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## Interventions and Management

### 1. Leap Motion Controller-based training for upper extremity rehabilitation in children and adolescents with physical disabilities: A randomized controlled trial.

Tarakci E, Arman N, Tarakci D, Kasapcopur O.

J Hand Ther. 2019 Apr 19. pii: S0894-1130(18)30344-2. doi: 10.1016/j.jht.2019.03.012. [Epub ahead of print]

**STUDY DESIGN:** Randomized controlled trial. **INTRODUCTION:** Juvenile idiopathic arthritis (JIA), cerebral palsy (CP), and brachial plexus birth injury (BPBI) are the most common disorders that cause upper extremity impairments in children and adolescents. Leap Motion Controller-based training (LMCBT) is a novel therapeutic method for upper extremity rehabilitation. **PURPOSE OF THE STUDY:** The aim of the present study was to investigate the potential efficacy of an 8-week LMCBT program set as an upper extremity rehabilitation program by comparing conventional rehabilitation program in children and adolescents with physical disabilities such as JIA, CP, and BPBI. **METHODS:** A randomized control trial which included children and adolescents of different disabilities (JIA, CP, BPBI) were grouped according to their diagnosis. All patients were randomized into 2 groups namely LMCBT (group I) and conventional treatment (group II) for the treatment (3 days/8 weeks). Duruoz Hand Index and Jebson Taylor Hand Function Test were used as primary outcomes. Secondary outcomes included the nine-hole peg test, Childhood Health Assessment Questionnaire, and assessments of grip and pinch strength using a dynamometer. **RESULTS:** One hundred three patients were included in the study, and 92 of them completed the treatment. After treatment, significant differences were found in Childhood Health Assessment Questionnaire, Duruoz Hand Index, Jebson Taylor Hand Function Test, nine-hole peg test, and grip and pinch strength scores in almost all groups (effect size [ES] = 0.10 to -0.77 for group I and 0.09 to -0.70 for group II in CP; ES = 0.31 to 2.65 for the group I and 0.12 to 1.66 for group II in JIA; and ES = 0 to -0.44 for group I and 0.08 to -0.62 for group II in BPBI) ( $P < .05$ ). Comparisons between LMCBT and conventional treatment groups showed similar results in all parameters in all disease groups ( $P > .05$ ). **CONCLUSIONS:** This study has quantitatively shown that LMCBT should be used as an effective alternative treatment option in children and adolescents with physical disabilities.

PMID: [31010703](#)

### 2. Femoral derotation osteotomy in children with cerebral palsy using the pediatric proximal femoral nail.

Sarikaya İA, Erdal OA, Şeker A, Görgün B, İnan M.

J Pediatr Orthop B. 2019 Apr 18. doi: 10.1097/BPB.0000000000000639. [Epub ahead of print]

We designed a pediatric proximal femoral nail (PPFN) to overcome fixation method-related complications when performing femoral derotation osteotomy in cerebral palsy patients. Preliminary results of cerebral palsy patients who underwent femoral derotation osteotomy fixed using PPFN to treat in-toeing were evaluated. Sixteen patients with a mean age of 10 years were included. Mean follow-up duration was 36 months. There was no significant difference in the follow-up neck-shaft angle and

articulotrochanteric distance values ( $P=0.2$  and  $0.3$ ). PPFN provides stable fixation, early weight-bearing, reduces soft-tissue disruption while limiting the complications due to fixation technique.

PMID: [31008810](#)

### **3. Development of a robotic walker for individuals with cerebral palsy.**

Alazem H, McCormick A, Nicholls SG, Vilé E, Adler R, Tibi G.

Disabil Rehabil Assist Technol. 2019 Apr 23;1-9. doi: 10.1080/17483107.2019.1604827. [Epub ahead of print]

