Cerebral Palsy ALLIANCE

NEWS
Cerebral Palsy Research

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Macquarie Group Foundation Chair of Cerebral Palsy

Interventions and Management

1. J Hand Ther. 2014 Aug 30. pii: S0894-1130(14)00089-1. doi: 10.1016/j.jht.2014.08.003. [Epub ahead of print]

Addressing muscle performance impairments in cerebral palsy: Implications for upper extremity resistance training.

Moreau NG1, Gannotti ME2.

STUDY DESIGN: Case study and literature review. INTRODUCTION: Muscle performance consists of not only strength but also muscle power, rate of force development, and endurance. Therefore, resistance training programs should address not only the force-generating capacity of the muscle but also the ability to produce force quickly. PURPOSE: To discuss the National Strength and Conditioning Association's resistance training guidelines for youth as specifically related to optimal dosing for muscle strength versus muscle power. Dosing parameters of frequency, volume, intensity, duration, and velocity are discussed independently for strength and power. METHODS: We describe how resistance training principles can be applied to the upper extremity in CP through a case study. The case describes an individual with spastic CP, who has a severe motor disability and is non-ambulatory, but has been able to perform resistance training focused on speed, power, and strength. DISCUSSION: Recommendations to optimize the dosing of this individual's resistance training program are made.

PMID: 25308313 [PubMed - as supplied by publisher]

2. Eur J Paediatr Neurol. 2014 Sep 18. pii: S1090-3798(14)00145-7. doi: 10.1016/j.ejpn.2014.09.002. [Epub ahead of print]

fMRI assessment of neuroplasticity in youths with neurodevelopmental-associated motor disorders after piano training.

Alves-Pinto A1, Turova V1, Blumenstein T1, Thienel A2, Wohlschläger A3, Lampe R4.

BACKGROUND: Damage to the developing brain may lead to lifelong motor impairments namely of the hand function. Playing an instrument combines the execution of gross and fine motor movements with direct auditory feedback of performance and with emotional value. This motor-associated sensory information may work as a self-control of motor performance in therapeutic settings. AIMS: The current study examined the occurrence of

neuronal changes associated to piano training in youths with neurodevelopmental-associated hand motor deficits. METHODS: Functional magnetic resonance imaging responses evoked during a finger tapping task in a group of ten youths with neuromotor impairments that received individualized piano lessons for eighteen months were analyzed. Functional imaging data obtained before and after the piano training was compared to that obtained from a similar group of six youths who received no training during the same period of time. RESULTS: Dynamic causal modeling of functional data indicated an increase in positive connectivity from the left primary motor cortical area to the right cerebellum from before to after the piano training. CONCLUSIONS: A wide variability across patients was observed and further studies remain necessary to clarify the neurophysiological basis of the effects of piano training in hand motor function of patients with neurodevelopmental motor disorders.

PMID: 25305700 [PubMed - as supplied by publisher]

3. Acta Bioeng Biomech. 2014;16(3):77-87.

Index of mechanical work in gait of children with cerebral palsy.

Dziuba AK, Tylkowska M, Jaroszczuk S.

The pathological gait of children with cerebral palsy involves higher mechanical work, which limits their ability to function properly in society. Mechanical work is directly related to walking speed and, although a number of studies have been carried out in this field, few of them analysed the effect of the speed. The study aimed to develop standards for mechanical work during gait of children with cerebral palsy depending on the walking speed. The study covered 18 children with cerebral palsy and 14 healthy children. The BTS Smart software and the author's software were used to evaluate mechanical work, kinetic, potential and rotational energy connected with motion of the children body during walk. Compared to healthy subjects, mechanical work in children with cerebral palsy increases with the degree of disability. It can be expressed as a linear function of walking speed and shows strong and statistically significant correlations with walking gait. A negative statistically significant correlation between the degree of disability and walking speed can be observed. The highest contribution to the total mechanical energy during gait is from mechanical energy of the feet. Instantaneous value of rotational energy is 700 times lower than the instantaneous mechanical energy. An increase in walking speed causes the increase in the effect of the index of kinetic energy on total mechanical work. The method described can provide a n objective supplementation for doctors and physical therapists to perform a simple and immediate diagnosis without much technical knowledge.

PMID: 25308510 [PubMed - in process]

4. J Electromyogr Kinesiol. 2014 Sep 16. pii: S1050-6411(14)00179-5. doi: 10.1016/j.jelekin.2014.08.008. [Epub ahead of print]

Electromyographic analysis of rectus femoris activity during seated to standing position and walking in water and on dry land in healthy children and children with cerebral palsy.

Oliveira LC1, Trócoli TO2, Kanashiro MS3, Braga D3, Cyrillo FN4.

Purpose: To analyze rectus femoris activity during seated to standing position and walking in water and on dry land comparing a group of children with the spastic diparesis type of cerebral palsy (CP) and a group of children without neurological disorders. Methods: This study included a group of nine children with CP and a control group of 11 children. The study compared the electromyographic activity of the rectus femoris during seated to standing position and walking, in water and on land. Results: A greater activation of the rectus femoris was observed in the group of children with CP compared with the control group when moving from a seated position to a standing position in water (p=0.0039) and while walking on land (p=0.0014) or in the pool (p=0.007). Conclusion: This study demonstrated the activation of the rectus femoris while walking or standing up from a seated position in water was greater in the group of children with CP. Further studies should be performed to better understand the extent of muscular activation during body immersion in individuals with neurological disorders.

PMID: 25282573 [PubMed - as supplied by publisher]

5. J Spinal Disord Tech. 2014 Oct 10. [Epub ahead of print]

The Long-term Outcome of Early Spine Fusion for Scoliosis in Children with Cerebral Palsy.

Sitoula P1, Holmes L Jr, Sees J, Rogers K, Dabney K, Miller F.

