

Monday 11 October 2010

This free weekly bulletin lists the latest research on cerebral palsy (CP), as indexed in the NCBI, PubMed (Medline) and Entrez (GenBank) databases. These articles were identified by a search using the key term "cerebral palsy".

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## Interventions

### 1. *J Bone Joint Surg Br.* 2010 Oct;**92(10):1442-8.**

#### **The use of minimally invasive techniques in multi-level surgery for children with cerebral palsy: preliminary results.**

Thompson N, Stebbins J, Seniorou M, Wainwright AM, Newham DJ, Theologis TN.

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This study compares the initial outcomes of minimally invasive techniques for single-event multi-level surgery with conventional single-event multi-level surgery. The minimally invasive techniques included derotation osteotomies using closed corticotomy and fixation with titanium elastic nails and percutaneous lengthening of muscles where possible. A prospective cohort study of two matched groups was undertaken. Ten children with diplegic cerebral palsy with a mean age of ten years six months (7.11 to 13.9) had multi-level minimally invasive surgery and were matched for ambulatory level and compared with ten children with a mean age of 11 years four months (7.9 to 14.4) who had conventional single-event multi-level surgery. Gait kinematics, the Gillette Gait Index, isometric muscle strength and gross motor function were assessed before and 12 months after operation. The minimally invasive group had significantly reduced operation time and blood loss with a significantly improved time to mobilisation. There were no complications intra-operatively or during hospitalisation in either group. There was significant improvement in gait kinematics and the Gillette Gait Index in both groups with no difference between them. There was a trend to improved muscle strength in the multi-level group. There was no significant difference in gross motor function between the groups. We consider that minimally invasive single-event multi-level surgery can be achieved safely and effectively with significant advantages over conventional techniques in children with diplegic cerebral palsy.

PMID: 20884985 [PubMed - in process]

### 2. *J Neurosurg Pediatr.* 2010 Oct;**6(4):353-8.**

#### **Selective dorsal rhizotomy in children with spastic hemiparesis.**

Oki A, Oberg W, Siebert B, Plante D, Walker ML, Gooch JL.

Department of Physical Medicine, Primary Children's Medical Center, University of Utah, Salt Lake City, Utah, USA.

OBJECT: Neurological conditions including cerebral palsy, brain injury, and stroke often result in severe spasticity, which can lead to significant deformity and interfere with function. Treatments for spasticity include oral medications, intramuscular botulinum toxin type A injections, orthopedic surgeries, intrathecal baclofen pump implanta-

tion, and selective dorsal rhizotomy (SDR). Selective dorsal rhizotomy, which has been well studied in children with spastic diplegia, results in significant reduction in spasticity and improved function in children. To the authors' knowledge, there are no published outcome data for SDR in patients with spastic hemiparesis. The object of this study was to examine the effects of SDR on spastic hemiparesis. **METHODS:** A 2-year study was undertaken including all children with spastic hemiparesis who underwent SDR at the authors' institution. The degree of spasticity, as measured by the Modified Ashworth Scale or quality of gait rated using the visual gait assessment scale, the gait parameters, and velocity were compared in patients before and after undergoing SDR. **RESULTS:** Thirteen children (mean age 6 years 7 months) with spastic hemiparesis underwent SDR performed by the same surgeon during a 2-year period. All of the patients had a decrease in tone in the affected lower extremity after the procedure. The mean reduction in tone in 4 muscle groups (hip adductors, knee flexors, knee extensors, and ankle plantar flexors) according to the modified Ashworth scale score was  $2.6 \pm 1.26$  ( $p < 0.0001$ ). The quality of gait was assessed in 7 patients by using the visual gait assessment scale. This score improved in 6 patients and remained the same in 1. Stride length and gait velocity were measured in 4 children. Velocity increased in 3 patients and decreased in a 3-year-old child. Parents and clinicians reported an improvement in quality of gait after the procedure. Stride length increased bilaterally in 3 patients and increased on one side and decreased on the other in the other patient. **CONCLUSIONS:** Selective dorsal rhizotomy showed efficacy in the treatment of spastic hemiparesis in children. All of the patients had decreased tone after SDR as measured by the modified Ashworth scale. The majority of patients had qualitative and quantitative improvements in gait.

PMID: 20887108 [PubMed - in process]

### 3. Indian J Orthop. 2010 Oct;44(4):461-3.

#### Early lateral migration of head after bipolar hemiarthroplasty in a cerebral palsy patient.

Hiragami K, Mukohyama A, Maruyama Y.

Department of Orthopaedic Surgery, Saka General Hospital, Miyagi, Japan.

Migration of the outer head after bipolar hemiarthroplasty within several years after surgery is not a rare complication. We present a patient with cerebral palsy who showed lateral migration of the outer head seven months after bipolar hemiarthroplasty for femoral neck fracture. The patient had no acetabular pathology prior to the fracture, and lacked ambulatory ability in a community setting. She underwent conversion to a total hip arthroplasty and returned to her previous lifestyle.

