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## Interventions and Management

### 1. Phys Occup Ther Pediatr. 2013 May 28. [Epub ahead of print]

#### **Change in Parent-Identified Goals in Young Children with Cerebral Palsy Receiving a Context-Focused Intervention: Associations with Child, Goal and Intervention Factors.**

Pollock N, Sharma N, Christenson C, Law M, Gorter JW, Darrah J.

School of Rehabilitation Science and CanChild Centre for Childhood Disability Research, McMaster University, Hamilton, ON, Canada.

The purpose of this study was to examine the relationship between goal achievement measured by the Canadian Occupational Performance Measure (COPM) and child, goal, and intervention factors. Participants were 41 preschool children with cerebral palsy (CP) who were in the context-focused therapy arm of a randomized controlled trial. Factors including child age, Gross Motor Function Classification System (GMFCS) level, type and complexity of goals, and intervention strategies were analyzed. Children made large, positive mean changes on the COPM over 6 months (Performance = 3.8, SD = 1.9; Satisfaction = 4.3, SD 4.3) with younger children showing greater change. The COPM scores had low to moderate correlations with change on the Pediatric Evaluation of Disability Inventory and the Gross Motor Function Measure (GMFM-66). Regression analysis indicated that age, but not GMFCS level influenced COPM change scores. Goal complexity and intervention strategies were not significantly related to COPM change scores. The results provide support for using the COPM as an individualized measure of change in young children with CP receiving intervention.

[PMID: 23713836](#) [PubMed - as supplied by publisher]

### 2. Disabil Rehabil. 2013 May 31. [Epub ahead of print]

#### **How are actual needs recognized in the content and goals of written rehabilitation plans?**

Jeglinsky I, Brogren Carlberg E, Autti-Rämö I.

Arcada, University of Applied Sciences, Helsinki, Finland.

**Purpose:** The primary aim of the study was to investigate the interrelation between needs and functional difficulties and the therapeutic goals in children with cerebral palsy (CP) as documented in individual written rehabilitation plans. **Method:** The study was a retrospective cross-sectional register study. The data consisted of randomly

chosen register documents for 77 children and adolescents with CP in different predetermined age ranges. The International Classification of Functioning, Disability and Health - Child and Youth version (ICF-CY) was used as a reference for analyzing the content of the written statements. Results: The rehabilitation plans for 70 children, 1-16 years of age, representing all GMFCS levels were analyzed. Goals were not well reflected in the children's needs and functional difficulties. The needs, functional difficulties and goals mainly encompassed the components of body functions and activity/participation. In half of the plans the presence of the parents was mentioned, and the plans were made in multidisciplinary collaboration. Conclusions: The results of this study indicate deficiencies in the content and goals of the written rehabilitation plans. The ICF-CY could serve as a framework to help professionals and parents identify the child's needs and those areas where the goals should be targeted. Implications for Rehabilitation Documenting the child's and family's needs in relation to activity and participation preferences is critical to rehabilitation and intervention planning. Goals, based on the child's needs, should be identified in collaboration with all parties involved, and focus on the child's functioning in meaningful everyday activities. The ICF-CY could serve as a framework for the family and professionals to identify needs and to communicate rehabilitation goals.

[PMID: 23721521](#) [PubMed - as supplied by publisher]

**3. Res Dev Disabil. 2013 May 24;34(8):2419-2432. doi: 10.1016/j.ridd.2013.04.013. [Epub ahead of print]**

**A systematic review of the clinimetric properties of measures of habitual physical activity in primary school aged children with cerebral palsy.**

Mitchell LE, Ziviani J, Oftedal S, Boyd RN.

Queensland Cerebral Palsy and Rehabilitation Research Centre, School of Medicine, The University of Queensland, Brisbane, Queensland, Australia; Children's Allied Health Research, Children's Health Queensland, Brisbane, Queensland, Australia. Electronic address: [louise.mitchell@uq.edu.au](mailto:louise.mitchell@uq.edu.au).

