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Interventions and Management

1. Does bimanual task training benefit manual ability and hand function of children with bilateral spastic cerebral palsy?
Surabhi Nawge, Suruliraj Karthikbabu

J Pediatr Rehabil Med. 2022 Nov 7. doi: 10.3233/PRM-210109. Online ahead of print.

Purpose: Sixty percent of children with bilateral cerebral palsy have impaired hand function. The study's purpose was to examine the benefits of bimanual task practice on the manual ability and hand function of children with bilateral spastic cerebral palsy. Methods: In this pre-post study design, 18 children with bilateral spastic cerebral palsy with an average age of 11.5 (+/-1.9) years, Manual Ability Classification System levels I-III and Bimanual Fine Motor Function levels I-III participated in bimanual task practice of upper extremities. The task practice included clay activities, paper manipulation and activities of daily needs. The children underwent 45-minute training sessions 3 times a week over 6 weeks. The outcome measures were ABILHAND-Kids, Quality of Upper Extremity Skills Test and grip strength. Results: Post-training, a mean change of 6.44 logits in ABILHAND-Kids, 11 points on the Quality of Upper Extremity Skills Test, and 3.3 and 3.1 kilograms grip strength in the dominant and nondominant hands respectively were observed with a statistical significance ($p < 0.05$). Conclusion: Bimanual task training might be beneficial in improving manual ability, hand function and grip strength in children with bilateral spastic cerebral palsy.

PMID: 36373302

2. Development and validation of a novel model based on hand knob score and white matter injury on MRI to predict hand function in children with cerebral palsy
Jing-Jing Zhang, Yan-Li Yang, Jie Hu, Chun-Feng Zhao, Xing-Hong He, Qian-Yu Yang, Xiao-Shan Qi, Hong Lu, Cheng He, Heng Liu

Ann Transl Med. 2022 Oct;10(20):1102. doi: 10.21037/atm-22-4112.

Background: Childhood hand function is considered to be one of the strongest predictors of the ability to participate in daily activities as children with cerebral palsy (CP) reach adulthood. The manual ability classification system (MACS) is currently the most widely used for grading hand function in children with CP. However, the MACS method is subjective and may be affected by the raters' experience. Hand knob is an important control center for hand movement. Therefor this study aimed to develop and validate an objective model for hand function estimation in children with CP and visualize it as a nomogram. Methods: A total of 70 Children (2-12 years old) with CP underwent magnetic resonance imaging (MRI) scanning, MACS assessment. According to MACS, children with CP were divided into mild impairment group (grade I-III) and severe impairment group (grade IV-V). Hand function prediction models based on (I) hand knob score, (II) clinical features, and (III)

the combination of clinical features and hand knob score were developed and validated separately. The models were subjected to stepwise regression according to the maximum likelihood method, and the Akaike information criterion was used to select the best model. Model discrimination was assessed using receiver operating characteristic (ROC) and calibration curves. The nomogram was finally built according to the best model. Results: The area under the curve (AUC) of the hand knob score model in the training set was 0.752, the clinical features model was 0.819, and the hand knob score and clinical features combined model was 0.880. The AUC of the hand knob score model in the validation set was 0.765, the clinical features model was 0.782, and the combined model was 0.894. The best model was the hand knob score-clinical features combined model, and the nomogram finally incorporated two assessment items: the hand knob score and white matter injury. The estimated probability of hand function injury degree of the combined model displayed good agreement with the actual occurrence probability. Conclusions: The hand knob score-clinical features combined model can be used to preliminarily assess the degree of hand impairment in children with CP, with good calibration.

PMID: 36388818

3. Goal-Directed Personalized Upper Limb Intensive Therapy (PULIT) for Children With Hemiparesis: A Retrospective Analysis
Géraldine L P Bono, Prisca Achermann, Bärbel Rückriem, Jan Lieber, Hubertus J A van Hedel

Am J Occup Ther. 2022 Nov 1;76(6):7606205050. doi: 10.5014/ajot.2022.049008.

Importance: Children with hemiparesis experience limitations in activities of daily living (ADLs) as a result of upper limb impairments. To address these limitations, we developed a group-based Personalized Upper Limb Intensive Therapy (PULIT) program combining modified constraint-induced movement therapy, bimanual intensive therapy, and exergame-based robotics. Objective: To determine the effectiveness of PULIT in helping children with upper limb impairments achieve individually set goals and enable transfer of the attained motor skills into ADLs. Design: Retrospective analysis. Setting: Day camp at a pediatric rehabilitation clinic in Switzerland. Participants: Twenty-three children with upper limb impairment (unilateral cerebral palsy, n = 16; acquired brain injury, n = 7); 13 boys and 10 girls (M age = 7 yr, 8 mo, SD = 2 yr, 1 mo; Manual Ability Classification System Level I-IV). Intervention: Thirty hours of PULIT over the course of 8 days. Outcomes and measures: Goal attainment scaling (GAS) was assessed on the first and last day of intervention. The Canadian Occupational Performance Measure (COPM) and dexterity tests, such as the Box and Block Test (BBT), were administered 3 wk before and 3 wk after the intervention. Results: Total goal achievement was 85.7%. GAS, parent- and child-rated COPM Performance and Satisfaction, and the BBT of the affected and dominant upper limb improved significantly. Conclusions and relevance: PULIT effectively increases children's dexterity of the impaired and dominant upper limb, improves ADL performance, and achieves individual goals. This retrospective analysis could serve as a basis for a future randomized trial. What This Article Adds: This article informs occupational therapy practitioners about a therapy program that includes conventional and rehabilitation technology interventions and enables children with hemiparesis of the upper limb to improve relevant ADL tasks in 8 days' time.

PMID: 36399391

4. The effects of postural control and upper extremity functional capacity on functional Independence in preschool-age children with spastic cerebral palsy: a path model
Kübra Seyhan-Bıyık, Sabri Erdem, Mintaze Kerem Günel

Physiother Theory Pract. 2022 Nov 15;1-10. doi: 10.1080/09593985.2022.2148227. Online ahead of print.

Purpose: To investigate the effects of postural control and upper extremity functional capacity on functional independence and identify whether quality of upper extremity skills mediates the effects of postural control on functional independence in preschool-age children with spastic cerebral palsy (CP). Methods: 106 children with CP -mean age 43.4 ± 11.3 (24-71 months)- were included in this cross-sectional study. Postural control, upper extremity functional capacity, and functional independence in activities of daily living were evaluated using the Early Clinical Assessment of Balance (ECAB), Quality of Upper Extremity Skills Test (QUEST), and the Functional Independence Measure of Children (WeeFIM), respectively. A path model was used to evaluate the total, direct, and indirect effects. Results: According to the path model, ECAB (direct effect; $r = 0.391$, $p < 0.01$, indirect effect; $r = 0.398$) and QUEST (direct effect; $r = 0.493$, $p < 0.01$) had an impact on WeeFIM. In addition, QUEST had mediating effects on the relationship between ECAB and WeeFIM. The path model explained 71% of the variation in functional independence of the participants. Conclusion: In the management of CP in preschool-age children, the focus should be on improving not only upper extremity capacity but also postural control to help improve functional

independence in activities of daily living.