STUDY DESIGN: Retrospective review of radiographs and charts (case-only). OBJECTIVE: The aim of this study was to describe the long-term outcomes of spine fusion for neuromuscular scoliosis in children <10 years of age with cerebral palsy (CP). SUMMARY OF BACKGROUND DATA: Severely involved children with CP may develop early onset scoliosis. The outcome of spine fusion is not clear and there are no studies focused on spine fusion in this young patient population. METHODS: This is a retrospective review of 33 children who underwent spine fusion with unit rod instrumentation between 1989 and 2006 for CP neuromuscular scoliosis, aged <10 years at spine fusion, and with follow-up> 5 years. Demographic, medical, and radiographic data were retrospectively assessed. RANOVA and Kaplan-Meier survival estimates were used for data assessment. RESULTS: 33 of 42 patients who underwent spine fusion in this period, 19 boys and 14 girls, met the inclusion criteria. Out of 9 patients who were excluded, 3 were lost to follow up and remaining 6 died within 5 years of surgery. Mean age at surgery was 8.3 years (range, 4.4-9.9). Mean follow-up was 9.8 years (range, 5.5-15.8). Gross motor function classification system level was V in 31 patients and IV in 2 patients. Thirty-one patients (94%) had seizure disorder, 29 patients (88%) had gastric feeding tubes, and 9 patients (27%) had tracheostomy tubes. 85% of the patients had posterior only surgery. Mean Cobb angles preoperative, immediately postoperative, and at final follow-up were 85°, 21°, and 24°, respectively. Mean postoperative pelvic obliquity correction was 15°±9°, P<0.001. At final follow-up, there was no significant change from the postoperative measurements. Complications included one deep wound infection and 10 other problems. Eleven patients (28.2%) died after a mean follow-up of 5.6±3.8 years. CONCLUSION: In our cohort with early onset neuromuscular scoliosis, spine fusion was associated with minimal short and long-term morbidity, but there 28% mortality at ten years follow-up and 50% predicted mortality at 15 years.

PMID: 25310392 [PubMed - as supplied by publisher]

6. Am J Phys Med Rehabil. 2014 Oct 8. [Epub ahead of print]

Agreement Between Actual Height and Estimated Height Using Segmental Limb Lengths for Individuals with Cerebral Palsy.

Haapala H1, Peterson MD, Daunter A, Hurvitz EA.

OBJECTIVE: The purpose of this study was to determine the agreement between actual height or segmental length and estimated height from segmental measures among individuals with cerebral palsy. DESIGN: A convenience sample of 137 children and young adults with cerebral palsy (age 2-25 yrs) were recruited from a tertiary care center. Height, body mass, recumbent length, knee height, tibia length, and ulna length were measured. Estimated height was calculated using several common prediction equations. Agreement between measured and estimated height was determined using the Bland-Altman method. RESULTS: Limits of agreement were wide for all equations, usually in the range of ±10 cm. Repeatability of the individual measures was high, with a coefficient of variation of 1%-2% for all measures. The equation using knee height demonstrated a nonuniform difference in which height estimation worsened as overall height increased. CONCLUSIONS: Accurate measurement of height is important but very difficult in individuals with cerebral palsy. Segmental measures are highly repeatable and thus may be used on their own to monitor growth. However, when an accurate measure of height is needed to monitor nutritional status (i.e., for body mass index calculation), caution is warranted because there is only fair-to-poor agreement between actual height and estimated height.

PMID: 25299521 [PubMed - as supplied by publisher]

7. Biomed Res Int. 2014;2014:637450. Epub 2014 Sep 17.

Shock Waves in the Treatment of Muscle Hypertonia and Dystonia.

Mori L1, Marinelli L1, Pelosin E1, Currà A2, Molfetta L1, Abbruzzese G1, Trompetto C1.

Since 1997, focused shock waves therapy (FSWT) has been reported to be useful in the treatment of muscle hypertonia and dystonia. More recently, also radial shock wave therapy (RSWT) has been successfully used to treat muscle hypertonia. The studies where FSWT and RSWT have been used to treat muscle hypertonia and dystonia are reviewed in this paper. The more consistent and long lasting results were obtained in the lower limb muscles of patients affected by cerebral palsy with both FSWT and RSWT and in the distal upper limb muscles of adult stroke patients using FSWT. The most probable mechanism of action is a direct effect of shock waves on muscle fibrosis and other nonreflex components of muscle hypertonia. However, we believe that up to now the biological effects of shock waves on muscle hypertonia and dystonia cannot be clearly separated from a placebo effect.

PMID: 25309915 [PubMed - as supplied by publisher]

8. Dev Med Child Neurol. 2014 Oct 8. doi: 10.1111/dmcn.12601. [Epub ahead of print]

The application of Kinesio Taping in children with cerebral palsy.

Iosa M.

PMID: 25293699 [PubMed - as supplied by publisher]

9. Dev Med Child Neurol. 2014 Oct 10. doi: 10.1111/dmcn.12602. [Epub ahead of print]

Can a lifestyle intervention programme improve physical behaviour among adolescents and young adults with spastic cerebral palsy? A randomized controlled trial.

Slaman J1, Roebroeck M, Dallmijer A, Twisk J, Stam H, Van Den Berg-Emons R; Learn 2 Move Research Group.