**OBJECTIVE:** This study describes the first use of a robotic walker in youth and young adults with cerebral palsy (CP) Gross Motor Function Classification (GMFCS) IV. **METHODS:** Semi-structured interviews were conducted before and after each robotic walker trial. Interviews were recorded, then transcribed and subjected to thematic analysis. **RESULTS:** Five participants (4 male, 13-22 years of age) with quadriplegia secondary to CP were recruited. Four individuals with mixed tone quadriplegia GMFCS IV were able to independently walk with the device. One individual with significant dyskinesia was unable to utilize the device. The assessment team included two physiotherapists, an occupational therapist, a physiatrist and three engineers. Major themes related to physical and social impacts were identified. Some physical advantages include the ability to walk hands-free and promotion of physical fitness. Examples of physical barriers include limited harness design and large device size. Social advantages include increased independence and peer engagement. Finally, a social disadvantage identified was limited use on uneven terrains. **DISCUSSION:** Suggestions for modifications for identified challenges and disadvantages include decreasing the size of the robotic walker, more harness designs, decreasing the force required to take an initial step, adding a joy stick for user control and creating a more versatile base that can be used on different terrains such as ice or baseball fields. **CONCLUSION:** Robotics holds great hope for individuals with CP where mobility options are limited. Physical and social advantages are evident. Recommendations for future improvement and studies of use in exercise and participation are provided. **IMPLICATIONS FOR REHABILITATION** As youth and young adults with cerebral palsy age, options for mobilization can become limited with challenges in placing them in a walking device due to size and numerous other physical limitations. A robotic walker with a built-in mechanical lift is available for individuals with cerebral palsy. This study was able to gather important information and recommendations to tailor a new robotic walker prototype specifically for individuals with cerebral palsy.

PMID: [31012754](#)

### **4. Factors Influencing Motor Outcome of Hippotherapy in Children with Cerebral Palsy.**

Seung Mi Y, Ji Young L, Hye Yeon S, Yun Sik S, Jeong Yi K.

Neuropediatrics. 2019 Apr 22. doi: 10.1055/s-0039-1685526. [Epub ahead of print]

**OBJECTIVE:** This study was aimed to identify individual factors influencing the gross motor outcome of hippotherapy in children with cerebral palsy (CP). **METHODS:** One hundred and forty-six children with CP (mean age:  $5.78 \pm 1.72$  years, male: 56.2%) presenting variable function (gross motor function classification system [GMFCS], levels I-IV) participated in this study. Participants received 30 minutes of hippotherapy twice a week for 8 weeks. Clinical information including GMFCS level, age, sex, CP distribution, CP type, gross motor function measure-88 (GMFM-88), GMFM-66, and pediatric balance scale (PBS) score were collected retrospectively. We regarded the children with GMFM-66 score increased by 2.0 points as good responders to hippotherapy. Further we analyzed factors affecting good responders. **RESULTS:** GMFCS level I and II compared with IV (odds ratio [OR] = 6.83) and III compared with IV (OR = 4.45) were significantly associated with a good response to hippotherapy. Higher baseline GMFM E (OR = 1.05) and lower baseline GMFM B (OR = 0.93) were also significantly associated with a good response to hippotherapy. Sex, age, CP type, and distribution were not factors influencing gross motor outcome of hippotherapy. **CONCLUSIONS:** The children with CP, GMFCS level I-III, with relatively poor postural control in sitting might have a greater chance to improve their GMFM-66 scores through hippotherapy. This supports the hypothesis that hippotherapy is a context-focused therapy to improve postural control in sitting.

PMID: [31009955](#)

### **5. Effects of virtual reality in body oscillation and motor performance of children with cerebral palsy: A preliminary randomized controlled clinical trial.**

Arnoni JLB, Pavão SL, Dos Santos Silva FP, Rocha NACF.

Complement Ther Clin Pract. 2019 May;35:189-194. doi: 10.1016/j.ctcp.2019.02.014. Epub 2019 Feb 25.

**BACKGROUND AND PURPOSE:** Virtual reality is an adjuvant technique to rehabilitation of children with cerebral palsy (CP). It has been gaining prominence in this field because of its accessibility and great levels of motivation it promotes in treatment. However, there is a lack of studies addressing the effects of virtual reality-based therapy on activity levels regarding postural stability, especially considering the level of evidence presented by studies addressing this issue. Therefore, we aim to evaluate the effects of intervention in body sway and gross motor function of children with CP using an active video game. **MATERIALS AND METHODS:** In this blind randomized controlled trial, fifteen children with CP, Gross Motor Function Classification System (GMFCS) I-II, regularly attending conventional physical therapy programs, were randomly assigned to an intervention (IG:n = 7) or to a control group (CG:n = 8). In both groups, children remained attending conventional therapy. In addition, IG underwent intervention using an active video game twice a week for 45 min and eight weeks. Standing body sway was assessed using a force plate, and Gross Motor Function Measure (GMFM) dimensions D (Standing) and E (Walking, Running and Jumping) were tested. **RESULTS:** Following the virtual reality-based intervention, the IG only showed significant improvements in the GMFM dimensions D (p = 0.021) and E (p = 0.008). Improvements were clinically significant (D = 10.8%; E = 14.0%). For the CG, no variable analyzed showed differences after eight weeks. **CONCLUSIONS:** Intervention using an active video game is a promising tool that can improve the gross motor function of children with CP, GMFCS I-II.