PMID: 36380714

5. Scoliosis Corrective Surgery With Continuous Intraoperative Neurophysiological Monitoring (IONM)
Faisal R Jahangiri, Rafia H Jahangiri, Hooria Asad, Laila Farooq, Wadana H Khattak

Case Reports Cureus. 2022 Oct 5;14(10):e29958. doi: 10.7759/cureus.29958. eCollection 2022 Oct.

Scoliosis is a spine deformity that presents as Cobb's angle greater than 10 degrees. Pedicle screw placement can be employed in scoliosis corrective procedures but poses a danger of disrupting the motor and sensory pathways by injuries to the nerves, spinal cord, and vasculature. Occasionally traction weight is applied before the instrumentation for correction. This correction weight may cause spinal cord functional compromise and may result in postoperative paresis or paralysis. A 10-year-old female patient with Cobb's angle of 120 degrees was scheduled for scoliosis correction surgery. A multimodality intraoperative neurophysiological monitoring (IONM) approach was designed with somatosensory evoked potentials (SSEPs), transcranial electrical motor evoked potentials (TCeMEPs), spontaneous electromyography (s-EMG), triggered electromyography (t-EMG) and train of four (TOF). In this patient, after placing the pedicle screw, TCeMEP changes were immediately identified and reported to the surgeon in the left lower extremity followed by both lower extremities. The surgeon immediately asked the anesthesiologist to remove 25 pounds of traction weight from the head and increase the mean arterial pressure. TCeMEP responses returned to the baselines immediately. Later during the surgery, left arm SSEP changes were also identified, which returned to normal on the repositioning of the arm. Multimodal IONM has the benefit of monitoring the sensory and motor functions of the spinal cord and nerve function at risk of damage during the procedure. The utilization of IONM in this spinal cord correction surgery helped to detect and timely reverse nerve injuries. We strongly recommend utilizing multimodality IONM during scoliosis correction procedures as a standard of care to minimize postoperative neurological deficits.

PMID: 36381772

6. Studying the Research-Practice Gap in Physical Therapies for Cerebral Palsy: Preliminary Outcomes Based on a Survey of Spanish Clinicians
Cristina Sanchez, Sergio Lerma-Lara, Rodrigo Garcia-Carmona, Eloy Urendes, Paula Laccourreye, Rafael Raya

Int J Environ Res Public Health. 2022 Nov 5;19(21):14535. doi: 10.3390/ijerph192114535.

The purpose of this work is to study the gap between the research evidence and the clinical practice in the physical rehabilitation of people with cerebral palsy. A review process was performed to (1) identify physical therapies to improve postural control in children with cerebral palsy and (2) determine the scientific evidence supporting the effectiveness of those therapies. A Likert-based survey addressing a total of 43 healthcare professionals involved in pediatric physical therapy departments in Spain was carried out. The discussion was mainly supported by studies of level I or II evidence (according to the Oxford scale). The search process yielded 50 studies reporting 16 therapies. A strong positive correlation between the most used treatments and elevated levels of satisfaction was found. Some well-known but not often used techniques, such as hippotherapy, were identified. The treatment with the highest degree of use and satisfaction-neurodevelopment therapy (Bobath)-and some emerging techniques, such as virtual reality, were also identified. The fact that there is a meaningful gap between clinical practice and the scientific evidence was confirmed. The identified gap brings a certain degree of controversy. While some classic and well-known therapies had poor levels of supporting evidence, other relatively new approaches showed promising results.

PMID: 36361414

7. The effects of balance board on the balance parameters in five children with spastic cerebral palsy
Mina Baniasad, Mahsa Asheghan, Mohammadreza Ziya, Mohammad Taghi Holisaz

J Pediatr Rehabil Med. 2022 Nov 7. doi: 10.3233/PRM-201526. Online ahead of print.

Purpose: This study evaluated the effects of an instrumented balance board on the balance parameters in children with spastic cerebral palsy by carrying out a pilot single-group pre-post clinical trial. Methods: Five children aged 5 to 15 years with spastic diplegia and a Gross Motor Function Classification System level of I or II were included. All participants attended 20 sessions with an instrumented balance board, 45 minutes per session, 3 times a week for 7 weeks. The main outcome measures included the center of pressure excursion, velocity, and overshoot during quiet standing with open and closed eyes. The assessments were performed in the mediolateral and anteroposterior directions at pre- and one week post-intervention. Results: Non-parametric tests showed that the excursion did not change significantly except in the mediolateral direction with eyes closed ($p < 0.05$). The velocity of the center of pressure improved in both directions and eye conditions ($p < 0.05$). Also, the maximum velocity decreased with eyes open (mediolateral, anteroposterior, and total) ($p < 0.05$), while the change was not significant with the eyes closed. The overshoot measurements did not change significantly. Conclusion: It is recommended to consider balance board training for improving balance parameters in children with cerebral palsy.

PMID: 36373298

8. Correction: Evaluating Postoperative Immobilization Following Hip Reconstruction in Children With Cerebral Palsy
Sean Tabaie, Kevin Cho, Omar Tarawneh, Alana Sadur, Aribah Shah

Published Erratum Cureus. 2022 Nov 4;14(11):c80. doi: 10.7759/cureus.c80. eCollection 2022 Nov.

[This corrects the article DOI: 10.7759/cureus.30270.].

PMID: 36382319

9. Treatment Outcome Prediction Using Multi-Task Learning: Application to Botulinum Toxin in Gait Rehabilitation
Adil Khan, Antoine Hazart, Omar Galarraga, Sonia Garcia-Salicetti, Vincent Vigneron

Sensors (Basel). 2022 Nov 3;22(21):8452. doi: 10.3390/s22218452.

We propose a framework for optimizing personalized treatment outcomes for patients with neurological diseases. A typical consequence of such diseases is gait disorders, partially explained by command and muscle tone problems associated with spasticity. Intramuscular injection of botulinum toxin type A is a common treatment for spasticity. According to the patient's profile, offering the optimal treatment combined with the highest possible benefit-risk ratio is important. For the prediction of knee and ankle kinematics after botulinum toxin type A (BTX-A) treatment, we propose: (1) a regression strategy based on a multi-task architecture composed of LSTM models; (2) to introduce medical treatment data (MTD) for context modeling; and (3) a gating mechanism to model treatment interaction more efficiently. The proposed models were compared with and without metadata describing treatments and with serial models. Multi-task learning (MTL) achieved the lowest root-mean-squared error (RMSE) (5.60°) for traumatic brain injury (TBI) patients on knee trajectories and the lowest RMSE (3.77°) for cerebral palsy (CP) patients on ankle trajectories, with only a difference of 5.60° between actual and predicted. Overall, the best RMSE ranged from 5.24° to 6.24° for the MTL models. To the best of our knowledge, this is the first time that MTL has been used for post-treatment gait trajectory prediction. The MTL models outperformed the serial models, particularly when introducing treatment metadata. The gating mechanism is efficient in modeling treatment interaction and improving trajectory prediction.

PMID: 36366149

10. Personalisation of Plantarflexor Musculotendon Model Parameters in Children with Cerebral Palsy
Kirsten Veerkamp, Marjolein M van der Krogt, Jaap Harlaar, Thomas D O'Brien, Barbara Kalkman, Ajay Seth, Lynn Bar-On

Ann Biomed Eng. 2022 Nov 15. doi: 10.1007/s10439-022-03107-8. Online ahead of print.