AIM: Optimal physical behaviour is important, as physical inactivity contributes to functional deterioration and reduced social participation. Nevertheless, research showed that persons with cerebral palsy (CP) have low physical activity levels. The objective of this study is to evaluate the effectiveness of a lifestyle intervention programme on physical behaviour. METHOD: Fifty-seven persons (36 completed the total study) with spastic CP (age range 16 to 25y; 27 males, 30 females), classified as Gross Motor Function Classification System levels I-IV were included in this randomized controlled trial. Twenty-nine participants had a unilateral CP and 27 had a bilateral CP. A 6-month lifestyle intervention consisting of fitness training and counselling on physical behaviour and sports participation was evaluated. Physical behaviour was objectively measured using ambulatory activity monitors. Self-reported physical activity was determined using the Physical Activity Scale for Individuals with Physical Disabilities. RESULTS: The intervention did not affect the objectively measured physical activity during the intervention (beta=0.34, CI=-1.70 to 2.37) or at follow-up (beta=0.30, CI=-1.99 to 2.59). Self-reported physical activity was positively affected during the intervention period (beta=7.61, CI=0.17-15.05); however, this effect was not present at follow-up (beta=3.65, CI=-3.05 to 10.36). INTERPRETATION: The lifestyle intervention was ineffective in eliciting a behavioural change towards more favourable physical behaviour in adolescents and young adults with spastic CP.

PMID: 25303096 [PubMed - as supplied by publisher]

10. J Clin Diagn Res. 2014 Aug;8(8):BC08-11. doi: 10.7860/JCDR/2014/8462.4679. Epub 2014 Aug 20.

Prevalance of obesity in children with cerebral palsy.

Bansal A1, Diwan S2, Diwan J3, Vyas N4.

INTRODUCTION: Obesity are epidemic among children and adolescents. There is worldwide tendency of increasing prevalence of obesity in children. Cerebral palsy (CP) is leading cause of childhood disability. Studies have proposed mechanism of children with disability leading towards obesity and related health risks. So this study is aimed at determining whether such trend of obesity exists in children with CP in terms of BMI and WHR. STUDY DESIGN: Cross -sectional study. MATERIALS AND METHODS: PARTICIPANTS: 40 children diagnosed as CP age 2-18 years, GMFCS I-IV. PROCEDURE: BMI; kg/m(2) was calculated from height and weight. WHR was calculated by measuring waist circumference and hip circumference. BMI percentiles were reported according to sex-specific age group standards for growth set by the WHO growth charts. RESULTS: Out of total CP subjects 40% were found to be underweight, 45%, 7.5% and 7.5% were found to be normal, overweight and obese respectively according to BMI. Whereas 20%, 20% 60% were found to be at high risk, moderate risk and high risk of obesity respectively according to WHR. CONCLUSION: In our patient population, analysis of BMI and WHR suggests that children with CP have a high rate of overweight and are at risk of overweight, particularly of central obesity.

PMID: 25302187 [PubMed] PMCID: PMC4190706 Free PMC Article

11. J Neural Eng. 2014 Oct 13;11(6):066003. [Epub ahead of print]

Performance sustaining intracortical neural prostheses.

Nuyujukian P1, Kao JC, Fan JM, Stavisky SD, Ryu SI, Shenoy KV.

Objective. Neural prostheses, or brain-machine interfaces, aim to restore efficient communication and movement ability to those suffering from paralysis. A major challenge these systems face is robust performance, particularly with aging signal sources. The aim in this study was to develop a neural prosthesis that could sustain high performance in spite of signal instability while still minimizing retraining time. Approach. We trained two rhesus macaques implanted with intracortical microelectrode arrays 1-4 years prior to this study to acquire targets with a neurally-controlled cursor. We measured their performance via achieved bitrate (bits per second, bps). This task was repeated over contiguous days to evaluate the sustained performance across time. Main results. We found that in the monkey with a younger (i.e., two year old) implant and better signal quality, a fixed decoder could sustain performance for a month at a rate of 4 bps, the highest achieved communication rate reported to date. This fixed decoder was evaluated across 22 months and experienced a performance decline at a rate of 0.24 bps yr-1. In the monkey with the older (i.e., 3.5 year old) implant and poorer signal quality, a fixed decoder could not sustain performance for more than a few days. Nevertheless, performance in this monkey was maintained for two weeks without requiring additional online retraining time by utilizing prior days' experimental data. Upon analysis of the changes in channel tuning, we found that this stability appeared partially attributable to the cancelling-out of neural tuning fluctuations when projected to two-dimensional cursor movements. Significance. The findings in this study (1) document the highest-performing communication neural prosthesis in monkeys, (2) confirm and extend prior reports of the stability of fixed decoders, and (3) demonstrate a protocol for system stability under conditions where fixed decoders would otherwise fail. These improvements to decoder stability are important for minimizing training time and should make neural prostheses more practical to use.

PMID: 25307561 [PubMed - as supplied by publisher]

12. ScientificWorldJournal. 2014;2014:964576. doi: 10.1155/2014/964576. Epub 2014 Sep 11.

Improving vision-based motor rehabilitation interactive systems for users with disabilities using mirror feedback.

Jaume-I-Capó A1, Martínez-Bueso P2, Moyà-Alcover B1, Varona J1.

Observation is recommended in motor rehabilitation. For this reason, the aim of this study was to experimentally

test the feasibility and benefit of including mirror feedback in vision-based rehabilitation systems: we projected the user on the screen. We conducted a user study by using a previously evaluated system that improved the balance and postural control of adults with cerebral palsy. We used a within-subjects design with the two defined feedback conditions (mirror and no-mirror) with two different groups of users (8 with disabilities and 32 without disabilities) using usability measures (time-to-start (T s) and time-to-complete (T c)). A two-tailed paired samples t-test confirmed that in case of disabilities the mirror feedback facilitated the interaction in vision-based systems for rehabilitation. The measured times were significantly worse in the absence of the user's own visual feedback (T s = 7.09 (P < 0.001) and T c = 4.48 (P < 0.005)). In vision-based interaction systems, the input device is the user's own body; therefore, it makes sense that feedback should be related to the body of the user. In case of disabilities the mirror feedback mechanisms facilitated the interaction in vision-based systems for rehabilitation. Results recommends developers and researchers use this improvement in vision-based motor rehabilitation interactive systems.

