

Monday 5 September 2016

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## Interventions and Management

### 1. Eur J Phys Rehabil Med. 2016 Aug 30. [Epub ahead of print]

Managing the maintenance of gait stability during dual walking task: effects of age and neurological disorders.

Tramontano M, Morone G, Curcio A, Temperoni G, Medici A, Morelli D, Caltagirone C, Paolucci S, Iosa M.

**BACKGROUND:** Dual task paradigm is common mechanism of daily life, it is often used for investigating the effect on cognitive processing of motor behavior. **AIM:** In the present study we investigate the dual task interference during walking on upright gait stability. **DESIGN:** cross-sectional study. **SETTING:** Inpatient neurorehabilitation unit and children neurorehabilitation unit. **POPULATION:** Eighty-five subjects were enrolled, divided into five groups: healthy young, healthy elderly, children with typical development, children with cerebral palsy and adults with stroke in subacute phase. **METHODS:** All subjects had to walk through a pathway during which they had to hear a sound, turn the head to watch a number and verbalize it. Subjects wore an accelerometer on their lumbar spine to measure upright gait stability have been assessed by means of the Root Mean Square (RMS) of the trunk acceleration. **RESULTS:** All subjects showed a reduced speed when performing a dual task with respect to single task. This reduction was significantly different among groups ( $F(4,81)=12.253$ ,  $p<0.001$ ,  $ES=0.377$ ). The RMS resulted increased along LL-axis, and reduced along AP- and CC-axes during the dual task walking. **CONCLUSION:** These accelerations were significantly related to the changes in speed that were managed in a different way in subjects affected by cerebral palsy and stroke. **CLINICAL REHABILITATION IMPACT:** The information obtained in this study may be used to support specific rehabilitation techniques in subjects with poor balance ability.

[PMID: 27575014](#)

### 2. Pediatrics. 2016 Sep;138(3). pii: e20161820. doi: 10.1542/peds.2016-1820.

Edwards P, Sakzewski L, Copeland L, et al. Safety of Botulinum Toxin Type A for Children With Nonambulatory Cerebral Palsy. Pediatrics. 136(5):895-904.

Erratum for

Safety of Botulinum Toxin Type A for Children With Nonambulatory Cerebral Palsy. [Pediatrics. 2015]

[No abstract available]

[PMID: 27581857](#)

**3. Arch Phys Med Rehabil. 2016 Aug 25. pii: S0003-9993(16)30897-8. doi: 10.1016/j.apmr.2016.07.021. [Epub ahead of print]**

Perspectives on postural control dysfunction to inform future research: A Delphi study for children with cerebral palsy.

Dewar R, Claus AP, Tucker K, Johnston LM.

**OBJECTIVE:** To identify if consensus can be achieved in how clinicians and researchers define, describe, assess and treat postural control dysfunction in children with cerebral palsy (CP). **DESIGN:** Delphi study with 3 iterative rounds. **SETTING:** Electronic survey **PARTICIPANTS:** 43 researchers and/or clinicians from 7 countries with a mean(SD) of 20(11) years experience working with children with cerebral palsy (CP) participated. Participants included authors of published works on postural control in CP (identified from a recent systematic review), members of the Australasian CP and Developmental Medicine Academy and two major Australian rehabilitation providers. **INTERVENTION:** Not applicable. **MAIN OUTCOME MEASURES:** The Delphi study consisted of 3 iterative rounds of surveys. In Round-I, respondents answered open-ended questions regarding their views on: i) definition items for postural control, ii) theoretical frameworks, iii) methods for assessment, and iv) interventions for postural control dysfunction in children with CP. Round II and III were made up of items generated by participants in Round-I and combined with items identified from the literature. Participants indicated their level of agreement for each item on a 7-point Likert scale. Threshold for consensus was  $\geq 85\%$  agreement. **RESULTS:** Of 306 items generated, 174 items reached consensus by Round-III. Most postural control Definition items (90%) achieved consensus. Two theoretical Frameworks reached consensus (14%). Less than half (42%) of Assessment items reached consensus. More individual assessment items (89%) reached consensus than multi-item tools (4%). Just over half (61%) of the items generated for interventions reached consensus. **CONCLUSION:** Consensus was achieved for a postural control definition. However, substantial research is needed to establish a comprehensive, postural control specific framework and suite of assessments. These would provide a foundation to improve intervention selection and dosage.