Neuromusculoskeletal models can be used to evaluate aberrant muscle function in cerebral palsy (CP), for example by estimating muscle and joint contact forces during gait. However, to be accurate, models should include representative

musculotendon parameters. We aimed to estimate personalised parameters that capture the mechanical behaviour of the plantarflexors in children with CP and typically developing (TD) children. Ankle angle (using motion capture), torque (using a load-cell), and medial gastrocnemius fascicle lengths (using ultrasound) were measured during slow passive ankle dorsiflexion rotation for thirteen children with spastic CP and thirteen TD children. Per subject, the measured rotation was input to a scaled OpenSim model to simulate the torque and fascicle length output. Musculotendon model parameters were personalised by the best match between simulated and experimental torque-angle and fascicle length-angle curves according to a least-squares fit. Personalised tendon slack lengths were significantly longer and optimal fibre lengths significantly shorter in CP than model defaults and than in TD. Personalised tendon compliance was substantially higher in both groups compared to the model default. The presented method to personalise musculotendon parameters will likely yield more accurate simulations of subject-specific muscle mechanics, to help us understand the effects of altered musculotendon properties in CP.

PMID: 36380165

11. Analysis of Running Gait in Children with Cerebral Palsy: Barefoot vs. a New Ankle Foot Orthosis
Federica Camuncoli, Alessia Barbonetti, Luigi Piccinini, Eugenio Di Stanislao, Claudio Corbetta, Gabriele Dell'Orto, Filippo Bertozzi, Manuela Galli

Int J Environ Res Public Health. 2022 Oct 30;19(21):14203. doi: 10.3390/ijerph192114203.

Running is an essential activity for children with cerebral palsy (CP). This study aims to characterize the locomotor pattern of running in hemiplegic children with new generation ankle foot orthosis (AFOs) conceived to foster intense motor activities such as running. A group of 18 children with spastic hemiplegia was recruited. A biomechanical multivariable comparison was made between barefoot and with AFO running trials. The focus was devoted to bilateral sagittal plane hip, knee, ankle kinematics and kinetics, and three-dimensional ground reaction forces. Wearing the orthoses, the children were found to reduce cadence and the duration of the stance phase as well as increase the step and stride length. The new AFO resulted in significant changes in kinematics of affected ankle both at initial contact 0-3% GC (p < 0.017) and during the entire swing phase 31-100%GC (p < 0.001) being the ankle more dorsiflexed with AFO compared to barefoot condition. Ankle power was found to differ significantly both in absorption and generation 5-10%GC (p < 0.001); 21-27%GC (p < 0.001) with a reduction in both cases when the AFO was worn. No statistical differences were recorded in the GRF components, in the affected ankle torque and hip and knee kinematics and kinetics.

PMID: 36361083

12. Mechanical and Morphological Changes of the Plantar Flexor Musculotendinous Unit in Children with Unilateral Cerebral Palsy Following 12 Weeks of Plyometric Exercise: A Randomized Controlled Trial
Ragab K Elnaggar, Mohammed S Alghamdi, Aqeel M Alenazi, Mshari Alghadier, Mustafa Z Mahmoud, Abbas Elbakry A Elsayed, Ismail Abdelfattah M Hassan, Asmaa A Abonour

Children (Basel). 2022 Oct 22;9(11):1604. doi: 10.3390/children9111604.

To investigate how plyometric exercise (PLYO-Ex) affects mechanics and morphometrics of the plantar flexor musculotendinous unit in children with unilateral cerebral palsy, 38 participants (aged 10-16 years) were allocated at random to either the PLYO-Ex group (n = 19; received 24 sessions of plyometric muscle loading, conducted 2 times a week for 3 months in succession) or the control group (n = 19; underwent traditional physical therapy for the same frequency and duration). Measurements were taken pre- and post-intervention. Standard ultrasound imaging was applied to evaluate morphometrics of the gastrocnemius muscle and Achilles tendon unit and an isokinetic dynamometer was used to evaluate maximum voluntary isometric plantar flexors contraction (IVCmax). With controlling for pre-treatment values, significant post-treatment changes favoring the PLYO-Ex group were observed for morphological (tendon ($p = 0.003$, $\eta2p = 0.23$) length; belly length ($p = 0.001$, $\eta2p = 0.27$); tendon thickness ($p = 0.035$, $\eta2p = 0.35$); muscle thickness ($p = 0.013$, $\eta2p = 0.17$); fascicle length ($p = 0.009$, $\eta2p = 0.18$); pennation angle ($p = 0.015$, $\eta2p = 0.16$)) and mechanical and material properties (IVCmax ($p = 0.009$, $\eta2p = 0.18$); tendon's elongation ($p = 0.012$, $\eta2p = 0.17$), stiffness ($p = 0.027$, $\eta2p = 0.13$); stress ($p = 0.006$, $\eta2p = 0.20$); strain ($p = 0.004$, $\eta2p = 0.21$)). In conclusion, plyometric exercise induces significant adaptations within the musculotendinous unit of the plantar flexors in children with unilateral cerebral palsy. These adaptations could improve muscular efficiency and consequently optimize physical/functional performance.

PMID: 36360332

13. Optimal frequency of physical therapy in young children with cerebral palsy: a retrospective pilot study
Ju Seok Ryu, Jee Hyun Suh

Dev Neurorehabil. 2022 Nov 17;1-7. doi: 10.1080/17518423.2022.2147595. Online ahead of print.

Purpose: To determine the optimal frequency of physical therapy (PT) in young children with cerebral palsy (CP). Methods: Twenty-three children (mean age, 47.30 ± 31.95 months) with CP who had undergone both low- and high-frequency PT in an outpatient rehabilitation clinic were analyzed retrospectively. The Gross Motor Function Measure-88 (GMFM-88) score was assessed before and after low- and high-frequency PT. Results: The high-frequency PT group showed statistically significant improvements of GMFM-88 compared to the low-frequency PT group. In the high-frequency PT group, the improvement in total GMFM-88 scores was greater in children below 36 months of age than in children above 36 months of age. Moreover, the ambulatory group showed greater improvement compared to the non-ambulatory group during high-frequency PT. Conclusions: High-frequency PT might benefit gross motor function in children with CP up to 36 months of age. High-frequency PT resulted in improved standing and gait function in the ambulatory group.

PMID: 36384414

14. Measuring the inch stones for progress: Gross motor function in the developmental and epileptic encephalopathies
Anne T Berg, Aaron J Kaat, Deborah Gaebler-Spira

Epilepsy Behav. 2022 Nov 8;137(Pt A):108953. doi: 10.1016/j.yebeh.2022.108953. Online ahead of print.

