Cerebral Palsy ALLIANCE

NEWS
Cerebral Palsy Research

Monday 28 October 2013

Professor Nadia Badawi
Macquarie Group Foundation Chair of Cerebral Palsy
PO Box 560, Darlinghurst, New South Wales 2010 Australia

Interventions and Management

1. BMC Neurol. 2013 Oct 21;13(1):152. [Epub ahead of print]

Observational skills assessment score: reliability in measuring amount and quality of use of the affected hand in unilateral cerebral palsy.

Speth L, Janssen-Potten Y, Leffers P, Rameckers E, Defesche A, Geers R, Smeets R, Vles H.

BACKGROUND: The Observational Skills Assessment Score (OSAS) measures amount and quality of use of the affected hand in children with unilateral Cerebral Palsy (CP) in bimanual activities and could therefore be a valuable addition to existing assessment tools. The OSAS consists of tasks that are age appropriate and require use of the affected hand. METHOD: To measure the agreement and reliability of the OSAS a convenience sample of two groups of 16 children with unilateral spastic CP (2.5-6 and 12--16 years old), performed age specific bimanual tasks in 2 measurement sessions. Three experienced raters took part in testing and 8 in scoring. Intra class correlation (ICC) values for intra- and inter-rater reliability, and the mean and standard deviation of the differences between measurements were calculated. For test-retest reliability beside ICC scores, Smallest Detectable Differences (SDDs) were calculated in 16 older and 10 younger children. RESULTS: Generally, there seems to be good agreement between repeated measurements of the OSAS, as indicated by the small SDDs on most scales for quality of movement, compared to the range of their scales. This indicates potentially good sensitivity to change if used for patient evaluation purposes. The exceptions were the 'quality of reach' score for all tasks, and all quality scores for the stacking blocks task for the young children. As used in the present study, the OSAS has good discriminative capacity within patient populations as indicated by the high ICCs for most quality scores. Measuring the amount of use does not seem to be useful for either discrimination or evaluation. CONCLUSION: In general, the OSAS seems to be a reliable tool for assessing the quality of use of the affected hand in bimanual activities in younger and older children with unilateral CP. Some modifications may improve its usefulness and efficiency.

PMID: 24139170 [PubMed - as supplied by publisher] Free full text

2. Res Dev Disabil. 2013 Oct 18. pii: S0891-4222(13)00409-5. doi: 10.1016/j.ridd.2013.09.015. [Epub ahead of print]

The effects of an exercise training program on hand and wrist strength, and function, and activities of daily living, in adults with severe Cerebral Palsy.

Hutzler Y, Rodríguez BL, Laiz NM, Díez I, Barak S.

Zinman College of Physical Education and Sport Science, Israel; Israel Sport Center for the Disabled, Israel. Electronic address: shayke@wincol.ac.il.

The purpose of the current study was to establish measurement reliability in adults with Cerebral Palsy (CP), and to examine the feasibility and outcomes of an upper extremity strength training program (three times per week for 90min each time). A control group design mixed with a prospective time series design for the intervention group was completed, including a pre-test, a post-test after a 12-week intervention period, and a follow-up in the intervention group after an additional 10-week period. Seventeen adults with CP with severe motor impairment took part in the study (10 in the intervention and seven in the control group). The test battery was comprised of wrist and hand dynamometry; dominant hand upper-extremity function measures (Jebsen Hand Function Test=JHFT, Minnesota Manual Dexterity Test=MMDT, and the Nine Hole Peg Test=NHPT); and activity of daily living with the Barthel Index. The results indicated that in both the control and the intervention groups, the strength tests exhibited good-to-excellent reliability during pre-test and post-test. The group comparison revealed that while in the pre-test no between-group differences existed, in the post-test the strength training group demonstrated significantly higher values in five out of eight strength measures, as well as in the MMDT. Discontinuing the program for eight weeks reversed the effects almost to baseline. In conclusion, the outcomes demonstrated the reliability of the assessments utilized in this study, as well as the feasibility of the strength training program, in adults with severe motor impairment due to CP.