PMID: [31003657](#)

## 6. Rehabilitation with a combination of scalp acupuncture and exercise therapy in spastic cerebral palsy.

Gao J, He L, Yu X, Wang L, Chen H, Zhao B, Jiang Y.

Complement Ther Clin Pract. 2019 May;35:296-300. doi: 10.1016/j.ctcp.2019.03.002. Epub 2019 Mar 7.

**PURPOSE:** To use Traditional Chinese Medicine (TCM) and Western approaches to improve gross motor function and activities of daily living (ADL) in children with spastic cerebral palsy. **METHODS:** Children were randomly divided into a treatment group, which received scalp acupuncture combined with exercise therapy and conventional rehabilitation training, and a control group, which received conventional rehabilitation training alone. Study subjects' gross motor function (gross motor function measure-88 [GMFM-88]) and ADL were evaluated before and after therapy. **RESULTS:** GMFM-88 and ADL scores were significantly improved in both groups after therapy, but the within group differences in post- and pre-therapy GMFM-88 and ADL scores were significantly higher in the treatment group compared to the control group. **CONCLUSION:** Scalp acupuncture combined with exercise therapy and conventional rehabilitation training can significantly improve gross motor function and the ability to perform ADLs in children with spastic cerebral palsy compared to conventional rehabilitation training alone.

PMID: [31003673](#)

## 7. International expert recommendations of clinical features to prompt referral for diagnostic assessment of cerebral palsy.

Boychuck Z, Andersen J, Bussi eres A, Fehlings D, Kirton A, Li P, Oskoui M, Rodriguez C, Shevell M, Snider L, Majnemer A Prompt Group.

Dev Med Child Neurol. 2019 Apr 25. doi: 10.1111/dmcn.14252. [Epub ahead of print]

**AIM:** To establish international expert recommendations on clinical features to prompt referral for diagnostic assessment of cerebral palsy (CP). **METHOD:** An online Delphi survey was conducted with international experts in early identification and intervention for children with CP, to validate the results obtained in two previous consensus groups with Canadian content experts and knowledge users. We sent two rounds of questionnaires by e-mail. Participants rated their agreement using a 4-point Likert scale, along with optional open-ended questions for additional feedback. Additionally, a panel of experts and knowledge-users reviewed the results of each round and determined the content of subsequent surveys. **RESULTS:** Overall, there was high-level of agreement on: (1) six clinical features that should prompt referral for diagnosis; (2) two 'warning sign' features that warrant monitoring rather than immediate referral for diagnosis; and (3) five referral recommendations to other healthcare professionals to occur simultaneously with referral for diagnosis. **INTERPRETATION:** There was high agreement among international experts, suggesting that the features and referral recommendations proposed for primary care physicians for early detection of CP were broadly generalizable. These results will inform the content of educational tools to improve the early detection of CP in the primary care context. **WHAT THIS PAPER ADDS:** International experts provide strong agreement on clinical features to detect cerebral palsy. Consensus on clinical 'warning signs' to monitor over time. Referral recommendations from primary care to specialized health services are identified.

PMID: [31025318](#)

### 8. Utilisation of coaching practices in early interventions in children at risk of developmental disability/delay: a systematic review.

Ward R, Reynolds JE, Pieterse B, Elliott C, Boyd R, Miller L.

Disabil Rehabil. 2019 Apr 25;1-22. doi: 10.1080/09638288.2019.1581846. [Epub ahead of print]

**BACKGROUND:** To conduct a systematic review of early intervention programs (0-5 years) utilising coaching practice characteristics, to identify (i) implementation fidelity; (ii) parent training processes, and (iii) outcome measures of capacity building in parents. The coaching practice characteristics of (1) joint planning, (2) observation, (3) action/practice, (4) reflection and (5) feedback identified by Rush and Shelden were utilised. **METHOD:** The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement was followed. A comprehensive search of 6 electronic databases was undertaken in March 2016 and updated in February 2018. **RESULTS:** Of 2397 articles, 18 papers met full inclusion criteria. Of these, 5 were randomised controlled trials. Only one specifically evaluated the impact of parent coaching versus therapist only delivered interventions. Risk of bias and study quality using Downs and Black checklist for clinical trial quality yielded the following descriptive ratings: Seven studies: "Poor" (scores 1-13); Six studies: "Fair" (scores 15-17); and five "Good" (scores 20-24). **CONCLUSION:** Coaching in early intervention is well accepted. Nevertheless, this review identified a continued lack of operationalised definitions; inconsistency in the reporting of therapist training and adherence to active ingredients/coaching principles; and an absence of outcome measures focused on parent capacity. Implications for Rehabilitation Contemporary early intervention services recognise the importance of engaging parents as active participators in their child's development. This is evident by the increase in interventions that utilise parent coaching practices. The findings of this systematic review indicate the need for professionals to: •Describe and document fidelity of coaching practices in the delivery of intervention. •Objectively measure changes in parent capacity and self-efficacy as a result of the coaching based intervention. The reporting of parent capacity measures will allow us to truly examine the effectiveness of coaching practices in empowering families to support their child to realise their full potential.