Regular participation in physical activity is an important determinant of health for children and adolescents with cerebral palsy (CP). However, there is little consensus on the most valid or reliable method to measure physical activity in this population. This study aimed to systematically review the psychometric properties of habitual physical activity (HPA) measures in primary school-aged children with CP. Databases were systematically searched for measures assessing physical activity over more than one day and had evidence of validity, reliability and/or clinical utility in children aged 6-12 years with CP. Ten measures met inclusion criteria and their quality was assessed in twelve studies. Quality of the included studies was appraised using the consensus-based standards for the selection of health measurement instruments (COSMIN) checklist. Measures were moderately to strongly correlated to criterion measures, with study quality rated as Fair (+) to Poor (0). Only four measures had evidence of reliability. Accelerometers provide a valid measure of HPA with good clinical utility; however they do not have documented reliability in this population. No one measure appears ideal to record HPA in primary school-age children with CP and further research is necessary to determine the psychometric properties of HPA measurement instruments in this population.

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**4. Disabil Rehabil Assist Technol. 2013 May 29. [Epub ahead of print]**

**The GestureTek virtual reality system in rehabilitation: a scoping review.**

Glegg SM, Tatla SK, Holsti L.

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Purpose: To identify, to map out and to appraise research examining GestureTek virtual reality (VR) use for physical and cognitive rehabilitation and to highlight areas for future research. Method: Scoping review methodology was used to systematically and comprehensively search the academic and grey literature for GestureTek-specific research. Consensus was achieved following two reviewers' independent inclusion screening,

data extraction and appraisal. Results: Forty-four studies evaluated the utility and efficacy of the IREX, GX, VMall and Meal Maker software for rehabilitation across a range of populations, with few adverse events reported. Stroke and cerebral palsy research dominated, while geriatrics was largely overlooked. Efficacy research provided support for balance, mobility, upper extremity, cognitive, fitness and daily living skills outcomes for specific populations with effect sizes ranging from 0.19 to 3.34. Nevertheless, few strong quality or high-level studies are available, and no clear guidelines on optimal treatment characteristics exist. Outcomes of primary interest were at ICF body function and activity levels; evaluation of transfer of training across ICF levels is needed. Conclusions: This literature provides preliminary evidence for the technology's efficacy for rehabilitation. Identified research gaps relate to study quality and design, treatment characteristics, populations and outcomes of interest, including transfer across ICF levels. Implications for Rehabilitation There is limited high-level evidence to support the use of the GestureTek virtual reality system for rehabilitation. Moderate to strong quality evidence exists primarily for the stroke and cerebral palsy populations, and primarily for balance, mobility and upper extremity outcomes. A lack of consistent outcome measures in this body of literature has created "silos" of research that cannot be quantitatively combined using a meta-analytic strategy.

[PMID: 23713408](#) [PubMed - as supplied by publisher]

##### **5. Scand J Occup Ther. 2013 May 29. [Epub ahead of print]**

###### **How do children and caregivers perceive their experience of undergoing the CIMT protocol?**

Mancini MC, Brandão MB, Dupin A, Drummond AF, Chagas PS, Assis MG.

Graduate Program in Rehabilitation Sciences, Occupational Therapy Department, Universidade Federal de Minas Gerais, Brazil.

Objective: Constraint-induced movement therapy (CIMT) is an effective intervention to improve hand function in children with cerebral palsy (CP). However, some of its features, including the restraining of the unaffected arm and the intensive training, may result in stressful experiences for children and interfere with family routine. This study aimed to document the perceptions of children with CP and their caregivers regarding the experience of undergoing the CIMT protocol. Methods: Qualitative data were collected from semi-structured interviews conducted with five children with CP and their caregivers (n = 6). Content analysis structured and summarized data into two emergent categories: (i) Perception of children and caregivers about CIMT implementation procedures; (ii) Occupational performance before and after the CIMT protocol. The interviews' content revealed that children and caregivers recognized the benefits of CIMT, including increased use of the affected arm and decreased need for assistance; they believed that these gains outweighed the difficulties they experienced in daily routine.