[PMID: 27568884](#)

**4. BMC Pediatr. 2016 Aug 27;16(1):146. doi: 10.1186/s12887-016-0678-7.**

PREMM: preterm early massage by the mother: protocol of a randomised controlled trial of massage therapy in very preterm infants.

Lai MM, D'Acunto G, Guzzetta A, Boyd RN, Rose SE, Fripp J, Finnigan S, Ngenda N, Love P, Whittingham K, Pannek K, Ware RS, Colditz PB.

**BACKGROUND:** Preterm infants follow an altered neurodevelopmental trajectory compared to their term born peers as a result of the influence of early birth, and the altered environment. Infant massage in the preterm infant has shown positive effects on weight gain and reduced length of hospital stay. There is however, limited current evidence of improved neurodevelopment or improved attachment, maternal mood or anxiety. The aim of this study is to investigate the effects of infant massage performed by the mother in very preterm (VPT) infants. Effects on the infant will be assessed at the electrophysiological, neuroradiological and clinical levels. Effects on maternal mood, anxiety and mother-infant attachment will also be measured. **METHODS/DESIGN:** A randomised controlled trial to investigate the effect of massage therapy in VPT infants. Sixty VPT infants, born at 28 to 32 weeks and 6 days gestational age, who are stable, off supplemental oxygen therapy and have normal cranial ultrasounds will be recruited and randomised to an intervention (infant massage) group or a control (standard care) group. Ten healthy term born infants will be recruited as a reference comparison group. The intervention group will receive standardised massage therapy administered by the mother from recruitment, until term equivalent age (TEA). The control group will receive care as usual (CAU). Infants and their mothers will be assessed at baseline, TEA, 12 months and 24 months corrected age (CA), with a battery of clinical, neuroimaging and electrophysiological measures, as well as structured questionnaires, psychoanalytic observations and neurodevelopmental assessments. **DISCUSSION:** Optimising preterm infant neurodevelopment is a key aim of neonatal research, which could substantially improve long-term outcomes and reduce the socio-economic impact of VPT birth. This study has the potential to give insights into the mother-baby relationship and any positive effects of infant massage on neurodevelopment. An early intervention such as massage that is relatively easy to administer and could alter the trajectory of preterm infant brain development, holds potential to improve neurodevelopmental outcomes in this vulnerable population.

[PMID: 27568006](#)

**5. Eur J Phys Rehabil Med. 2016 Aug 31. [Epub ahead of print]**

Assessing and treating pain associated with stroke, multiple sclerosis, cerebral palsy, spinal cord injury and spasticity. Evidence and recommendations from the Italian Consensus conference on Pain in Neurorehabilitation.

Paolucci S, Martinuzzi A, Scivoletto G, Smania N, Solaro C, Aprile I, Armando M, Bergamaschi R, Berra E, Berto G, Carraro E, Cella M, Gandolfi M, Masciullo M, Molinari M, Pagliano E, Pecchioli C, Roncari L, Torre M, Trabucco E, Vallies G, Zerinati P; Italian Consensus Conference on Pain in Neurorehabilitation (ICCPN).