PMID: [31021669](#)

### 9. Understanding the factors that impact the participation in physical activity and recreation in young adults with cerebral palsy (CP).

Sienko S.

Disabil Health J. 2019 Apr 3. pii: S1936-6574(19)30042-1. doi: 10.1016/j.dhjo.2019.02.008. [Epub ahead of print]

**BACKGROUND:** Young adults with cerebral palsy (CP) are reported to be less active than their typically developing peers, have higher rates of sedentary behaviors, engage in slower tempo activities, and overall participate in a smaller variety of physical activities (PA). Functional motor level and environmental barriers have been purported to impact the ability of young adult with CP to participate in physical activity and recreational activities. **OBJECTIVE:** To examine the role functional motor level and environmental barriers have on participation in PA and recreation in young adults with CP. **METHODS:** A survey assessing functional motor level (Gross Motor Function Classification Scale), participation in physical activity (The Physical Activity Scale for Individuals with Physical Disabilities) and recreation (The Assessment of Life Habits), and environmental barriers (The Craig Hospital Inventory of Environmental Factors) was mailed to 442 young adults with CP, between the ages of 18-30 years. **RESULTS:** 97 surveys were returned. No differences in PA were found between GMFCS level; however, young adults in GMFCS levels I and II participated more in recreational activities than GMFCS levels III-V. Greater environmental barriers were experienced by young adults in GMFCS II-V. **CONCLUSIONS:** This study showed that GMFCS level and physical/structural, policy and attitudinal barriers significantly impacted participation in recreational activities for young adults with CP. Strategies for addressing these barriers from both an individualized therapeutic and advocacy perspective are needed in order to facilitate engagement in physical activity and recreation for young adults with CP at all GMFCS levels.

PMID: [31018910](#)

### 10. Aberrant Interhemispheric Functional Organization in Children with Dyskinetic Cerebral Palsy.

Qin Y, Sun B, Zhang H, Li Y, Zhang T, Luo C, Sun C, Yao D.

Biomed Res Int. 2019 Mar 18;2019:4362539. doi: 10.1155/2019/4362539. eCollection 2019.

**BACKGROUND:** Hemispheric asymmetry is one fundamental principle of neuronal organization. Interhemispheric connectivity and lateralization of intrinsic networks in the resting-state brain demonstrate the interhemispheric functional

organization and can be affected by disease processes. This study aims to investigate the interhemispheric organization in children with dyskinetic cerebral palsy (DCP) based on resting-state functional MRI (fMRI). **METHODS:** 24 children with DCP and 20 healthy children were included. Voxel-mirrored homotopic connectivity (VMHC) was calculated to detect the interhemispheric connectivity, and the lateralization of the resting-state networks was performed to examine the asymmetry of the intrinsic networks of brain. **RESULTS:** Decreased interhemispheric connectivity was found at visual, motor, and motor-control related regions in children with DCP, while high cognitive related networks including the central executive network, the frontoparietal network, and the salience network represented decreased asymmetry in children with DCP. Abnormal VMHC in visual areas, as well as the altered lateralization in inferior parietal lobule and supplementary motor area, showed correlation with the gross motor function and activities of daily living in children with DCP. **CONCLUSION:** These findings indicate that the interhemispheric functional organization alteration exists in children with DCP, suggesting that abnormal interhemispheric interaction may be a pathophysiological mechanism of motor and cognitive dysfunction of CP.

PMID: [31011574](#)

### **11. Using Artificial Intelligence to Identify Factors Associated with Autism Spectrum Disorder in Adolescents with Cerebral Palsy.**

Bertoncelli CM, Altamura P, Vieira ER, Bertoncelli D, Solla F.