PMID: 24145046 [PubMed - as supplied by publisher]

3. J Clin Neurosci. 2013 Oct 20. pii: S0967-5868(13)00322-6. doi: 10.1016/j.jocn.2013.04.020. [Epub ahead of print]

Long-term results of selective dorsal rhizotomy for hereditary spastic paraparesis.

Kai M, Yongjie L, Ping Z.

Beijing Institute of Functional Neurosurgery, Xuanwu Hospital, Capital University of Medical Science, No. 45 Changchun Street, Xicheng District, Beijing 100053, China.

Pure hereditary spastic paraparesis usually presents with progressive weakness and spasticity of the legs, which is similar to spastic cerebral palsy. In this study selective dorsal rhizotomy (SDR) was performed to improve the spasticity of pure hereditary spastic paraparesis and the long-term results were followed. A series of four patients with pure hereditary spastic paraparesis diagnosed by a multidisciplinary team received SDR. The dorsal rootlets from the L2 to S1 levels were selectively resected under electrophysiological monitoring. The patients were followed up for more than 2years to evaluate the outcome of surgery. There was a significant reduction in muscular spasm after SDR. Standing and walking stability were improved in all patients which led to improvement in walking posture and longer walking distance without assistance. No urinary retention, cerebrospinal fluid leak, surgical infection or kyphosis occurred. For severe pure hereditary spastic paraparesis, SDR can reduce muscle spasm and improve standing and walking stability. These results were stable throughout follow-up. SDR performed at the level of the conus medullaris through a laminectomy from T12 to L1 or L1 to L2 requires a shorter incision, laminectomy of fewer segments, and has a shorter operation time than the usual method (laminectomy from L2 to S1). Intraoperative electrophysiological monitoring is helpful to discriminate abnormal rootlets and protect sphincter function.

PMID: 24153323 [PubMed - as supplied by publisher]

4. Orthopade. 2013 Oct 26. [Epub ahead of print]

Osseous and soft tissue operations for treatment of joint malpositioning in infantile cerebral palsy [Article in German]

Senst S.

Abteilung für Kinderorthopädie, Schön Klinik Hamburg-Eilbek, Dehnhaide 120, 22081, Hamburg, Deutschland, St.senst@gmail.com.

If untreated infantile cerebral palsy (ICP) leads to a progressive shortening of muscles and to progressive joint malpositioning. In addition a number of other disorders also result, in particular sensory disorders, intelligence deficits and epilepsy. In order to optimally treat as many as possible of the problems of multi-handicapped children with ICP it is of immanent importance that physiotherapists, occupational therapists, speech therapists, orthopedic technicians, pediatric orthopedists as well as neuropediatricians and social pediatricians work as a team. Surgical measures to correct joint malpositioning serve to improve the function and also to avoid or alleviate pain. Functional improvement measures are ideally undertaken during or shortly before elementary school age, thus enabling a further verticalization/straightening and mobilization. To improve symmetry and therefore the sitting posture, surgery is also indicated for profoundly disabled patients, sometimes making foot operations necessary. It is only in this way that maximum participation can be guaranteed and if necessary utilizing additional aids, such as Zimmer frames or E-wheelchairs.

PMID: 24158389 [PubMed - as supplied by publisher]

5. J Child Neurol. 2013 Jun;28(6):819. doi: 10.1177/0883073813487025.

Botulinum toxin induces chemodenervation of intrafusal and extrafusal fibers.

Phadke CP, On AY, Ismail F, Boulias C.

Comment in:

Response: Botulinum toxin induces chemodenervation of intrafusal and extrafusal fibers. [J Child Neurol. 2013]

Comment on

Usefulness of the tendon reflex for assessing spasticity after botulinum toxin-a injection in children with cerebral palsy. [J Child Neurol. 2013]

PMID: 23677547 [PubMed - indexed for MEDLINE]

6. J Child Neurol. 2013 Jun;28(6):820. doi: 10.1177/0883073813487026.

Response: Botulinum toxin induces chemodenervation of intrafusal and extrafusal fibers.

Jang DH, Sung IY.

