

Monday 28 June 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 Pediatr Orthop.* 2010 Jul-Aug;30(5):489-95.

Issues of concern before single event multilevel surgery in patients with cerebral palsy.

Park MS, Chung CY, Lee KM, Lee SH, Choi IH, Cho TJ, Yoo WJ, Kim KH.

Department of Orthopedic Surgery, Seoul National University Bundang Hospital, Sunghnam, Kyungki, Korea.

BACKGROUND: This study was performed to identify the issues of concern of parents of patients with cerebral palsy before single event multilevel surgery (SEMS). **METHODS:** The parental concerns of 64 patients [34 males, 30 females, mean age 15 y and 5 mo (SD 8 y and 10 mo)] with cerebral palsy were obtained using a questionnaire preoperatively. The issues of parental concern were evaluated using 59 items specifically designed for this study. The individual items were scored using a 5-point Likert scale (1 to 5). **RESULTS:** The top 5 issues of concern were as follows: postoperative rehabilitation, duration of rehabilitation, immediate postoperative pain, general anesthesia, and medical cost. Sporting activities and poor compliance to wearing orthosis were included in the top 5 issues of parental concern in patients with unilateral involvement. The overall parental concern in patients with unilateral involvement was lower than that in bilateral involvement ($P=0.054$). Parents of younger patients showed significantly higher concern score than those of older patients ($P=0.020$). There was no significant difference in the overall concern score between the parents of patients scheduled for bony procedures and those of patients scheduled for soft tissue procedures ($P=0.298$). Multiple regression analysis revealed the patient's age ($P=0.018$) and responding parent (father vs. mother, $P=0.025$) to be the factors that significantly affected the overall concern score (adjusted $R(2)=0.281$). **CONCLUSIONS:** An understanding of the issues of concern will enhance communication between physicians and parents, which would assist in preoperative discussion. **LEVEL OF EVIDENCE:** Diagnostic level II.

PMID: 20574269 [PubMed - in process]

2. *J Pediatr Orthop.* 2010 Jul-Aug;30(5):479-84.

Achilles tendon length and medial gastrocnemius architecture in children with cerebral palsy and equinus gait.

Wren TA, Cheatwood AP, Rethlefsen SA, Hara R, Perez FJ, Kay RM.

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BACKGROUND: The aim of this study was to examine both the tendon and muscle components of the medial gastrocnemius muscle-tendon unit in children with cerebral palsy (CP) and equinus gait, with or without contracture. We also examined a small number of children who had undergone prior surgical lengthening of the triceps surae to address equinus contracture. **METHODS:** Ultrasound was used to measure Achilles tendon length and

muscle-tendon architectural parameters in children of ages 5 to 12 years. Muscle and tendon parameters were compared among 4 groups: Control group (N=40 limbs from 21 typically developing children), Static Equinus group (N=23 limbs from 15 children with CP and equinus contracture), Dynamic Equinus group (N=12 limbs from 7 children with CP and equinus gait without contracture), and Prior Surgery group (N=10 limbs from 6 children with CP who had prior gastrocnemius recession or tendo-achilles lengthening). The groups were compared using analysis of variance and Scheffe post hoc tests. RESULTS: The CP groups had longer Achilles tendons and shorter muscle bellies than the Control group ($P<0.001$). Normalized tendon length was also longer in the Prior Surgery group compared with the Static Equinus group ($P<0.001$). The Prior Surgery group had larger pennation angles than the CP groups ($P< \text{or} =0.009$) and tended to have shorter muscle fascicle lengths ($P< \text{or} =0.005$ compared with Control and Static Equinus, $P=0.08$ compared with Dynamic Equinus). Similar results were observed for pennation angles and normalized muscle fascicle lengths throughout the range of motion. CONCLUSIONS: Children with spastic CP and equinus gait have longer-than-normal Achilles tendons and shorter-than-normal muscle bellies. These characteristics are observed even in children with dynamic equinus, before contracture has developed. Surgery further lengthens the tendon, restoring dorsiflexion but not normal muscle-tendon architecture. These architectural features likely affect function, possibly contributing to functional deficits such as plantarflexor weakness after surgery. LEVEL OF EVIDENCE: Level II, prospective comparative study.

PMID: 20574267 [PubMed - in process]

3. J Pediatr Orthop. 2010 Jul-Aug;30(5):475-8.

Dynamic displacement of the femoral head by hamstring stretching in children with cerebral palsy.