[PMID: 23713691](#) [PubMed - as supplied by publisher]

##### **6. Disabil Rehabil. 2013 May 30. [Epub ahead of print]**

###### **Expanded and revised gross motor function classification system: study for Chinese school children with cerebral palsy.**

Shi W, Yang H, Li CY, Zhou MQ, Zhu M, Wang Y, Qian X.

Rehabilitation Department, Children's Hospital of Fudan University, Shanghai, China.

Purpose: To determine the reliability and validity of the Chinese version of Expanded and Revised Gross Motor Function Classification System (GMFCS-ER) for cerebral palsy (CP) and to explore if there existed differences between parents and the other raters. Method: The GMFCS-ER was translated into Chinese. Children with CP age 6 to 18 years from two special education schools were assessed by 6 psychiatrists, 21 physiotherapists, 15 teachers and parents. Inter-rater reliability was analyzed with inter-rater correlation coefficients (ICC). Validity was assessed using Gross Motor Function Measure (GMFM) score as the criterion standard. Results: Mean (SD) age of the 130 children (93 boys, 37 girls) was 11.5 (2.8) years. Overall ICCs ranged between 0.84 and 0.92. Reliabilities between psychiatrists, physiotherapists and teachers (ICCs from 0.86 to 0.92) were higher than those between parents and the other raters (ICCs from 0.80 to 0.84) in 6-to-12 year age band. The overall correlation for criterion-related validity was -0.83. Conclusion: The Chinese version of the GMFCS-ER is a valid measure of functional ability in

school children with CP and reliable enough for use by Chinese healthcare providers and parents. Effects of environmental and personal factors should be considered when practicing GMFCS-ER assessment. Implications for Rehabilitation Cerebral palsy. Research about GMFCS-ER is needed to promote a more extensive use of GMFCS-ER in China for school children with CP. The Chinese version of the GMFCS-ER is a valid measure of functional ability in school children with CP and reliable enough for use by Chinese healthcare providers. Effects of environmental and personal factors should be considered when performing the GMFCS-ER assessment.

[PMID: 23721494](#) [PubMed - as supplied by publisher]

## 7. J Neurosurg Pediatr. 2013 May 28. [Epub ahead of print]

### Long-term functional benefits of selective dorsal rhizotomy for spastic cerebral palsy.

Dudley RW, Parolin M, Gagnon B, Saluja R, Yap R, Montpetit K, Ruck J, Poulin C, Cantin MA, Benaroch TE, Farmer JP.

Division of Neurosurgery, Department of Pediatric Surgery, Montreal Children's Hospital, McGill University, Montreal, Quebec, Canada;