PMID: 25295310 [PubMed - in process] PMCID: PMC4177771 Free PMC Article

13. J Child Neurol. 2014 Oct 7. pii: 0883073814549248. [Epub ahead of print]

Comparative Study of Refractive Errors, Strabismus, Microsaccades, and Visual Perception Between Preterm and Full-Term Children With Infantile Cerebral Palsy.

Kozeis N1, Panos GD2, Zafeiriou DI3, de Gottrau P4, Gatzioufas Z5.

The purpose of this study was to examine the refractive status, orthoptic status and visual perception in a group of preterm and another of full-term children with cerebral palsy, in order to investigate whether prematurity has an effect on the development of refractive errors and binocular disorders. A hundred school-aged children, 70 preterm and 30 full-term, with congenital cerebral palsy were examined. Differences for hypermetropia, myopia, and emmetropia were not statistically significant between the 2 groups. Astigmatism was significantly increased in the preterm group. The orthoptic status was similar for both groups. Visual perception was markedly reduced in both groups, but the differences were not significant. In conclusion, children with cerebral palsy have impaired visual skills, leading to reading difficulties. The presence of prematurity does not appear to represent an additional risk factor for the development of refractive errors and binocular disorders.

PMID: 25296927 [PubMed - as supplied by publisher]

14. Postgrad Med. 2014 Sep;126(5):146-58. doi: 10.3810/pgm.2014.09.2809.

Eye movement during reading in young adults with cerebral palsy measured with eye tracking.

Lampe R1, Turova V, Blumenstein T, Alves-Pinto A.

BACKGROUND: Cerebral palsy is a nonprogressive brain disorder associated with lifelong motor impairments and often with cognitive deficits, impaired communication, and impaired sensory perception. Vision deficits, in particular, occur frequently in cerebral palsy and can lead to reading difficulties. OBJECTIVE: Investigate the extent to which the motor impairments in this clinical group affect patients' ability to read. METHODS: An eye-tracking system was used to record the eye movements during a reading task in 31 adults diagnosed with cerebral palsy and in 10 healthy controls. Participants were asked to read out loud 1 to 5 excerpts from children's books. RESULTS: In comparison to the healthy readers, cerebral palsy patients took longer to read the excerpts; made more saccades, fixations, and regressions; and made shorter saccades. Average fixation times were similar between the 2 groups, but the average saccade duration was significantly longer for the cerebral palsy group, as a function of the degree of severity of motor impairment. The latter was not a determinant of the level of text comprehension achieved by these patients. CONCLUSIONS: OBJECTIVE measures of eye movement during a reading task can be obtained in cerebral palsy patients using eye-tracking techniques. RESULTS suggest that cerebral palsied patients may experience difficulties in searching for words during reading.

PMID: 25295659 [PubMed - in process]

15. Lancet. 2014 Oct 6. pii: S0140-6736(14)61229-0. doi: 10.1016/S0140-6736(14)61229-0. [Epub ahead of print]

Self-reported quality of life of adolescents with cerebral palsy: a cross-sectional and longitudinal analysis.

Colver A1, Rapp M2, Eisemann N3, Ehlinger V4, Thyen U2, Dickinson HO5, Parkes J6, Parkinson K5, Nystrand M7, Fauconnier J8, Marcelli M9, Michelsen SI10, Arnaud C11.

BACKGROUND: Children with cerebral palsy who can self-report have similar quality of life (QoL) to their able-bodied peers. Is this similarity also found in adolescence? We examined how self-reported QoL of adolescents with cerebral palsy varies with impairment and compares with the general population, and how factors in childhood predict adolescent QoL. METHODS: We report QoL outcomes in a longitudinal follow-up and cross-sectional analysis of individuals included in the SPARCLE1 (childhood) and SPARCLE2 (adolescent) studies. In 2004 (SPARCLE1), a cohort of 818 children aged 8-12 years were randomly selected from population-based cerebral palsy registers in nine European regions. We gathered data from 500 participants about QoL with KIDSCREEN (ten domains); frequency of pain; child psychological problems (Strengths and Difficulties Questionnaire); and parenting stress (Parenting Stress Index). At follow-up in 2009 (SPARCLE2), 355 (71%) adolescents aged 13-17 years remained in the study and self-reported QoL (longitudinal sample). 76 additional adolescents self-reported QoL in 2009, providing data for 431 adolescents in the cross-sectional sample. Researchers gathered data at home visits. We compared QoL against matched controls in the general population. We used multivariable regression to relate QoL of adolescents with cerebral palsy to impairments (cross-sectional analysis) and to childhood QoL, pain, psychological problems, and parenting stress (longitudinal analysis). FINDINGS: Severity of impairment was significantly associated ($p<0·01$) with reduced adolescent QoL on only three domains (Moods and emotions, Autonomy, and Social support and peers); average differences in QoL between the least and most able groups were generally less than 0·5 SD. Adolescents with cerebral palsy had significantly lower QoL than did those in the general population in only one domain (Social support and peers; mean difference -2·7 [0·25 SD], 95% CI -4·3 to -1·4). Pain in childhood or adolescence was strongly associated with low adolescent QoL on eight domains. Childhood QoL was a consistent predictor of adolescent QoL. Child psychological problems and parenting stress in childhood or their worsening between childhood and adolescence predicted only small reductions in adolescent QoL. INTERPRETATION: Individual and societal attitudes should be affected by the similarity of the QoL of adolescents with and without cerebral palsy. Adolescents with cerebral palsy need particular help to maintain and develop peer relationships. Interventions in childhood to alleviate psychological difficulties, parenting stress, and especially pain, are justified for their intrinsic value and for their longer term effect on adolescent QoL. FUNDING: SPARCLE1 was funded by the European Union Research Framework 5 Program (grant number QLG5-CT-2002-00636), the German Ministry of Health GRR-58640-2/14, and the German Foundation for the Disabled Child. SPARCLE2 was funded by: Wellcome Trust WT086315 A1A (UK and Ireland); Medical Faculty of the University of Lübeck E40-2009 and E26-2010 (Germany); CNSA, INSERM, MiRe-DREES, and IRESP (France); Ludvig and Sara Elsass Foundation, The Spastics Society and Vanforefonden (Denmark); Cooperativa Sociale "Gli Anni in Tasca" and Fondazione Carivit, Viterbo (Italy); Göteborg University-Riksforbundet for Rorelsehindrade Barn och Ungdomar and the Folke Bernadotte Foundation (Sweden).