Pain is a common and disabling symptom in patients with stroke, multiple sclerosis (MS), cerebral palsy (CP), spinal cord injury (SCI) and other conditions associated with spasticity, but data on its prevalence, and natural history, as well as guidelines on its assessment and treatment in the field of neurorehabilitation, are largely lacking. The Italian Consensus Conference on Pain in Neurorehabilitation (ICCPN) searched and evaluated current evidence on the frequency, evolution, predictors, assessment, and pharmacological and non-pharmacological treatment of pain in patients with stroke, MS, CP, SCI and other conditions associated with spasticity. Patients with stroke, MS, CP, and SCI may suffer from pain related to spasticity, as well as nociceptive and neuropathic pain (NP), whose prevalence, natural history, impact on functional outcome, and predictors are only partially known. Diagnosis and assessment of the different types of pain in these patients is important, because their treatment may differ. Botulinum neurotoxin is the first choice treatment for spasticity, while some antidepressant and antiepileptic drugs may be effective on NP, but pharmacological treatment varies according to the underlying disease. In most cases, a single therapy is not sufficient to treat pain, and a multidisciplinary approach, which include pharmacological and non-pharmacological treatments is needed. Further studies, and in particular randomized controlled trials, are needed on these topics.

[PMID: 27579581](#)

**6. Neurophotonic. 2017 Jan;4(1):011004. doi: 10.1117/1.NPh.4.1.011004. Epub 2016 Aug 17.**

Somatic stimulation causes frontoparietal cortical changes in neonates: a functional near-infrared spectroscopy study.

Kashou NH, Dar IA, Hasenstab KA, Nahhas RW, Jadcherla SR.

Palmar and plantar grasp are the foremost primitive neonatal reflexes and functions. Persistence of these reflexes in infancy is a sign of evolving cerebral palsy. Our aims were to establish measurement feasibility in a clinical setting and to characterize changes in oxyhemoglobin (HbO) and deoxyhemoglobin (HbD) concentration in the bilateral frontoparietal cortex in unsedated neonates at the crib-side using functional near-infrared spectroscopy (fNIRS). We hypothesized that bilateral concentration changes will occur upon somatic central and peripheral somatic stimulation. Thirteen preterm neonates (five males) underwent time 1, and six (two males) returned for time 2 (mean [Formula: see text] and 47.0 weeks, respectively). Signals from a total of 162 somatic stimuli responses were measured. Response amplitude, duration, and latency were log-transformed and compared between palmar, plantar, and oromotor stimuli using linear mixed models, adjusted for cap, electroencephalogram abnormality, time (1 versus 2), and Sarnat score, if necessary. The oromotor stimulus resulted in a 50% greater response than the palmar or plantar stimuli for HbO left and right hemisphere duration ([Formula: see text]). There were no other statistically significant differences between stimuli for any other outcome ([Formula: see text]). Utilizing fNIRS in conjunction with occupational and physical therapy maneuvers is efficacious to study modifiable and restorative neurophysiological mechanisms.

[PMID: 27570791](#)

**7. Farm Hosp. 2016 Sep 1;40(5):412-26. doi: 10.7399/fh.2016.40.5.10429.**

Cost-minimization analysis in the treatment of spasticity in children with cerebral palsy with botulinum toxin type A: an observational, longitudinal, retrospective study.

Tapias G, García-Romero M, Crespo C, Cuesta M, Forné C, Pascual-Pascual SI.

**OBJECTIVE:** Cost-minimization analysis of onabotulinumtoxinA and abobotulinumtoxinA, taking into account the real dose administered to children with spasticity associated with dynamic equinus foot deformity due to cerebral palsy. **METHOD:** A single centre, observational, longitudinal, and retrospective study which included spastic paediatric patients aged 2-to-18-years and treated with onabotulinumtoxinA or abobotulinumtoxinA from December 1995 to October 2012, in the Paediatric Neurology Unit of a first-level Spanish hospital. A longitudinal analysis of spasticity severity was made to confirm the similar

efficacy of both treatments. Cost minimization was analyzed using the dose administered and the direct costs (pharmacological and medical visits costs) from the perspective of the National Health System (in euros from 2016). RESULTS: We analyzed 895 patients with paediatric spasticity: 543 were treated only with onabotulinumtoxinA, 292 only with abobotulinumtoxinA, and 60 with both treatments. The mean doses administered were 5.44 U/kg (SD = 2.17) for onabotulinumtoxinA, and 14.73 U/kg (5.26) for abobotulinumtoxinA. The total annual direct cost (pharmacological and medical visits) was € 839.56 for onabotulinumtoxinA and € 631.23 for abobotulinumtoxinA, which represents a difference of € 208.34 per year in favour of treatment with abobotulinumtoxinA. CONCLUSIONS: It has been demonstrated that in real clinical practice, the cost per patient and year for treatment of paediatric spasticity was lower when abobotulinumtoxinA was used.