Comment on:

Usefulness of the tendon reflex for assessing spasticity after botulinum toxin-a injection in children with cerebral palsy. [J Child Neurol. 2013]

Botulinum toxin induces chemodenervation of intrafusal and extrafusal fibers. [J Child Neurol. 2013]

PMID: 23677548 [PubMed - indexed for MEDLINE]

7. World J Orthop. 2013 Oct 18;4(4):279-86. doi: 10.5312/wjo.v4.i4.279.

Percutaneous pelvic osteotomy in cerebral palsy patients: Surgical technique and indications.

Canavese F, Rousset M, Samba A, de Coulon G.

Federico Canavese, Marie Rousset, Antoine Samba, Pediatric Surgery Department, University Hospital Estaing, 63003 Clermont-Ferrand, France.

AIM: To describe the surgical technique of and indications for percutaneous pelvic osteotomy in patients with severe cerebral palsy. METHODS: Twenty-one non-ambulatory children and adolescents (22 hips) were consecutively treated with percutaneous pelvic osteotomy, which was used in conjunction with varus, derotational, shortening femoral osteotomy and soft tissue release, to correct progressive hip subluxation and acetabular dysplasia. The age, gender, Gross Motor Function Classification System level, side(s) of operated hip, total time of follow-up, immediate post-operative immobilization, complications, and the need for revision surgery were recorded for all patients. RESULTS: Seventeen patients (81%) were classified as GMFCS level IV, and 4 (19%) patients were classified as GMFCS level V. At the time of surgery, the mean age was 10.3 years (range: 4-15 years). The mean Reimers' migration percentage improved from 63% (range: 3%-100%) pre-operatively to 6.5% (range: 0%-70%) at the final follow-up ($P < 0.05$). The mean acetabular angle (AA) improved from 34.1° (range: 19°-50°) pre-operatively to 14.1° (range: 5°-27°) ($P < 0.05$). Surgical correction of MP and AA was comparable in hips with open ($n = 14$) or closed ($n = 8$) triradiate cartilage ($P < 0.05$). All operated hips were pain-free at the time of the final follow-up visit, although one patient had pain for 6 mo after surgery. We did not observe any cases of bone graft dislodgement or avascular necrosis of the femoral head. CONCLUSION: Pelvic osteotomy through a less invasive surgical approach appears to be a valid alternative with similar outcomes to those of standard techniques. This method allows for less muscle stripping and blood loss and a shorter operating time.

PMID: 24147263 [PubMed] Free PMC Article

8. Rev Paul Pediatr. 2013 Sep;31(3):377-83. doi: 10.1590/S0103-05822013000300016.

Timed "Up & Go" test in children and adolescents [Article in English, Portuguese]

Nicolini-Panisson RD, Donadio MV.

PUC, Porto AlegreRS, Brasil.

OBJECTIVE To evaluate, by a literature review, the Timed "Up & Go" (TUG) test use and its main methodological aspects in children and adolescents. DATA SOURCES The searches were performed in the following databases: PubMed, CINAHL, Web of Science, SciELO and Cochrane Library, from April to July 2012. Studies published from 1990 to 2012 using the terms in Portuguese and English "Timed "Up & Go", "test", "balance", "child", and "adolescent" were selected. The results were divided into categories: general characteristics of the studies, population, test implementation METHODS, interpretation of results and associations with other measurements. DATA SYNTHESIS 27 studies were analyzed in this review and most of them used the TUG test along with other outcome measures to assess functional mobility or balance. Three studies evaluated the TUG test in significant samples of children and adolescents with typical development, and the most studied specific diagnoses were cerebral palsy and traumatic brain injury. The absence of methodological standardization was noted, but one study proposed adaptations to the pediatric population. In children and adolescents with specific clinical diagnoses, the coefficient of within-session reliability was found to be high in most studies, as well as the intra and inter-examiner reliability, which characterizes the good reproducibility of the test. CONCLUSIONS The TUG test was shown to be a good tool to assess functional mobility in the pediatric population, presenting a good reproducibility and correlation with other assessment tools.

PMID: 24142322 [PubMed - in process] Free full text [PDF]

9. Br J Sports Med. 2013 Nov;47(17):e4. doi: 10.1136/bjsports-2013-093073.39.

Changes in body composition and performance of a cerebral palsy paralympic athlete in preparation for the london paralympic games.

Shreeve S, Rowley N, Gilby C, Mitchell N.