PMID: 25301503 [PubMed - as supplied by publisher]

16. Lancet. 2014 Oct 6. pii: S0140-6736(14)61599-3. doi: 10.1016/S0140-6736(14)61599-3. [Epub ahead of print]

Quality of life in adolescents with cerebral palsy.

Hoon AH Jr1, Stashinko EE2.

PMID: 25301504 [PubMed - as supplied by publisher]

17. MCN Am J Matern Child Nurs. 2014 Oct 3. [Epub ahead of print]

Health-Related Quality of Life for Chronically Ill Children.

Cantrell MA1, Kelly MM.

Approximately 43% of children in the United States (32 million) are currently living with at least 1 of 20 common chronic childhood illnesses. The most common chronic childhood illnesses are asthma, cystic fibrosis, diabetes, obesity, malnutrition, developmental disabilities, cerebral palsy, consequences of low birthweight, and mental illness. For all chronically ill pediatric populations, the outcome of health-related quality of life (HRQOL) is particularly important because many of these children have not and will not be cured, and will continue to manage their chronic illness into adulthood. Advances in biomedical science and technology continue to improve efficacy of treatments and care for chronically ill children, adolescents, and their families, which highlight the importance measurement of HRQOL as a treatment and health status outcome. The construct of HRQOL is subjective, multidimensional, dynamic, and unique to each individual. It includes aspects of physical, psychological, social function and goal attainment. Outcomes of HRQOL now include the financial implications for these children, their families, as well as financial and organizational consequences for healthcare planning and delivery of services.This article reviews the importance of HRQOL as a health outcome for chronically ill children. A historical overview and synthesis of the conceptualization and measurement of HRQOL for the chronically ill pediatric population is provided. Current research investigations that have measured health outcomes using individual scales tailored to children's specific symptoms health outcomes, such as PROMIS®-Patient Reported Outcomes Measurement Information System-are reviewed. The clinical applications of HRQOL outcomes research include facilitation of patient-healthcare provider communication, improved patient satisfaction, identification of hidden morbidities, a positive impact on clinical decision making, and improvement of patient outcomes over time.

PMID: 25285426 [PubMed - as supplied by publisher]

18. S Afr Med J. 2014 Apr;104(4):310-3.

Transition from child- to adult-orientated care for children with long-term health conditions: a process, not an event.

Westwood A, Langerak N, Fieggen G.

Long-term health conditions in childhood include both congenital conditions and acquired diseases. Children with long-term health conditions face issues and potential secondary problems that are different from those of adults with chronic diseases. Transition to adult-orientated care for such children and adolescents is a major challenge. Transition needs to be prepared for and planned. A variety of possible transition models exists, depending on circumstances.

PMID: 25118562 [PubMed - indexed for MEDLINE]

19. J Child Neurol. 2014 Oct 7. pii: 0883073814549245. [Epub ahead of print]

Pediatric Cerebral Palsy in Africa: Where Are We?

Donald KA1, Kakooza AM2, Wammanda RD3, Mallewa M4, Samia P5, Babakir H6, Bearden D7, Majnemer A8, Fehlings D9, Shevell M10, Chugani H11, Wilmshurst JM12.

Cerebral palsy is the most common cause of physical disability in children worldwide. However, little is reported on this condition in the African context. Doctors from 22 countries in Africa, and representatives from a further 5 countries outside Africa, met to discuss the challenges in the evaluation and management of children with cerebral palsy in Africa and to propose service needs and further research. Basic care is limited by the poor availability of diagnostic facilities or medical personnel with experience and expertise in managing cerebral palsy, exacerbated by lack of available interventions such as medications, surgical procedures, or even regular therapy input. Relevant guidelines are lacking. In order to guide services for children with existing disabilities, to effectively target the main etiologies and to develop preventive strategies for the continent, research priorities must include multicenter collaborative studies looking at the prevalence, risk factors, and treatment of cerebral palsy.

PMID: 25296926 [PubMed - as supplied by publisher]

20. BMC Neurol. 2014 Oct 7;14(1):203. [Epub ahead of print]

GAME (Goals - Activity - Motor Enrichment): protocol of a single blind randomised controlled trial of motor training, parent education and environmental enrichment for infants at high risk of cerebral palsy.

Morgan C, Novak I, Dale RC, Guzzetta A, Badawi N.

Background: Cerebral palsy is the most common physical disability of childhood and early detection is possible using evidence based assessments. Systematic reviews indicate early intervention trials rarely demonstrate efficacy for improving motor outcomes but environmental enrichment interventions appear promising. This study is built on a previous pilot study and has been designed to assess the effectiveness of a goal-oriented motor training and enrichment intervention programme, GAME, on the motor outcomes of infants at very high risk of cerebral palsy (CP) compared with standard community based care. Methods/design: A two group, single blind randomised controlled trial (n=30) will be conducted. Eligible infants are those diagnosed with CP or designated "at high risk of CP" on the basis of the General Movements Assessment and/or abnormal neuroimaging. A physiotherapist and occupational therapist will deliver home-based GAME intervention at least fortnightly until the infant's first birthday. The intervention aims to optimize motor function and engage parents in developmental activities aimed at enriching the home learning environment. Primary endpoint measures will be taken 16 weeks after intervention commences with the secondary endpoint at 12 months and 24 months corrected age. The primary outcome measure will be the Peabody Developmental Motor Scale second edition. Secondary outcomes measures include the Gross Motor Function Measure, Bayley Scales of Infant and Toddler Development, Affordances in the Home Environment for Motor Development Infant Scale, and the Canadian Occupational Performance Measure. Parent well-being will be monitored using the Depression Anxiety and Stress Scale.Discussion: This paper presents the background, design and intervention protocol of a randomised trial of a goal driven, motor learning approach with customised environmental interventions and parental education for young infants at high risk of cerebral palsy.