Chang CH, Chen YY, Wang CJ, Lee ZL, Kao HK, Kuo KN.

Department of Orthopedics, Chang Gung Memorial Hospital, Chang Gung University, Taiwan.

BACKGROUND: Hamstring stretching is an integral component in the treatment for knee flexion contracture in cerebral palsy (CP). As hamstrings span across hip and knee joints, passive stretching of hamstrings applies force to the hip that is often dysplasia in CP. The purpose of this study is to measure the dynamic displacement of femoral head produced by passive stretching of hamstrings and to determine the factors associated with the phenomenon. METHODS: Children with spastic CP were studied using computerized tomography (CT) of the pelvis. Two sets of CT studies were carried out, one with the knee flexed and the hip flexed (resting) and the other with the knee extended and the hip flexed to simulate manual hamstrings stretching. The distance from pelvic baseline to the posterior margin of femoral epiphysis was measured on the CT images and compared between resting and stretching for dynamic displacement. The dynamic displacement of the femoral head was expressed by a ratio to femoral epiphysis diameter. RESULTS: Twenty-seven CP children had CT studies at a mean age of 6.8 years (range: 4.5 to 9.6 y). Ten children were ambulators with or without devices and the other 17 children were nonambulators. On plain radiographs of the pelvis, the mean Reimer's migration percentage was 39% (range: 13% to 92%). On CT scan, dynamic displacement by stretching was 4.7% (range: -3.8% to 16.1%) of femoral epiphysis diameter ($P<0.001$ by paired t test). The displacement in the 33 hips with migration percentage of greater than 30% was significantly greater than the displacement in the other 21 hips with migration percentage of less than 30% (7.4% vs. 0.5%, $P=0.001$). CONCLUSIONS: Passive stretching of spastic hamstrings in the hip flexion position resulted in dynamic posterior displacement of the femoral head. Medical professionals should be aware of this fact, especially in spastic CP children with a higher migration percentage on radiograph. LEVEL OF EVIDENCE: Diagnostic II.

PMID: 20574266 [PubMed - in process]

4. Disabil Rehabil. 2010 Jun 25. [Epub ahead of print]

Implicit and explicit learning: applications from basic research to sports for individuals with impaired movement dynamics.

Steenbergen B, van der Kamp J, Verneau M, Jongbloed-Pereboom M, Masters RS.

Behavioural Science Institute, Radboud University Nijmegen, The Netherlands.

Purpose: Motor skills can be learned in an explicit or an implicit manner. Explicit learning places high demands on working memory capacity, but engagement of working memory is largely circumvented when skills are learned implicitly. We propose that individuals with impaired movement dynamics may benefit from implicit learning methods when acquiring sports-related motor skills. **Method:** We discuss converging evidence that individuals with cerebral palsy and children born prematurely have compromised working memory capacity. This may in part explain the difficulties they encounter when learning motor and other skills. We also review tentative evidence that older people, whose movement dynamics deteriorate, can implicitly learn sports-related motor skills and that this results in more durable performance gains than explicit learning. **Results:** Individuals with altered movement dynamics and compromised working memory can benefit from implicit motor learning. **Conclusion:** We conclude with an appeal for more extensive evaluation of the merits of implicit motor learning in individuals with impaired movement dynamics.

PMID: 20575752 [PubMed - as supplied by publisher]

5. Disabil Rehabil. 2010 Jun 25. [Epub ahead of print]

Physical activity in young children with cerebral palsy.

Zwier JN, van Schie PE, Becher JG, Smits DW, Gorter JW, Dallmeijer AJ.

Department of Rehabilitation Medicine, VU University Medical Center, Amsterdam, The Netherlands.

Purpose: The aim of this study was to describe the physical activity levels of 5- and 7-year-old children with cerebral palsy (CP, n = 97), to compare their physical activity levels with those of typically developing peers (TD, n = 57) and the Dutch recommendation for physical activity, and to investigate the associated factors. **Method:** The level of physical activity (hours spent on sports and physical activity per week) and contextual factors were assessed with standardised questionnaires. **Results:** Mean duration of self-reported physical activity for children with CP was 3.4 (+/- 1.9) h/week, which was significantly less than the 5.8 (+/- 2.3) h/week for TD-peers. Ninety-three percent of the children with CP were insufficiently physically active according to the Dutch recommendation for physical activity. Multiple regression analyses showed that younger age and lower educational level of the mother were significantly associated with lower levels of physical activity for children with CP, while severity of CP was not associated with physical activity levels. Twenty-two percent of the parents reported that more facilities in sport and games are required for children with CP. **Conclusion:** Physical activity is low in young children with CP and needs to be promoted at an early stage.

