Cerebral Palsy Alliance

NEWS
Cerebral Palsy Research

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Interventions and Management

1. J Physiother. 2012;58(1):59.

Bimanual therapy and constraint-induced movement therapy are equally effective in improving hand function in children with congenital hemiplegia.

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SUMMARY OF: Gordon AM et al (2011) Bimanual training and constraint-induced movement therapy in children with hemiplegic cerebral palsy: a randomized trial. Neurorehabil Neural Repair 25: 692-702. [Prepared by Nora Shields, CAP Editor.] QUESTION: Does constraint-induced movement therapy (CIMT) improve hand function in children with congenital hemiplegia compared to bimanual therapy? DESIGN: Randomised trial with concealed allocation and blinded outcome assessment. SETTING: 6 CIMT and bimanual therapy day camps were conducted at a University in the United States. PARTICIPANTS: Children with congenital hemiplegia aged 3.5 to 10 years, with basic movement and grasp in their paretic hand, and who attended mainstream school. Health problems not associated with cerebral palsy, severe hypertonia, and recent surgery or botulinum toxin therapy were exclusion criteria. Randomisation of 44 participants allocated 22 to the CIMT group and 22 to the bimanual therapy group. The groups were matched for age and hand function. INTERVENTIONS: Both groups received 90 hours of therapy, delivered in day-camps with 2-5 children in each group. Participants completed 6 hours of therapy a day for 15 consecutive weekdays. Treatment was delivered by physiotherapists, occupational therapists, and students enrolled in health related courses. Participants worked individually and in groups. The CIMT group had their less affected hand restrained in a sling and performed age appropriate fine and gross motor unimanual activities The bimanual therapy group engaged in age appropriate fine and gross motor bimanual activities. OUTCOME MEASURES: The primary outcomes were the Jebsen-Taylor Test of Hand Function (JTTHF) to assess unimanual capacity and the Assisting Hand Assessment (AHA) to assess bimanual performance. Secondary outcome measures were Goal Attainment Scale, Quality of Upper Extremity Skills Test (QUEST), and physical activity (percentage time each hand was used during the AHA assessment). Assessments were completed before treatment, 2 days after treatment, and 1 and 6 months after treatment. RESULTS: 42 participants completed the study. At the end of the 15-day intervention period, the groups did not significantly differ on the primary outcome measures and on two secondary outcome measures (QUEST, physical activity). There were significant within group changes for both groups on each primary outcome (mean change score JTTHF -137 s, 95% CI -174 to -99; mean change score AHA -0.49 logits, 95% CI 0.25 to 0.73) which were maintained at the 6 month follow-up. There were also significant within group changes for both groups for the QUEST and physical activity assessments. The bimanual therapy group made greater progress than the CIMT group on their Goal Attainment Scale scores (mean difference between groups 8.1 T-score, 95% CI 0.7 to 15.5). CONCLUSION: CIMT and bimanual therapy resulted

in similar improvements in hand function among young children with congenital hemiplegia. The bimanual therapy group made better progress on established goals. [Mean difference between groups calculated by the CAP Editor].

PMID: 22341385 [PubMed - in process]

2. Dev Med Child Neurol. 2012 Feb 21. doi: 10.1111/j.1469-8749.2012.04241.x. [Epub ahead of print] Sakzewski et al. reply.

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PMID: 22352369 [PubMed - as supplied by publisher]

3. Disabil Rehabil. 2012 Feb 22. [Epub ahead of print]

Mental health, health related quality of life and recurrent musculoskeletal pain in children with cerebral palsy 8-18 years old.

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Purpose: To extend knowledge on mental health with children's self-report and explore mental health and health related quality of life (HRQL) in a context of recurrent musculoskeletal pain in cerebral palsy (CP). Method: Eighty-three participants, mean age 14.2 ± 2.8 years, were assessed with clinical examination, interview and questionnaires. Gross motor function was GMFCS level I 42%, level II 42%, level III 12% and level IV-V 5%. Children self-reported mental health on SDQ (Strengths and Difficulty Questionnaire), HRQL on PedsQL (Pediatric Quality of Life), and pain on CHQ (Child Health Questionnaire). Mothers proxy-reported on the same questionnaires and reported own mental health on GHQ (General Health Questionnaire). Results: Both self-reported mental health and HRQL was better than proxy-reported. Recurrent musculoskeletal pain was associated with more mental health problems and reduced HRQL in self-reports, but not in proxy-reports. Conclusions: In CP, the importance of child-report on mental health and HRQL when possible, in addition to parent proxy-report, cannot be overstated. Close co-operation between (re)habilitation and child psychiatry is urgent. Further research on self-reported mental health and impact of mental health problems is warranted together with a focus on the impact of recurrent musculoskeletal pain on participation.