Neuropediatrics. 2019 Apr 24. doi: 10.1055/s-0039-1685525. [Epub ahead of print]

Autism spectrum disorder (ASD) is common in adolescents with cerebral palsy (CP) and there is a lack of studies applying artificial intelligence to investigate this field and this population in particular. The aim of this study is to develop and test a predictive learning model to identify factors associated with ASD in adolescents with CP. This was a multicenter controlled cohort study of 102 adolescents with CP (61 males, 41 females; mean age  $\pm$  SD [standard deviation] = 16.6  $\pm$  1.2 years; range: 12-18 years). Data on etiology, diagnosis, spasticity, epilepsy, clinical history, communication abilities, behaviors, intellectual disability, motor skills, and eating and drinking abilities were collected between 2005 and 2015. Statistical analysis included Fisher's exact test and multiple logistic regressions to identify factors associated with ASD. A predictive learning model was implemented to identify factors associated with ASD. The guidelines of the "transparent reporting of a multivariable prediction model for individual prognosis or diagnosis" (TRIPOD) statement were followed. Type of spasticity (hemiplegia > diplegia > tri/quadruplegia; OR [odds ratio] = 1.76, SE [standard error] = 0.2785,  $p = 0.04$ ), communication disorders (OR = 7.442, SE = 0.59,  $p < 0.001$ ), intellectual disability (OR = 2.27, SE = 0.43,  $p = 0.05$ ), feeding abilities (OR = 0.35, SE = 0.35,  $p = 0.002$ ), and motor function (OR = 0.59, SE = 0.22,  $p = 0.01$ ) were significantly associated with ASD. The best average prediction model score for accuracy, specificity, and sensitivity was 75%. Motor skills, feeding abilities, type of spasticity, intellectual disability, and communication disorders were associated with ASD. The prediction model was able to adequately identify adolescents at risk of ASD.

PMID: [31018221](#)

### **12. Visuo-haptic transfer for object recognition in children with periventricular leukomalacia and bilateral cerebral palsy.**

Purpura G, Perazza S, Cioni G, Tinelli F.

Child Neuropsychol. 2019 Apr 24;1-14. doi: 10.1080/09297049.2019.1602599. [Epub ahead of print]

Object recognition is a complex adaptive process that can be impaired in children with neurodevelopmental disabilities. Recently, we found a significant effect of time on the development of unimodal and crossmodal recognition skills for common objects in typical children and this was a starting point for the study of visuo-haptic object recognition skills in impaired populations. In this study, we investigated unimodal visual information, unimodal haptic information and visuo-haptic information transfer in 30 children, from 4.0 to 10.11 years of age, with bilateral Periventricular Leukomalacia (PVL) and bilateral cerebral palsy. Results were matched with those of 116 controls. Participants were tested using a clinical protocol, adopted in the previous study, involving visual exploration of black-and-white photographs of common objects, haptic exploration of real objects and visuo-haptic transfer of these two types of information. Results show that in the PVL group as in controls, there is an age-dependent development of object recognition abilities for visual, haptic and visuo-haptic modalities, even if PVL children perform worse in all the three conditions, in comparison with the typical group. Furthermore, PVL children have a specific deficit both in visual and haptic information processing, that improves with age, probably thanks to everyday experience, but the visual modality shows a better and more rapid maturation, remaining more salient compared to the haptic one. However, multisensory processes partially facilitate recognition of common objects also in PVL children and this finding could be useful for planning early intervention in children with brain lesion.

PMID: [31017037](#)

**13. Predictors of Adverse Events Following Cleft Palate Repair.**

Mets EJ, Chouairi F, Torabi SJ, Alperovich M.

J Craniofac Surg. 2019 Apr 18. doi: 10.1097/SCS.0000000000005542. [Epub ahead of print]