PMID: 20575751 [PubMed - as supplied by publisher]

6. Clin Rehabil. 2010 Jun 24. [Epub ahead of print]

Effectiveness of motor learning coaching in children with cerebral palsy: a randomized controlled trial.

Bar-HAIM S, Harries N, Nammourah I, Oraibi S, Malhees W, Loepky J, Perkins NJ, Belokopytov M, Kaplanski J, Lahat E.

Faculty of Health Sciences, Ben-Gurion University of the Negev, Beer-Sheva and Human Motion Analysis Laboratory, Assaf-Harofeh Medical Center, Zerifin, Israel.

Objective: To evaluate effectiveness of motor learning coaching on retention and transfer of gross motor function in children with cerebral palsy. **Design:** Block randomized trial, matched for age and gross motor function. **Setting:** Coordinated, multinational study (Israel, Jordan and Palestinian Authority) in schools and rehabilitation centers. **Subjects:** 78 children with spastic cerebral palsy, gross motor functional levels II and III, aged 66 to 146 months. **Interventions:** 1 hr/day, 3 days/week for 3 months treatment with motor learning coaching or neurodevelopmental treatment: two groups. **Main measures:** Gross motor function Measure (GMFM-66), stair-climbing mechanical efficiency (ME) and parent questionnaire rating their child's mobility. **Immediate treatment effects** were assessed after 3 months and retention determined from follow-up measurements 6 months after treatment. **Results:** GMFM-66, ME and parent questionnaires were obtained from 65, 31 and 64 subjects, respectively. Although both groups increased GMFM-66 score over 3 months, measurements 6 months later indicated retention was significantly superior by 2.7 in the motor learning coaching children of level-II. Similar retention trend was evident for ME, increasing 6 months after motor learning coaching by 1.1% and declining 0.3% after neurodevelopmental treatment. **Mobility**

performance in the outdoors and community environment increased 13% from 3 to 9 months after motor learning coaching and decreased 12% after neurodevelopmental treatment. Minor group differences occurred in children of level-III. Conclusions: In higher functioning children with cerebral palsy, the motor learning coaching treatment resulted in significantly greater retention of gross motor function and transfer of mobility performance to unstructured environments than neurodevelopmental treatment.

PMID: 20576667 [PubMed - as supplied by publisher]

7. Phys Ther. 2010 Jun 24. [Epub ahead of print]

Family Priorities for Activity and Participation of Children and Youth With Cerebral Palsy.

Chiarello LA, Palisano RJ, Maggs JM, Orlin MN, Almasri N, Kang LJ, Chang HJ.

Department of Physical Therapy and Rehabilitation Sciences, Drexel University, 245 N 15th St, Mail Stop 502, Philadelphia, PA 19102-1192 (USA), and a member of the scientific staff of Shriners Hospitals for Children, Philadelphia, Pennsylvania.

Background: Understanding family priorities for children and youth with cerebral palsy is essential for family-centered service. **Objective** The purposes of this study were: (1) to identify family priorities for activity and participation in children and youth with cerebral palsy and (2) to determine differences based on age and Gross Motor Functional Classification System (GMFCS) level. **Design** Five hundred eighty-five children and youth with cerebral palsy and their caregivers participated at regional children's hospitals. The children and youth were 2 to 21 years of age; 56% were male, and 44% were female. Their caregivers, predominantly mothers (80%), had a mean age of 40.3 years (SD=9.3). The Canadian Occupational Performance Measure was administered to caregivers to identify their priorities for their children. The priorities were coded into 3 categories (daily activities, productivity, and leisure) and 13 subcategories. The GMFCS levels were determined by assessors who met the criterion for reliability. Friedman and Kruskal-Wallis one-way analyses of variance were used to examine differences in priorities. **RESULTS:** Parents of children in all age groups and GMFCS levels II to V identified more priorities for daily activities. Parents of school-aged children and youth had more priorities for productivity than parents of younger children. For parents of children in all age groups and motor function levels, self-care was the most frequent priority subcategory. Sixty-one percent of parents identified at least one priority related to mobility. **Limitations** The study did not include qualitative analysis of priorities of parents. **CONCLUSIONS:** Parents' priorities for their children and youth with cerebral palsy differed depending on age and gross motor function level; however, the most frequent priority for all age groups was daily activities. Interviews with families are recommended for identifying outcomes for activity and participation and developing an intervention plan.