PMID: 22352294 [PubMed - as supplied by publisher]

4. Stud Health Technol Inform. 2012;173:450-6.

Using a smart wheelchair as a gaming device for floor-projected games: a mixed-reality environment for training powered-wheelchair driving skills.

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For children with a severe disability, such as can arise from cerebral palsy, becoming independent in mobility is a critical goal. Currently, however, driver's training for powered wheelchair use is labor intensive, requiring hand-over-hand assistance from a skilled therapist to keep the trainee safe. This paper describes the design of a mixed reality environment for semi-autonomous training of wheelchair driving skills. In this system, the wheelchair is used as the gaming input device, and users train driving skills by maneuvering through floor-projected games created with a multi-projector system and a multi-camera tracking system. A force feedback joystick assists in steering and

enhances safety.

PMID: 22357035 [PubMed - in process]

5. Neurologia. 2012 Feb 16. [Epub ahead of print]

Use of virtual reality systems as proprioception method in cerebral palsy: clinical practice guideline [Article in English, Spanish]

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INTRODUCTION: The limitations in performing functional activities in children and adolescents with cerebral palsy are important. The use of virtual reality systems is a new treatment approach that reinforces task-oriented motor learning. The purpose of this guide is to study the impact of the use of virtual reality systems in the improvement and acquisition of functional skills, and to evaluate the scientific evidence to determine the strength of recommendation of such interventions. DEVELOPMENT: All available full-text articles, regardless of their methodology, were included. The following data bases were consulted: PubMed (Medline), PEDro, EMBASE (OVID -Elsevier), Cochrane Library, Medline (OVID), CINAHL, ISI Web Knowledge. An assessment was made of methodological quality, the level of scientific evidence, and the strength of recommendations using the tools: Critical Review Form - Quantitative Studies and the Guidelines for Critical Review Form - Quantitative Studies and U.S. Preventive Services Task Force. Finally, we included 13 articles and 97 participants were recruited. We obtained significant improvements in outcome measures that assessed postural control and balance, upper limb function, the selective joint control, and gait. CONCLUSIONS: The guide has some limitations: the limited number of patients enrolled, clinical diversity and age range, as well as the methodological quality of existing trials. Virtual reality is a promising tool in the treatment of children with cerebral palsy. There is strong scientific evidence of an acceptable recommendation for the use of virtual reality systems in the treatment of cerebral palsy.

PMID: 22341675 [PubMed - as supplied by publisher]

6. Z Orthop Unfall. 2012 Feb 21. [Epub ahead of print]

Botulinum Toxin A Treatment in Spastic Forms of Cerebral Palsy: A Retrospective Clinical Study. [Article in German]

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BACKGROUND: Botulinum toxin therapy now has a firm place in the treatment of spastic forms of cerebral palsy in children. This paper considers the subjective and practical results and the degrees of satisfaction from the point of view of the patients and their families. It also documents the data of infiltrations carried out under anaesthesia. PATIENTS AND METHODS: 57 patients with an average age of 11 (± 6.7; 2-30) and with infantile spastic cerebral palsy underwent altogether 118 botulinum toxin A infiltrations. The patients were divided into two groups: those with spastic hemiparesis or diparesis, and those with tetraparesis, and then compared with each other. The results of the treatment were evaluated from the point of view of the patients and their families with the help of a specially developed questionnaire. RESULTS: The study shows that, broadly-speaking, patients less affected with spastic hemiparesis or diparesis felt they profited more from the treatment than patients more severely affected with tetraparesis. The statistics also show that the first group's expectations were significantly more often fulfilled and that they more frequently perceived greater success after each infiltration than the group with tetraparesis. Most patients and their families from both groups were satisfied with the treatment. CONCLUSION: Patients and their families feel that the use of botulinum toxin in the management of spastic cerebral palsy in children is an effective and accepted form of treatment. The aims of the therapy should be defined accurately and realistically before starting treatment, especially for those severely affected with tetraparesis, and discussed in detail with both the patient and his/her family.

