PMC Article

11. Female Pelvic Med Reconstr Surg. 2015 Feb 27. [Epub ahead of print]

Effective Treatment of Dyssynergic Defecation Using Sacral Neuromodulation in a Patient With Cerebral Palsy.

Chan DK1, Barker MA.

BACKGROUND: Dyssynergic defecation is a complex bowel problem that leads to chronic constipation and abdominal pain. Management is often challenging owing to the incoordination of multiple pelvic floor muscles involved in normal defecation. CASE: We report a case of dyssynergic defecatory dysfunction in a patient with cerebral palsy treated with sacral neuromodulation. At presentation, Sitz marker study and magnetic resonance defecography showed evidence of chronic functional constipation. Anorectal manometry, rectal anal inhibitory reflex, and rectal sensation study showed intact reflex and decreased first sensation of lower canal at 50 mL. After stage 2 of InterStim implant placement, bowel habits improved to once- to twice-daily soft solid bowel movements from no regular solid bowel movements. Fecal incontinence improved from daily liquid and small solid loss to no stool leakage. CONCLUSIONS: In patients with systemic medical problems contributing to defecatory dysfunction and bowel incontinence, such as cerebral palsy, sacral neuromodulation was found to provide significant relief of bowel symptoms in addition to associated abdominal pain. As a result of intervention, the patient reported significant improvement in quality of life and less limitations due to dyssynergic defecation.

PMID: 25730427 [PubMed - as supplied by publisher]

12. J Back Musculoskelet Rehabil. 2015 Mar 3. [Epub ahead of print]

Musculoskeletal system problems and quality of life of mothers of children with cerebral palsy with different levels of disability.

Kavlak E1, Altug F1, Büker N1, Senol H2.

OBJECTIVE: The objective of this study is to investigate musculoskeletal system problems and quality of life of mothers of children with cerebral palsy with different levels of disability. METHODS: 100 children (37 girls and 63 boys) with cerebral palsy (CP) and their mothers were included in this study. Functional levels of children with CP were assessed by using the Gross Motor Function Classification System (GMFCS) and the Pediatric Functional Independence Measure (WeeFIM). Quality of life of mothers regarding health was assessed by using the Nottingham Health Profile (NHP). Musculoskeletal system problems of mothers were assessed by using the Neck Disability Index (NDI) and the Roland-Morris Disability Questionnaire (RMDQ).RESULTS: No statistical significance was found when GMFCS levels of children with CP and the NHP, DASH - T, RMDQ, NDI and the BAE values of mothers were compared in an inter-group way ($p > 0.05$). When the NHP parameters and the existence of lower and arm pains of mothers were compared with their BAI, NDI, RMDQ and DASH - T scores, a statistically significant relationship was found among them ($p < 0.05$). CONCLUSION: As functional levels of children with CP get worse, upper extremity, lower back and neck problems and anxiety levels of mothers increase and this situation negatively affects mothers' quality of life.

PMID: 25736956 [PubMed - as supplied by publisher]

13. Disabil Rehabil. 2015 Mar 4:1-6. [Epub ahead of print]

Service use and family-centred care in young people with severe cerebral palsy: a population-based, cross-sectional clinical survey.

McDowell BC1, Duffy C, Parkes J.

Purpose: To assess healthcare use and family perception of family-centred care in children and young adults with severe cerebral palsy (CP) within a geographical region of the UK. Method: Young people (4-27years) with severe forms of CP; Gross Motor Function Classification System levels IV and V, were recruited via an established case register. Data were collected in the participant's home using a standardised background proforma and validated questionnaires. The Measure of Processes of Care was used to assess the family's perception of family-centred care. Results: One-hundred and twenty-three children, young people and their families/guardians participated.