English Institute of Sport, Sportcity, Gate 13, Rowsley Street, Manchester, UK, M11 3FF.

This case study examined body composition changes of a cerebral palsy (CP) athlete, in the 12 weeks prior to the London 2012 Paralympic Games. The aim was to monitor body composition of an athlete in preparation for the London Paralympic Games as part of the optimisation of performance. Within a 12 week period, body composition assessments were completed alongside an incremental 7×200 m swimming performance test, each separated by 6 weeks. One ISAK trained anthropometrist recorded body mass, sum of 8 skinfold thicknesses (biceps, triceps, subscapular, iliac crest, supraspinale, abdominal, front thigh and medial calf), girths (arm, waist, hips and calf), alongside calculations of mid upper arm muscle circumference (MUAMC). With the athlete's non-affected side being the left side, additional measurements of arm and calf circumference, bicep and triceps skinfold and MUAMC were also assessed. Sum of 8 skinfolds fluctuated over weeks 1, 6 and 12 with 65.8 mm, 60.7 mm and 63.0 mm respectively. Arm circumference in the dominant left arm increased in the 12 week period 29.7 cm, 29.4 cm and 30.5 cm respectively, with the non-dominant right arm maintaining arm circumference over the same period. Performance in the final 200 m of the incremental performance test improved at each time point. 1.2% improvement in performance was noted between weeks 1 and 6 and a 2.1% improvement between weeks 6 and 12. A total performance improvement of 3.2% was noted from the start to end of the 12 week period. This case study highlights in a CP athlete, performance and body composition changes in the lead into major competition. There was little change in body composition but improvements in performance. This suggests that minimal body fat is not critical in CP swimming performance. However, the athlete maintained muscle mass which may suggest that functional mass is more an indicator of performance and provides a direction for future work.

PMID: 24159129 [PubMed - in process]

10. J Deaf Stud Deaf Educ. 2013 Oct 21. [Epub ahead of print]

Outcomes of 3-Year-Old Children With Hearing Loss and Different Types of Additional Disabilities.

Cupples L, Ching TY, Crowe K, Seeto M, Leigh G, Street L, Day J, Marnane V, Thomson J.

Macquarie University.

This research investigated the speech, language, and functional auditory outcomes of 119 3-year-old children with hearing loss and additional disabilities. Outcomes were evaluated using direct assessment and caregiver report. Multiple regressions revealed that type of additional disability and level of maternal education were significant predictors of language outcomes. Poorer outcomes were achieved in a combined group of children with autism, cerebral palsy, and/or developmental delay (DD) (Group A), compared with children with vision or speech output impairments, syndromes not entailing DD, or medical disorders (Group B). Better outcomes were associated with higher levels of maternal education. The association between better language outcomes and earlier cochlear implant switch-on approached significance. Further regression analyses were conducted separately for children with different types of additional disabilities. Level of maternal education was the only significant predictor of outcomes for Group A children, whereas degree of hearing loss was the strongest predictor for children in Group B. The findings highlight the variable impact that different types of additional disabilities can have on language development in children with hearing loss.

PMID: 24150488 [PubMed - as supplied by publisher]

11. Int J Pediatr Otorhinolaryngol. 2013 Oct 1. pii: S0165-5876(13)00470-9. doi: 10.1016/j.ijporl.2013.09.023. [Epub ahead of print]

AAC intervention using a VOCA for deaf children with multiple disabilities who received cochlear implantation.

Lee Y, Jeong SW, Kim LS.

Department of Speech-Language Therapy & Aural Rehabilitation, Woosong University, Daejeon, Republic of Korea.

