Cerebral Palsy ALLIANCE

NEWS
Cerebral Palsy Research

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Cerebral Palsy Alliance is delighted to bring you this free weekly bulletin of the latest published research into cerebral palsy.

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Interventions and Management

1. Augment Altern Commun. 2011 Sep;27(3):150-62.

An integrated approach to detecting communicative intent amid hyperkinetic movements in children.

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Children with hyperkinetic movement (HKM) often have limited access to traditional augmentative and alternative communication technologies (e.g., mechanical switches). To seek a communication solution for these children, this study explored the possibility that discernable biomechanical patterns, related to preference, exist amid HKM. We deployed a unified approach to analyse a child's movements, fusing caregiver and clinician observations with quantitative data (accelerations of the upper extremities). Two case studies were examined. In both, the accelerometer data identified preference at adjusted accuracies statistically above chance using a linear discriminant classifier. Visually, communicative movement patterns were identified in the first child (κ=0.25-0.27) but not in the second child (κ=0.03-0.11). Implications of this study include possible enhancement in communication and independence for these children.

PMID: 22008028 [PubMed - indexed for MEDLINE]

2. Adv Otorhinolaryngol. 2012;73:70-5. Epub 2012 Mar 29.

Bilateral submandibular gland excision and parotid duct ligation.

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Sialorrhea affects a significant number of children with cerebral palsy and other neuromuscular disorders. It can lead not only to social embarrassment but also to severe medical issues including chronic aspiration. There are numerous medical and surgical options, which include oral medications and transdermal patches, botulinum injection, and various forms of surgical ligation or excision of the major salivary glands. In this chapter, the authors describe the surgical management of sialorrhea, highlighting surgical pearls necessary for success.

PMID: 22472232 [PubMed - in process]

3. Disabil Rehabil. 2012 Apr 4. [Epub ahead of print]

Children's perceptions of their cerebral palsy and their impact on life satisfaction.

Chong J, Mackey AH, Broadbent E, Stott NS.

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Purpose: To assess an individual child's cognitive and emotional perceptions of their cerebral palsy (CP) and how these are associated with their reported life satisfaction and their functional walking ability.Method: Convenience sample of 48 children with cerebral palsy, GMFCS (Gross Motor Function Classification System) I-IV, mean age of 12.2 ± 2.5 years was recruited from tertiary level out-patient clinics. All children completed the Brief Illness Perception Questionnaire-Cerebral Palsy version (BIPQ-CP), Students' Life Satisfaction Scale (SLSS) and 1- and 6 -min walk tests.Results: Children with CP reported levels of global life satisfaction (mean score 31.4/42) equivalent to previous studies of typically developing children. Higher total SLSS scores were associated with lower concern about CP (rho = -0.61, $p < 0.001$), lower emotional impact (rho = -0.58, $p < 0.001$), fewer perceived consequences (rho = -0.53, $p < 0.001$) and perceptions of higher levels of personal control (rho = 0.40, $p = 0.01$). Multiple regression models using BIPQ-CP constructs found that a combination of lower level of concern and fewer perceived consequences predicted 46% of the variance in SLSS score ($p < 0.001$). GMFCS levels, walk distance and age were not significant predictors of life satisfaction. Conclusions: Life satisfaction in this group of children was strongly associated with a child's perceptions of their CP but was not associated with functional walking ability. Although the cross-sectional nature of the study precludes assumptions of causality, understanding children's cognitive and emotional beliefs about their cerebral palsy would seem to be an important adjunct to clinical management.

PMID: 22472118 [PubMed - as supplied by publisher]

4. Pediatr Phys Ther. 2012 Summer;24(2):141-8.

Short-term, Early Intensive Power Mobility Training: Case Report of an Infant at Risk for Cerebral Palsy.

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PURPOSE: This case report describes the feasibility of quantifying short-term, intensive power mobility training for an infant soon after a diagnosis of cerebral palsy. KEY POINTS: An 11-month-old infant with significant mobility impairments and her parents were filmed during 14 consecutive daily training sessions. The infant moved the power chair with hand-over-hand assistance and performed open exploration of the joystick and toys. Mobility measures, coded from video, were compared across training. Frequency and combination of looking at and interacting with the joystick, percentage of time of moving independently, and average percentage of success in moving when prompted, all increased across the training. CLINICAL IMPLICATIONS: Quantifying short-term, intensive power mobility training for infants is feasible and may have yielded positive short-term effects for this infant. The "who," "when," and "how" of early power mobility training, as well as the critical need for paradigm shifts in power mobility training, are discussed.