**Object:** Large-scale natural history studies of gross motor development have shown that children with spastic cerebral palsy (CP) plateau during childhood and actually decline through adolescence. Selective dorsal rhizotomy (SDR) is a well-recognized treatment for spastic CP, but little is known about long-term outcomes of this treatment. The purpose of this study was to assess the durability of functional outcomes in a large number of patients through adolescence and into early adulthood using standardized assessment tools. **Methods:** The authors analyzed long-term follow-up data in children who had been evaluated by a multidisciplinary team preoperatively and at 1, 5, 10, and 15 years after SDR. These evaluations included quantitative, standardized assessments of lower-limb tone (Ashworth Scale), Gross Motor Function Measure (GMFM), and performance of activities of daily living (ADLs) by the Pediatric Evaluation of Disability Inventory in children who had been stratified by motor severity using the Gross Motor Function Classification System (GMFCS). In addition, group-based trajectory modeling (GBTM) was used to identify any heterogeneity of response to SDR among these treated children, and to find which pretreatment variables might be associated with this heterogeneity. Finally, a chart review of adjunct orthopedic procedures required by these children following SDR was performed. **Results:** Of 102 patients who underwent preoperative evaluations, 97, 62, 57, and 14 patients completed postoperative assessments at 1, 5, 10, and 15 years, respectively. After SDR, through adolescence and into early adulthood, statistically significant durable improvements in lower-limb muscle tone, gross motor function, and performance of ADLs were found. When stratified by the GMFCS, long-lasting improvements for GMFCS Groups I, II, and III were found. The GBTM revealed 4 groups of patients who responded differently to SDR. This group assignment was associated with distribution of spasticity (diplegia was associated with better outcomes than triplegia or quadriplegia) and degree of hip adductor spasticity (Ashworth score < 3 was associated with better outcomes than a score of 3), but not with age, sex, degree of ankle plantar flexion spasticity, or degree of hamstring spasticity. In a sample of 88 patients who had complete records of orthopedic procedures and botulinum toxin (Botox) injections, 52 (59.1%) underwent SDR alone, 11 (12.5%) received only Botox injections in addition to SDR, while 25 patients (28.4%) needed further lower-extremity orthopedic surgery after SDR. **Conclusions:** In the majority of patients, the benefits of SDR are durable through adolescence and into early adulthood. These benefits include improved muscle tone, gross motor function, and performance of ADLs, as well as a decreased need for adjunct orthopedic procedures or Botox injections. The children most likely to display these long-term benefits are those in GMFCS Groups I, II, and III, with spastic diplegia, less hip adductor spasticity, and preoperative GMFM scores greater than 60.

[PMID: 23713680](#) [PubMed - as supplied by publisher]

## 8. J Neurosurg Pediatr. 2013 Apr;11(4):377-8; discussion 378-9. doi: 10.3171/2012.10.PEDS12412. Epub 2013 Feb 8.

### Dorsal rhizotomy.

Park TS.

Comment on: Functional outcomes of childhood dorsal rhizotomy in adults and adolescents with cerebral palsy. [J

Neurosurg Pediatr. 2013]

[PMID: 23394358](#) [PubMed - indexed for MEDLINE]

**9. Folia Phoniatr Logop. 2013 May 23;65(1):32-39. [Epub ahead of print]**

**A Preliminary Investigation of Longitudinal Changes in Speech Production over 18 Months in Young Children with Cerebral Palsy.**

Lee J, Hustad KC.

Department of Communicative Disorders and Waisman Center, University of Wisconsin-Madison, Madison, Wisc., USA.

**Objective:** This study examined longitudinal change in speech intelligibility, vowel space, and word duration over 18 months among children with cerebral palsy (CP) who varied in the severity of their speech motor involvement. The study also examined relationships among variables at each time point. **Method:** Twenty-two children with CP participated in the study (mean age = 50 months at the first time point). Speech samples were collected at four time points that were 6 months apart. Children were separated into four severity groups based on intelligibility scores. **Results:** Change over time varied by severity. Children with CP who did not have speech motor involvement and children in the mild group showed gains in intelligibility, but no changes in vowel space area or word duration. Children in the moderate group showed no significant change, and children in the severe group showed increased vowel space and decreased word durations. Significant positive correlations between intelligibility and vowel space were noted at each time point for data pooled across all children. **Conclusion:** Children showed different patterns of change over time in intelligibility, vowel space, and word duration based on their speech motor abilities. The relationship between intelligibility and vowel space across severity groups was constant, suggesting a robust relationship between these variables.

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**10. Dev Med Child Neurol. 2013 May;55(5):403-4. doi: 10.1111/dmcn.12106. Epub 2013 Feb 26.**

**Communicative participation and speech intelligibility: complexities and challenges.**

Dykstra A.

School of Communication Sciences and Disorders, Western University, London, ON, Canada.