Objective: Developmental and epileptic encephalopathies (DEE) entail moderate to profound impairments in gross motor skills and mobility, which are poorly quantified with clinical outcomes assessments (COA) used in neuro-typical populations. We studied the motor domain of the Adaptive Behavior Assessment System-3 for ages 0-5 years (ABAS) used outside of its intended age range with a focus on raw scores. Methods: In a cross-sectional survey, 117 parents of children with a variety of DEEs (ages 1-35 years, median = 9) completed the motor domain section of the ABAS. Floor and ceiling effects and associations with epilepsy-related factors were assessed with appropriate parametric and nonparametric statistical techniques. The sensitivity of the ABAS and additional measures of mobility borrowed from the cerebral palsy literature (Functional Activities Questionnaire (FAQ-22) walking level (FAQ-WL)) to different levels of the Functional Mobility Scale was determined. Results: ABAS motor scores corresponded to a median age equivalent of 20.5 months (Inter-Quartile Range (IQR) 8-34). Most raw scores corresponded to standardized scores > 2 standard deviations below the ABAS standardization sample mean. ABAS raw scores demonstrated minimal floor and ceiling effects (<5%). In linear regression models, scores increased with age under 6 years ($p < 0.0001$) but flattened out thereafter. Scores varied substantially by DEE group ($p < 0.001$) and decreased with higher convulsive seizure frequency (<0.0001) and number of seizure medications ($p < 0.001$). ABAS and other motor scores were sensitive to important differences in mobility as represented by the FMS at 5 yards. Further, they correlated with declines in mobility function from 5 to 500 yards. Significance: An out-of-range COA with raw scores may provide a measure of motor ability and mobility sensitive within the range of moderate to profound impairment seen in patients with DEE. This approach could shorten the time to appropriate COA development and ensure timely clinical trial readiness for novel therapies for rare DEEs.

PMID: 36368092

15. Addition of respiratory exercises to conventional rehabilitation for children and adolescents with cerebral palsy: a systematic review and meta-analysis
Thálita Raysa de Lima Crispim, Mansueto Gomes Neto, Tafnes Rayane Lima Crispim, Renivaldo Batista Dias, Maria Déborah Monteiro de Albuquerque, Micheli Bernardone Saquetto, Paulo André Freire Magalhães
Review World J Pediatr. 2022 Nov 15;1-16. doi: 10.1007/s12519-022-00642-1. Online ahead of print.

Background: Respiratory dysfunctions are an important cause of morbidity and death in cerebral palsy (CP) populations. Respiratory exercises in addition to conventional rehabilitation have been suggested to improve respiratory status in CP patients. The objective of this systematic review and meta-analysis was to verify the effects of the addition of respiratory exercises to conventional rehabilitation on pulmonary function, functional capacity, respiratory muscle strength, gross motor

function and quality of life in children and adolescents with CP. Methods: We searched for randomized controlled clinical trials in PubMed/Medline, Lilacs, SciELO, EMBASE and Physiotheraphy Evidence (PEDro) from their inception until July 2022 without language restrictions. Studies that included respiratory exercises (breathing exercise program; feedback respiratory training; incentive spirometer exercise; inspiratory muscle training; and combination of respiratory exercises + incentive spirometer exercise) in combination with conventional rehabilitation for children and adolescents with CP were evaluated by two independent reviewers. The mean difference (MD) and 95% confidence interval (CI) were estimated by random effect models. Results: Ten studies met the eligibility criteria, including 324 children aged from 6 to 16 years. The meta-analysis showed an improvement in inspiratory muscle strength of 22.96 cmH2O (18.63-27.27, n = 55) and pulmonary function of 0.60 (0.38-0.82, n = 98) for forced vital capacity (L); 0.22 (0.06-0.39, n = 98) for forced expiratory volume at 1 second (L); and 0.50 (0.05-0.04, n = 98) for peak expiratory flow (L/min). Functional skills in daily living activities improved in the intervention group. Caregivers' assistance of daily living activities, functional capacity, gross motor function and expiratory muscle strength showed a nonsignificant improvement. Social well-being and acceptance and functioning domains improved in only one study. Conclusions: Emerging data show significant enhancements in inspiratory muscle strength and pulmonary function in CP patients after respiratory training in addition to conventional rehabilitation. There is no consensus on the frequency, type or intensity of respiratory exercises for children with and adolescents with CP.

PMID: 36376558

16. An evaluation of data processing when using the ActiGraph GT3X accelerometer in non-ambulant children and adolescents with cerebral palsy
Trille Jakobsson, Katarina Lauruschkus, Åsa B Tornberg

Clin Physiol Funct Imaging. 2022 Nov 14. doi: 10.1111/cpf.12795. Online ahead of print.

Purpose: To evaluate vertical acceleration, vector magnitude, non-wear time, valid day classifications and valid period classifications, in the data processing phase when using the ActiGraph GT3X accelerometer in non-ambulant children and adolescents with cerebral palsy (CP). Material and methods: Accelerometer data retrieved from 33 non-ambulant children and adolescents (4-17 years) with CP, were analysed. Comparisons of i) vertical acceleration versus vector magnitude, ii) two different non-wear times, iii) three different settings to classify a day as valid and iv) two different settings to classify a period as valid were made. Results and conclusions: Vector magnitude and a non-wear time of at least 90 consecutive minutes statistically significantly increased minutes recorded per day, especially for sedentary time. There was a statistically significant difference in numbers of valid days depending on time criteria set to determine a valid day, whereas there was no statistically significant difference in valid periods using 3 compared to 4 days. This study suggests using the pre-settings in ActiLife; vector magnitude, non-wear time of 90 consecutive minutes, 500 minutes recorded per day with periods of at least 3 valid days when assessing physical activity objectively by the ActiGraph GT3X accelerometer in non-ambulant children and adolescents with CP.

PMID: 36373707

17. Neurophysiological Response of Adults with Cerebral Palsy during Inclusive Dance with Wheelchair
Sandra Mendoza-Sánchez, Alvaro Murillo-Garcia, Juan Luis Leon-Llamas, Jesús Sánchez-Gómez, Narcis Gusi, Santos Villafaina

Biology (Basel). 2022 Oct 22;11(11):1546. doi: 10.3390/biology11111546.

A total of 16 adults with cerebral palsy (age = 37.50 (7.78)) participated in this cross-sectional study. The electroencephalographic (EEG) data were recorded under three conditions: (1) baseline; (2) while listening to music; (3) while performing inclusive dance choreography with wheelchair. EEG data was banded into theta (4-7 Hz), alpha (8-12 Hz), and beta (13-30 Hz). Significantly higher values of theta, alpha, and beta bands were found in dance conditions than in the baseline. Significant differences between baseline and listening to music conditions were not found in any of the power spectrum bands. Differences between listening to music conditions and inclusive dance with wheelchair were observed in theta and beta power spectrum band studies in the F4 electrode. Inclusive dance with wheelchair increases theta, alpha, and beta power spectra when compared to baseline. In addition, the beta power spectrum is greater only during inclusive dance conditions, which could be modulated by emotions. However, future studies should corroborate this hypothesis.

PMID: 36358249

18. Drooling and Aspiration of Saliva
Amy Hughes, Elton M Lambert

Review Otolaryngol Clin North Am. 2022 Dec;55(6):1181-1194. doi: 10.1016/j.otc.2022.07.007.

Drooling and aspiration of saliva can affect the quality of life and morbidity of patients with neuromuscular diseases. Practitioners must differentiate between drooling with and without aspiration of saliva, as the presence of aspiration affects respiratory health. There are several validated drooling scales, but validated assessments for aspiration of saliva are lacking. Once diagnosed, drooling can be treated with rehabilitative therapy, anticholinergics, botulinum toxin to the salivary glands, and surgery. Drooling with aspiration of saliva often requires multidisciplinary engagement to decrease the risk of respiratory complications.