Trial registration: This trial is registered on the Australian New Zealand Clinical Trial register: ACTRN12611000572965.

PMID: 25287779 [PubMed - as supplied by publisher] PMCID: PMC4194357 Free full text

21. Front Neurol. 2014 Sep 24;5:185. doi: 10.3389/fneur.2014.00185. eCollection 2014.

Early diagnosis and early intervention in cerebral palsy.

Hadders-Algra M.

This paper reviews the opportunities and challenges for early diagnosis and early intervention in cerebral palsy (CP). CP describes a group of disorders of the development of movement and posture, causing activity limitation that is attributed to disturbances that occurred in the fetal or infant brain. Therefore, the paper starts with a summary of relevant information from developmental neuroscience. Most lesions underlying CP occur in the second half of gestation, when developmental activity in the brain reaches its summit. Variations in timing of the damage not only result in different lesions but also in different neuroplastic reactions and different associated neuropathologies. This turns CP into a heterogeneous entity. This may mean that the best early diagnostics and the best intervention methods may differ for various subgroups of children with CP. Next, the paper addresses possibilities for early diagnosis. It discusses the predictive value of neuromotor and neurological exams, neuroimaging techniques, and neurophysiological assessments. Prediction is best when complementary techniques are used in longitudinal series. Possibilities for early prediction of CP differ for infants admitted to neonatal intensive care and other infants. In the former group, best prediction is achieved with the combination of neuroimaging and the assessment of general movements, in the latter group, best prediction is based on carefully documented milestones and neurological assessment. The last part reviews early intervention in infants developing CP. Most knowledge on early intervention is based on studies in high-risk infants without CP. In these infants, early intervention programs promote cognitive development until preschool age; motor development profits less. The few

studies on early intervention in infants developing CP suggest that programs that stimulate all aspects of infant development by means of family coaching are most promising. More research is urgently needed.

PMID: 25309506 [PubMed]

Prevention and Cure

22. Front Hum Neurosci. 2014 Sep 12;8:725. doi: 10.3389/fnhum.2014.00725. eCollection 2014.

Cortical somatosensory reorganization in children with spastic cerebral palsy: a multimodal neuroimaging study.

Papadelis C1, Ahtam B1, Nazarova M2, Nimec D3, Snyder B3, Grant PE4, Okada Y1.

Although cerebral palsy (CP) is among the most common causes of physical disability in early childhood, we know little about the functional and structural changes of this disorder in the developing brain. Here, we investigated with three different neuroimaging modalities [magnetoencephalography (MEG), diffusion tensor imaging (DTI), and resting-state fMRI] whether spastic CP is associated with functional and anatomical abnormalities in the sensorimotor network. Ten children participated in the study: four with diplegic CP (DCP), three with hemiplegic CP (HCP), and three typically developing (TD) children. Somatosensory (SS)-evoked fields (SEFs) were recorded in response to pneumatic stimuli applied to digits D1, D3, and D5 of both hands. Several parameters of water diffusion were calculated from DTI between the thalamus and the pre-central and post-central gyri in both hemispheres. The sensorimotor resting-state networks (RSNs) were examined by using an independent component analysis method. Tactile stimulation of the fingers elicited the first prominent cortical response at ~50ms, in all except one child, localized over the primary SS cortex (S1). In five CP children, abnormal somatotopic organization was observed in the affected (or more affected) hemisphere. Euclidean distances were markedly different between the two hemispheres in the HCP children, and between DCP and TD children for both hemispheres. DTI analysis revealed decreased fractional anisotropy and increased apparent diffusion coefficient for the thalamocortical pathways in the more affected compared to less affected hemisphere in CP children. Resting-state functional MRI results indicated absent and/or abnormal sensorimotor RSNs for children with HCP and DCP consistent with the severity and location of their lesions. Our findings suggest an abnormal SS processing mechanism in the sensorimotor network of children with CP possibly as a result of diminished thalamocortical projections.

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23. Otolaryngol Pol. 2014 May 13. pii: S0030-6657(14)00088-2. doi: 10.1016/j.otpol.2014.04.003. [Epub ahead of print]

Congenital and acquired cytomegalovirus infection and hearing evaluation in

Smiechura M1, Struzycka M2, Konopka W2.

OBJECTIVES: Congenital cytomegalovirus (CMV) infection is one of the most common intrauterine diseases. In all, 1% of live births is affected by cytomegalovirus infection, while 90% neonates with perinatal infection do not show symptoms of disease. Symptomatic CMV is present in 5-10% of children. Typical clinical signs of CMV infection are microcephalia, mental retardation, progressive major amblyacousia, and neuromuscular infection. Hypoacusis is present in 30-60% of children with congenital symptomatic CMV - in most cases it is bilateral and applies to high frequency hearing loss. The purpose of this article is to emphasize the importance of hearing evaluation in children with congenital and acquired cytomegalovirus infection. PATIENTS AND METHODS: A group of 70 children had serological and genetic screening for CMV DNA, using PCR method, in urine and blood. In this group, 52 children were diagnosed with congenital CMV and 18 children had acquired CMV. Audiological examinations including PTA, ABR, TEOAE and immittance audiometry were performed. RESULTS: Bilateral sensorineural hearing losses were found in 9 children, associated with mental and physical retardation, brain malformation and microcephalia, and unilateral losses in 3 children. In 40 cases, we did not observe hearing loss, although the level of bilirubin was high, and splenomegaly, hepatomegaly and paralysis of facial nerve were present. In the group of children with acquired CMV, we did not notice hearing loss. CONCLUSIONS: This research proved that CMV infection often caused

hearing loss. In spite of this, all children with congenital and acquired CMV should be monitored and assessed throughout their lifetime by an audiologist.