PMID: 20576716 [PubMed - as supplied by publisher]

8. BMC Musculoskelet Disord. 2010 Jun 23;11(1):131. [Epub ahead of print]

Sitting and standing performance in a total population of children with cerebral palsy: a cross-sectional study.

Rodby-Bousquet E, Hagglund G.

BACKGROUND: Knowledge of sitting and standing performance in a total population of children with cerebral palsy (CP) is of interest for health care planning and for prediction of future ability in the individual child. In 1994, a register and a health care programme for children with CP in southern Sweden were initiated. In the programme information on how the child usually sits, stands, stands up and sits down, together with use of support or assistive devices, is recorded annually. **Material and method** A cross-sectional study was performed, analysing the most recent report of all children with CP born 1990-2005 and living in southern Sweden during 2008. All 562 children (326 boys, 236 girls) aged 3-18 years were included in the study. The degree of independence, use of support or assistive devices to sit, stand, stand up and sit down was analysed in relation to the Gross Motor Function Classification System (GMFCS), CP subtype and age. **Result** A majority of the children used standard chairs (57%), could stand independently (62%) and could stand up (62%) and sit down (63%) without external support. Adaptive seating was used by 42%, external support to stand was used by 31%, to stand up by 19%, and to sit down by 18%. The use of adaptive seating and assistive devices increased with GMFCS levels ($p < 0.001$) and there was a difference be-

tween CP subtypes ($p < 0.001$). The use of support was more frequent in preschool children aged 3-6 ($p < 0.001$).
CONCLUSION: About 60% of children with CP, aged 3-18, use standard chairs, stand, stand up, and sit down without external support. Adding those using adaptive seating and external support, 99% of the children could sit, 96% could stand and 81% could stand up from a sitting position and 81% could sit down from a standing position. The GMFCS classification system is a good predictor of sitting and standing performance.

PMID: 20573201 [PubMed - as supplied by publisher]

9. Disabil Rehabil Assist Technol. 2010 Jun 23. [Epub ahead of print]

Client-centred development of an infrared thermal access switch for a young adult with severe spastic quadriplegic cerebral palsy.

Memarian N, Venetsanopoulos AN, Chau T.

Institute of Biomaterials and Biomedical Engineering, University of Toronto, Toronto, Ontario, Canada.

Purpose: This study reports a client-centred development of a non-contact access switch based on an infrared thermal imaging of mouth opening-closing activity of an individual with severe spastic quadriplegic cerebral palsy.
Method: Over a 6-month period, the client participated in five test sessions to inform the development of an infrared thermal switch. The client completed eight stimulus-response trials (switch test) and eight word-matching trials (scan test) using the infrared thermal switch and provided subjective feedback throughout.
Results: For the switch test, the client achieved an average correct activation rate of 90% and average response time of 2.4 s. His mean correct activation rate on the scan test improved from 65 to 80% over the course of system development, with an average response time of 11.7 s.
Conclusions: An infrared thermography switch tuned to a client's extant orofacial gestures is a practical non-invasive access solution and warrants further research in clients with severe physical disability.

PMID: 20569118 [PubMed - as supplied by publisher]

10. BMC Neurol. 2010 Jun 22;10(1):52. [Epub ahead of print]

Percutaneous radiofrequency lesions adjacent to the dorsal root ganglion alleviate spasticity and pain in children with cerebral palsy: pilot study in 17 patients.

Vles GF, Vles JS, van Kleef M, van Zundert J, Staal HM, Weber WE, van Rhijn LW, Soudant D, Graham KH, de Louw AJ.