OBJECTIVES: The aim of this study was to examine the efficacy of a new habilitation approach, augmentative and alternative communication (AAC) intervention using a voice output communication aid (VOCA), in improving speech perception, speech production, receptive vocabulary skills, and communicative behaviors in children with cochlear implants (CIs) who had multiple disabilities. METHODS: Five children with mental retardation and/or cerebral palsy who had used CIs over two years were included in this study. Five children in the control group were matched to children who had AAC intervention on the basis of the type/severity of their additional disabilities and chronological age. They had limited oral communication skills after cochlear implantation because of their limited cognition and oromotor function. The children attended the AAC intervention with parents once a week for 6 months. We evaluated their performance using formal tests, including the monosyllabic word tests, the articulation test, and the receptive vocabulary test. We also assessed parent-child interactions. We analyzed the data using a one-group pretest and posttest design. RESULTS: The mean scores of the formal tests performed in these children improved from 26% to 48% in the phoneme scores of the monosyllabic word tests, from 17% to 35% in the articulation test, and from 11 to 18.4 in the receptive vocabulary test after AAC intervention (all $p<.05$). Some children in the control group showed improvement in the speech perception, speech production, and receptive vocabulary tests for 6 months, but the differences did not achieve statistical significance (all $p>.05$). The frequency of spontaneous communicative behaviors (i.e., vocalization, gestures, and words) and imitative words significantly increased after AAC intervention ($p<.05$). CONCLUSIONS: AAC intervention using a VOCA was very useful and effective on improving communicative skills in children with multiple disabilities who had very limited oral communication skills after cochlear implantation.

PMID: 24140395 [PubMed - as supplied by publisher]

12. Rev Paul Pediatr. 2013 Sep;31(3):344-9. doi: 10.1590/S0103-05822013000300011.

Food pattern and nutritional status of children with cerebral palsy [Article in English, Portuguese]

Lopes PA, Amancio OM, Araújo RF, Vitalle MS, Braga JA.

Universidade Federal de São Paulo, Escola Paulista de Medicina, Departamento de Pediatria, São PauloSP, Brasil.

OBJECTIVES To assess the food intake pattern and the nutritional status of children with cerebral palsy. METHODS Cross-sectional study with 90 children from two to 12.8 years with cerebral palsy in the following forms: hemiplegia, diplegia, and tetraplegia. Nutritional status was assessed by weight, height, and age data. Food intake was verified by the 24-hour recall and food frequency questionnaire. The ability to chew and/or swallowing, intestinal habits, and physical activity were also evaluated. RESULTS For 2-3 year-old age group, the mean energy intake followed the recommended range; in 4-6 year-old age group with hemiplegia and tetraplegia, energy intake was below the recommended limits. All children presented low intake of carbohydrates, adequate intake of proteins and high intake of lipids. The tetraplegia group had a higher prevalence of chewing (41%) and swallowing (12.8%) difficulties compared to 14.5 and 6.6% of children with hemiplegia, respectively. Most children of all groups had a daily intestinal habit. All children presented mild physical activity, while moderate activity was not practiced by any child of the tetraplegia group, which had a significantly lower height/age Z score than those with hemiplegia (-2.14 versus -1.05; $p=0.003$). CONCLUSIONS The children with cerebral palsy presented inadequate dietary pattern and impaired nutritional status, with special compromise of height. Tetraplegia imposes difficulties regarding chewing/ swallowing and moderate physical activity practice.

PMID: 24142317 [PubMed - in process] Free full text [PDF]

13. Res Dev Disabil. 2013 Oct 17. pii: S0891-4222(13)00427-7. doi: 10.1016/j.ridd.2013.09.033. [Epub ahead of print]

Development of social functioning and communication in school-aged (5-9years) children with cerebral palsy.

van Schie PE, Siebes RC, Dallmeijer AJ, Schuengel C, Smits DW, Gorter JW, Becher JG.

VU University Medical Center, Department of Rehabilitation Medicine and EMGO Institute for Health and Care Research, Amsterdam, The Netherlands. Electronic address: pem.vanschie@vumc.nl.

The aim of this study was to examine determinants of the course and level of social functioning and communication in school-aged children with cerebral palsy (CP) over a 2-year period. A clinic-based sample of 5 and 7 years old children with CP (n=108; 72 males; mean age 6y 3mo, SD 12mo; Gross Motor Function Classification System (GFMCS) level I-V) was followed longitudinally in three yearly assessments. Social functioning and communication were measured with the Vineland Adaptive Behavior Scales (VABS). Data were analyzed with generalized estimated equations. The results showed that social function followed a course of progressive restrictions over time in non-ambulatory children with CP aged 5-9 compared to children who could walk with or without walking aids. Overall lower levels of social functioning were found in children with GMFCS V, epilepsy, speech problems, lower intellectual capacity and older age at baseline. For communication more restrictions over time were found in children with lower intellectual capacity. Children with GMFCS V, speech problems and older age at baseline had overall greater restrictions in communication. It was concluded that motor functioning and intellectual ability can be used to identify children at risk for progressive restrictions in social functioning and communication. For children with CP and social and communicative restrictions, multidisciplinary assessment and treatment may be indicated to counteract an unfavorable development.