[PMID: 27570991](#)

**8. J Biomed Inform. 2016 Aug 24. pii: S1532-0464(16)30100-9. doi: 10.1016/j.jbi.2016.08.018. [Epub ahead of print]**

Integrating semantic dimension into openEHR archetypes for the management of cerebral palsy electronic medical records.

Ellouze AS, Bouaziz R, Ghorbel H.

**PURPOSE:** Integrating semantic dimension into clinical archetypes is necessary once modeling medical records. First, it enables semantic interoperability and, it offers applying semantic activities on clinical data and provides a higher design quality of Electronic Medical Record (EMR) systems. However, to obtain these advantages, designers need to use archetypes that cover semantic features of clinical concepts involved in their specific applications. In fact, most of archetypes filed within open repositories are expressed in the Archetype Definition Language (ADL) which allows defining only the syntactic structure of clinical concepts weakening semantic activities on the EMR content in the semantic web environment. This paper focuses on the modeling of an EMR prototype for infants affected by Cerebral Palsy (CP), using the dual model approach and integrating semantic web technologies. Such a modeling provides a better delivery of quality of care and ensures semantic interoperability between all involved therapies' information systems. **METHODS:** First, data to be documented are identified and collected from the involved therapies. Subsequently, data are analyzed and arranged into archetypes expressed in accordance of ADL. During this step, open archetype repositories are explored, in order to find the suitable archetypes. Then, ADL archetypes are transformed into archetypes expressed in OWL-DL (Ontology Web Language - Description Language). Finally, we construct an ontological source related to these archetypes enabling hence their annotation to facilitate data extraction and providing possibility to exercise semantic activities on such archetypes. **RESULTS:** Semantic dimension integration into EMR modeled in accordance to the archetype approach. The feasibility of our solution is shown through the development of a prototype, baptized "CP-SMS", which ensures semantic exploitation of CP EMR. This prototype provides the following features: (i) creation of CP EMR instances and their checking by using a knowledge base which we have constructed by interviews with domain experts, (ii) translation of initially CP ADL archetypes into CP OWL-DL archetypes, (iii) creation of an ontological source which we can use to annotate obtained archetypes and (vi) enrichment and supply of the ontological source and integration of semantic relations by providing hence fueling the ontology with new concepts, ensuring consistency and eliminating ambiguity between concepts. **CONCLUSIONS:** The degree of semantic interoperability that could be reached between EMR systems depends strongly on the quality of the used archetypes. Thus, the integration of semantic dimension in archetypes modeling process is crucial. By creating an ontological source and annotating archetypes, we create a supportive platform ensuring semantic interoperability between archetypes-based EMR-systems.

[PMID: 27568295](#)

## Prevention and Cure

**9. Biomed Res Int. 2016;2016:5961928. doi: 10.1155/2016/5961928. Epub 2016 Aug 4.**

Volumetric Magnetic Resonance Imaging Study of Brain and Cerebellum in Children with Cerebral Palsy.

Kułał P, Maciorkowska E, Gościłk E.