Comment on  
Intensive dysarthria therapy for younger children with cerebral palsy. [Dev Med Child Neurol. 2013]

[PMID: 23441870](#) [PubMed - indexed for MEDLINE]

**11. J Music Ther. 2012 Winter;49(4):430-52.**

**Joint attention responses of children with autism spectrum disorder to simple versus complex music.**

Kalas A.

University of Miami, United Cerebral Palsy of Miami, USA.

**BACKGROUND:** Joint attention deficits are viewed as one of the earliest manifestations and most characteristic features of the social deficits in Autism Spectrum Disorder (ASD). **PURPOSE:** The purpose of this study was to examine the effect of simple versus complex music on joint attention of children with ASD. **METHOD:** Thirty children with a diagnosis of ASD participated in this study. Fifteen of the participants were diagnosed with severe

ASD and 15 were diagnosed with mild/moderate ASD. Each participant took part in six, 10-minute individual music conditions (3 simple & 3 complex) over a 3-week period. Each condition was designed to elicit responses to joint attention. Results: Results indicated a statistically significant interaction between music modality and functioning level. Therefore, the effect of simple versus complex music was dependent on functioning level. Specifically, the Simple Music Condition was more effective in eliciting Responses to Joint Attention (RJA) for children diagnosed with severe ASD, whereas the Complex Music Condition was more effective in eliciting RJA for children diagnosed with mild/moderate ASD. CONCLUSIONS: The results of the present study indicate that for children in the severe range of functioning, music that is simple, with clear and predictable patterns, may be most effective in eliciting responses to bids for joint attention. On the contrary, for children in the mild/moderate range of functioning, music that is more complex and variable may be most effective in eliciting responses to bids for joint attention. These results demonstrate that careful manipulation of specific musical elements can help provide the optimal conditions for facilitating joint attention with children with ASD.

[PMID: 23705346](#) [PubMed - in process]

## 12. Eur J Pediatr. 2013 May 26. [Epub ahead of print]

### **Familial glucocorticoid deficiency: a diagnostic challenge during acute illness.**

Habeb AM, Hughes CR, Al-Arabi R, Al-Muhamadi A, Clark AJ, Metherell LA.

Paediatric department, Maternity and Children Hospital, PO Box 20873, Madinah, Saudi Arabia, amhabeb@hotmail.com.

Familial glucocorticoid deficiency (FGD) is a heterogeneous condition of isolated glucocorticoid deficiency due to adrenocorticotrophic hormone (ACTH) resistance. Patients have adrenal failure with normal electrolytes. We report two Arab children with different forms of FGD, in whom the diagnosis was initially masked by their acute illness and discuss the reasons for the delay in the diagnosis of FGD in both patients. Patient 1 presented at 12 days with Serratia sepsis. She received hydrocortisone for septic shock and needed dexamethasone courses to wean her off ventilation. At 13 weeks, she had normal electrolytes, low cortisol and high ACTH in keeping with FGD. A homozygous missense mutation (T159) in MC2R confirmed the diagnosis of FGD type 1. Patient 2 was admitted at 4.5 years, with an acute exacerbation of chronic asthma. At presentation, he had hypotension, hypoglycaemia and normal electrolytes. He was given IV hydrocortisone to treat his severe asthma, and his lip hyperpigmentation was thought to be central cyanosis. Two weeks later, his lips remained dark, and cortisol was low, with markedly elevated ACTH. Family history revealed a sister aged 22 years with cerebral palsy and a healthy 15-year-old brother, who were both severely pigmented with high ACTH levels. The diagnosis of FGD type 2 was confirmed by identifying a homozygous missense mutation (p.Y59D) in MRAP in the three siblings. Conclusions: FGD can be easily overlooked during acute illness. In a sick child, paired measurement of serum cortisol with ACTH prior to starting steroid therapy would be useful in making the diagnosis of FGD.