Background: Cerebral palsy (CP) may cause severe spasticity, requiring neurosurgical procedures. The most common neurosurgical procedures are continuous infusion of intrathecal baclofen and selective dorsal rhizotomy. Both are invasive and complex procedures. We hypothesized that a percutaneous radiofrequency lesion of the dorsal root ganglion (RF-DRG) could be a simple and safe alternative treatment. We undertook a pilot study to test this hypothesis.
Method: We performed an RF-DRG procedure in 17 consecutive CP patients with severe hip flexor / adductor spasms accompanied by pain or care-giving difficulties. Six children were systematically evaluated at baseline, and 1 month and 6 months after treatment by means of the Modified Ashworth Scale (MAS), Gross Motor Function Measure (GMFM) and a self-made caregiver's questionnaire. Eleven subsequent children were evaluated using a Visual Analogue Scale (VAS) for spasticity, pain and ease of care.
Results: A total of 19 RF-DRG treatments were performed in 17 patients. We found a small improvement in muscle tone measured by MAS, but no effect on the GMFM scale. Despite this, the caregivers of these six treated children unanimously stated that the quality of life of their children had indeed improved after the RF-DRG. In the subsequent 11 children we found improvements in all VAS scores, in a range comparable to the conventional treatment options.
Conclusion: RF-DRG is a promising new treatment option for severe spasticity in CP patients, and its definitive effectiveness remains to be defined in a randomised controlled trial.

PMID: 20569438 [PubMed - as supplied by publisher]Free Article

11. Dev Med Child Neurol. 2010 Jun 22. [Epub ahead of print]**Decreased fracture incidence after 1 year of pamidronate treatment in children with spastic quadriplegic cerebral palsy.**

Bachrach SJ, Kecskemethy HH, Harcke HT, Hossain J.

Department of Pediatrics, Alfred I duPont Hospital for Children, Nemours Children's Clinic, Wilmington, DE, USA.

Aim: The aim of this study was to assess the rate of fracture before and after a 1-year course of intravenous pamidronate in children with spastic quadriplegic cerebral palsy (CP) who had previously experienced fractures. **Method:** Twenty-five children (nine males, 16 females) with quadriplegic CP in Gross Motor Function Classification System (GMFCS) level IV or V who were treated with intravenous pamidronate for approximately 1 year were identified. All participants had previously experienced at least one non-traumatic fracture. Each received 15 doses of pamidronate over a mean of 13.6 months. Post-treatment observation ranged from 1 to 10 years 6 months (mean 4y 1mo). The fracture rate before and after commencement of treatment was calculated using the person-years method. **Results:** The participants had experienced a total of 86 fractures before treatment began, occurring over 280.6 person-years, giving a fracture rate of 30.6% per year. During the post-treatment observation period, totalling 107.5 person-years, 8 of the 25 children experienced a total of 14 fractures. This fracture rate of 13.0% per year is a statistically significant decrease ($p=0.02$). **Interpretation:** Pamidronate treatment lowered the rate of fracture, and a 1-year course appears to provide a protective effect after treatment ends. For the majority of participants, this effect lasted 4 years or longer. However, a subset of children suffered a fracture soon after the drug was discontinued. In these children, a longer course of treatment appears to have been necessary.

PMID: 20573180 [PubMed - as supplied by publisher]

12. Gait Posture. 2010 Jun 21. [Epub ahead of print]**Gillette Gait Index in adults.**

Cretual A, Bervet K, Ballaz L.

M2S Lab (Mouvement Sport Santé), UFRAPS, Université Rennes 2-ENS Cachan, Avenue Charles Tillon, CS24414, 35044 Rennes, France.

Gillette Gait Index (GGI) is a very useful tool to assess gait abnormalities. However, it seems that it has only been validated in children with cerebral palsy. Nevertheless, the parameters used to compute GGI are not specific to children population. Our Aim: is to demonstrate that GGI could also be used to evaluate adults gait abnormalities. 44 adults (25 healthy and 19 pathological) participated to this study. Pathological subjects had a diagnosis of central nervous system pathology (6 with spinal cord injury and 13 with brain injury). We first, compared the kinematic parameter values of our healthy adult group to healthy children group in previous studies. It appears that those parameters' variability is a bit lower in adults, which makes the GGI more sensitive. Moreover, the GGI in adults is too much dependent on one parameter among the 16 proposed by Schutte et al. (2000), the "Time of Peak Flexion". Finally, the Edinburgh Visual Gait Score (EVGS) is correlated to GGI in children. To emphasize the relevance of GGI in adults, we have evaluated the correlation between EVGS and GGI in our pathological group. Those two parameters are indeed highly correlated. All these results allow us to conclude that the GGI computed with the 15 remaining parameters is a useful tool to assess gait abnormalities in adults. Copyright © 2010 Elsevier B.V. All rights reserved.