**INTRODUCTION:** Cleft palate repair has rare, but potentially life-threatening risks. Understanding the risk factors for adverse events following cleft palate repair can guide surgeons in risk stratification and parental counseling. **METHODS:** Patients under 2 years of age in National Surgical Quality Improvement Project Pediatric Database (NSQIP-P) from 2012 to 2016 who underwent primary cleft palate repair were identified. Risk factors for adverse events after cleft palate repair were identified. **RESULTS:** Outcomes for 4989 patients were reviewed. Mean age was 1.0±0.3 years and 53.5% were males. Adverse events occurred in 6.4% (320) of patients. The wound dehiscence rate was 3.1%, and the reoperation rate was 0.9%. On multivariate analysis, perioperative blood transfusion (adjusted odds ratio [aOR] 30.2), bronchopulmonary dysplasia/chronic lung disease (aOR 2.2), and prolonged length of stay (LOS) (aOR 1.1) were significantly associated with an adverse event. When subdivided by type of adverse event, reoperation was associated with perioperative blood transfusion (aOR 286.5), cerebral palsy (aOR 11.3), and prolonged LOS (aOR 1.1). Thirty-day readmission was associated with American Society of Anesthesiologists Physical Status Classification class III (aOR 2.0) and IV (aOR 4.8), bronchopulmonary dysplasia/chronic lung disease (aOR 2.5), cerebral palsy (aOR 5.7), and prolonged LOS (aOR 1.1). Finally, wound dehiscence was significantly associated with perioperative blood transfusion only (aOR 8.2). **CONCLUSIONS:** Although adverse events following cleft palate surgery are rare, systemic disease remains the greatest predictor for readmission and reoperation. Neurologic and pulmonary diseases are the greatest systemic risk factors. Intraoperative adverse events requiring blood transfusion are the greatest surgical risk factor for post-surgical complications.

PMID: [31022146](#)**14. Risk factors associated with epilepsy development in children with cerebral palsy.**

Karatoprak E, Sözen G, Saltık S.

Childs Nerv Syst. 2019 Apr 22. doi: 10.1007/s00381-019-04152-w. [Epub ahead of print]

**OBJECTIVES:** Epilepsy is one of the most common and important comorbidity among patients with cerebral palsy (CP). The purpose of this study was to determine the risk factors predicting the development of epilepsy considering prenatal, perinatal, and natal characteristics; associated impairments; and cranial imaging findings in our patient population with cerebral palsy at a tertiary center in Istanbul, Turkey. **METHODS:** This retrospective study consisted of 234 children aged between 3 and 18 years of age. Children were divided into two groups as CP patients with epilepsy (126 patients) and CP patients without epilepsy (108 patients). Demographic features and clinical and cranial magnetic resonance imaging (cMRI) findings were compared between the two groups. **RESULTS:** Presence of family history of epilepsy, history of neonatal seizure especially in the first 72 h of life, quadriplegic type of CP, severe degree of gross motor function and fine motor disorders, and moderate to severe mental retardation or psycho-social developmental delay were determined as risk factors for the development of epilepsy in CP patients. Also, an increased risk of epilepsy was detected in term infants and appropriate for gestational age (2500-4000 g) infants. On the other hand, presence of parental consanguinity, being born from a primiparous mother, age of mother at birth, mode of delivery, presence of multiple gestation and labor problems, history of follow-up in neonatal intensive care unit and intubation, and cMRI findings were not significant risk factors for the development of epilepsy in CP. **CONCLUSION:** Predicting epilepsy development by determining the risk factors in patients with CP might be useful because knowing the risk factors could provide close follow-up of these patients for epilepsy.

PMID: [31011806](#)**15. [Slipped capital femoral epiphysis in a patient with cerebral palsy due to seizure].**

Nhamoucha Y, Tazi M, Abdellaoui H, Alaoui O, Andaloussi S, Oukhoya M, Chater L, Atarraf K, Arroud M, Afifi A.

Pan Afr Med J. 2018 Oct 5;31:89. doi: 10.11604/pamj.2018.31.89.6832. eCollection 2018. [Article in French]

Slipped capital femoral epiphysis (SCFE) is a slippage of the femoral epiphysis (femoral head) on the femoral neck. Femoral epiphysis usually slips backward and inward because of body weight. This disorder mainly occurs during puberty. We report the very rare case of a child with cerebral palsy associated with spasticity of the limbs.

PMID: [31011390](#)

**16. Tuberculous peritonitis in a cerebral palsy patient: A challenge in diagnosis and management.**

Tangsirapat V, Chakrapan Na Ayudhya V, Kongon P, Chakrapan Na Ayudhya K, Sookpotarom P, Vejchapipat P.

Int J Surg Case Rep. 2019 Apr 16;58:88-91. doi: 10.1016/j.ijscr.2019.04.019. [Epub ahead of print]

**INTRODUCTION:** Diagnosis of tuberculous peritonitis (TBP) in a normal person, although possible, is often difficult to make because of its non-specific symptoms and signs. However, establishing a diagnosis of TBP in a patient with cerebral palsy (CP) does not seem to be possible due to impaired mental development accompanied by communication problems.