Results showed high accessing of specialist services in childhood with a considerable decrease in young adults. Use of generalist services remained relatively constant. The reported use of formal respite services and support groups/youth clubs was relatively poor. Family-centred care was poor in the area of "providing general information" (2.8±1.73) but more moderate in the areas of "providing specific information about the young person" (4.2±1.94), "enabling and partnership" (4.2±1.9), "co-ordinated and comprehensive care" (4.3±1.95) and "respectful and supportive care" (4.7±1.75). Conclusions: The accessing of specialist services and respite care notably decreases amongst adolescents with severe forms of CP and the perception of family-centred care amongst families was fair at best. In particular, the results highlight the need for families to be provided with more general information and advice. Implications for Rehabilitation In a quest to enhance the rehabilitation process in young people with severe forms of cerebral palsy: Commissioners and service providers need to a adopt a more rationalised, needs led approach to service provision across the lifespan of people with severe forms of cerebral palsy, to include an effective and efficient transitional period. Habilitation specialists working with young adults need to continue to recognise the importance of family-centred care in managing this complex and chronic condition. Professionals working within the healthcare system must provide better communication and improve their dissemination of information to the families of children and young people with complex needs.

PMID: 25738910 [PubMed - as supplied by publisher]

14. Dev Med Child Neurol. 2015 Feb;57(2):203-4. doi: 0.1111/ dmcn.12639. Epub 2014 Nov 25.

International Classification of Functioning, Disability and Health Core Sets for children and youth with CP: contributions to clinical practice.

Schiariti V1, Selb M, Cieza A, O'Donnell M.

Comment on: International Classification of Functioning, Disability and Health Core Sets for children and youth with cerebral palsy: a consensus meeting. [Dev Med Child Neurol. 2015]

PMID: 25422048 [PubMed - indexed for MEDLINE]

Prevention and Cure

15. Obstet Gynecol. 2015 Mar;125(3):636-42. doi: 10.1097/ AOG.0000000000000673.

Preterm cesarean delivery for nonreassuring fetal heart rate: neonatal and neurologic morbidity.

Mendez-Figueroa H1, Chauhan SP, Pedroza C, Refuerzo JS, Dahlke JD, Rouse DJ.

OBJECTIVE: To compare the rates of neonatal morbidity and cerebral palsy among preterm neonates (less than 37 weeks of gestation) delivered by cesarean for a nonreassuring fetal heart rate (FHR) tracing compared with those who did not. METHODS: This was a secondary analysis of a multicenter randomized trial of MgSO4 for the prevention of cerebral palsy. Newborns of women delivered by cesarean delivery for nonreassuring FHR were compared with a control group composed of the offspring of women who labored for 2 hours or longer but did not undergo cesarean delivery for nonreassuring FHR regardless of the mode of delivery. Using multivariable analysis to adjust for potential confounders, our objective was to compare two outcomes: 1) composite neonatal morbidity (Apgar score 3 or less at 5 minutes, seizure, sepsis, necrotizing enterocolitis grade II or III, intraventricular hemorrhage grade III or IV, or death before discharge) and 2) neurologic injury (cerebral palsy) at 2 years or more of corrected age between the groups. RESULTS: Of the 1,291 preterm neonates who met the inclusion criteria, 177 (14%) were delivered by cesarean for nonreassuring FHR compared with 1,114 (86%) in the control group. Composite neonatal morbidity was similar between the groups (30.5 compared with 22.2%, adjusted odds ratio [OR] 1.4, 95% confidence interval [CI] 0.9-2.1). The rate of cerebral palsy of any severity (8.3 compared with 4.0%, adjusted OR 2.3, 95% CI 1.2-4.5) and moderate-to-severe cerebral palsy at 2 years of corrected age (6.0 compared with 2.2%, adjusted OR 3.2, 95% CI 1.4-7.1) was significantly higher in children born through cesarean delivery for nonreassuring FHR. CONCLUSION: Nonreassuring fetal tracing deemed so serious as to require cesarean delivery is associated with an increased risk of cerebral palsy in preterm neonates.

LEVEL OF EVIDENCE: II.

PMID: 25730227 [PubMed - in process]

16. Front Immunol. 2015 Feb 12;6:56. doi: 10.3389/fimmu.2015.00056. eCollection 2015.

Antimicrobial peptides and complement in neonatal hypoxia-ischemia induced brain damage.