PMID: 36371134

19. Dental treatment under general anesthesia in patients with severe intellectual disability at the Gregorio Marañón General University Hospital: a 10-year retrospective study
Víctor Cortezo, Carlos M Cobo-Vázquez, Alfonso Rayo, Félix M Martín, Tomás Hernán, Víctor M Paredes, Manuel Joaquín De Nova

Quintessence Int. 2022 Nov 15;0(0):0. doi: 10.3290/j.qi.b3512031. Online ahead of print.

Objectives: There is a high demand for dental treatment in a hospital setting for patients with severe intellectual disability (ID), due to their inability to cooperate. The objective was to determine the types of dental treatment carried out on patients with severe ID, as well as the possibility of performing clinical and radiographic examinations prior to treatment and to identify their characteristics. Method and materials: A retrospective observational study was performed, based on the medical histories of patients with severe ID or a disability included in the portfolio of dental services of Community of Madrid, who underwent dental treatment at the Stomatology Service of the Gregorio Marañón General University Hospital from the year 2009 to 2019. Data on age, sex, etiology of disability, and dental treatment were obtained. Results: A total of 1,845 patients were included. The type of disability in the majority of cases was unknown, followed by encephalopathy, cerebral paralysis, and Down syndrome. In total, 8,439 dental extractions were performed on 1,548 patients (83.9%). Clinical and radiographic exploration were carried out on 874 patients (47.4%). Conclusions: Ultrasonic scaling was the most frequently performed treatment in patients. Dental extractions were the next most common treatment. An increase in age showed a higher demand for surgical procedures and extractions. Over half of the patients (52.6%) did not tolerate clinical or radiographic examinations.

PMID: 36378299

20. Role of gabapentin in reducing the need for high-risk medications in patients with stable severe neurological impairment
Khaled Alghamdi, David Lysecki

J Taibah Univ Med Sci. 2022 Aug 15;18(1):170-174. doi: 10.1016/j.jtumed.2022.07.006. eCollection 2023 Feb.

Objective: The study was aimed at assessing the prevalence of pain behaviors in children with severe neurological impairment (SNI), as well as the use of prescribed pain behavior medications, and the effects of gabapentin initiation on behaviors and use. Methods: A pre-post study was conducted on data from 11 patients with SNI who received gabapentin at a children's hospital in Canada. Symptoms and the use of high-risk pain behavior medications were assessed before and after gabapentin initiation and titration. Results: Pain was identified as a primary concern in most patients (8/11 [73%]) before gabapentin initiation. Dystonia was the most prevalent pain behavior (6/11 [55%]). Of the 11 patients, eight (73%) were taking benzodiazepines for symptom management, four (36%) were taking opioids, and one was taking a hypnotic sedative. Symptom improvement was observed in 10/11 (91%) patients after gabapentin initiation and titration. The use of benzodiazepine decreased in 6/8 (75%) patients, opioid use decreased in 3/4 patients, and hypnotic sedative use decreased in 1/1 patient. Successful discontinuation occurred for benzodiazepines in 5/8 (62.5%) patients, opioids in 1/4 (25%) patients, and hypnotic sedatives in 1/1 patient. Conclusions: Prescription medications with substantive risks, including benzodiazepines, opioids, and hypnotic sedatives, were used with

high prevalence for pain behaviors in children with SNI. This study revealed an association between gabapentin initiation, and improved symptom burden and decreased use of the three medications.

PMID: 36398026

21. Psychological Stress Induced by Prone Positioning among Adults with Severe Cerebral Palsy
Tadashi Matsuda, Yoshiteru Akezaki, Yoko Tsuji, Kazunori Hamada, Mitsuhiro Ookura

Acta Med Okayama. 2022 Oct;76(5):535-540. doi: 10.18926/AMO/64034.

The purpose of this study was to investigate the psychological impact of various positionings in subjects with cerebral palsy (CP). The participants were 17 individuals with severe motor and intellectual disability due to CP. They began in a sitting position in their wheelchair, and were placed consecutively in prone or supine positions, with no intervals between placements. Physiological observations were made in each position, and included salivary α-amylase activity, pulse, percutaneous oxygen saturation, respiratory rate, learance or not of airway secretions, and occurrence or not of adverse events. Salivary α-amylase activity values were higher in the prone position than in the baseline and supine positions ($p<0.05$). Clearance of airway secretions was significantly more prevalent in the prone position than in the baseline and supine positions ($p <0.05$). The participants' pulse was significantly lower in the supine and prone positions than in the baseline position ($p<0.05$). Greater prevalence of airway secretion clearance and significantly higher stress levels as indicated by saliva amylase were observed in the prone position than in the other two positions. Therefore, when such patients are placed in a prone position, close attention to airway management and the potential for psychological stress may be necessary.

PMID: 36352800

22. Feeding Difficulties Among Children With Special Needs: A Cross-Sectional Study From India
Bhuvaneswari Manikandan, Keren Gloria J, Reema Samuel, Paul S S Russell

OTJR (Thorofare N J). 2022 Nov 14;15394492221130971. doi: 10.1177/15394492221130971. Online ahead of print.

Deficits in feeding can lead to impairments in occupational performance for children with special needs. This correlational study assessed the relationship between oromotor deficits, behavior problems related to feeding, and caregiver perception of the behavior in children with special needs. We included children with neurodevelopmental disorders (n=79), between 2 and 12 years of chronological age, and their caregivers. Those fulfilling the selection criteria were administered the Behavioral Pediatric Feeding Assessment Scale (BPFAS) and Schedule for Oromotor Assessment (SOMA). More than half the sample had skill deficits and behavioral problems related to feeding. There was a statistically significant correlation of oromotor deficits with specific food consistencies and feeding-related behavior problems. Children with special needs have impaired participation in feeding. Deficits at the body system level are associated with parental and cultural factors, which would have to be mitigated to optimize performance.

PMID: 36377204

23. Association of motor performance of children with cerebral palsy and burnout level of their informal caregivers in an African community
Yusuf Tunde Gbonjubola, Margaret Bukola Fatudimu, Talhatu Kolapo Hamzat

J Pediatr Rehabil Med. 2022 Nov 7. doi: 10.3233/PRM-200675. Online ahead of print.
Purpose: The demands of caring for children with cerebral palsy (CWCP) may lead to burnout among the informal caregivers of these children. However, this subject area has not received significant research attention in Nigeria. The primary aim of this study was to investigate the association between burnout level of informal caregivers of CWCP and the motor performance of the CWCP. The association between burnout level of the informal caregivers and selected clinical variables of CWCP was also investigated. Methods: This is a descriptive study of 75 consecutively-sampled informal caregivers (34.76±8.7 years) of CWCP and an equal number of their CWCP. Burnout level of the caregivers and motor performance of the CWCP were assessed using

the Copenhagen Burnout Inventory (CBI) and Gross Motor Function Classification System Family Questionnaire (GMFCSFQ) respectively. Descriptive and inferential statistics were used to analyse results at alpha = 0.05. Results: There was a statistically significant positive association between the CBI scores and the GMFCSFQ scores ($p < 0.05$). Age of the CWCP as well as type and topography of the cerebral palsy were not significantly associated with the caregivers' burnout level. Similarly, the age and sex of the caregivers had no statistically significant association with their burnout level ($p > 0.05$). Conclusion: Caregiving for children with lower motor performance is associated with higher burnout among caregivers. This may impact negatively on the overall health of the caregivers and the quality of care for the CWCP.