**PRESENTATION OF CASE:** A 19-year-old spastic man diagnosed with CP presented with fever and a nonverbal complaint of abdominal pain. The conditions were hard to evaluate due to his mental status. Abdominal radiography showed dilatation of both small and large bowels, and a subsequent computed tomography (CT) scan did not provide any additional information. With respect to a common suspected cause, a diagnosis of perforated appendicitis was established. However, at the theatre, there was only bowel dilatation with multiple small nodules at the serosa of small and large bowels. Postoperatively, polymerase chain reaction and culture revealed Mycobacterium tuberculosis, thereby leading to a diagnosis of TBP.

**DISCUSSION:** Due to spasticity caused by CP, on examination, the patient presented with board-like rigidity, from which a diagnosis of a surgical condition was established. The misdiagnosis of an acute abdomen situation had let the patient to undergo an unnecessary exploration. To our knowledge, there has not been a report of TBP in a CP patient. **CONCLUSION:** The diagnosis of TBP had been complicated by the presence of CP in the reported case. The underlying CP not only preclude the diagnosis of TBP, but also produced symptoms that mimicked a condition requiring surgery.

PMID: [31022625](#)**17. Maternal chorioamnionitis & long term neurological morbidity in the offspring.**

Freud A, Wainstock T, Sheiner E, Beloosesky R, Fischer L, Landau D, Walfisch A.

Eur J Paediatr Neurol. 2019 Mar 27. pii: S1090-3798(18)30458-6. doi: 10.1016/j.ejpn.2019.03.005. [Epub ahead of print]

**BACKGROUND:** Chorioamnionitis is a common and potentially devastating complication of pregnancy associated with maternal and perinatal adverse outcomes. **OBJECTIVE:** To evaluate a possible association between maternal chorioamnionitis and long-term pediatric neurological morbidity. **STUDY DESIGN:** A population-based retrospective cohort analysis was performed comparing the risk of long-term neurological morbidity. Pediatric neurological morbidity evaluated included hospitalizations with neurological morbidity. Kaplan-Meier survival curves were constructed to compare the cumulative neurological morbidity and a Cox regression model was used to control for confounders. **RESULTS:** 238 622 newborns were included. Of them, 0.5% were born to mothers with chorioamnionitis. 3.1% offspring were hospitalized with a neurological condition. Total neurological morbidity was not significantly more common in the chorioamnionitis group (3.8% vs. 3.1% respectively, OR 1.23, 95% CI 0.9-1.6,  $p = 0.147$ ). However, a significant and independent association was noted between maternal chorioamnionitis and cerebral palsy. (0.5% vs. 0.1%, OR 5.77, 95% CI 2.5-13.0,  $p = 0.001$ ). In a Cox proportional hazards model, controlling for preterm delivery, birthweight, maternal factors and mode of delivery the association between chorioamnionitis and cerebral palsy remained significant (adjusted HR = 2.78, 95% CI 1.20-6.43,  $P = 0.016$ ). **CONCLUSION:** Maternal chorioamnionitis is associated with cerebral palsy in the offspring, independently of other birth circumstances such as preterm delivery and birthweight.

PMID: [31005407](#)**18. Use of gestational surrogates for women with Eisenmenger syndrome: a cost-effectiveness analysis.**

Clennon EK, Pare E, Amato P, Caughey AB.

J Matern Fetal Neonatal Med. 2019 Apr 21:1-181. doi: 10.1080/14767058.2019.1610734. [Epub ahead of print]

**OBJECTIVE:** Eisenmenger syndrome is regarded as a contraindication to pregnancy, with therapeutic abortion recommended in the event of unintended pregnancy. However, women with Eisenmenger syndrome continue to desire and attempt pregnancy despite grave risks to their own health. This study compares the costs and outcomes of pregnancy in women with Eisenmenger syndrome to the use of gestational surrogates in their pregnancies. **STUDY DESIGN:** A decision-analytic model was built using TreeAge software that compared use of gestational surrogates and pregnancy in women with Eisenmenger syndrome. Maternal death and neonatal outcomes including intrauterine fetal demise, preterm birth, cerebral palsy, and death were assessed. All probabilities and costs were derived from the literature. Utilities were discounted at a rate of 3% across the expected lifespan to generate quality-adjusted life years (QALYs). Univariate and multivariate sensitivity analyses were