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24. Aust N Z J Obstet Gynaecol. 2014 Oct 11. doi: 10.1111/ajo.12271. [Epub ahead of print]

A prospective audit of the adherence to a new magnesium sulphate guideline for the neuroprotection of infants born less than 30 weeks' gestation.

Tan YH1, Groom KM.

Antenatal magnesium sulphate reduces the risk of cerebral palsy in babies born <30 weeks' gestation. A guideline for its use in women at imminent risk of preterm birth was implemented at National Women's Health, Auckland City Hospital in 2012. This prospective audit assessed adherence to the guideline in women delivering at <30 weeks in the first year after its implementation. Magnesium sulphate was safely administered to 58 of 71 (82%) eligible women and 58 of 61 (95%) of women where it was clinically appropriate and practically achievable.

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25. Eur Child Adolesc Psychiatry. 2014 Oct 11. [Epub ahead of print]

Minor neurodevelopmental impairments are associated with increased occurrence of ADHD symptoms in children born extremely preterm.

Elgen SK1, Sommerfelt K, Leversen KT, Markestad T.

ADHD is more common in children born preterm than at term. The purpose of the study was to examine if, and to what extent, ADHD symptoms are associated with minor neurodevelopmental impairments (NDI) in extremely preterm children. In a national population-based cohort with gestational age 22-27 weeks or birth weight <1,000 g assessed at 5 years of age, scores on Yale Children's Inventory (YCI) scales (seven scales) were related to normal functions vs. NDI defined as mild impairments in cognitive function (IQ 70-84), motor function (Movement Assessment Battery for children score > the 95th percentile or freely ambulatory cerebral palsy), vision (correctable), and hearing (no hearing aid). YCI was completed for 213 of 258 eligible children (83 %). Children with minor NDIs (n = 98) had significantly higher scores (more ADHD symptoms) than those without NDI (n = 115) on the YCI scales of Attention, Tractability, Adaptability and Total score. Increasing numbers of minor NDIs were associated with higher mean YCI scores. In multivariate analysis only decreased hearing, IQ, and male gender were significantly associated with scores on the Attention scale. Thirty-three children (16 %) had scores >3 on the Attention scale (probably ADHD), and the proportion was significantly higher for those with mild NDIs compared to those without (Odds ratio = 2.7, 95 % CI 1.3-6.0). Children born extremely preterm with minor NDIs were more likely to have ADHD symptoms than those with no NDI, and increasing number of minor NDIs were associated with more ADHD symptoms.

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26. Pediatr Neurol. 2014 Jul 16. pii: S0887-8994(14)00407-X. doi: 10.1016/j.pediatrneurol.2014.07.009. [Epub ahead of print]

Autism Spectrum Disorder in a Term Birth Neonatal Intensive Care Unit Population.

Winkler-Schwartz A1, Garfinkle J2, Shevell MI3.

BACKGROUND: Nonspecific perinatal risk factors have been revealed to be associated with the development of autism spectrum disorder. However, term at-risk infants, as a distinct population, are underrepresented in the literature. This study examines the incidence and neonatal risk factors for autism spectrum disorder in term neonatal intensive care unit survivors. METHODS: We performed a retrospective analysis from a single university-practice database of neonates admitted to the neonatal intensive care unit and followed by a single pediatric neurologist. Term infants (=37 weeks), born between 1991 and 2011, with at least 2 years (or 1 year if found to be neurologically normal) of follow-up were included. Principle outcomes were autism spectrum disorder, cerebral palsy, global developmental delay, and epilepsy. RESULTS: One hundred eighty infants were included from a database of 564 neonates. Twelve (6.6%) developed autism spectrum disorder, 53 (29.4%) cerebral palsy, 77 (42.7%) global developmental delay, and 47 (26.1%) epilepsy. Seventy-one (39.4%) developed no adverse outcomes. Nine patients with autism spectrum disorder (75%) were diagnosed with at least one other adverse outcome. No neonatal or perinatal variables were evident to be significantly associated with later autism spectrum disorder. CONCLUSIONS: In term neonatal intensive care unit survivors, autism spectrum disorder occurs at a greater frequency than in the general population and often develops alongside comorbid conditions. This highlights the importance of screening term neonatal intensive care unit survivors for autism spectrum disorder, particularly when comorbidities are present.

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27. Cell Transplant. 2014 Oct 9. [Epub ahead of print]

Clinical experience with autologous M2-macrophages in children with severe cerebral palsy.

Chernykh ER, Kafanova MY, Shevela EY, Sirota SI, Adonina EI, Sakhno LV, Ostanin AA, Kozlov VV.