PMID: 36373297

24. Parental Age and Childhood Risk for Cerebral Palsy in California
Lifang Zhou, Qi Meng, Ondine S von Ehrenstein, Jingyuan Xiao, Yu Gao, Yvonne W Wu, Beate Ritz, Zeyan Liew

J Pediatr. 2022 Nov 10;S0022-3476(22)01001-0. doi: 10.1016/j.jpeds.2022.10.039. Online ahead of print.

Objective: To investigate the associations between maternal or paternal age at the time of delivery and offspring's risk for cerebral palsy (CP) in California. Study design: We conducted a population-based, case-control study that included 8,736 singleton CP cases and 90,250 singleton controls, matched by sex and birth year selected from California birth certificate records from 1994 to 2010. We estimated odds ratios (OR) and 95% confidence intervals (CIs) for CP diagnosis according to maternal and paternal age recorded on the birth certificates. Causal mediation analysis was performed to estimate direct and indirect effects of parental ages on CP with preterm delivery as a potential mediator. Results: Children born to younger mothers (≤19 years) or older mothers (35-39 years; ≥40 years) had a higher risk of CP compared with children of mothers aged 25-29 years (ORs ranging from 1.13 to 1.59). Compared with paternal age 25-29 years, older paternal age (40-44 years; ≥45 years) was also associated with an increased risk for CP independent of maternal age. When analyzing jointly using both parents of ages 20-34 years as the reference, the highest risk was estimated for older parents (≥35 years). Preterm birth was estimated to mediate 19-34% of the total effects between maternal or paternal age and offspring CP risk. Conclusion: Young maternal age and an older age in either or both parents were associated with a higher risk of CP in their children. Although preterm birth was a mediator, additional factors related to parental age need further exploration to explain risk of CP.

PMID: 36372095

25. Underlying Causes of Death among Adults with Cerebral Palsy
Mark D Peterson, Allecia M Wilson, Edward A Hurvitz

J Clin Med. 2022 Oct 27;11(21):6333. doi: 10.3390/jcm11216333.

Background: Adults with cerebral palsy (CP) represent a growing population whose healthcare needs are poorly understood. The purpose of this study was to examine trends in the underlying causes of death (UCOD) among adults with CP in the United States. Methods: A national cohort was created from the Centers for Disease Control and Prevention Wide-ranging Online Data for Epidemiologic Research (WONDER) database from 1999 to 2019. The UCOD was determined using the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10 code G80x, Infantile CP) based on death certificate adjudication. Crude and age-adjusted mortality rates (AAMRs), as well as 95% confidence intervals (CIs) were calculated for adults with CP. Results: There were 25,138 deaths where CP was listed as the UCOD between 1999-2019. There was a steady increase in the UCOD attributable to CP in both crude mortality rates and AAMRs, with the highest rates occurring in 2019. The highest co-occurring secondary causes of death were other diseases of the nervous system (e.g., epilepsy), diseases of the respiratory system (e.g., pneumonia), symptoms, signs, and abnormal clinical and laboratory findings, not elsewhere classified (e.g., dysphagia), and diseases of the circulatory system (e.g., cardiovascular disease). Conclusions: Listing the UCOD as CP should be accompanied by other mechanisms leading to mortality in this population.

PMID: 36362560

26. The factors affecting neurodevelopmental outcomes in HIE
Sevgi Yimenicioglu, Tugba Barsan Kaya, Egemen Yıldırım, Sema Arayıcı, Yaşar Bildirici, Arzu Ekici

Acta Neurol Belg. 2022 Nov 9. doi: 10.1007/s13760-022-02126-5. Online ahead of print.

Background: Hypoxic ischemic encephalopathy (HIE) has different neurological outcomes. Aim: We wanted to see if there was any developmental delay in neonates with hypoxia ischemic encephalopathy who were given therapeutic hypothermia. Study design: Retrospective cohort study. Methods: The Denver developmental screening test II (DDST-II) was performed to newborns who had been applied to therapeutic hypothermia. Results: There were 69 male and 36 female newborns. The mean 1 -min and 5-min Apgar scores were 4.72 ± 2.51 and 7.03 ± 2.017, respectively. The mean pH and mean base excess were 6.92 ± 0.1 and -18.05 ± 5.72, respectively. The most common risk factors were meconium staining (17.1%). There were 67 patients with Stage I, 20 with Stage II, and 18 with Stage III. Diffusion restriction was seen in 13 patients. 28 patients had seizures. In aEEG, 12 patients had burst suppression. Three (2.9%) infants died during hospitalization. 19 patients missed follow-up appointments. Thirteen patients had abnormal development according to DDST-II. Seven patients had gross motor function delays and were diagnosed with cerebral palsy. Three had language skill delays, but two of them had speech disorders after two years of age. Two had delayed milestones. Two had delays in fine motor skills but did not have any sequels after two years of age. A significant difference was found between seizures and the severity of Sarnat stage, intubation in the delivery room with developmental delay. Apgar scores were significantly lower in patients with CP. Conclusion: We should closely follow-up neonates who had low Apgar scores, seizures, a high Sarnat stage, were intubated in the delivery room.

PMID: 36352199

27. Fetal heart rate evolution and brain imaging findings in preterm infants with severe cerebral palsy
Masahiro Nakao, Yukiko Nanba, Asumi Okumura, Junichi Hasegawa, Satoshi Toyokawa, Kiyotake Ichizuka, Naohiro Kanayama, Shoji Satoh, Nanako Tamiya, Akihito Nakai, Keiya Fujimori, Tsugio Maeda, Hideaki Suzuki, Mitsutoshi Iwashita, Akira Oka, Tomoaki Ikeda

Am J Obstet Gynecol. 2022 Nov 9;S0002-9378(22)02165-2. doi: 10.1016/j.ajog.2022.11.1277. Online ahead of print.