PMID: 20573512 [PubMed - as supplied by publisher]

13. Laryngoscope. 2010 Jun 21. [Epub ahead of print]**Prevalence of laryngomalacia in children presenting with sleep-disordered breathing.**

Thevasagayam M, Rodger K, Cave D, Witmans M, El-Hakim H.

Subdivision of Pediatric Otolaryngology, Divisions of Otolaryngology & Pediatric Surgery (Departments of Surgery),

The Stollery Children's Hospital and The University of Alberta Hospitals, Edmonton, Alberta, Canada.

OBJECTIVE: To determine the prevalence of laryngomalacia among children presenting with symptoms of sleep-disordered breathing (SDB). **METHOD:** A retrospective observational study was conducted at a tertiary care paediatric hospital. All children presenting with SDB during a 55-month period were investigated using sleep nasopharyngoscopy (SNP). Patients who had laryngomalacia were identified. Patients who did not present primarily with SDB, or were not examined with SNP were excluded. Data for analysis was collected from a prospectively kept surgical database and medical records. This included patients' demographics, symptoms (including symptoms in infancy), diagnoses, SNP findings, overnight pulse oximetry findings, and treatment. **RESULTS:** We identified 358 patients with documented primary diagnosis of SDB and who had undergone SNP. Fourteen of these also had a documented diagnosis of laryngomalacia, giving a prevalence rate of 3.9%. Three children were syndromic, and one had cerebral palsy in addition to SDB and laryngomalacia. Three children were obese, and three children had gastroesophageal reflux disease. Seven cases (50%) had symptoms of snoring and/or swallowing dysfunction and/or stridor in infancy. Twelve patients had adenotonsillar surgery. In eight cases symptoms resolved completely with adenotonsillar surgery only. In total, six patients had a supraglottoplasty. There were three failures to supraglottoplasty. **CONCLUSION:** The prevalence of laryngomalacia within children presenting with SDB is 3.9%. Our findings support full evaluation of the airway to identify the site of pathology mediating SDB symptoms. *Laryngoscope*, 2010.

PMID: 20568277 [PubMed - as supplied by publisher]

14. Dev Med Child Neurol. 2010 Jun 15. [Epub ahead of print]

The effect of gastrostomy tube feeding on body protein and bone mineralization in children with quadriplegic cerebral palsy.

Henderson R.

University of North Carolina, Orthopaedics, Chapel Hill, NC, USA.

PMID: 20561012 [PubMed - as supplied by publisher]

15. Dev Med Child Neurol. 2010 Jun 15. [Epub ahead of print]

Adverse events following botulinum toxin type A treatment in children with cerebral palsy.

Langdon K, Blair E, Davidson SA, Valentine J.

Department of Paediatric Rehabilitation, Princess Margaret Hospital for Children, Subiaco, Western Australia, Australia.

PMID: 20561011 [PubMed - as supplied by publisher]

16. Dev Med Child Neurol. 2010 Jun 15. [Epub ahead of print]

Constipation as an adverse event after botulinum toxin A treatment in children with cerebral palsy.

Vles GF, Vles JS.

Department of Child Neurology, University Hospital Maastricht, Maastricht, the Netherlands.

PMID: 20561010 [PubMed - as supplied by publisher]

17. Dev Med Child Neurol. 2010 Jun 15. [Epub ahead of print]**Tibial length growth curves for ambulatory children and adolescents with cerebral palsy.**

Oeffinger D, Conaway M, Stevenson R, Hall J, Shapiro R, Tylkowski C.

Medical Staff Research, Shriners Hospitals for Children, Lexington, KY, USA.