PMID: 20924492 [PubMed - in process]

### 4. J Hand Surg Am. 2010 Sep 29. [Epub ahead of print]

#### Late Deformities Following the Transfer of the Flexor Carpi Ulnaris to the Extensor Carpi Radialis Brevis in Children With Cerebral Palsy.

Patterson JM, Wang AA, Hutchinson DT.

**PURPOSE:** The transfer of flexor carpi ulnaris (FCU) to extensor carpi radialis brevis (ECRB) (the Green transfer) in children with cerebral palsy (CP) is a surgical option frequently used to address the typical wrist flexion deformity that is often present in these patients. We hypothesize that late deformities may occur when these transfers are performed in patients before skeletal maturity. The purpose of this investigation was to determine the frequency of these deformities and the factors that influence their development. **METHODS:** We performed 41 FCU to ECRB tendon transfers in children with CP at our institution between 1987 and 2005 and retrospectively reviewed them. A total of 24 patients with 25 transfers had a minimum 2-year follow-up and were included in the study population. We identified patients who developed a late deformity after tendon transfer. We analyzed medical records of these patients to identify factors associated with the development of a deformity. **RESULTS:** Of the 25 transfers, 12 developed a late deformity between 10 and 105 months postoperatively. The deformities that developed were extension deformities (8), supination deformities (one), and recurrent flexion deformities (3). Of the 12 patients with deformity, 9 required revision surgeries. Of these 12 patients, 9 who were less than 13 years of age at the time of transfer developed a late deformity, compared with 3 who were older than 13 years of age. **CONCLUSIONS:** The FCU to ECRB tendon transfer remains a viable option to address the wrist flexion deformity seen in patients with CP. Care

should be taken when performing this tendon transfer in patients less than 13 years of age because they may develop a postoperative deformity, commonly an extension deformity. We believe that these deformities develop when the patient enters a growth spurt and the transferred muscle-tendon unit does not lengthen at the same rate as the involved upper extremity.

TYPE OF STUDY/LEVEL OF EVIDENCE: Therapeutic IV.

PMID: 20888146 [PubMed - as supplied by publisher]

## **6. Am J Orthod Dentofacial Orthop. 2010 Oct;138(4):394.e1-5; discussion 394-5.**

### **Severity of malocclusion in patients with cerebral palsy: determinant factors.**

Miamoto CB, Ramos-Jorge ML, Pereira LJ, Paiva SM, Pordeus IA, Marques LS.

Department of Orthodontics, University of Vale do Rio Verde (UNINCOR), Três Corações, Brazil.

**INTRODUCTION:** Our aims in this study were to compare the biopsychosocial aspects of patients with cerebral palsy and subjects in a control group, establish the severity of malocclusion, and identify determinant factors. **METHODS:** The group with cerebral palsy included 60 patients diagnosed with the spastic form of the disease. The control group included 60 randomly selected healthy subjects with various malocclusions. Data were collected through questionnaires, medical charts, and clinical evaluations. The criteria of the dental aesthetic index were used for the diagnosis of malocclusion. Comparisons between groups and between the independent variables and dependent variable (severity of malocclusion) were performed by using the chi-square test ( $P \leq 0.05$ ) and multivariate logistic regression (forward stepwise procedure). **RESULTS:** Significant differences between the groups were found for these variables: tooth loss, overjet, anterior open bite, facial type, breathing pattern, drooling, difficulty in swallowing, and lip incompetence. **CONCLUSIONS:** The main risk factors associated with the severity of malocclusion were cerebral palsy, mouth breathing, lip incompetence, and long face.

PMID: 20889041 [PubMed - in process]

## **7. Eur J Dent. 2010 Oct;4(4):361-6.**

### **Oral health status of disabled individuals attending special schools.**

Altun C, Guven G, Akgun OM, Akkurt MD, Basak F, Akbulut E.

Associate Professor, Department of Pediatric Dentistry, Center of Dental Sciences, Gulhane Medical Academy, Ankara, Turkey.

**OBJECTIVES:** The purpose of this study was to determine the prevalence of the dmft-DMFT indexes and the oral hygiene status of 136 individuals attending a special school for the disabled. **METHODS:** Participants were grouped according to disability [Mental Retardation (MR), Cerebral Palsy (CP), Autistic Disorder (AD), Down Syndrome (DS), Other (OTH)] and age [2-6 years ( $n=24$ ), 7-12 years (50 children) and 13+ years (62 children)]. Caries examinations were carried out in accordance with WHO criteria and oral cleanliness was evaluated by visually assessing the presence of plaque on teeth. **RESULTS:** The age range of patients was 2-26 years (mean age:  $11.89 \pm 5.19$  years). Mean dmft and DMFT scores by age group were as follows: 2-6 years:  $dmft=2.04 \pm 2.24$ ; 7-12 years:  $dmft=2.24 \pm 2.60$ ,  $DMFT=0.98 \pm 2.58$ ; 13+years:  $DMFT=2.68 \pm 2.91$ . Overall, 15.4% of children had no caries or fillings. While dmft and DMFT levels ( $P > .05$ ) did not vary significantly by type of disability, oral cleanliness did. Children with autism were observed to maintain the best oral hygiene and those with mental retardation (MR), the poorest. **CONCLUSIONS:** It is important for the dentist to concentrate on a preventive approach and provide proper dental education to parents of disabled individuals. Among the children with disabilities, more attention should be paid to the oral hygiene of MR group.