Background: Cerebral palsy is more common in preterm infants than in full-term infants. While there is still no clear evidence that fetal heart rate monitoring effectively reduces cerebral palsy incidence, it is helpful to estimate the timing of brain injury leading to cerebral palsy and the causal relationship with delivery based on the fetal heart rate evolution patterns. Understanding the relationship between the timing and the type of brain injury can help in utilizing preventive measures in obstetric care. Objective: To examine the relationship between the timing of insults and type of brain injury in preterm infants with severe cerebral palsy. Study design: This longitudinal study was based on a nationwide database for cerebral palsy. The data of infants with severe cerebral palsy (equivalent to levels 3-5 of the Gross Motor Function Classification System-Expanded and Revised), born between 2009 and 2014 at 28 to 33 weeks of gestation, were included. The intrapartum fetal heart rate evolution patterns were evaluated by three obstetricians blinded to clinical information other than gestational age at birth and were categorized into (1) continuous bradycardia, (2) persistently non-reassuring (prenatal onset), (3) reassuring-prolonged deceleration, (4) Hon's pattern (intrapartum onset), (5) persistently reassuring (pre- or postnatal onset), and (6) unclassified after agreement by at least two of the three reviewers. Infant brain magnetic resonance imaging (MRI) finding at term equivalent age was assessed by a pediatric neurologist blinded to the background details, except gestational age at birth and corrected age at image acquisition, and was categorized as (I) basal ganglia-thalamus, (II) white matter, (III) watershed cortex or subcortex, (IV) stroke, (V) normal, and (VI) unclassified based on the predominant site involved. The risk factors of the basal ganglia-thalamus group were compared with those of the combined white matter and watershed injuries group. Results: Among 1593 infants with severe cerebral palsy, 231 were born at 28-33 weeks of gestation, and 140 met the eligibility criteria. Fetal heart rate evolution patterns were categorized as bradycardia, 17% (24); persistently non-reassuring, 40% (56); reassuring-prolonged deceleration, 7% (10); reassuring-Hon, 6% (8); persistently reassuring, 7% (10); and unclassified, 23% (32). Cerebral palsy was presumed to have an antenatal onset in 57% and be caused by intrapartum insult in 13% of infants. MRI showed that 34% (n=48) developed the basal ganglia-thalamus-dominant brain injury. Of the remaining 92 infants, 43% (60) showed white matter injuries, 1% (1) watershed injuries, 4% (5) stroke, 1% (1) normal findings, and 18% (25) had unclassified findings. Infants with continuous bradycardia (adjusted odds ratio, 1033.06; 95% confidence interval, 15.49-68879.92) and persistently non-reassuring fetal heart rate (61.20; 2.09-1793.12) had a significantly increased risk of basal ganglia-thalamus injury. Conclusion: Severe cerebral palsy was presumed to have an antenatal onset in 57 % and be caused by intrapartum insult in only 13% of infants born at 28-33 weeks of gestation. While the white matter-watershed injury was predominant in the study populations, severe acute hypoxia-ischemia may be an important prenatal etiology of severe cerebral palsy in preterm infants.

PMID: 36370872

28. When a baby is diagnosed at high risk of cerebral palsy: understanding and meeting parent need
Corrine Dickinson, Jeanie Sheffield, Catherine Mak, Roslyn N Boyd, Koa Whittingham

Disabil Rehabil. 2022 Nov 13;1-9. doi: 10.1080/09638288.2022.2144491. Online ahead of print.

Purpose: To explore the experiences and needs of parents with an infant diagnosed at risk of cerebral palsy (CP) and to receive feedback on a new online support program (Parenting Acceptance and Commitment Therapy; PACT). Materials and methods: Eleven parents from eight family dyads (8 mothers, 3 fathers) with infants under 24 months of age (age range 10-24 months) recently diagnosed as at risk of CP as well as fourteen clinicians participated in this qualitative study through interviews. Results: Parents reported conflicting emotions and grief. Further, they reported that they wanted honesty, support and normalisation of their experiences from clinicians. Parents pointed to a gap in service delivery in terms of non-pathologising psychological support specific to their needs. Clinicians reported a lack of skills in supporting distressed parents. Parent feedback on PACT was positive, with parents receptive to the online delivery. Conclusions: Parents want acceptance without pathologisation, honesty, and flexible support. Clinicians working with children at risk of CP need training in grief awareness and support for their own coping. Health services should consider building better parental support into their systems of care. Implications for Rehabilitation: Parents want clinicians to be honest, supportive and to normalise their grief. Clinicians in rehabilitation would benefit from up-skilling in grief support. Parental support should be built into systems of care for children with cerebral palsy.

PMID: 36373179

29. Muscle-tendon unit in children with cerebral palsy
No authors listed

Dev Med Child Neurol. 2022 Nov 10. doi: 10.1111/dmcn.15458. Online ahead of print.

No abstract available

PMID: 36354208

30. Treatment on patients with spastic cerebral palsy in the past 30 years: A systematic review and bibliometric analysis
Dingfang Chen, Yuefeng Wu, HaiYing Li, Xue Pan, Jin Zhou

Medicine (Baltimore). 2022 Nov 11;101(45):e30535. doi: 10.1097/MD.0000000000030535.

Background: Over the past 30 years, treatments from different disciplines have been applied to spastic cerebral palsy (SCP). However, few bibliometric studies have been conducted to date. This study explored the knowledge base, emerging hotspots, and future trends related to SCP treatment research using bibliometric analysis. Methods: Publications on SCP treatment included in the Web of Science Core Collection database between 1990 and 2020 were retrieved, and Medical Subject Headings terms were extracted from PubMed. Online bibliometric analysis website (http://bibliometric.com/), 2 pieces of software called "CiteSpace" and "VOSViewer" were used for quantitative analysis and knowledge map establishment. Results: A total of 1668 papers were retrieved from 1990 to 2020. The number of publications has increased annually. Developmental Medicine and Child Neurology is the most productive and the highest co-cited journal. The United States has been the largest contributor. Vrije Universiteit Amsterdam ranked first in the number of papers published among institutions that have conducted correlational research. Becher JG and Graham HK should be considered scholars who have made outstanding contributions. The knowledge base of the SCP treatment research field is thoughtfully constructed to promote understanding of the field. Conclusion: This bibliometric study identified global achievements, research hotspots, and trends of SCP treatment. They provide insights into the research field and valuable information for future scientific research and clinical treatment.

PMID: 36397367

31. Botulinum Toxin Intervention in Cerebral Palsy-Induced Spasticity Management: Projected and Contradictory Effects on Skeletal Muscles
Cemre Su Kaya Keles, Filiz Ates

Review Toxins (Basel). 2022 Nov 8;14(11):772. doi: 10.3390/toxins14110772.

Spasticity, following the neurological disorder of cerebral palsy (CP), describes a pathological condition, the central feature of which is involuntary and prolonged muscle contraction. The persistent resistance of spastic muscles to stretching is often followed by structural and mechanical changes in musculature. This leads to functional limitations at the respective joint. Focal injection of botulinum toxin type-A (BTX-A) is effectively used to manage spasticity and improve the quality of life of the patients. By blocking acetylcholine release at the neuromuscular junction and causing temporary muscle paralysis, BTX-A aims to reduce spasticity and hereby improve joint function. However, recent studies have indicated some contradictory effects such as increased muscle stiffness or a narrower range of active force production. The potential of these toxin- and atrophy-related alterations in worsening the condition of spastic muscles that are already subjected to changes should be further investigated and quantified. By focusing on the effects of BTX-A on muscle biomechanics and overall function in children with CP, this review deals with which of these goals have been achieved and to what extent, and what can await us in the future.

PMID: 36356022

32. Trihexyphenidyl in young children with dystonic cerebral palsy: A single arm study
Lavanya Rajkumar, Abhinaya Ventatakrishnan, Smitha Sairam, Megha Khosla, Ritu Khanna, Biswajit Das, Devendra Mishra, Monica Juneja

J Pediatr Rehabil Med. 2022 Nov 7. doi: 10.3233/PRM-210087. Online ahead of print.