PMID: 24139717 [PubMed - as supplied by publisher]

14. Child Care Health Dev. 2013 Oct 21. doi: 10.1111/cch.12113. [Epub ahead of print]

Growing up with cerebral palsy: perceptions of the influence of family.

Freeborn D, Knafl K.

College of Nursing, Brigham Young University, Provo, UT, USA.

BACKGROUND: Cerebral palsy (CP) is a non-progressive condition present from birth or infancy that includes various neurological patterns of dysfunction. It is characterized by abnormal motor control and/or posture and can involve communication difficulties. Children and youth with CP face multiple social and developmental challenges during their formative years including mild to severe physical limitations, poor socialization, limited recreational activities, and stigmatization. Families play a key role in supporting adaptation to CP. The purpose of this paper was to explore women's perceptions of the ways their families contributed to their overall quality of life with CP. METHODS: Drawing on data from a qualitative study of eight women with CP, the purpose of this analysis was to examine perceptions of the ways in which their families and individual family members contributed to participants' overall quality of life and adaptation to CP. Respondents ranged in age from 22 years to 55 years and had varied forms of CP. The study was based on a feminist biographical approach, which combines biographical methods with feminist principles. RESULTS: Participants provided considerable, rich contextual data on their family life and the pivotal role family played. The analysis identified four themes related to supportive family roles: (1) being an advocate, and teaching advocacy; (2) promoting inclusion and acceptance; (3) integrating therapy into daily life; and (4) the importance of siblings as friends and mentors. CONCLUSIONS: Health-care providers can contribute to the family's ability to facilitate quality of life by providing guidance on how to be advocates and teach advocacy, including the child with CP in family activities, accessing therapy and incorporating beneficial therapies at home, and promoting healthy sibling relationships.

PMID: 24148084 [PubMed - as supplied by publisher]

15. Patient. 2013 Oct 19. [Epub ahead of print]

How Illness Affects Family Members: A Qualitative Interview Survey.

Wittenberg E, Saada A, Prosser LA.

Center for Health Decision Science, Harvard School of Public Health, 718 Huntington Ave, Boston, MA, 02115, USA, ewittenb@hsph.harvard.edu.

OBJECTIVE: Spillover effects of illness on family members can be substantial. The objective of this study was to identify the domains of family members' health and well-being that are affected when a relative has a chronic health condition. METHODS: Semi-structured telephone interviews were conducted in February 2012 with 49 individuals whose relatives had any of five chronic health conditions (arthritis, cancer, Alzheimer's disease/dementia, cerebral palsy, and depression), purposively sampled to include different relationships with the ill relative (parent, child, spouse). Subjects were queried on whether and how having an ill relative affected their health and well-being; they were also asked about their caregiving responsibilities and the relative's health. Interview data were analyzed using thematic analysis. RESULTS: Family members in our sample reported experiencing psychological and non-health effects from having an ill relative, and secondarily somatic effects. Effects on emotional health were most commonly reported as psychological spillover; non-health effects frequently included changes in daily activities and provision of caregiving. Spouses of patients reported the broadest range of spillover domains affected and adolescents of ill parents the fewest. Family members reported experiencing effects that were perceived as both positive and negative. CONCLUSIONS: Spillover of illness onto family members encompasses a wide range of domains of health and well-being, extending beyond those included in many existing health-related quality of life measures. Outcomes measurement efforts should be expanded to adequately capture these health and well-being outcomes for analysis, to ensure that the benefits of interventions are accurately estimated and conclusions are valid.

PMID: 24142495 [PubMed - as supplied by publisher]

16. Neurology. 2013 Oct 22;81(17):1550-4. doi: 10.1212/WNL.0b013e3182a95894.

The Dercum-Muybridge collaboration for sequential photography of neurologic disorders.