performed to evaluate the robustness of the model given changes in baseline assumptions. RESULTS: In a theoretical cohort of 1000 women with Eisenmenger syndrome, pregnancy would result in 360 maternal deaths, 100 stillbirths, 477 preterm births, and 157 neonatal deaths (Table 1). In these highly desired pregnancies, use of gestational surrogates would prevent 99 and 98% of maternal and neonatal death, respectively. Cases and costs of preterm birth and associated cerebral palsy are also significantly reduced. Use of a gestational surrogate would save \$518 255 per woman with a gain of 6.77 QALYs, a dominant strategy. The approach is cost effective up to a cost of surrogacy of \$1.2 million and even if the surrogate achieves pregnancy only 30% of the time. CONCLUSION: The use of surrogate mothers for those with Eisenmenger syndrome is cost effective and results in significantly improved maternal and neonatal outcomes. These benefits are robust in the face of high surrogacy costs largely due to the marked reduction in maternal mortality and preterm birth. These findings should be used to underscore the importance of broadening health care financing for medically-indicated assisted reproduction.

PMID: [31006283](#)

### **19. Low grade intraventricular hemorrhage of preterm infants: neurodevelopmental and motor outcome.**

Briana DD, Malamitsi-Puchner A.

J Matern Fetal Neonatal Med. 2019 Apr 21:1-11. doi: 10.1080/14767058.2019.1610741. [Epub ahead of print]

Intraventricular hemorrhage (IVH) is a main complication of prematurity, inversely associated with gestational age and birth weight. Low-grade IVH (I and II), diagnosed by cranial ultrasound, had long been considered rather not to affect neurodevelopmental and motor outcome, a view challenged by several literature reports. However, diversity in studies design, periods of subjects' collection, cohort characteristics, demographic data, maternal or neonatal comorbidities, neuroimaging methods, evaluation tools, short-or-long-term follow-up by the same or different examiners, as well as other parameters and confounders make comparisons among reports very difficult, not allowing solid conclusions. Older, but also newer investigations claim both possible outcomes: impairment or not of cognitive and motor abilities in very preterm infants with low grade IVH. Thus, the current suggestion in the relevant literature is not to rely only on the results of cranial ultrasounds, but to also implement classic, or even more advanced MRI techniques at term equivalent age to preterm infants with grade I or II IVH. Additionally, continuation of close follow-up during school age is warranted.

PMID: [31006295](#)

### **20. Inflammation-mediated fetal injury by maternal granulocyte-colony stimulating factor and high-dose intraamniotic endotoxin in the caprine model.**

Sezik M, Köker A, Özmen Ö, Halıgür M, Kaşıkçı D, Aydoğan A, Özatik O.

Turk J Obstet Gynecol. 2019 Mar;16(1):41-49. doi: 10.4274/tjod.tjod.galenos.2019.92300. Epub 2019 Mar 27.

OBJECTIVE: To define a novel experimental model with maternal intravenous (i.v.) granulocyte-colony stimulating factor (G-CSF) followed by a single- and high-dose of 20 mg intra-amniotic (IA) endotoxin to induce fetal brain injury in the preterm fetal goat. MATERIALS AND METHODS: Pregnant goats (n=4) were given 50 microg/day G-CSF into the maternal jugular vein through gestational days 110-115 (term, 150 days). At gestational day 115, 20 mg of IA endotoxin was administered. Following preterm delivery at day 120 by cesarean section umbilical cord, fetal lung and brain tissues were harvested for histopathology, immunohistochemistry, and electron microscopy. Inflammatory markers were evaluated in the amniotic fluid and fetal plasma. RESULTS: Necrotizing funisitis with abundant leukocyte infiltration and fetal brain injury was induced in all the fetuses in the experimental group. CONCLUSION: Maternal i.v. G-CSF for 5 days followed by 20 mg of IA endotoxin is a feasible caprine model to exacerbate intrauterine inflammation.

PMID: [31019839](#)



## Prevention and Cure

### **21. Magnesium Sulfate and Novel Therapies to Promote Neuroprotection.**

Jameson RA, Bernstein HB.

Clin Perinatol. 2019 Jun;46(2):187-201. doi: 10.1016/j.clp.2019.02.008. Epub 2019 Mar 30.

Cerebral palsy occurs more often in preterm than in term deliveries and is one of the major neurologic injuries seen in preterm infants. Magnesium sulfate has been found to reduce the risk of cerebral palsy in patients at risk of delivery before 32 weeks' gestational age. Multiple large clinical trials have shown this effect. The authors recommend magnesium sulfate bolus followed by continuous dosing of magnesium sulfate in those at risk of delivery before 32 weeks' gestation until delivery occurs or is no longer imminent. This article also discusses novel and emerging therapies for the prevention of cerebral palsy.

PMID: [31010555](#)