**Introduction.** Quantitative magnetic resonance imaging (MRI) studies are rarely used in the diagnosis of patients with cerebral palsy. The aim of present study was to assess the relationships between the volumetric MRI and clinical findings in children with cerebral palsy compared to control subjects. **Materials and Methods.** Eighty-two children with cerebral palsy and 90 age- and sex-matched healthy controls were collected. **Results.** The dominant changes identified on MRI scans in children with cerebral palsy were periventricular leukomalacia (42%) and posthemorrhagic hydrocephalus (21%). The total brain and

cerebellum volumes in children with cerebral palsy were significantly reduced in comparison to controls. Significant grey matter volume reduction was found in the total brain in children with cerebral palsy compared with the control subjects. Positive correlations between the age of the children of both groups and the grey matter volumes in the total brain were found. Negative relationship between width of third ventricle and speech development was found in the patients. Positive correlations were noted between the ventricles enlargement and motor dysfunction and mental retardation in children with cerebral palsy. Conclusions. By using the voxel-based morphometry, the total brain, cerebellum, and grey matter volumes were significantly reduced in children with cerebral palsy.

[PMID: 27579318](#)

**10. Ital J Pediatr. 2016 Aug 27;42(1):75. doi: 10.1186/s13052-016-0288-x.**

Progress in pediatrics in 2015: choices in allergy, endocrinology, gastroenterology, genetics, haematology, infectious diseases, neonatology, nephrology, neurology, nutrition, oncology and pulmonology.

Caffarelli C, Santamaria F, Di Mauro D, Mastroianni C, Mirra V, Bernasconi S.

This review focuses key advances in different pediatric fields that were published in Italian Journal of Pediatrics and in international journals in 2015. Weaning studies continue to show promise for preventing food allergy. New diagnostic tools are available for identifying the allergic origin of allergic-like symptoms. Advances have been reported in obesity, short stature and autoimmune endocrine disorders. New molecules are offered to reduce weight gain and insulin-resistance in obese children. Regional investigations may provide suggestions for preventing short stature. Epidemiological studies have evidenced the high incidence of Graves' disease and Hashimoto's thyroiditis in patients with Down syndrome. Documentation of novel risk factors for celiac disease are of use to develop strategies for prevention in the population at-risk. Diagnostic criteria for non-celiac gluten sensitivity have been reported. Negative effect on nervous system development of the supernumerary X chromosome in Klinefelter syndrome has emerged. Improvements have been made in understanding rare diseases such as Rubinstein-Taybi syndrome. Eltrombopag is an effective therapy for immune thrombocytopenia. Children with sickle-cell anemia are at risk for nocturnal enuresis. Invasive diseases caused by *Streptococcus pyogenes* are still common despite of vaccination. No difference in frequency of antibiotic prescriptions for acute otitis media between before the publication of the national guideline and after has been found. The importance of timing of iron administration in low birth weight infants, the effect of probiotics for preventing necrotising enterocolitis and perspectives for managing jaundice and cholestasis in neonates have been highlighted. New strategies have been developed to reduce the risk for relapse in nephrotic syndrome including prednisolone during upper respiratory infection. Insights into the pathophysiology of cerebral palsy, arterial ischemic stroke and acute encephalitis may drive advances in treatment. Recommendations on breastfeeding and complementary feeding have been updated. Novel treatments for rhabdomyosarcoma should be considered for paediatric patients. Control of risk factors for bronchiolitis and administration of pavilzumab for preventing respiratory syncytial virus infection may reduce hospitalization. Identification of risk factors for hospitalization in children with wheezing can improve the management of this disease. Deletions or mutations in genes encoding proteins for surfactant function may cause diffuse lung disease.

[PMID: 27566421](#)

**11. PLoS One. 2016 Aug 30;11(8):e0162271. doi: 10.1371/journal.pone.0162271.**

Correction: Surface-Based fMRI-Driven Diffusion Tractography in the Presence of Significant Brain Pathology: A Study Linking Structure and Function in Cerebral Palsy.

Reid LB, Cunnington R, Boyd RN, Rose SE.

[This corrects the article DOI: 10.1371/journal.pone.0159540].

Erratum for

Surface-Based fMRI-Driven Diffusion Tractography in the Presence of Significant Brain Pathology: A Study Linking Structure and Function in Cerebral Palsy. [PLoS One. 2016]

[No abstract available]

[PMID: 27575551](#)