PMID: 22466381 [PubMed - in process] PMCID: PMC3319352

5. Arch Phys Med Rehabil. 2012 Mar 29. [Epub ahead of print]

Kinematic Determinants Of Anterior Knee Pain In Cerebral Palsy, A Case-Control Study.

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OBJECTIVE: To quantify the role patellofemoral and tibiofemoral kinematics may play in development of anterior knee pain (AKP) in individuals with cerebral palsy (CP). DESIGN: Case-Control SETTING: Clinical Research Center PARTICIPANTS: Twenty knees from individuals diagnosed with CP and 40 control knees were evaluated. Controls were matched for sex and age based on the group average. Matching by height and weight was a secondary priority. Subjects in the control cohort were asymptomatic with no history of lower leg abnormality, surgery, or major injury. Only individuals who were physically capable of sustaining slow cyclic knee flexion-extension for 2.5 minutes and had no contraindications to MR imaging were enrolled. Both groups were samples of convenience. INTERVENTIONS: Not applicable. MAIN OUTCOME MEASURE: The 3D patellofemoral and tibiofemoral joint kinematics, acquired during active leg extension, under volitional control. RESULTS: Participants with CP and AKP (n=8) demonstrated significantly greater patellofemoral extension, valgus rotation, superior, and posterior displacement relative to controls and to the subgroup of participants with CP and no AKP (n=12). Patellofemoral extension discriminated AKP in individuals with CP with 100% accuracy. CONCLUSIONS: In quantifying the 3D in vivo knee joint kinematics during a volitional extension task, kinematic markers that discriminate AKP in individuals with CP were identified. This provides an ability to predict which individuals with CP are most likely to advance into AKP and could enable aggressive conservative treatment, aimed at reducing patella alta and excessive PF extension to be prescribed prior to considering surgical options. The current findings will likely lead to improved clinical diagnostics and interventions for individuals with CP, with the ultimate goal of helping maintain, if not improve functional mobility throughout the lifespan.

PMID: 22465585 [PubMed - as supplied by publisher]

6. Pediatr Phys Ther. 2012 Summer;24(2):177-181.

The Relationship Between Spasticity and Muscle Volume of the Knee Extensors in Children With Cerebral Palsy.

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PURPOSE: The purpose of this study was to examine the relationship between spasticity and muscle volume in children with cerebral palsy (CP), using isokinetic dynamometry and magnetic resonance imaging. METHODS: A retrospective sample of 8 children with diplegic CP was analyzed. One set of 10 passive knee flexion movements was completed at a velocity of 180° per second with concurrent surface electromyography of the medial hamstrings (MH) and vastus lateralis (VL) to assess knee extensor spasticity. Magnetic resonance imaging was used to measure maximum cross-sectional area and muscle volume of the quadriceps femoris. RESULTS: The quadriceps femoris muscle volume was positively correlated with MH reflex activity, VL reflex activity, MH/VL co-contraction, and peak knee extensor passive torque ($P < .05$). CONCLUSION: The present findings suggest that higher levels of knee extensor muscle spasticity are associated with greater quadriceps muscle volume in children with spastic diplegic CP.

PMID: 22466388 [PubMed - as supplied by publisher]

7. Pediatr Phys Ther. 2012 Summer;24(2):182.

Commentary on "the relationship between spasticity and muscle volume of the knee extensors in children with cerebral palsy".

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PMID: 22466389 [PubMed - in process]

8. Int J Pediatr Otorhinolaryngol. 2012 Mar 31. [Epub ahead of print]

Peri-operative complications after adenotonsillectomy in a UK pediatric tertiary referral centre.