Lanska DJ.

From the Veterans Affairs Medical Center, Great Lakes Healthcare System, Tomah, WI.

OBJECTIVE: To analyze the contributions of American photographer Eadweard Muybridge (1830-1904) and Philadelphia neurologist Francis Dercum (1856-1931) toward creating the first motion-picture sequences of patients with neurologic disorders. BACKGROUND: In the late 1870s and 1880s, prior to the development of movie cameras or projectors, Muybridge photographed sequential images of people and animals in motion, using arrays of sequentially triggered single-image cameras and multilens cameras. METHODS: Examination of published writings and photographic sequences by Muybridge and Dercum, and primary source documents, including letters from Dercum. RESULTS: In 1885, Philadelphia neurologist Francis Dercum (1856-1931) collaborated with Muybridge at the University of Pennsylvania to photograph sequential images of patients with various neurologic disorders involving abnormal movements. Subjects were recruited from the neurology services of the University Hospital and the Philadelphia Hospital. Muybridge and Dercum photographed patients with tabes dorsalis, hemiparesis, paraparesis, athetotic cerebral palsy, lead encephalopathy, congenital hydrocephalus with diparesis, poliomyelitis, pseudoseizures, psychogenic movement disorder, and other conditions. CONCLUSIONS: These are the first motion-picture sequences of neurologic disorders ever filmed, and provide an important visual archive and teaching resource for neurologic disorders that were prevalent in the late 19th century.

PMID: 24145881 [PubMed - in process]

Prevention and Cure

17. Arch Dis Child Fetal Neonatal Ed. 2013 Oct 18. doi: 10.1136/archdischild-2013-304705. [Epub ahead of print]

Antenatal steroid exposure and outcomes of very premature infants: a regional cohort study.

Wong D, Abdel-Latif M, Kent A; for the NICUS Network.

Australian National University Medical School, Canberra, Australian Capital Territory, Australia.

OBJECTIVE: To compare mortality, short-term morbidity and long-term neurodevelopmental outcomes of <29 week premature infants with antenatal steroid exposure (none, incomplete and complete). PATIENTS AND METHODS: Multicentre retrospective cohort study, within a geographically defined area in Australia served by a network of 10 neonatal intensive care units (NICUs), of infants <29 weeks gestational age, admitted to NICUs between 1998 and 2004. Outcome measures included hospital survival, perinatal complications and functional disability at 2-3 years follow-up. RESULTS: 2549 neonates were included; 319 (12.5%) received no exposure to steroids. Hospital mortality (OR 0.59, 95% CI 0.45 to 0.76, p<0.001, intraventricular haemorrhage (IVH) (OR 0.58, 95% CI 0.42 to 0.81, p=0.001) and necrotising entercolitis (NEC) (OR 0.62, 95% CI 0.42 to 0.91, p=0.018) was less likely in infants with any steroid exposure. Any steroid exposure was associated with less need for surfactant (OR 0.41, 95% CI 0.30 to 0.57, p<0.001) and mechanical ventilation (OR 0.30, 95% CI 0.17 to 0.52, p<0.001). Subgroup analyses demonstrated differences in outcomes only with complete steroid coverage and not with incomplete coverage. Survival benefit and reduction in the incidence of severe IVH was evident from 24 to 28 weeks. Long-term neurodevelopmental data available for 1473 survivors showed no significant difference in outcomes with steroid exposure after multivariate analysis. CONCLUSIONS: Exposure to a complete course of antenatal steroids is associated with higher infant survival rates, lower rates of severe IVH and NEC compared to an incomplete course or no exposure. Any exposure to steroids reduces the risk of moderate cerebral palsy, however, long-term neurodevelopmental outcome may not be affected by steroid exposure.

PMID: 24142624 [PubMed - as supplied by publisher]

18. Brain Struct Funct. 2013 Oct 22. [Epub ahead of print]

Changes in the integrity of thalamocortical connections are associated with sensorimotor deficits in children with congenital hemiplegia.

Tsao H, Pannek K, Boyd RN, Rose SE.

School of Medicine, The University of Queensland, Brisbane, Australia, h.tsao@uq.edu.au.