Rocha-Ferreira E1, Hristova M1.

Hypoxic-ischemic encephalopathy (HIE) is a clinical condition in the neonate, resulting from oxygen deprivation around the time of birth. HIE affects 1-5/1000 live births worldwide and is associated with the development of neurological deficits, including cerebral palsy, epilepsy, and cognitive disabilities. Even though the brain is considered as an immune-privileged site, it has innate and adaptive immune response and can produce complement (C) components and antimicrobial peptides (AMPs). Dysregulation of cerebral expression of AMPs and C can exacerbate or ameliorate the inflammatory response within the brain. Brain ischemia triggers a prolonged inflammatory response affecting the progression of injury and secondary energy failure and involves both innate and adaptive immune systems, including immune-competent and non-competent cells. Following injury to the central nervous system (CNS), including neonatal hypoxia-ischemia (HI), resident microglia, and astroglia are the main cells providing immune defense to the brain in a stimulus-dependent manner. They can express and secrete pro-inflammatory cytokines and therefore trigger prolonged inflammation, resulting in neurodegeneration. Microglial cells express and release a wide range of inflammation-associated molecules including several components of the complement system. Complement activation following neonatal HI injury has been reported to contribute to neurodegeneration. Astrocytes can significantly affect the immune response of the CNS under pathological conditions through production and release of pro-inflammatory cytokines and immunomodulatory AMPs. Astrocytes express ß-defensins, which can chemoattract and promote maturation of dendritic cells (DC), and can also limit inflammation by controlling the viability of these same DC. This review will focus on the balance of complement components and AMPs within the CNS following neonatal HI injury and the effect of that balance on the subsequent brain damage.

PMID: 25729383 [PubMed] PMCID: PMC4325932 Free PMC Article

17. Semin Pediatr Neurol. 2014 Dec;21(4):241-7. doi: 10.1016/ j.spen.2014.10.003. Epub 2014 Oct 27.

Interdisciplinary approach to neurocritical care in the intensive care nursery.

Glass HC1, Rogers EE2, Peloquin S2, Bonifacio SL2.

Neurocritical care is a multidisciplinary subspecialty that combines expertise in critical care medicine, neurology, and neurosurgery, and has led to improved outcomes in adults who have critical illnesses. Advances in resuscitation and critical care have led to high rates of survival among neonates with life-threatening conditions such as perinatal asphyxia, extreme prematurity, and congenital malformations. The sequelae of neurologic conditions arising in the neonatal period include lifelong disabilities such as cerebral palsy and epilepsy, as well as intellectual and behavioral disabilities. Centers of excellence have adapted the principles of neurocritical care to reflect the needs of the developing newborn brain, including early involvement of a neurologist for recognition and treatment of neurologic conditions, attention to physiology to help prevent secondary brain injury, a protocol-driven approach for common conditions like seizures and hypoxic-ischemic encephalopathy, and education of specialized teams that use brain monitoring and imaging to evaluate the effect of critical illness on brain function and development.

PMID: 25727505 [PubMed - in process]

18. Biomark Med. 2015 Mar;9(3):267-75. doi: 10.2217/bmm.14.116.

Biomarkers of multiorgan injury in neonatal encephalopathy.

Aslam S1, Molloy EJ.

Neonatal encephalopathy (NE) is a major contributor to neurodevelopmental deficits including cerebral palsy in term and near-term infants. The long-term neurodevelopmental outcome is difficult to predict with certainty in first few days of life. Multiorgan involvement is common but not part of the diagnostic criteria for NE. The most frequently involved organs are the heart, liver, kidneys and hematological system. Cerebral and organ involvement is associated with the release of organ specific biomarkers in cerebrospinal fluid, urine and blood. These biomarkers may have a role in the assessment of the severity of asphyxia and long-term outcome in neonates with NE.

PMID: 25731212 [PubMed - in process]