PMID: 22354442 [PubMed - as supplied by publisher]

7. J Neurosci Rural Pract. 2012 Jan;3(1):12-6.

Neurological disorders and barriers for neurological rehabilitation in rural areas in Uttar Pradesh: A cross-sectional study.

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BACKGROUND: In India, the majority of individuals with neurological disorders are rural based and cannot even afford the cost of rehabilitation. At the same time, we do not have barrier free environment in India. AIM: This study attempts to find out the neurological disorders and barriers for neurological rehabilitation in rural areas in Uttar Pradesh, India. SETTING: Rural areas in Uttar Pradesh, India. DESIGN: It is a cross-sectional study. MATERIALS AND METHODS: The study was done by means of an interview method using a questionnaire. The rural areas in Uttar Pradesh were visited personally and a data from 201 individuals was collected. STATISTICAL ANALYSIS USED: Data analysis was done by using descriptive statistics. RESULTS: Out of 201 individuals, 76.6% (n=154) individuals were with polio, 12.9% (n=26) were with cerebral palsy, 7.9% (n=16) were with stroke and 2.4% (n=5) were with spinal cord injury. Reasons for not taking the treatment/discontinuation of treatment were financial problem (44%), lack of awareness (43%), family negligence (6%), transportation problem (3.5%) and other environmental barriers (1%). CONCLUSION: In our study, we found polio to be the most prevalent disorder followed by Cerebral Palsy, Stroke and Spinal Cord Injury. Financial problem was the major barrier for neurological rehabilitation followed by lack of awareness, family negligence and transportation problem.

PMID: 22346183 [PubMed - in process] PMCID: PMC3271604

Prevention and Cure

8. Clin Perinatol. 2012 Mar;39(1):33-45. Epub 2012 Jan 10.

Obstetric interventions beneficial to prematurely delivering newborn babies: antenatal corticostetroids, progesterone, magnesium sulfate.

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Although improvements in neonatal care have continued to result in reduced mortality and morbidity of prematurely delivering newborns for decades, the results of a myriad of obstetric efforts and interventions have failed to reduce the overall rate of prematurity or prolong pregnancy at any gestational age. A few new developments or refinements of established interventions give increased hope for an improved obstetric contribution to the problem of prematurity. These include a better understanding of how best to use antenatal corticosteroids, and the newer options of magnesium sulfate to ameliorate or avoid cerebral palsy associated with prematurity and maternal progesterone administration to selected at-risk populations to decrease the likelihood of premature delivery.

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9. Behav Brain Res. 2012 Feb 8. [Epub ahead of print]

Neuroprotection of VEGF-expression neural stem cells in neonatal cerebral palsy rats.

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Cerebral palsy (CP) is a very common neural system development disorder that can cause physical disability in human. Here, we studied the neuroprotective effect of vascular endothelial growth factor (VEGF)-transfected neural stem cells (NSCs) in newborn rats with cerebral palsy (CP). Seven-day-old Sprague-Dawley rats were randomly divided into four groups: sham operation (control group), PBS transplantation (PBS group), VEGF+NSCs transplantation (transgene NSCs group) and NSCs transplantation groups (NSCs group). PBS, Transgene NSCs and NSCs groups respectively received stereotactic injections of PBS, lentiviral vector (pGC-FU-VEGF) infected NSCs or a NSCs suspension in the left sensory-motor cortex 3 days after CP model was established. The NSCs activity, their impacts on neural cell growth and apoptosis, brain development and animal behaviors were examined on the animals up to age 35-days. As expected, unilateral carotid artery occlusion plus hypoxia (cerebral palsy model) resulted in severe neural developmental disorders, including slowed growth, increased in cortical neuron apoptosis, decreased cerebral cortex micro-vessel density and retarded behavior developments. Transplantation of NSCs not only resulted in increases in VEGF protein expression in rat brains, but also largely prevented the behavioral defects and brain tissue pathology that resulted from cerebral palsy procedure, with animals received VEGF transfected NSCs always being marginally better than these received un-transfected cells. In conclusion, NSCs transplantation can partially prevent/slow down the brain damages that are associated with CP in the newborn rats, suggesting a new possible strategy for CP treatment.

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