Preservation of thalamocortical projections to the sensorimotor cortex is related to improved hand function in children with cerebral palsy (CP). Whether CP is associated with altered microstructure of these sensorimotor projections or other thalamocortical pathways remains unclear. Forty-two children with congenital hemiplegia and fifteen typically developing children (TDC) underwent structural and diffusion-weighted imaging (high-angular-resolution diffusion imaging) using a 3T MRI. Structural T1-images were parcellated into 34 cortical regions and the thalamus per hemisphere. Thalamocortical projections were extracted using probabilistic tractography and the top tan cortical regions with the greatest number of thalamocortical streamlines for the TDC group were selected for further analysis. The thalamus was parcellated based on its cortical connections. Differences between hemispheres for thalamocortical streamline numbers to each cortical region [asymmetry index (AI)], tract volume and tract microstructure [weighted mean fractional anisotropy (FA) and mean diffusivity (MD)] were calculated. Correlations between these measures (AI, FA and MD) and sensorimotor function were performed. Thalamocortical projections showed topographical organisation based on cortical connectivity. Projections to paracentral lobule, pre-central and post-central gyri showed greater AI in CP group, which indicates reduced streamlines on the ipsilesioned hemisphere. Reduced FA, reduced tract volume and increased MD were also found for these thalamocortical projections on the ipsilesioned hemisphere in children with CP. Changes in AI and tract microstructure of these projections were associated with poorer sensorimotor function. The findings suggest CP is associated with reorganisation of thalamocortical projections to the sensorimotor cortex. Integrity in these projections may underpin

deficits in sensorimotor function. PMID: 24146132 [PubMed - as supplied by publisher]

19. Int J Dev Neurosci. 2013 Oct 15. pii: S0736-5748(13)00143-3. doi: 10.1016/j.ijdevneu.2013.10.003. [Epub ahead of print]

Inflammatory response and oxidative stress in developing rat brain and its consequences on motor behavior following maternal administration of LPS and perinatal anoxia.

Stigger F, Lovatel G, Marques M, Bertoldi K, Moysés F, Elsner V, Siqueira IR, Achaval M, Marcuzzo S.

Programa de Pós-Graduação em Neurociências, Instituto de Ciências Básicas da Saúde, Universidade Federal do Rio Grande do Sul, RS, Brazil; Laboratório de Histofisiologia Comparada, Departamento de Ciências Morfológicas, Instituto de Ciências Básicas da Saúde, Universidade Federal do Rio Grande do Sul, RS, Brazil. Electronic address: felipe.stigger@ufrgs.br.

Cerebral palsy (CP) is a disorder of locomotion, posture and movement that can be caused by prenatal, perinatal or postnatal insults during brain development. An increased incidence of CP has been correlated to perinatal asphyxia and maternal infections during gestation. The effects of maternal exposure to low doses of bacterial endotoxin (lipopolysaccharide, LPS) associated or not with perinatal anoxia (PA) on oxidative and inflammatory parameters were examined in cerebral cortices of newborns pups. Concentrations of TNF-α, IL-1, IL-4, SOD, CAT and DCF were measured by the ELISA method. Other newborn rats were assessed for neonatal developmental milestones from day 1 to 21. Motor behavior was also tested at P29 using open-field and Rotarod. PA alone only increased IL-1 expression in cerebral cortex with no changes in oxidative measures. PA also induced a slight impact on development and motor performance. LPS alone was not able to delay motor development but resulted in changes in motor activity and coordination with increased levels of IL-1 and TNF-α expression associated with a high production of free radicals and elevated SOD activity. When LPS and PA were combined, changes in inflammatory and oxidative stress parameters were greater. In addition, greater motor development and coordination impairments were observed. Prenatal exposure of pups to LPS appeared to sensitize the developing brain to effects of a subsequent anoxia insult resulting in an increased expression of pro-inflammatory cytokines and increased free radical levels in the cerebral cortex. These outcomes suggest that oxidative and inflammatory parameters in the cerebral cortex are implicated in motor deficits following maternal infection and perinatal anoxia by acting in a synergistic manner during a critical period of development of the nervous system.

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Birth size and risk of cerebral palsy in term births.

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