Purpose: The incidence of dystonic cerebral palsy causing significant morbidity is on the rise. There is a paucity of evidence for the management of dystonia in children. Methods: Forty-one children aged 6 months-5 years with predominantly dystonic cerebral palsy were started on a predetermined protocol of trihexyphenidyl (0.25-0.52 mg/kg) and followed up at 3, 6 and 12 weeks. Dystonia severity, motor function and developmental age at baseline and 12 weeks were compared using the Global Dystonia Scale (GDS), the Gross Motor Function Measure (GMFM), and Fine Motor/Perceptual Subscale of the Early Developmental Profile-2. Thirty-four children completed the entire 12 weeks of intervention. Results: The mean age of participants was 25±11 months. A significant decrease in median total dystonia scores on the GDS was observed post-intervention (74.5 to 59, $p < 0.0001$), and 64% of participants gained motor milestones. GMFM scores increased significantly from a median of 19.8% pre-intervention to 26.5% post-intervention ($p < 0.0001$). There was improvement in the fine motor domain as compared to the baseline ($p < 0.0001$). The number of children classified at Gross Motor Function Classification System levels 1 and 2 increased to 47.05% from 5.88% in the pre-intervention group. Conclusion: Trihexyphenidyl significantly improved dystonia, motor function and development in children with dystonic cerebral palsy in this study. Additional studies are needed to clarify its role in larger numbers of children with this condition.

PMID: 36373299

33. Temporal effects of two interferential current applications on peripheral circulation in children with hemiplegic cerebral palsy
Nanees E Mohamed, Asmaa A Hussein, Doaa A M Sanad

J Taibah Univ Med Sci. 2022 Sep 5;18(1):140-147. doi: 10.1016/j.jtumed.2022.08.004. eCollection 2023 Feb.

Objectives: To determine the short-term effects of sympathetic and peripheral stimulation of interferential current (IFC) on blood flow (BF) in children with hemiplegic cerebral palsy (CP). Methods: Thirty children with hemiplegic CP, ranging from 8 to 12 years old, were randomly divided into three groups (10 children/group). The first group received sympathetic stimulation of IFC, the second group received peripheral stimulation of IFC, and the third group (control) received placebo peripheral stimulation of IFC. A frequency of 80-100 Hz at an intensity of 10-20 mA was applied for 20 min. Blood volume pulse (BVP) amplitude was measured before IFC application using a plethysmography sensor at the big toe immediately after and 15 min

poststimulation. The data were statistically analyzed and compared. Results: There were statistically significant differences in BVP amplitude among the three time intervals in both the sympathetic and peripheral groups ($P < 0.05$) with no difference in the control group ($P = 0.995$). There was a significant increase in BVP amplitude immediately after stimulation compared with before stimulation in both the sympathetic and peripheral groups ($P = 0.0001$). However, differences between the sympathetic and peripheral groups at the three measured periods were statistically nonsignificant ($P > 0.05$). Conclusion: Both IFC applications had a proper effect on improving BF in children with hemiplegic CP with no difference in efficacy between sympathetic and peripheral stimulation.

PMID: 36398021

34. Comparative Sedation with Sevoflurane and Thiopental in Children Undergoing MR Imaging
Nurettin Kurt, Duygu Karakose Caliskan, Haci Yusuf Gunes

J Coll Physicians Surg Pak. 2022 Nov;32(11):1381-1385. doi: 10.29271/jcpsp.2022.11.1381.

Objective: To compare the use of propofol and thiopental in children undergoing MRI. Study design: Descriptive, comparative study. Place and duration of study: University of Health Sciences, Van Training and Research Hospital, Van, Turkey, between January 01 and December 31, 2019. Methodology: One thousand two hundred and twenty two paediatric patients having MRI were included and divided into two groups. Patients aged 2-18 years who were administered Propofol were classified as Group I, and the patients under the age of 2 years who were administered Thiopental were classified as group II. All patients received Sevoflurane insufflation via face mask after induction agent. Patient's demographic data, ASA scores, anaesthesia-procedure-recovery times, comorbidities, type of MRI examination and complications were recorded. Results: Age, body weight and ASA score of the patients in Group I were higher than Group II ($p<0.05$). Epilepsy, cerebral palsy, mental retardation, speech retardation and autism were more prevalent in Group I than in Group II ($p<0.05$). Neuromuscular growth retardation, hydrocephalus, and metabolic disease were less common in Group I than in Group II ($p<0.05$). With this Apnea and desaturation was higher in Group I, and bradycardia was higher in Group II. Conclusion: Sevoflurane insufflation with a face mask can be safely used in children after induction of anaesthesia with propofol or thiopental.

PMID: 36377001

35. The Greek Version of Mini-Manual Ability Classification System (Mini-MACS): Translation and Reliability Study
Vasileios C Skoutelis, Niki Mastronikola, Argirios Dinopoulos, Eleni Skouteli, Zacharias Dimitriadis, Daphne Bakalidou

Cureus. 2022 Oct 8;14(10):e30073. doi: 10.7759/cureus.30073. eCollection 2022 Oct.

Introduction: The Mini-Manual Ability Classification System (Mini-MACS) is an adaptation of the MACS for children with cerebral palsy (CP) aged 1-4 years, which classifies children's performance to handle objects that are relevant to their age and development. The availability of a reliable Mini-MACS in Greek would allow for using it safely and properly in the clinical and research context of Greece. Therefore, the purpose of this study was to translate the original English version into Greek and examine its test-retest and interrater reliability. Material and methods: The English Mini-MACS was translated into Greek using the "forward-backward" method. Sixty-three children with CP, Gross Motor Function Classification System (GMFCS) levels I-V, aged 12 -50 months were included in the reliability study. Test-retest and interrater reliability were assessed using the interclass correlation coefficient (ICC). The association between Mini-MACS and GMFCS level ratings was also assessed using Spearman's rho correlation coefficient (ρ). Results: The translated version was easy to understand and use. The Greek Mini-MACS was found to have excellent test-retest reliability (ICC > 0.96) for both parents and therapists, good interrater reliability (ICC=0.89) between therapists and parents, and moderate-to-strong correlation with the GMFCS ($\rho = 0.56$-0.64, $p < 0.0001$). Conclusion: The Greek Mini-MACS constitutes a user-friendly and reliable scale for use in the Greek population.

PMID: 36381925

36. Psychometric evaluation and distribution of classification systems in children with cerebral palsy in Japan
Hisato Nishibu, Tsugumi Hosokawa Seino, Nobuaki Himuro

J Pediatr Rehabil Med. 2022 Nov 7. doi: 10.3233/PRM-210098. Online ahead of print.

Purpose: The study sought to examine the content validity, the intra- and inter-rater reliability, and concurrent validity of the Japanese versions of the Manual Ability Classification System, the Communication Function Classification System, and the Eating and Drinking Ability Classification System, and representation of the distribution of the levels of each classification systems in comparison to the Gross Motor Function Classification System levels for children with cerebral palsy. Methods: The Japanese versions were developed using the back-translation method. For content validity, professionals were asked to complete a questionnaire including items on the appropriateness of the translation, its validity, and distinctions among levels. For reliability, professionals used the three classification systems twice in children with cerebral palsy. For concurrent validity, relationships among the four classification systems were examined by correlation analyses. Results: Participants included twenty-one professionals and 290 children with cerebral palsy (mean age: 12 years two months, female: 132, male: 158). The content validity was generally good. For reliability, the lower limit of the 95% confidence interval for the intraclass correlation coefficients was greater than 0.89, and the correlation coefficients were high. Conclusion: The results of this study showed good reliability and validity of the functional classification systems in Japan.

PMID: 36373301