Aim: The aim of this study was to generate growth curves for ambulatory children and adolescents with cerebral palsy (CP) using tibial lengths and to determine if they differed according to sex or Gross Motor Function Classification System (GMFCS) level. **Method:** Growth data were studied from a cohort of 750 participants (442 males, 308 females [1199 visits]; mean age 10y 9mo, SD 3y 4mo, range 4-21y) with CP (hemiplegia, n=163; diplegia, n=573; triplegia, n=11; quadriplegia n=2; GMFCS levels I-III), and 165 typically developing children (96 males, 115 females; [211 visits]) mean age 10y 9mo, SD 4y 2mo, range 4-19y). Tibial length measurements calculated from data collected during routine gait analyses were validated using anthropometric tibial length measurements and were used to generate growth curves for males and females classified as GMFCS level I, II, or III. Growth was compared in participants of different sexes and GMFCS levels using the median curves. **Results:** Growth curves for males and females (GMFCS levels I-III) with estimate lines for 3rd, 10th, 25th, 50th, 75th, 90th, and 97th centiles were generated. Mean tibial length was greater in males than in females in all GMFCS levels. Tibial lengths were shorter in participants classified as GMFCS level III than in those classified as GMFCS level I or II. **Interpretation:** To our knowledge this is the first large-scale investigation of bone growth in ambulatory children and adolescents with CP. The large sample made it possible to generate growth curves and to provide insight into growth trends. The study findings serve as a basis for analysis of the relationships between growth, function, and treatment outcomes.

PMID: 20561007 [PubMed - as supplied by publisher]

18. Dev Med Child Neurol. 2010 Jun 15. [Epub ahead of print]**Botulinum toxin versus submandibular duct relocation for severe drooling.**

Scheffer AR, Erasmus C, VAN Hulst K, VAN Limbeek J, Rotteveel JJ, Jongerius PH, VAN DEN Hoogen FJ.

Department of Otorhinolaryngology and Head and Neck Surgery, Radboud University Medical Centre, Nijmegen, the Netherlands.

Aim: Botulinum neurotoxin type A (BoNT-A) has been described as an effective intervention for drooling and is being increasingly adopted. However, its effectiveness compared with established treatments is still unknown. We undertook a within-participants observational study to examine this. **Method:** An historic cohort was formed of 19 children and young adults (10 males, nine females) with severe drooling who underwent BoNT-A injections followed by surgical re-routing of the submandibular duct at least 6 months later. Mean age at time of admission was 11 years 5 months (range 5-17y) and mean age at the time of surgery was 14 years (range 6-23y). Fifteen children were diagnosed with bilateral cerebral palsy (CP), three with unilateral CP, and one with non-progressive developmental delay. Gross Motor Function Classification System levels were the following: level I, n=1; level II, n=2; level III, n=7; level IV, n=6; and level V, n=3). The primary outcome was the drooling quotient, which was assessed before each intervention and 8 and 32 weeks thereafter. A multivariate analysis of variance of repeated measures was performed, with the measurement points as the within-participant variables. **Results:** The drooling quotient was reduced to a greater extent after surgery than after BoNT-A administration ($p=0.001$). Compared with a baseline value of 28, the mean drooling quotient 8 weeks after surgery was 10, and 32 weeks after surgery was 4 ($p<0.001$). Among the group treated with BoNT-A, the drooling quotient showed a significant reduction from a baseline value of 30 to 18 after 8 weeks ($p=0.02$), and a continued but diminished effect after 32 weeks (drooling quotient 22; $p=0.05$). **Interpretation:** Both interventions are effective, but surgery provides a larger and longer-lasting effect.

PMID: 20561006 [PubMed - as supplied by publisher]

19. PM R. 2010 Mar;2(3):S19-25.**Pediatric rehabilitation: 3. Facilitating family-centered treatment decisions.**

Moberg-Wolff E, Kim CT, Murphy N, Trovato M, Kim H.

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OBJECTIVE: This self-directed learning module focuses on the role of accurate diagnosis, psychological support, and family integration of children who have chronic impairments such as pain, spasticity, or cognitive disability. It is part of the study guide on pediatric rehabilitation in the Self-Directed Physiatric Education Program for practitioners and trainees in physical medicine and rehabilitation and pediatric medicine. The role of therapeutic, medical (traditional and nontraditional) and psychological interventions that improve family and individual function are emphasized. The goal of this article is to refine a learner's knowledge of the impact family-centered care can have on the medical, psychological, financial, and functional capabilities of families to improve treatment decisions in the context of children with disability. Copyright 2010 American Academy of Physical Medicine and Rehabilitation. Published by Elsevier Inc. All rights reserved.