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OBJECTIVES: Adenoidectomy and/or tonsillectomy are commonly performed in tertiary pediatric hospitals for the management of obstructive sleep apnea, often in children with significant comorbidities. This study examines the peri-operative course of a large series of complex patients undergoing such surgery at a major pediatric centre, reporting particularly cases of respiratory compromise requiring intensive care admission, both electively and unplanned. METHODS: This study was conducted by the pediatric ENT department at Great Ormond Street Hospital. All children undergoing adenoidectomy and/or tonsillectomy from July 2003 to December 2010 were included in this study. This involved a retrospective review of the case notes and hospital databases, with particular emphasis on those children requiring admission to the pediatric intensive care unit. RESULTS: A total of 1735 consecutive admissions for adenoidectomy and/or tonsillectomy (1627 individual patients aged 4-197 months, median 46 months) were included between 2003 and 2010 (998 adenotonsillectomies, 182 tonsillectomies and 555 adenoidectomies). In this group, 999/1627 patients (61.4%) had a diagnosis of sleep disordered breathing or sleep apnea, including 258 who had polysomnography. 407/1627 (25.0%) had no specific comorbidities which were felt likely to influence their surgical outcome. Established high risk factors included age less than 24 months (292), Down syndrome (99), neuromuscular problems (314), craniofacial abnormalities (94), storage diseases (23), morbid obesity (20), cardiovascular disease (133), respiratory disease (261), hemoglobinopathy (76) and coagulophathy (34). 300/1735 admissions were day cases and 1082/1735 were observed for one night. 353/1735 required more than one night in hospital (294 for two to three nights). 7/1735 had primary hemorrhage necessitating return to the operating room, all after tonsillectomy. 41/1735 (38 with major comorbidities) required peri-operative intensive care admission, mostly for respiratory support. Of these, 7 were admitted pre-operatively to intensive care, and 17 were planned post-operative transfers. Only 17/1735 required unanticipated post-operative admission to intensive care. Odds ratio analysis suggested a significantly higher chance of PICU admission in children with particular comorbidities (Down Syndrome, cardiac disease, obesity, cerebral palsy, craniofacial anomalies, mucopolysaccharidoses and hemoglobinopathy) when compared to children without comorbidities. Adenotonsillectomy was associated with a higher risk of PICU admission than adenoidectomy alone, but patient age less than 24 months was not associated with significantly higher rates of PICU admission. There were no peri-operative mortalities in this cohort. CONCLUSIONS: The peri-operative course was largely uneventful for the majority of children undergoing surgery during this period, particularly given the high prevalence of sleep apnea and other risk factors in this cohort. Major complications were uncommon, with 2.4% of these selected, typically high risk cases requiring peri-operative intensive care admission. Importantly, only 1% of all admissions required unanticipated transfer to intensive care. This has informed changes in peri-operative management in this unit, with implications for other pediatric tertiary referral centres.

PMID: 22469495 [PubMed - as supplied by publisher]

Prevention and Cure

9. Cell Transplant. 2012 Mar 27. [Epub ahead of print]

Effects of neural progenitor cells transplantation in children with severe cerebral palsy.

Luan Z, Liu W, Qu S, Du K, He S, Wang Z, Yang Y, Wang C, Gong X.

Cerebral palsy (CP) is a chronic nervous system disease that severely damages the physical and developmental health of children. Traditional treatment brings about only improvement of mild to moderate CP, but severe CP still lacks effective interventions. To explore safety and efficacy of using neural progenitor cells (NPCs) to treat CP in children, we performed NPCs transplantation in 45 patients with severe CP by injecting NPCs derived from aborted fetal tissue into the lateral ventricle. Gross Motor Function Measures (GMFM), the Peabody Developmental Motor Scale-Fine Motor (PDMS-FM) test and a unified survey questionnaire designed specifically for children with CP were used to evaluate neurological function of the patients. Motor development was significantly accelerated within the first month after cell transplantation, but the rate of improvement gradually slowed to preoperative levels. However, after 1 year, the developmental level in each functional sphere (gross motor, fine motor and cognition) of the treatment group was significantly higher compared to the control group. No delayed complications of this therapy were noted. These results suggest that NPCs transplantation is a safe and effective therapeutic method for treating children with severe CP.

PMID: 22469184 [PubMed - as supplied by publisher]

10. Cell Transplant. 2012 Mar 27. [Epub ahead of print]

Administration of autologous bone marrow derived mononuclear cells in children with incurable neurological disorders and injury is safe and improves their quality of life.

Sharma A, Gokulchandran N, Chopra G, Kulkarni P, Lohia M, Badhe P, Jacob VC.

Neurological disorders such as muscular dystrophy, cerebral palsy and injury to the brain and spine currently, have no known definitive treatments or cures. A study was carried out on seventy one children suffering from such incurable neurological disorders and injury. They were intrathecally and intra-muscularly administered autologous bone marrow-derived mononuclear cells. Assessment after transplantation showed neurological improvements in muscle power and a shift on assessment scales such as FIM and Brooke and Vignos scale. Further, imaging and electrophysiological studies also showed significant changes in selective cases. On an average follow up of 15 months ± 1 month, overall 97% muscular dystrophy cases showed subjective and functional improvement, with 2 of them also showing changes on MRI and 3 on EMG. One hundred percent of the spinal cord injury cases showed improvement with respect to muscle strength, urine control, spasticity etc. Eighty five percent of cases of cerebral palsy cases showed improvements out of which 75% reported improvement in muscle tone and 50% in speech among other symptoms. Eighty eight percent of cases of other incurable neurological disorders such as autism, Retts Syndrome, Giant Axonal Neuropathy etc also showed improvement. No significant adverse events were noted. The results show that this treatment is safe, efficacious and also improves the quality of life of children with incurable neurological disorders and injury.

PMID: 22469130 [PubMed - as supplied by publisher]