Stem cell-based therapy is considered to be a new approach for the treatment of cerebral palsy (CP). Given the potent anti-inflammatory activity and high regenerative potential of M2-macrophages, these cells may be an alternative source for cell transplantation. To evaluate the safety and efficacy of autologous M2-macrophages we conducted a pilot clinical trial in 21 children with severe CP. The primary outcome measure was safety, which included assessment of mortality of any cause, immediate adverse reactions and serious adverse effects and comorbidities during 5-year follow-up. The secondary outcome measure was functional improvement in Gross Motor Function Measure (66-item GMFM) test, Peabody Developmental Motor Scale-Fine Motor (PDMS-FM) test, Ashworth scale, MRC scale and an easy-to-understand questionnaire for evaluation of cognitive functions in our modification. Intradural injection of M2-cells (in mean dose of 0.8x10^6/kg) into the lumbar spinal area did not induce any serious adverse events. No cases of mortality, psychomotor worsening, exacerbation of seizures and long-termed comorbidities, including tumors, were observed during a 5-year follow-up. After 3 months GMFM score increased from 13.7 7.8 to 58.6 14.6, PDMS-FM score improved from 0.76 0.42 to 5.05 0.97 and the Ashworth score decreased from 3.8 0.21 to 3.3 0.24. Along with gross and fine motor function enhancement, an improvement of cognitive activity (from 1.62 0.41 to 4.05 0.64, according to Questionnaire assessment) and reduction of seizure syndrome were registered as well. The neurological improvements did not diminish during the 5-year follow-up period. The data obtained suggest that cell therapy based on M2-macrophages is safe, does not induce early adverse effects and long-term comorbidities and is accompanied with a significant improvement of motor and cognitive activities in severe CP patients. This manuscript is published as part of the International Association of Neurorestoratology (IANR) special issue of Cell Transplantation.

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28. Cell Biochem Biophys. 2014 Oct 10. [Epub ahead of print]

A Meta-analysis of the Protective Effect of Recombinant Human Erythropoietin (rhEPO) for Neurodevelopment in Preterm Infants.

Wang H1, Zhang L, Jin Y.

The purpose of this study is to assess the efficacy and safety of recombinant human erythropoietin (rhEPO) for improving neurodevelopment outcomes in preterm infants. According to the requirements of Cochrane systematic review, a literature search was performed among PubMed, EMBASE, Cochrane Central Register of Controlled Trials, Chinese Biomedical Literature Database, Chinese National Knowledge Infrastructure, Wan Fang Data, and VIP INFORMATION from the establishment of the database from January 1999 to December 2011. Quality assessments of clinical trials were carried out. Randomized controlled trials (RCTs) or quasi-RCTs with rhEPO in preterm infants were enrolled, and RevMan5.0 software was used for meta-analysis. Data extraction, quality assessment, and meta-analysis for the results of homogeneous studies were done by two reviewers. The trials were analyzed using weighted mean difference (WMD) for continuous data and odds ratio (OR) for dichotomous data, both kinds of data were expressed by 95 % CI. For homogenous data (P = 0.10), fixed effect model was calculated. Two RCTs and 3 quasi-RCTs including 233 preterm infants (119 of treatment group and 114 of control group) were included in the analysis. The results of quality assessment were that 1 study was A, 1 was B, and 3 were C. There was evidence of a significant effect of therapeutic rhEPO on the outcomes of MDI scores [WMD = 7.77, 95 % CI (3.49-12.06), P = 0.0004], PDI scores [WMD = 3.85, 95 % CI (0.62-7.09), P = 0.02] at 18-22 months and NBNA scores [WMD = 1.96, 95 % CI (1.56-2.37), P < 0.00001] at 40 weeks of corrected gestational age. However, rhEPO had no effect on MDI <70 (OR = 0.70, 95 % CI 0.31-1.61), PDI <70 (OR = 2. 46, 95 % CI 0.94-6.45), cerebral palsy (OR = 1.08, 95 % CI 0.39-2.99), blindness (OR = 0.34, 95 % CI 0.01-8.56), and hearing loss (OR = 1.04, 95 % CI 0.06-17.15). There were no differences between groups with respect to the percentage of preterm infants with severe retinopathy of prematurity of stage III or above (OR = 1.30, 95 % CI 0.50-3.43), severe intraventricular hemorrhage of stage III or above (OR = 2. 91, 95 % CI 0.64-13.23), necrotizing enterocolitis (OR = 0.57, 95 % CI 0.13-2.54), and borderline personality disorder (OR = 1. 06, 95 % CI 0.50-2.26). The rhEPO treatment has beneficial effect on the neurodevelopment outcomes without severe adverse side effect in preterm infants.

PMID: 25300689 [PubMed - as supplied by publisher]

29. Indian J Pediatr. 2014 Oct 10. [Epub ahead of print]

CDC Kerala 16: Early Detection of Developmental Delay/Disability Among Children Below 6 y - A District Model.

Nair MK1, Harikumaran Nair GS, Beena M, Princly P, Abhiram Chandran S, George B, Leena ML, Russell PS.

OBJECTIVE: To develop a district model for establishing early detection of childhood disability below 6 y of age and to develop appropriate referral linkages for confirmation of the diagnosis and establish home based early intervention therapy to all needy children. METHODS: Trained Accredited Social Health Activist (ASHA) workers conducted the preliminary survey for identifying developmental delay/disability among children below 6 y of age using Trivandrum Developmental Screening Chart (TDSC) (0-6 y) and a team of experts assessed the screen positives in developmental evaluation camps conducted at primary health centres (PHCs). RESULTS: Community survey was carried out and 1,01,438 children below 6 y of age in Thiruvananthapuram district were screened by ASHA workers and 2,477 (2.45 %) positive cases (TDSC two or more item delay) were identified and these children were called for the developmental evaluation camps conducted at 80 PHCs in the district. Among the 1,329 children who reached the evaluation camps 43.1 % were normal. 24.98 % children had speech and language delay and 22.95 % children had multiple disabilities. Developmental delay was observed among 49.89 % children and cerebral palsy in 8.43 % and intellectual disability 16.85 % were confirmed. Visual impairment in 3.31 % and neuromuscular disorders in 1.35 were found among children evaluated in the camp. CONCLUSIONS: The results of this district wide early detection of disability survey by trained ASHA workers among children below 6 y of age showed a community prevalence of 3.08 % observed, based on two or more item delay in TDSC and among these children, 43.1 % were normal, 49.89 % had developmental delay, 24.98 % had speech and language delay and 22.95 % had multiple disabilities.

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