PMID: 20922154 [PubMed - in process] PMCID: PMC2948746

## Epidemiology / Aetiology / Diagnosis & Early Treatment

*Please note: This is not yet a comprehensive outline of cerebral palsy prevention literature. It is expected that more research will be included when the search terms are expanded to include key terms other than "cerebral palsy". It is a work-in-progress and it will be expanded in coming months.*

### 8. *Pediatr Res.* 2010 Oct 4. [Epub ahead of print]

#### **Potential Neuronal Repair in Cerebral White Matter Injury in the Human Neonate.**

Haynes RL, Xu G, Folkerth RD, Trachtenberg FL, Volpe JJ, Kinney HC.

Department of Pathology [R.L.H., G.X., H.C.K.], Department of Neurology [J.J.V.] Children's Hospital Boston, Harvard Medical School, Boston, Massachusetts, 02115; Department of Pathology [R.D.F.], Brigham and Women's Hospital, Boston, Massachusetts, 02115; New England Research Institutes [F.L.T.], Watertown, Massachusetts, 02472.

Periventricular leukomalacia (PVL) in the premature infant represents the major substrate underlying cognitive deficits and cerebral palsy and is characterized as focal periventricular necrosis and diffuse gliosis in the immature cerebral white matter. We have recently shown a significant decrease in the density of neurons in PVL relative to controls throughout the white matter, including the subventricular, periventricular, and subcortical regions. These neurons are likely to be remnants of the subplate and/or GABAergic neurons in late migration to the cerebral cortex, both of which are important for proper cortical circuitry in development and throughout adulthood. Here we tested the hypothesis that intrinsic repair occurs in PVL to attempt to compensate for the deficits in white matter neurons. Using doublecortin (DCX) immunopositivity as a marker of postmitotic migrating neurons, we found significantly increased densities ( $p < 0.05$ ) of DCX-immunopositive cells in PVL cases ( $n=9$ ) compared to controls ( $n=7$ ) in the subventricular zone (their presumed site of origin), necrotic foci, and subcortical white matter in the perinatal time-window, i.e., 35-42 postconceptional weeks. These data provide the first evidence suggestive of an attempt at neuronal repair or regeneration in human neonatal white matter injury.

PMID: 20924315 [PubMed - as supplied by publisher]

### 9. *Neuroimage.* 2010 Oct 1. [Epub ahead of print]

#### **Quantitative Analysis of Brain Pathology Based on MRI and Brain Atlases - Applications for Cerebral Palsy.**

Faria AV, Hoon A, Stachinko E, Li X, Jiang H, Mashayekh A, Akhter K, Hsu J, Oishi K, Zhang J, Miller MI, van Zijl PC, Mori S.

The Russell H. Morgan Department of Radiology and Radiological Science, The Johns Hopkins University School of Medicine, Baltimore, MD, USA; Department of Radiology, University of Campinas, Campinas, SP, Brazil.

We have developed a new method to provide a comprehensive quantitative analysis of brain anatomy in cerebral palsy patients, which makes use of two techniques: diffusion tensor imaging and automated 3D whole brain segmentation based on our brain atlas and a nonlinear normalization technique (large-deformation diffeomorphic metric mapping). This method was applied to 13 patients and normal controls. The reliability of the automated segmentation revealed close agreement with the manual segmentation. We illustrate some potential applications for individual characterization and group comparison. This technique also provides a framework for determining the impact of various neuroanatomic features on brain functions.

PMID: 20920589 [PubMed - as supplied by publisher]

**10. J Trop Pediatr. 2010 Oct 1. [Epub ahead of print]**

**Prevalence of Cerebral Palsy in Children <10 Years of Age in R.S. Pura Town of Jammu and Kashmir.**

Raina SK, Razdan S, Nanda R.

Dr. Rajendra Prasad Government Medical College, Kangra, Himachal Pradesh 176001, India.

Objective: To determine the prevalence of cerebral palsy in children aged <10 years. Methods: The study was conducted in the framework of a population-based, single-centre, cross-sectional surveillance at R.S. Pura town, 22 km south-west of Jammu city. Results: A total of 11 cases of cerebral palsy were ascertained yielding a crude prevalence rate of 2.27/1000 in the age group of <10 years. The proportion of cerebral palsy occurring in males was higher than that in females. Interpretation: The prevalence rates of cerebral palsy among children <10 years of age in R.S. town compare favorably with studies from developed countries.

PMID: 20889624 [PubMed - as supplied by publisher]