[PMID: 23708259](#) [PubMed - as supplied by publisher]

## 13. Vopr Kurortol Fizioter Lech Fiz Kult. 2013 Mar-Apr;(2):38-41.

### **Sinusoidal modulated currents for the complex rehabilitation of the patients presenting with pediatric cerebral palsy during a school year [Article in Russian]**

[No authors listed]

The objective of the present work was to study the adaptation of patients with pediatric cerebral palsy to the educational process throughout the academic year. The patients were examined with the use of the method of variational cardiointervalography in the beginning and the end of the school year and during exposure to sinusoidal modulated currents applied to the vegetative nodes on the neck. It was shown that the clinical conditions of the patients with cerebral palsy in the beginning of the school year were dominated by ergotropic influence. The introduction of sinusoidal modulated currents in their rehabilitative treatment increased the adaptive capacity of the brain and promoted the trophotropic influence.

[PMID: 23718084](#) [PubMed - in process]

## Prevention and Cure

**14. Dev Med Child Neurol. 2013 May;55(5):402-3. doi: 10.1111/dmcn.12136. Epub 2013 Mar 14.**

**Proper stratification of survival curves by level of gross motor function.**

Day SM.

Mortality Research and Consulting Inc, Newport Beach, CA, USA.

Comment on

Long-term survival of children with cerebral palsy in Okinawa, Japan. [Dev Med Child Neurol. 2013]

[PMID: 23489110](#) [PubMed - indexed for MEDLINE]

**15. J Paediatr Child Health. 2013 May 28. doi: 10.1111/jpc.12237. [Epub ahead of print]**

**Cerebral palsy prevention and cure: Vision or mirage? A personal view.**

Graham HK.

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[PMID: 23711208](#) [PubMed - as supplied by publisher]

**16. Stroke. 2013 May 28. [Epub ahead of print]**

**Thyroxin Treatment Protects Against White Matter Injury in The Immature Brain via Brain-Derived Neurotrophic Factor.**

Hung PL, Huang CC, Huang HM, Tu DG, Chang YC.

From the Department of Pediatrics and Graduate Institute of Clinical Medicine Sciences.

**BACKGROUND AND PURPOSE:** Low level of thyroid hormone is a strong independent risk factor for white matter (WM) injury, a major cause of cerebral palsy, in preterm infants. Thyroxin upregulates brain-derived neurotrophic factor during development. We hypothesized that thyroxin protected against preoligodendrocyte apoptosis and WM injury in the immature brain via upregulation of brain-derived neurotrophic factor. **METHODS:** Postpartum (P) day-7 male rat pups were exposed to hypoxic ischemia (HI) and intraperitoneally injected with thyroxin (T4; 0.2 mg/kg or 1 mg/kg) or normal saline immediately after HI at P9 and P11. WM damage was analyzed for myelin formation, axonal injury, astrogliosis, and preoligodendrocyte apoptosis. Neurotrophic factor expression was assessed by real-time polymerase chain reaction and immunohistochemistry. Neuromotor functions were measured using open-field locomotion (P11 and P21), inclined plane climbing (P11), and beam walking (P21). Intracerebroventricular injection of TrkB-Fc or systemic administration of 7,8-dihydroxyflavone was performed. **RESULTS:** On P11, the HI group had significantly lower blood T4 levels than the controls. The HI group showed ventriculomegaly and marked reduction of myelin basic protein immunoreactivities in the WM. T4 (1 mg/kg) treatment after HI markedly attenuated axonal injury, astrogliosis, and microgliosis, and increased preoligodendrocyte survival. In addition, T4 treatment significantly increased myelination and selectively upregulated brain-derived neurotrophic factor expression in the WM, and improved neuromotor deficits after HI. The protective effect of T4 on WM myelination and neuromotor performance after HI was significantly attenuated by TrkB-Fc. Systemic 7,8-dihydroxyflavone treatment ameliorated hypomyelination after HI injury. **CONCLUSIONS:** T4 protects against WM injury at both pathological and functional levels via upregulation of brain-derived neurotrophic factor-TrkB signaling in the immature brain.

[PMID: 23715956](#) [PubMed - as supplied by publisher]