PMID: 20359675 [PubMed - indexed for MEDLINE]

20. Comput Biol Med. 2010 Feb;40(2):201-7. Epub 2009 Dec 29.**GaitaBase: Web-based repository system for gait analysis.**

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The need to share gait analysis data to improve clinical decision support has been recognised since the early 1990s. GaitaBase has been established to provide a web-accessible repository system of gait analysis data to improve the sharing of data across local and international clinical and research community. It is used by several clinical and research groups across the world providing cross-group access permissions to retrieve and analyse the data. The system is useful for bench-marking and quality assurance, clinical consultation, and collaborative research. It has the capacity to increase the population sample size and improve the quality of 'normative' gait data. In addition the accumulated stored data may facilitate clinicians in comparing their own gait data with others, and give a valuable insight into how effective specific interventions have been for others. 2009 Elsevier Ltd. All rights reserved.

PMID: 20042185 [PubMed - indexed for MEDLINE]

21. PM R. 2010 Mar;2(3):S26-30.**Pediatric rehabilitation: 4. Prescribing assistive technology to promote community integration.**

Trovato M, Kim H, Moberg-Wolff E, Murphy N, Kim CT.

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OBJECTIVE: This self-directed learning module highlights the equipment and assistive technology needs of children and youth with disabilities. This article specifically focuses on preparing families and patients for equipment transitions that occur over the course of childhood and adolescence including progressing from stroller to wheelchair to powerchair, as well as job training and use of augmentative communication. It is part of the study guide on pediatric rehabilitation in the Self-Directed Physiatric Education Program for practitioners and trainees in physical medicine and rehabilitation and pediatric medicine. The goal of this article is to modify the learner's current practice techniques to ensure that assistive technology is used to promote community integration from early childhood

through transition and into adulthood. Copyright 2010 American Academy of Physical Medicine and Rehabilitation. Published by Elsevier Inc. All rights reserved.

PMID: 20359676 [PubMed - indexed for MEDLINE]

22. Anesteziol Reanimatol. 2010 Jan-Feb;(1):55-7.

Epidural use of electrostimulation catheters in a complex of balanced anesthesia in patients with infantile cerebral paralysis [Article in Russian]

[No authors listed]

The paper presents the results of epidural blocks using Arrow electrostimulation catheters in 25 patients with infantile cerebral paralysis for anesthetic provision of reconstructive orthopedic operations. The findings lead to the conclusion that epidural anesthesia with electrostimulation catheters provides a high anesthesia quality and safety.

PMID: 20568334 [PubMed - in process]

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.

23. Clin Perinatol. 2010 Jun;37(2):355-74.

The role of proteomics in the diagnosis of chorioamnionitis and early-onset neonatal sepsis.

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Intrauterine infection is a unique pathologic process that raises the risk for early-onset neonatal sepsis (EONS). By acting synergistically with prematurity, EONS increases the risk for adverse neonatal outcomes, including intraventricular hemorrhage and cerebral palsy. Although several pathways for the pathogenesis of fetal damage have been proposed, the basic molecular mechanisms that modulate these events remain incompletely understood. Discovery of clinically and biologically relevant biomarkers able to reveal key pathogenic pathways and predict pregnancies at risk for antenatal fetal damage is a priority. Proteomics provides a unique opportunity to fill this gap.

PMID: 20569812 [PubMed - in process]

24. Clin Perinatol. 2010 Jun;37(2):339-54.

Diagnosis and management of clinical chorioamnionitis.

Tita AT, Andrews WW.

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Chorioamnionitis is a common complication of pregnancy associated with significant maternal, perinatal, and long-term adverse outcomes. Adverse maternal outcomes include postpartum infections and sepsis whereas adverse infant outcomes include stillbirth, premature birth, neonatal sepsis, chronic lung disease, and brain injury leading to cerebral palsy and other neurodevelopmental disabilities. Research in the past 2 decades has expanded under-

standing of the mechanistic links between intra-amniotic infection and preterm delivery as well as morbidities of pre-term and term infants. Recent and ongoing clinical research into better methods for diagnosing, treating, and preventing chorioamnionitis is likely to have a substantial impact on short and long-term outcomes in the neonate.

PMID: 20569811 [PubMed - in process]

25. Dis Mon. 2010 Jun;56(6):304-97.

Developmental disabilities across the lifespan.

Patel DR, Greydanus DE, Calles JL Jr, Pratt HD.

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PMID: 20515667 [PubMed - indexed for MEDLINE]